Action Plan on Health care waste Management

1.0 Introduction

Waste generation in hospitals and their disposal has always been a matter of concern to the medical profession ever since hospitals came into existence as institutions. Waste disposal systems in the form of burial, landfilling & incineration were existing. Those practices conformed to the then existing knowledge of public health, epidemiological concept or public health legislations enacted from time to time. No comprehensive law either in a state or the country was however brought forward to deal effectively with the subject.

The apparent risks include :

a) Occupational health hazards to doctors, nurses and other staff patients (nosocomial infection) & attendants.

b) Source of foul odour

c) Blocking of sewers, drains (and by polythene bags) and general unhyginic condition in the hospital premises.

d)Breeding ground for rodents/reptiles, mosquitoes and flies and attracting stray animals

e) Uncontrolled dumping causing underground water contamination

f) Burning causing air-pollution (adding toxogenic gases)

The potential risk include transmission of HIV/AIDS, Hepatitis B or C virus.

Other problems are :

g) Disposables are being repacked & sold without being even washed.

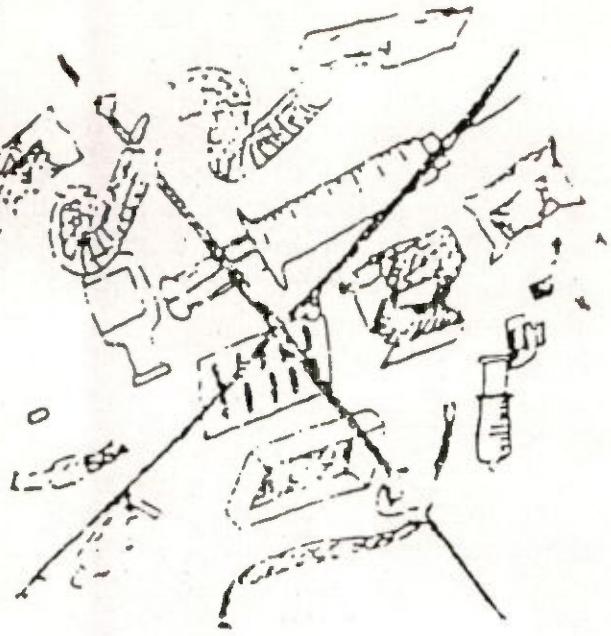
h) Discarded drugs disposed being re-packed & sold.

Therefore, scientific health care waste management should be a part of routine hospital management.

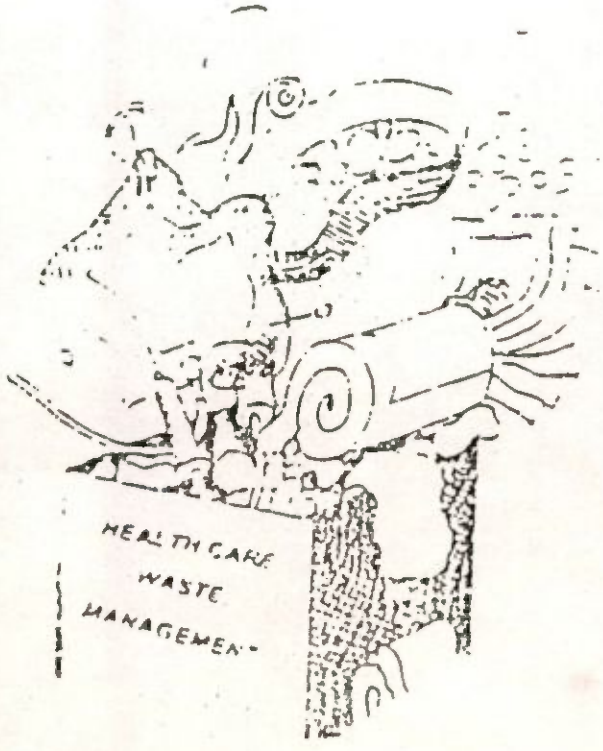
WEST BENGAL HEALTH SYSTEMS DEVELOPMENT PROJECT

Department of Health & Family Welfare

Government of West Bengal



ACTION PLAN
on
HEALTH CARE WASTE MANAGEMENT



Basic requirements such as safe water supply sanitation facilities, disinfection etc. are vital to keep a health care facility clean and safe. Health care waste should be carefully and scientifically handled from the point of generation upto the point of final disposal.

An effective waste management programme is an integral part of a hospital's infection control programme and therefore, critically linked to the quality of patient care as well as the health and safety of hospital workers, visitors and the general public at large. Further, when properly implemented and enforced, effective waste management can have distinct benefits, in terms of improved procurement practices and streamlined consumption of various supplies.

2.0 Composition of hospital wastes:

2.1 Health care wastes is produced in hospitals, health centres, clinics, nursing homes, laboratories, research institutions, vetenerary clinics, midwifery centres and other medical cares conducted at home. The amount of wastes generated varies according to type of facilities. A study estimated that health care waste generated in hospitals is about 1 kg. per bed per day. About 38% of this is infectious and hazardous (infectious non-sharp 14.9 % to 26.78 %; infectious sharp 8.77 % to 15.18 %; pathological 0.8 % to 6.39 %). The rest 62% is non-infectious/ non-hazardous waste (52.29 % to 63.59 %) which implies that ensuring segregation of the first two categories of waste at source is the first and foremost step in waste management. Under the current practice, the infectious and hazardous waste is often mixed with the non-hazardous general waste which multiples the problem in handling the final disposal. Handling of sharps (the hazardous waste) is extremely critical. It calls for separate attention from others disposables in a waste management scheme.

3.0 Segregation in colour coded containers :

Colour coding of collection bins is an easy and effective system of segregating waste at source. The bins should be lined with similar colour plastic bags (non-halogenated). The red / blue/ yellow bins and red / blue/ yellow polythelene bags should be labelled with the internationally accepted ' Biohazard' symbol (symbol of infectious and hazardous material).

A simple system of colour coding is as follows :

3.1 Categories of waste	Colour code of polythelene bags	Colour code of bins
a) General waste(non-hazardous,non-Infectious)	Black	Black
b) Infectious waste	Red	red
c) Sharps (after keeping sharps in the Card-board Box)	Blue	Red
d) Pathological	Yellow	Yellow

3.2 This category excludes toxic metals, such as mercury contained in broken thermometers and B.P. apparatus and radio active isotopes. Those items will be put in designated containers and managed accordingly.

3.3 Training, awareness activities and supervision of staff is essential for ensuring segregation at source and handling infectious and hazardous health care waste.

4.0 Collection and storage.

4.1 Each facility i.e. O.T. wards, investigation units, OPD, kitchen, Morgue etc. is to be provided with a set of two plastic bins preferably with lid. The bins should be located just outside and adjacent to the facilities. Further one bin should be kept in all the nursing stations for onsite disinfection of sharps and other infectious material with 1% bleach solution

4.2 The general waste should be put into the black polythelene lined bin.

4.3 All infected materials should be put into the red polythelene lined bin.

4.4 Management of sharps

4.4.1 All sharps should be put in the bleach Solution (1% i.e. 10 gms of Bleaching powder in 1 litre of water) containing bin (one sieved bucket to be kept inside the bin) for onsite disinfection (at least for one hour). However it must be cautioned that the disinfected materials should continue to be treated as hazardous and should be dealt with accordingly.

4.4.2 Needle & nozzoles of disposable syringes should be cut with the neddle cutter prior to being put into the bleach Solution.

4.4.3 The sieved bucket is to be taken out from the bin containing bleach soin. After allowing time for graining out the last drop of bleach soin - the sharps including cut syringes should be put in a card -board box. The box should be tied & then placed in the blue polythelene bag which is then put in the red polythelene lined red bin.

4.5 The cleaning staff should change the polythelene bags when they are 3/4th full. after tying up, it should be placed in the hand driven trolly & the bin shoud be lined with a new polythelene bag. The general waste (black P bags to be put in the black Vat , the infectious wastes & sharps & pathoogical waste (red & yellow P bags) to be placed in the red vat being constructed for the purpose in the remotest corner of the hospital campus - easily accessible to the Municipal vehicle. The key of the vats should be with the concerned Ward-master/ incharge of the waste management scheme of the particular institution, like collection and storage - segregation should be maintained during internal as well as external transportation.

4.6 Nursing staff should keep a record of the number of coloured bags transported to the vats only.

5.0 **Wet thermal treatment (waste autoclaving)**

Wet thermal treatment (waste autoclaving) is being pilotted in one District hospital (Howrah D H). After a few months,- functional efficacy will be examined and if O.K., will be extended to other health care institutions.

5.1 Placenta & body parts should be segregated and kept in a yellow bin lined with yellow polythene bag marked with bio-hazard symbol.

5.2 Rest infectious waste to be treated in waste autoclave.

5.3 The effectiveness of waste autoclaving disinfection is to be checked through " Bacillus stearothermophillus " - spore testing.

6.0 **Transport and disposal:**

6.1 All vat waste should be transported in a segregated manner to the Municipal disposal ground - atleast once in 48 hours. Separate vehicle hiring cost for transportation of infectious & haxzardous waste may be borne out of the project fund.

6.2.1 The municipal body should set up a burial pit (as per design provided by Project Management Cell) at the landfill site for disposal of red (& yellow bags) - maintaining the standards prescribed for that - for the infectious and hazardous waste.Cost of construction of such pit may be borne out of the project fund .

6.2.2 The general waste should be disposed off by sanitary landfilling by the Municipality.

6.3.1 In non-municipal areas (rural and other hospitals) the infectious & hazardous waste should be disposed of by digging a burial pit in the hospital in the hospital campus itself (as per design provided by Project management cell) - maintaining the standards.

6.3.2 The general waste should be disposed of in a Trench (the compost to be used as a nutrient of the garden).

7.0 Disinfection of bins/ needle cutters

Bins should be disinfected daily with bleach soln and the needle cutter should be autoclaved daily.

8.0 Disposal of other wastes :

8.1 Disposal of radioactive wastes

Radioactive wastes should be disposed of as per guidelines of BARC/ WHO. Hazard at source can be minimised by lead-sealing in X-ray unit wherever it is currently not being done.

8.2 Disposal of laboratory waste.

The laboratory glass waste and biological material left after the laboratory tests has to be decontaminated by complete immersion in 10% bleach soln. and putting all biological material into it throughout the day and allowing it to stand over night right in the laboratory. Next morning the decontaminated solid material in the bucket should be put in the red bin and the liquid discharged in the sewer.

8.3 Disposal of liquid waste

All liquid waste chemicals, fluids and un-used blood should be treated with Na-hypochlorite soin and then poured into the sewer.

8.4 Disposal of expired drugs

Expired drugs should be returned to the Manufacturer/disposed of by observing existing formalities.

9.0 Management of accidental spillage of hazardous material

9.1 In case of accidental spillage of liquids (body fluid, blood etc.) absorbant materials such as cotton, gauge etc. should be used to contain the spillage, and appropiate disinfectants (1 % sodium hyproclorite solution) to be poured over the spillage. After half an hour contact time spillage can be clean and the materials can be collected in container for disposal. Normal tap water could be used for washing the area.

9.2 Management of Mercury

In case of mercury spillage sulpher powder to be poured to prevent mercury evaporisation. A regular syringe to be used for sucking the droplets.

Minor spills of Mercury may be collected by gathering of mercury droplets in stiff paper to scoop it (while handling hand gloves to be used).
All collected mercury droplets to be poured into a glass container with 5 to 10 ml of water. The container should be capped properly & sealed. The used gloves and the glass container should be poured in the infectious & hazardous bin (possibility of recycling through appropiate treatment will be examined in due course).

The spillage area after removal of Mercury, should be washed with Mercury neutralising soln such as 20% calcium sulphide soln, 20% sodium thio-sulphate soln.

10.0 Implementation

10.1 Implementation at district level

At the district level the District Health Committee would be the nodal forum. The expected capacities on medical waste matters are as follows.

1. Supervisory capacity- to make sure that the earmarked hospitals are implementing the scheme.

2. Training capacity - to provide training for staff who handle medical waste.

3. Logistics capacity &

4. Co-ordination capacity

10.2 At the facility level

10.2.1 A small task force will be formed for implementation, supervision and monitoring the scheme with the Superintendent as Chairman comprising 3 Clinicians : 1 each from Medicine G&O, Surgery : 1 Pathologist, Nursing Supdt./O.T. incharge, 1 Wardmaster, 1 SWO, 1 group 'D' staff, 1 sweeper, Dy. CMOH-II (ACMOH in case of SD/SG and RH hospital and any other member Supdt. finds suitable and one representative of the chairman, Municipality / Panchayet Samity and one representative each from PHE & PWD Deptt.

10.2.2 The task force should arrange a series of training programmes for all health personnel.

10.2.3 The task force should launch a massive IEC campaign to educate the users particularly the visitors in the wards in the disposal of wastes in the identified bins. Strict vigilance by the task force must be kept for the use of bins by the providers, parients attendants.

10.2.4 the task force should decide about the procurement of necessary logistics as well as personal protective equipment of the cleaning staff.

10.2.5 The task force should keep an eye on the routine hygiene and maintenance activities.

10.2.6 The task force should also keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.

10.2.7 the task force should keep an eye on the procurement practices and recommend reuse of supplies and materials so as to reduce overall waste generation.

10.2.8 task force should keep DHC informed of the progress.

10.3 DHC should monitor the functioning of the Task force from time to time and seek the guidance of the Project Management Cell as and when required.

10 4.1 An agency (/ agencies) is (/are) being appointed to provide support to the health care institutions with a view to implementing the scheme within the project time period.

10.4.2 DHC should also monitor the functioning of the said agency (/ agencies) and keep PMC informed about the progress of work.

Existing System :

HEALTH CARE INSTITUTION

Operation Theatre	Laboratory	Kitchen	Indoor Wards	Outdoor Wards	Other Depts.

Non-Segregated Mixed Solid Waste

Storage Vat (Within premises) — Collection by Municipality

Landfilling (Uncontrolled air-dumping) — Disposal

System undetaken :

HEALTH CARE INSTITUTION

Operation Theatre	Laboratory	Kitchen	Indoor Wards	Outdoor Wards	Other Depts.

(General) (Infectious)

(Sharps) (Pathological waste)

(Segregated Collection in color coded container)

Packaging - Labelling

Handling

On-site treatment
(S D U)

Internal transportation
(Segregated)

	Separate Storage Vat (Within premises)	Auto - -claving	Collection and segregated transportation by Municipality
A. Urban	* Landfilling (Sanitary)		Disposal by Municipality
	* Deep burial (for infectious & hazardous)		Disposal by Municipality
B. Rural	* Trench Composting for general waste		By WBHSDP
	* Campus disposal for infectious & hazardous waste		By WBSHDP

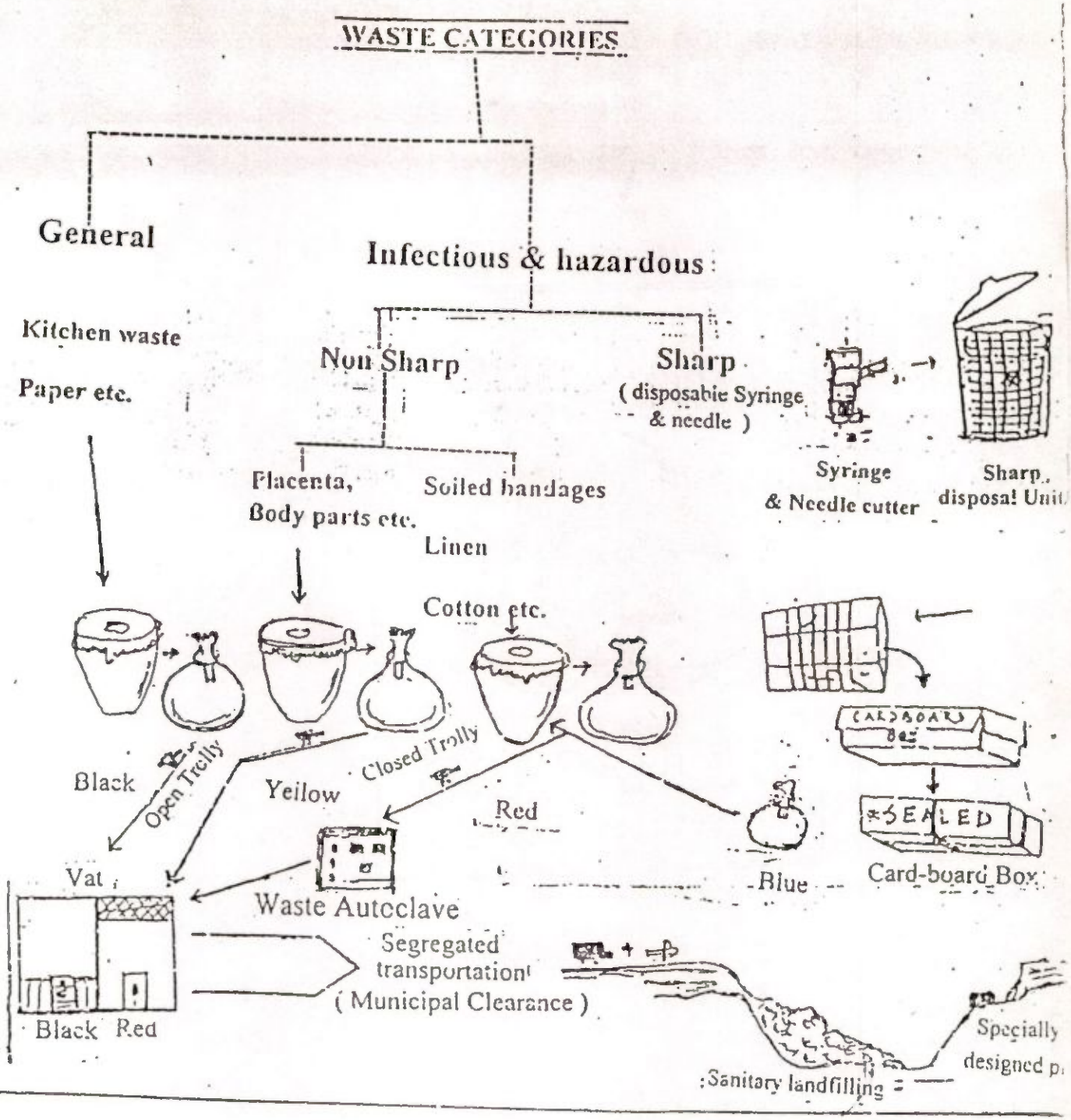
HEALTH CARE WASTE MANAGEMENT

CATEGORIES

General	Pathological	Infectious (non-sharp)	Sharps
Food waste Paper Card-board Floor--Sweepings Earthen--vessel, Woods, Shells. towel,	Human tissue/ organ, body parts, foetus, placenta, blood & body fluids, animal caracus.	Soiled waste contaminated with blood & body fluids (cotton, dressing, soiled plaster cut, linen, bedding, gloves, Lab.Coats microbiology & biotechnology waste isolation ward waste and solid waste containing disposable items other than waste sharps e.g tubing, catheter I.V. set etc.	Needles, syringes, scalpel, blade, broken glass nails & any other items that may cause puncture & cuts. Cutter SHARP DISPOSAL UNIT
Black bag	Yellow bag (biohazard)	Red bag (biohazard)	Blue bag (biohazard)

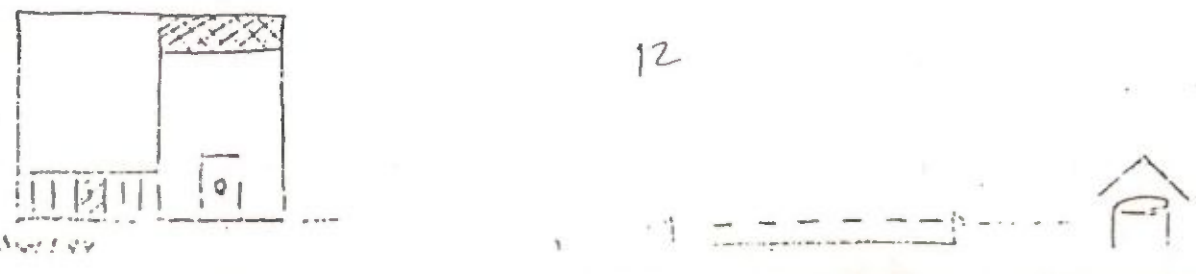
Action plan

URBAN AREA



Private establishments

RURAL AREA



WARNING

BIOHAZARD

(Infectious material)

B

附図 13

Institutional Strengthening (Task-force at the institutional level)

Superintendent of the hospital as **Chairman**

Departmental Heads
Medicine, Surgery
Pathology & G.O.

Nursing Superintendent

Ward Master as **in-charge**--Social welfare Officer--Pharmacist as **E C - incharge**

Group ' D ' Staff - Technician - Sweeper

Dy. C M O H - II Representative of Chairman Municipality Engineer (P W D) Engineer (P H E)

Report to :

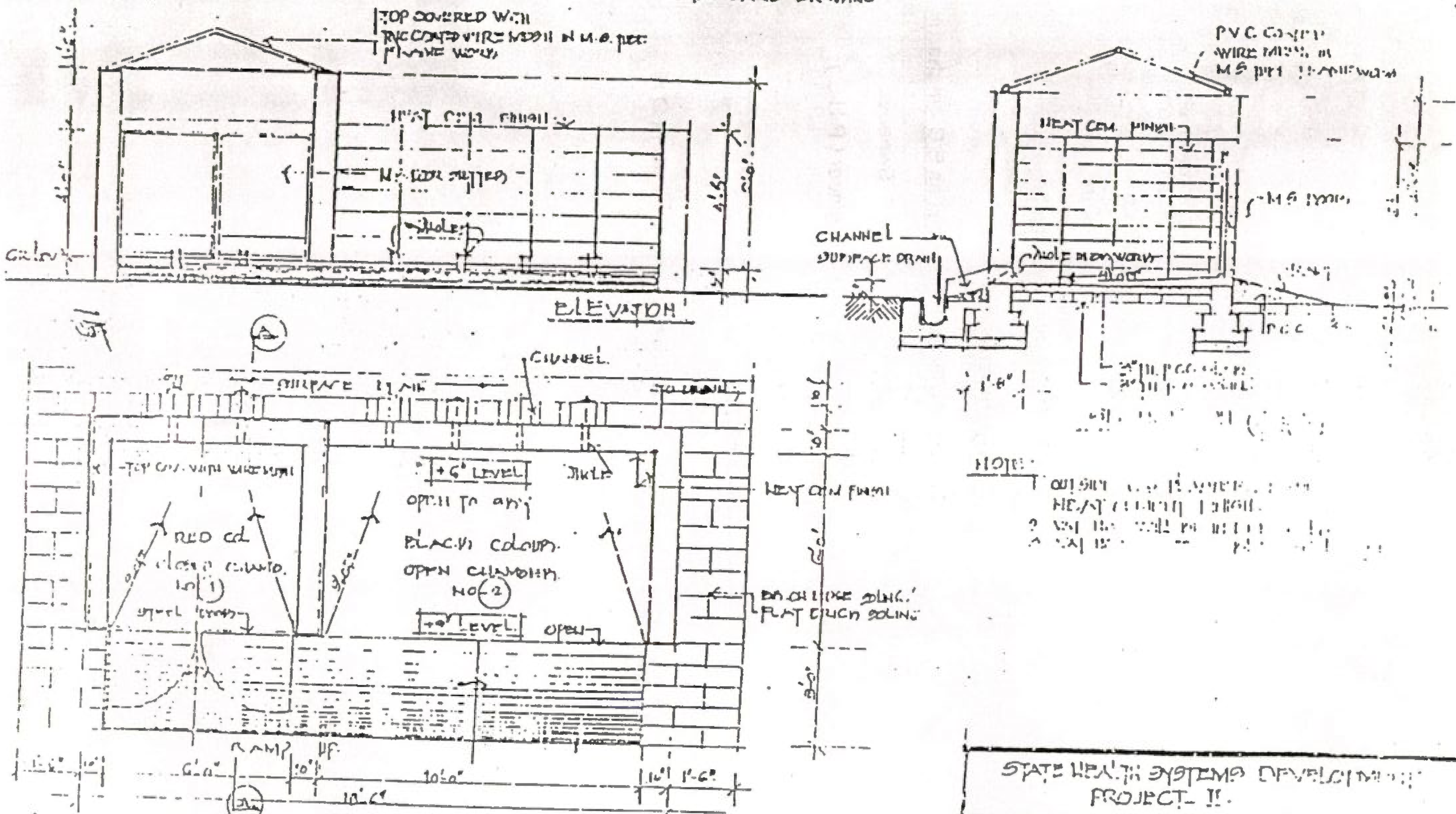
District Health Committee Office of the Chief Project Manager C M O H

P M C

Deptt. of Health & Family welfare
Govt. of W.B.

PROPOSED MEDICAL WASTE COLLECTION VAT.

STANDARD DRAWING



PLAN OF WASTE DISPOSAL SPOT/ VAT

SCALE: 1" = 4'-0".

NOTE:

STATE HEALTH SYSTEMS DEVELOPMENT PROJECT- II.

D.D. (ARCH)

Standards for Waste Autoclaving

The autoclave should be dedicated for the puspises of disinfecting and treating bio-medical waste

1. When operating a vacuum autoclave, medical waste shall be subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air. The waste shall be subjected to the following :

i) A temperature of not less than 121 degree centigrade and pressure of 15 psi per an autoclave residence time of not less than 45 minutes ; or

ii) A temperature of not less than 135 degree centigrade and the pressure 31 psi for an autoclave residence time of not less than 30 minutes.

2. Medical waste shall not be considered properly treated unless the time, temperature and pressure in monitors indicate that the required time, temperature and pressure were reached during the autoclave process. If for any reason, time , temperature or pressure indicator indicates that the required temperature, pressue or residence time was not reached, the entire load of medical waste must be autoclaved again until the proper temperature, pressure and residence time were achieved

3.Recording of operational parameters

Each autocloave shall have graphic or computer recording devices which will automnatically and continuously monitor and record dates, time of day , load identification number and operating parameters throughout the entire length of the autoclave cycle.

4. Validation test

Spore testing:

The autoclave should completely and consistently kill the approved bio-logical indicator at the maximum design capacity of each autoclave unit. Bio-logical indicator for autoclave shall be Bacillus stearothermophilus spores using vials or spore strips, with at least 1 x 10 to the power 4 spores per milimeter. Under no circumstances will an autoclave have minimum operating parameters less than a residence time of 30 minutes, regardless of temperature and pressure, a temperature less than 121 degree centigrade or a pressure less than 15 psi.

5. Routine test

A chemical indicator strip / tape that changes colour when a certain temperature is reached can be used to verify that a specific temperature has been achieved. It may be necessary to use more than one strip over the waste package at different location to ensure that the inner content of the package has been adequately autoclaved.

Standards for Deep Burial

1. A pit or trench should be dug about 2 meters deep. It should be half filled with waste, then covered with lime within 50 cm of the surface, before filling the rest of the pit with soil.

2. It must be ensured that animals do not have any access to burial sites. Covers of galvanized iron/ wire meshes may be used.

3. On each occasion, when wastes are added to the pit, a layer of 10 cm of soil shall be added to cover the wastes.

4. Burial must be performed under close & dedicated supervision.

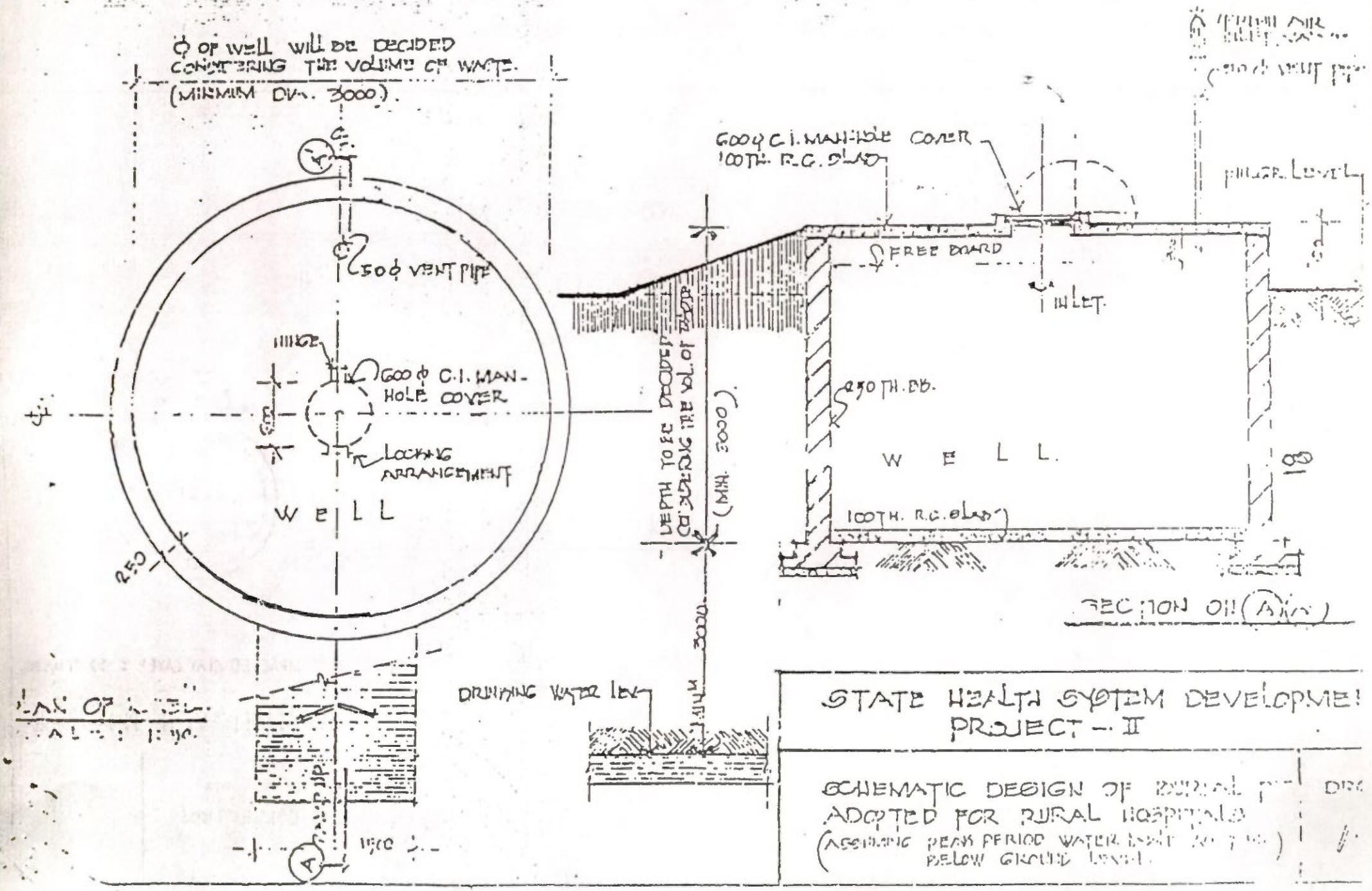
5. The deep burial site should be relatively impermeable and no shallow well should be close to the site.

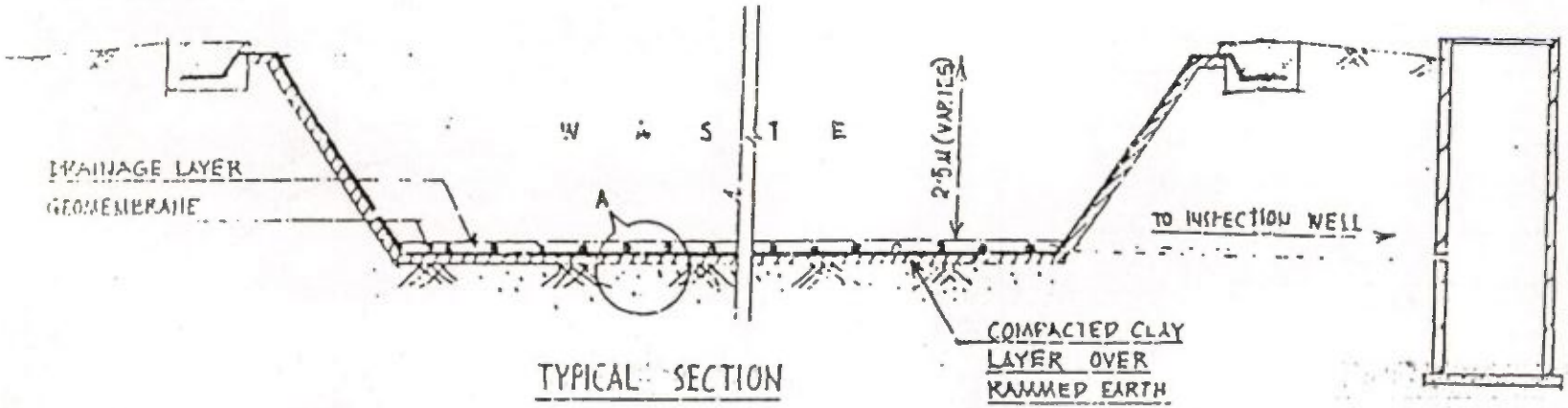
6. The pits should be distant from habitation, and sited so as to ensure that no contamination occurs of any surface water or ground water. The area should not be prone to flooding or erosion.

7. The location of the deep burial site will be authorised by the prescribed authority.

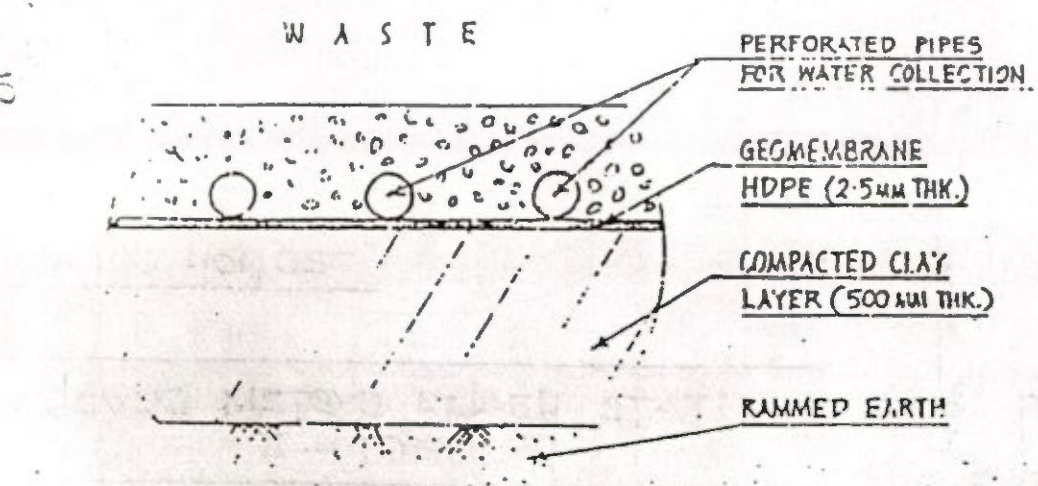
8. The institution shall maintain a record of all pits for deep burial.

24.10/akg/24impeng


Φ OF WELL WILL BE DECIDED CONSIDERING THE VOLUME OF WASTE. (MINIMUM DIA. 3000).
600φ VENT PIPE
600φ C.I. MAN-HOLE COVER
LOCKING ARRANGEMENT
W E L L
600φ C.I. MAN-HOLE COVER 100TH. R.C. SLAB
FREE BOARD
INLET
250 TH. RR.
W E L L
100TH. R.C. SLAB
DEPTH TO BE DECIDED CONSIDERING THE VOL. OF WASTE (MIN. 3000).
DRINKING WATER LEVEL
SECTION ON (A-A)
STATE HEALTH SYSTEM DEVELOPME
PROJECT - II
SCHEMATIC DESIGN OF
ADOPTED FOR RURAL HOSPITALS
BELOW GROUND LEVEL



TYPICAL SECTION



DETAIL AT 'A'

NOTE :
HYDRAULIC CONDUCTIVITY OF COMPACTED CLAY LAYER = 10^{-7} CM/SEC.

STATE HEALTH SYSTEMS DEVELOPMENT PROJECT - II

SCHEMATIC DESIGN OF BURIAL PIT FOR INFECTIOUS WASTE COLLECTION

Reporting format/ Check-list

Implementation of phase - I / Phase - II Health Care waste Management Programme

Sl.No.	Subject	Remarks

1) a) Name of the Institution under reference - ____________________

b) Phase - I / Phase - II implemented w.e.f ....

2) Further Staff training held --/ Nil.

3) Task force constituted --- Yes / No

4) Logistics procured -------------------- No / Yes (if yes, name the logistics)

(Name the logistics) 1.Bins.........2.Buckets..... ...3.Sieved buckets............4.P.Bags i).red........ii) black...........iii) Yellow..............5. Register............6.Disposable Syringe &needle cutter...... ....7. PPEs i) Gloves.........ii) Gum-Boots............. iii) Aprons.............iv) Masks...........v) ....vi).............8.Bleaching Powder ....9.Threads/ Sutuli................10.......... ......

5) Storage Vat constructed --- No / Yes

6) Municipal clearance of Waste is being done-----------daily/ by - weekly/ weekly.

7) Birbed wire-fencinghas been done by Municipality -------------------- yes / no.

8) Sharp management system has been included------------------------- yes/ no.

9) No. of Poly. Bags generated per month -- i) Red------ ii) Black------ iii) Yellow------

10) Registers maintained (in Wards/ in Ward Master's Office)i).... ......ii)........iii)..........

11) Water quality is being examined -- Yes / No.?

12) Care of sewearage system and sanitary facilities is being taken------- Yes / No.

13) Overall cleanliness has improved ------- ------------- ---------- Yes / No

14) NGOs have been involved --- ------------------------------ ----- Yes / No.

15) Further requirements -------- ______________________________

16) Suggestions---------------- ______________________________

17) Overall comments on implementation of the programme.-----------------------

Signature
Superintendent of the Hospital

Superendragn/July.98

হাসপাতালের বর্জ্য পদার্থ নিষ্কাশন : কয়েকটি আবেদন

(দেওয়াল লিখনের জন্য)।

ক) না-খাওয়া খাবার, ফলের খোসা ইত্যাদি কালো পাত্রে ফেলুন ।

খ) রক্ত, পূঁজ যুক্ত গজ - ব্যান্ডেজ তুলো লাল পাত্রে ফেলুন ।

গ) বর্জ্য পদার্থ সংক্রামিত মনে হলে লাল পাত্রে ফেলুন ।

ঘ) ডিসপোসেবল সিরিঞ্জ, কাটারে কেটে ব্লিচ সলুশনে ফেলুন ।

ঙ) নোংরা যেখানে সেখানে ছড়াবেন না ।

চ) যেখানে সেখানে থুতু ফেলবেন না ।

ছ) এই হাসপাতাল আপনার - হাসপাতাল পরিষ্কার রাখুন ।

জ) পরিচ্ছন্নতাই পবিত্রতা ।

Implementation of Health care waste management scheme

Institutional structure (Task force for implementation as well as for sustainance)

Composition of Task force members :

In larger hospitals (DH/ SDH/SGH)

* Superintendent as the Chairman
* Senior Ward Master as Waste Management in-charge
* Heads of the Departments as members
* Chief (/ Senior) Pharmacist as Emergency control in-charge
* Nursing Superintendents as member
* Senior Social welfare Officer as member
* Nodal Engineer(/ Engineers) as member (/ members)
* Representative of Technicians as member
* Chief (/ senior) Storekeeper as member
* Representative of Group-D staff as member
* Representative of Swecpers as member

and

* Representative of local Municipal boby.
* Representative from Public Health Deptt. (Dy. CMOH-II)

In smaller hospitals (RH)

* Medical Officer in charge (/ BMOH) as the Chairman
* Senior Ward Master as Waste Management in-charge
* Heads of the Departments as members
* Chief (/ Senior) Pharmacist as Emergency control in-charge
* Nurse in-charge (/ Nursing Superintendent) as member
* Senior Social welfare Officer as member
* Nodal Engineer(/ Engineers) as member (/ members)
* Representative of Technicians as member
* Chief (/ senior) Storekeeper as member
* Representative of Group-D staff as member
* Representative of Sweepers as member

and

* Representative of local Panchayet boby.
* Representative from Public Health Deptt. (ACMOH)

FUNCTIONS OF THE TASK FORCE

1.1. The task force shall meet atleast once in a month.

1.2 The task force should arrange a series of training programmes for all health personnel.

1.3 The task force should launch a massive IEC campaign to educate the users particularly the visitors in the wards in the disposal of wastes in the identified bins. Strict vigilance by the task force must be kept for the use of bins by the providers, parients attendants.

1.4 the task force should decide about the procurement of necessary logistics as well as personal protective equipment of the cleaning staff.

1.5 The task force should keep an eye on the routine hygiene and maintenance activities.

1.6 The task force should also keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.

1.7 the task force should keep an eye on the procurement practices and recommend reuse of supplies and materials so as to reduce overall waste generation.

1.8 task force should keep DHC informed of the progress.

1.9 DHC should monitor the functioning of the Task force from time to time and seek the guidance of the Project Management Cell as and when required.

iob/99/akg

RESPONSIBILITIES OF KEY TASK FORCE MEMBERS .

1.1 Role of Chairman (Superintendent of the concerned hospital)

i) To assume overall responsibility of MWM at the health care unit.

ii) To send the monthly report on MWM to the CMOH/DHC & PMC

iii) To send an annual report to WBPCB by 31 January every year (with a copy to CMOH/ DHC/PMC/ Health DEptt.) as per the format given in Form II of the Bio-Medical Waste (Management and Handling) Rules 1998

iv)To apply in prescribed Form I as given in the Bio-Medical Waste (Management and Handling) Rules 1998 to WBPCB for granting of authorisation for MWM

v) To assume the overall responsibility of implementing the policies/directives of the PMC/ GOWB on MWM at the health care unit.

vi) To allocate adequate manpower, infrastructure and re-sources to the Waste management in-charge (WMI) for MWM at the health care unit.

vii) To arrange required training for the staff on MWM

viii) To keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.

ix) To interact with the local municipal/ Panchayat Bodies and other Government Departments on any matter in relation with MWM including supply of safe water, sanitation facilities at the health care unit etc with a view to maintaining the hospital hygiene.

x) To interact with the local NGOs and local people to involve them with (off-site) transport. treatment and disposal of medical wastes.

1.2 Role of Waste management in-charge (WMI - Senior Ward Master)

i) To assume responsibility of day-to-day activities related to MWM including development and maintenance of greenbelt at the health care unit.

ii) To monitor the activities of hospital staff in relation with segregation. collection, transport, storage on-site treatment and disposal of medical wastes.

iii) To ensure regular supply of adequate resources and equipment including bags/ containers, protective gear, etc. for the hospital staff for MWM.

iv) To ensure availability of adequate manpower for MWM at the health care unit everyday.

v) To ensure proper fencing and locking of storage vats to prevent access to ragpickers,birds, and stray animals to medical wastes.

vi) To provide necessary assistance to the Emergency control in-charge (ECI) for matters in relation with

management and control of accidents and spillage.

vii) To investigate any accidents and prepare report on it in association with the ECI as per the format In Form III of the Bio-Medical Waste (Management and Handling) Rules 1998.

viii) To maintain daily record of medical waste generation at different wards at the health care unit

ix) To prepare monthly report on MWM and submit it to the Chairman.

x) To prepare annual report as per the format given in Form II of the Bio-Medical Waste (Management and Handling) Rules 1998 and submit it to the Chairman.

xi) To liaise with the Chairman, Nursing Superintendent and Heads of the various Departments to ensure scientific MWM at every ward at the health care unit.

xii) To organise training and awareness generation campaign for the hospital staff, visitors and the local community on the utility and benefits of scientific MWM practices.

1.3 Role of **Emergency control in-charge** (ECI - Pharmacist)

i) To assume overall responsibility of management and control of accidents (including needle stick injury) and spillage of hazardous substances.

ii) To liaise with other members of the HWMC to provide advice and guidance on matters relating to prevention of accidents and spillage of hazardous substances.

iii) To provide training to the hospital staff on preventive and emergency measures to avoid and prevent accidents and spillage of hazardous substances.

iv) To provide technical assistance to the WMI on matters in relation with management of chemical wastes.

v) To provide technical assistance to the WMi for preparation of report on accidents and spillage of hazardous substances as per the format III of the Bio-Medical Waste (Management and Handling) Rules 1998.

1.4 Role of **Head of the Departments.**

i) To assume overall responsibility of MWM at the department.

ii) To ensure availability of adequate manpower for day-to-day MWM at the department.

iii) To ensure that the departmental staff including nursing staff and sweepers receive adequate training on MWM.

1.5 Role of **Nursing Superintendent.**

i) To assume responsibility of monitoring MWM activities at various wards at the health care unit.

ii) To see that all her staffs keep daily records of the no. of coloured bags disposed.

iii) To see that all her staffs keep the logistics in stock in sufficient quantity.

iv) To see that all her staffs follow the norms, as framed by the authority, specially on management of sharps and on routine necessary clearance of coloured bags from the wards.

v) To liaise with the Chairman, WMI, ECI, Heads of the Departments and other members od the HWMC to ensure quality standards of MWM at the health care unit.

SUDA

STATE URBAN DEVELOPMENT AGENCY

HEALTH WING

"ILGUS BHAVAN"

H-C BLOCK, SECTOR-III, BIDHANNAGAR, CALCUTTA-700 091

West Bengal

Ref No. ..... *Date* .....

SUDA-15/98(Pt-VI)/ **22.5.2002**

From: Adviser(Health)
SUDA

To: The Chief Engineer
Municipal Engineering Directorate
Bikash Bhavan
Salt Lake

Sub: Release of fund for construction of twin Burial Pits for Bio-waste Management in OPD cum MH under IPP-VIII-(Extn.).

Sir,

Reference is invited to your communication no. ME/0216/4S- 42/2001 dt. 8th May, 2002.

The fund for construction of twin Burial Pits at Burdwan amounting to Rs.2.99 Lakhs (Rupees Two Lakhs Ninety Nine Thousand only) as per your estimate is placed at the disposal of the Executive Engineer, Burdwan Divn., MED as suggested.

You are requested to advise the said Engineer to collect the aforesaid fund from this office.

Since, EOP of IPP-VIII-(Extn.) is June 30, 2002, you are requested to complete the construction by that time.

The charges for construction may be booked under the Project fund- " Innovative Schemes".

A feed back on the action taken may kindly be granted at an early date.

Yours faithfully,
Adviser(Health) 22/5/02

SUDA-15/98(Pt-VI)/ **22.5.2002**
C.C
The Project Director, IPP-VIII-(Extn.),Burdwan, for kind information & necessary action .

Adviser(Health) 22/5/02

SUDA-15/98(Pt-VI)/ **22.5.2002**
C.C
The Chairman , Burdwan Municipality, for kind information & necessary action .

Adviser(Health) 22/5/02

Tel/Fax No.: 359-3184 e-mail : adviser@vsnl.net

SUDA

STATE URBAN DEVELOPMENT AGENCY

HEALTH WING
"ILGUS BHAVAN"
H-C BLOCK, SECTOR-III, BIDHANNAGAR, CALCUTTA-700 091
West Bengal

SUDA/15/98(Pt-VI)/ **29.11.2001**

Ref No. ..... *Date .....*

From: Adviser(Health)
SUDA

To: The Project Director,
IPP-VIII-(Extn.), Durgapur

Sub: Bio-Waste Management scheme in Maternity Homes and OPDs Under IPP-VIII-(Extn.)- construction of burial pits.

Sir,

Reference is invited to communication no. DMC/RCH / 840 dt. 23.11.2001 from Health Officer, Durgapur Municipal Corporation on the above subject (vide copy enclosed).

As requested in this office communication no. SUDA-15/98(Pt-VI)/479 dt. 2.11.2001 (vide copy enclosed), the details of the location may be transmitted directly to the CE, MED endorsing a copy to the undersigned.

Encle. *

Yours faithfully,
29/11
Adviser(Health)

SUDA/15/98(Pt-VI)/ **29.11.2001**

C.C
The Mayor, Durgapur Municipal Corporation for favour of kind information and necessary action.

29/11
Adviser(Health)

23-11-2001 14:18 FROM:CEO DURGAPUR M CRPN 0343546472 TO:91 033 3585800 PAGE:1

(7)

23 NOV 2001

Phone Nos. : (0343) 545842 546994 546107 EPABX
545828 Mayor
Fax No. : 546472

IPP VIII EXT PROJECT
DURGAPUR MUNICIPAL CORPORATION
CITY CENTRE, DURGAPUR - 713216
Dist. - BURDWAN

Ref. No. DMC/RCH/ 840 Date 23/11/01

To
The Adviser (Health)
State Urban Development Agency.(Health Wing)
ILGUS BHABAN, H-C Block, Sector-III
Bidhannagar
Kolkatta-91

Sub : Bio-Waste Management scheme in Maternity Homes and O.P.D.S under IPP-VIII Extension Project and RCH Sub Project Asansol Construction of burial Pits.

Sir,

In reference to Memo No.SUDA15/98 (pt-vi) 499 dt.02/11/2001 I am to inform you that a suitable location has been spoted out and selected at Desbandhu Nagar under Durgapur Municipal Corporation area at Durgapur-01.

This is for favour of your kind information and necessary action from your end.

Yours faithfully

23/11/01
Health Officer
Durgapur Municipal Corporation

Details may be asked with this regard for direct transmission Govt. order
copy ... 27/11

Draft (c/c) for kind approval. 29/11

SUDA

STATE URBAN DEVELOPMENT AGENCY

HEALTH WING
"ILGUS BHAVAN"
H-C BLOCK, SECTOR-III, BIDHANNAGAR, CALCUTTA-700 091
West Bengal

Ref No. .....SUDA-15/98(pt-VI)/479 *Date* 02.11.2001

From: Adviser (Health)
SUDA

To: The Project Director
IPP-VIII-(Extn.)/RCH Sub-Project Asansol
_____ Municipality / Municipal Corporation

Sub: ***Bio-waste management scheme in Maternity Homes and OPDs under IPP-VIII- (Extn) and RCH Sub-Project Asansol- Construction of burial pits.***

Sir,

Reference is invited to this office communication nos. SUDA-15/98(Pt-VI)276 & 397 dated 26.07.2001 and 20.09.2001 respectively on the above subject.

MED have been entrusted with the works relating to construction of burial pits. Necessary fund for the same is being released to MED.

Detailed drawings along with cost estimate for the said construction obtained from MED * is enclosed herewith.

No. of twin burial pits are to be constructed one set for each OPD cum MH. You are requested to provide the space in writing for such construction in a convenient location in the area to C.E, MED under intimation to the undersigned.

The matter is extremely urgent.

Yours faithfully,
2/11/01
Adviser (Health), SUDA

Encl. *

SUDA

STATE URBAN DEVELOPMENT AGENCY

HEALTH WING
"ILGUS BHAVAN"
H-C BLOCK, SECTOR-III, BIDHANNAGAR, CALCUTTA-700 091
West Bengal

Ref No. ..... *Date* .....

Ref. No.: SUDA-15/98(pt-VI)/479 November 2, 2001

C.C.

C.E. MED – for kind information with reference to his office memo no. ME/2166/3(1)/4S-42/99-III dated 16th October 2001. On getting confirmation regarding site from the ULBs, fund shall be placed as proposed.

Adviser (Health), SUDA 2/11/01

Ref. No.: SUDA-15/98(pt-VI)/479 November 2, 2001

C.C.

The Chairperson / Mayor _____ Municipality / Municipal Corporation for favour of kind information and necessary action.

Adviser (Health), SUDA 2/11/01

Tel/Fax No.: 359-3184

23 NOV 2001

Phone Nos. : (0343) 545842
546994
546107 EPABX
545828 Mayor
Fax No. : 546472

IPP VIII EXT PROJECT
DURGAPUR MUNICIPAL CORPORATION
CITY CENTRE, DURGAPUR - 713216
Dist. - BURDWAN

Ref. No. DMC/RCH/ 840 Date 23/11/01

To
The Adviser (Health)
State Urban Development Agency.(Health Wing)
ILGUS BHABAN, H-C Block,Sector-III
Bidhannagar
Kolkatta-91

Sub : Bio-Waste Management scheme in Maternity Homes and O.P.D.S under IPP-VIII Extension Project and RCH Sub Project Asansol Construction of burial Pits.

Sir,

In reference to Memo No.SUDA15/98 (pt-vi) 499 dt.02/11/2001 I am to inform you that a suitable location has been spoted out and selected at Desbandhu Nagar under Durgapur Municipal Corporation area at Durgapur-01.

This is for favour of your kind information and necessary action from your end.

Yours faithfully

23/11/01

Health Officer
Durgapur Municipal Corporation

23 NOV 2001

Phone Nos. : (0343) 545842
546994
546107 EPABX
545828 Mayor
Fax No. : 546472

IPP VIII EXT PROJECT
DURGAPUR MUNICIPAL CORPORATION
CITY CENTRE, DURGAPUR - 713216
Dist. - BURDWAN

Ref. No. DMC/RCH/ 840 Date 23/11/01

To
The Adviser (Health)
State Urban Development Agency.(Health Wing)
ILGUS BHABAN, H-C Block,Sector-III
Bidhannagar
Kolkatta-91

Sub : Bio-Waste Management scheme in Maternity Homes and O.P.D.S under IPP-VIII Extension Project and RCH Sub Project Asansol Construction of burial Pits.

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This is for favour of your kind information and necessary action from your end.

Yours faithfully

23/11/01

Health Officer
Durgapur Municipal Corporation

Phone Nos. : (0343) 545842
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IPP VIII EXT PROJECT
DURGAPUR MUNICIPAL CORPORATION
CITY CENTRE, DURGAPUR - 713216
Dist. - BURDWAN

Ref. No. DMC/RCH/ 840 Date 23/11/01

To
The Adviser (Health)
State Urban Development Agency.(Health Wing)
ILGUS BHABAN, H-C Block,Sector-III
Bidhannagar
Kolkatta-91

Sub : Bio-Waste Management scheme in Maternity Homes and O.P.D.S under IPP-VIII Extension Project and RCH Sub Project Asansol Construction of burial Pits.

Sir,

In reference to Memo No.SUDA15/98 (pt-vi) 499 dt.02/11/2001 I am to inform you that a suitable location has been spoted out and selected at Desbandhu Nagar under Durgapur Municipal Corporation area at Durgapur-01.

This is for favour of your kind information and necessary action from your end.

Yours faithfully

23/11/01

Health Officer
Durgapur Municipal Corporation

OFFICE OF THE PROJECT DIRECTOR IPP-VIII(EXTN) PROJECT
ENGLISHBAZAR MUNICIPALITY, MALDA

Memo No. 221 /IPP-VIII(Extn)/RCH/2001-2002 Dated 20.11.2001

From : Chairman,
IPP-VIII(Extn) Project,
Englishbazar Municipality, Malda

Office of Adviser (Health) DATE 21 NOV 2001

To : The Chief Engineer,
Municipal Engineering Directorate,
Bikash Bhavan, South Block,
Salt Lake City, Cal – 91.

Sub : Proposed Site for Bio-waste Management scheme in Maternity Home and OPD under IPP-VIII(Extn) of Englishbazar Municipality, Malda.

Ref : Advisor (Health) , SUDA Memo No. 15/98(Pt.-VI)/479 dated 02.11.2001

The undersigned is sending herewith a proposed site for construction of Burial Pits under Bio-waste management scheme in Maternity Home and OPD under IPP-VIII(Extn) of Englishbazar Municipality, Malda.

This is for favour of information & taking necessary action.

Sd/-

Chairman,
IPP-VIII(Extn) Project,
Englishbazar Municipality, Malda.

Memo No. 221/IPP-VIII(Extn)/RCH/2001-2002/1(3) Dated 20.11.2001

Copy forwarded for favour of information and taking necessary action to :-

1. The Advisor (Health), SUDA, Ilgus Bhavan, H.C.Block, Sector-III, Cal-91.
2. The Project Director IPP-VIII(Extn) Project & ADM(G) Malda.
3. The Councillor-in-charge, IPP-VIII(Extn) Project, EBM, Malda.
4. The Executive Engineer, MED, Malda.

Chairman,
IPP-VIII(Extn) Project,
Englishbazar Municipality, Malda.

(7)

Phone Nos. : (0343) 545842
546994 EPABX
546107
545828 Mayor
Fax No. 546472

Office of Adviser (Health) Dated 26 NOV 2001

IPP VIII EXT PROJECT
DURGAPUR MUNICIPAL CORPORATION

CITY CENTRE, DURGAPUR - 713216
Dist. - BURDWAN

Ref. No. DMC/RCH/ 840 Date 23/11/01

To
The Adviser (Health)
State Urban Development Agency.(Health Wing)
ILGUS BHABAN, H-C Block,Sector-III
Bidhannagar
Kolkatta-91

Sub : Bio-Waste Management scheme in Maternity Homes and O.P.D.S under IPP-VIII Extension Project and RCH Sub Project Asansol Construction of burial Pits.

Sir,

In reference to Memo No.SUDA15/98 (pt-vi) 499 dt.02/11/2001 I am to inform you that a suitable location has been spoted out and selected at Desbandhu Nagar under Durgapur Municipal Corporation area at Durgapur-01.

This is for favour of your kind information and necessary action from your end.

Yours faithfully

23/11/01

Health Officer
Durgapur Municipal Corporation

File

Government of West Bengal
Office of the District Magistrate, Malda.
Judicial Munshikhana.

Memo No _____/J.M. Dated _____/2001.

Office of Adviser Health, S.U.D.A.
DATE
21 DEC 2001

From :- The District Magistrate,
M A L D A.

To :- The Chairman,
English Bazar Municipality,
M A L D A.

Sub :- Bio-Waste Management Scheme in Maternity Homes and OPD's under IPP-VIII (Extn.) Programme and construction of Buril Pits.

For the construction of ~~Buril~~ Burial Pits, you are requested to make a suitable Land with ~~adjaction~~ adjacent Road facility available to the Executive Engineer, Malda Division, M.E.Director, Atul Market, so that the work may be started without delay.

A xerox copy of the Schematic drawings is attached for ready reference.

This may please be treated as extremly Urgent.

sd/-
Project Director,
IPP-VIII (Extn.) Project
English Bazar, Malda.

Memo No 2778/1(2) /J.M. Dated 13.12 /2001.

Copy forwarded for information and taking necessary action to:-

1. The Advisor (Health)
SUDA, Illgus Bhavan, H.C.
Block, Section-III,
Kolkata-91.
2. The Executive Engineer,
Malda Division, M.E.Director,
Malda.

Project Director,
IPP-VIII (Extn.) Project
English Bazar, Malda.

19

From :
Sri Sibapada Bhaumik
CHAIRMAN
JALPAIGURI MUNICIPALITY

File

OFFICE OF THE
MUNICIPAL COUNCILLORS
JALPAIGURI MUNICIPALITY
Phone : Office-30050
Chamber-31096
Residence-30488
Fax : 03561-31096

No. 2764 /M Dated 4.12.2001

To,
The Chief Engineer,
Municipal Engineering Directorate,
Bikash Bhavan, 1st floar,
Salt Lake city,
Kolkata- 91

- 5 DEC 2001

Sub: Bio- waste management scheme in Maternity Home and OPD under IPP-VIII (EXTn

Sir,

With reference to memo no SUDA-15/98(Pt-Vi)/479, dated 02.11.2001, on the aforesaid subject I would like to state that the twin burial pits for this Municipality may be constructed at the trenching ground of this Municipality.

The site would be shown to your representiative when asked for.

Yours faithfully,
Chairman
Jalpaiguri Municipality.

Memo No: 2764-A(2) Dated: 4.12.2001.

Copy forwarded to the:-

i) Advisor(Health), SUDA, ILGUS BHAVAN, H-C.Block, Sector-III, Bidhannagar, Kolkata-700 091.

ii) The Executive Engineer, MED, Jalpaiguri, for favour of kind information and necessary action.

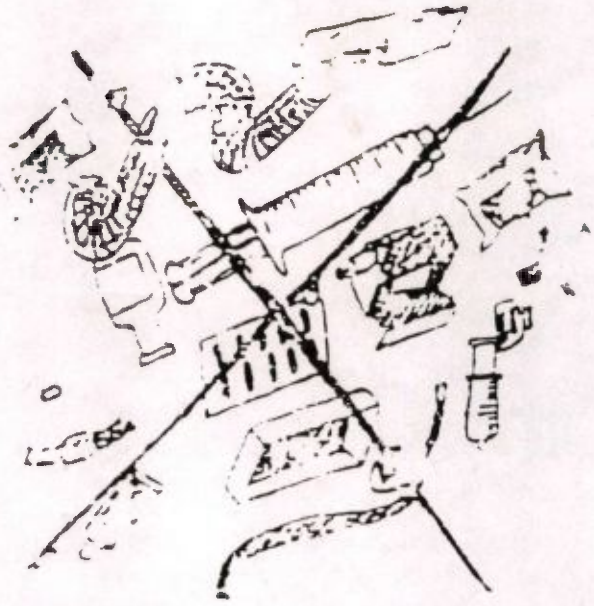
Chairman
Jalpaiguri Municipality.

J.S.

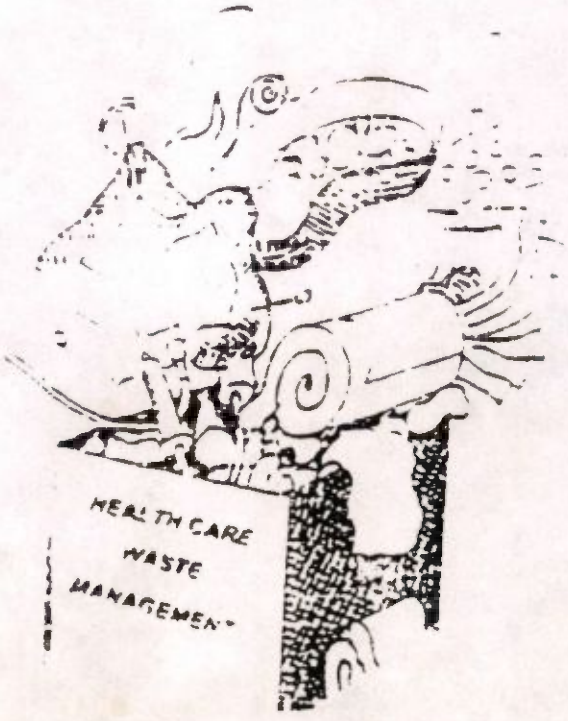
WEST BENGAL HEALTH SYSTEMS DEVELOPMENT PROJECT

Department of Health & Family Welfare

Government of West Bengal



ACTION PLAN
on
HEALTH CARE WASTE MANAGEMENT



G N 29, Sector - V, Bidhan nagar, Calcutta - 91

Action Plan on Health care waste Management

1.0 Introduction

Waste generation in hospitals and their disposal has always been a matter of concern to the medical profession ever since hospitals came into existence as institutions. Waste disposal systems in the form of burial, landfilling & incineration were existing. Those practices conformed to the then existing knowledge of public health, epidemiological concept or public health legislations enacted from time to time. No comprehensive law either in a state or the country was however brought forward to deal effectively with the subject.

The apparent risks include :

a) Occupational health hazards to doctors, nurses and other staff patients (nosocomial infection) & attendants.

b) Source of foul odour

c) Blocking of sewers, drains (and by polythene bags) and general unhyginic condition in the hospital premises.

d)Breeding ground for rodents/reptiles, mosquitoes and flies and attracting stray animals

e) Uncontrolled dumping causing underground water contamination

f) Burning causing air-pollution (adding toxogenic gases)

The potential risk include transmission of HIV/AIDS, Hepatitis B or C virus.

Other problems are :

g) Disposables are being repacked & sold without being even washed.

h) Discarded drugs disposed being re-packed & sold.

Therefore, scientific health care waste management should be a part of routine hospital management.

Basic requirements such as safe water supply sanitation facilities, disinfection etc. are vital to keep a health care facility clean and safe. Health care waste should be carefully and scientifically handled from the point of generation upto the point of final disposal.

An effective waste management programme is an integral part of a hospital's infection control programme and therefore, critically linked to the quality of patient care as well as the health and safety of hospital workers, visitors and the general public at large. Further, when properly implemented and enforced, effective waste management can have distinct benefits, in terms of improved procurement practices and streamlined consumption of various supplies.

2.0 Composition of hospital wastes:

2.1 Health care wastes is produced in hospitals, health centres, clinics, nursing homes, laboratories, research institutions, vetenerary clinics, midwifery centres and other medical cares conducted at home. The amount of wastes generated varies according to type of facilities. A study estimated that health care waste generated in hospitals is about 1 kg. per bed per day. About 38% of this is infectious and hazardous (infectious non-sharp 14.9 % to 26.78 %; infectious sharp 8.77 % to 15.18 %; pathological 0.8 % to 6.39 %). The rest 62% is non-infectious/ non-hazardous waste (52.29 % to 63.59 %) which implies that ensuring segregation of the first two categories of waste at source is the first and foremost step in waste management. Under the current practice, the infectious and hazardous waste is often mixed with the non-hazardous general waste which multiples the problem in handling the final disposal. Handling of sharps (the hazardous waste) is extremely critical. It calls for separate attention from others disposables in a waste management scheme.

3.0 Segregation in colour coded containers :

Colour coding of collection bins is an easy and effective system of segregating waste at source. The bins should be lined with similar colour plastic bags (non-halogenated). The red / blue/ yellow bins and red / blue/ yellow polythelene bags should be labelled with the internationally accepted ' Biohazard' symbol (symbol of infectious and hazardous material).

A simple system of colour coding is as follows :

3.1 Categories of waste	Colour code of polythelene bags	Colour code of bins
a) General waste(non-hazardous,non-infectious)	Black	Black
b) Infectious waste	Red	red
c) Sharps (after keeping sharps in the Card-board Box)	Blue	Red
d) Pathological	Yellow	Yellow

3.2 This category excludes toxic metals, such as mercury contained in broken thermometers and B.P. apparatus and radio active isotopes. Those items will be put in designated containers and managed accordingly.

3.3 Training, awareness activities and supervision of staff is essential for ensuring segregation at source and handling infectious and hazardous health care waste.

4.0 Collection and storage.

4.1 Each facility i.e. O.T. wards, investigation units, OPD, kitchen, Morgue etc. is to be provided with a set of two plastic bins preferably with lid. The bins should be located just outside and adjacent to the facilities. Further one bin should be kept in all the nursing stations for onsite disinfection of sharps and other infectious material with 1% bleach solution

4.2 The general waste should be put into the black polythelene lined bin.

4.3 All infected materials should be put into the red polythelene lined bin.

4.4 Management of sharps

4.4.1 All sharps should be put in the bleach Solution (1% i.e. 10 gms of Bleaching powder in 1 litre of water) containing bin (one sieved bucket to be kept inside the bin) for onsite disinfection (at least for one hour). However it must be cautioned that the disinfected materials should continue to be treated as hazardous and should be dealt with accordingly.

4.4.2 Needle & nozzoles of disposable syringes should be cut with the neddle cutter prior to being put into the bleach Solution.

4.4.3 The sieved bucket is to be taken out from the bin containing bleach soin. After allowing time for graining out the last drop of bleach soin - the sharps including cut syringes should be put in a card -board box. The box should be tied & then placed in the blue polythelene bag which is then put in the red polythelene lined red bin.

4.5 The cleaning staff should change the polythelene bags when they are 3/4th full. after tying up, it should be placed in the hand driven trolly & the bin shoud be lined with a new polythelene bag. The general waste (black P bags to be put in the black Vat , the infectious wastes & sharps & pathoogical waste (red & yellow P bags) to be placed in the red vat being constructed for the purpose in the remotest corner of the hospital campus - easily accessible to the Municipal vehicle. The key of the vats should be with the concerned Ward-master/ incharge of the waste management scheme of the particular institution. like collection and storage - segregation should be maintained during internal as well as external transportation.

4.6 Nursing staff should keep a record of the number of coloured bags transported to the vats only.

5.0 **Wet thermal treatment (waste autoclaving)**

Wet thermal treatment (waste autoclaving) is being pilotted in one District hospital (Howrah D H). After a few months.- functional efficacy will be examined and if O.K., will be extended to other health care institutions.

5.1 Placenta & body parts should be segregated and kept in a yellow bin lined with yellow polythene bag marked with bio-hazard symbol.

5.2 Rest infectious waste to be treated in waste autoclave.

5.3 The effectiveness of waste autoclaving disinfection is to be checked through " Bacillus stearothermophillus " - spore testing.

6.0 Transport and disposal:

6.1 All vat waste should be transported in a segregated manner to the Municipal disposal ground - atleast once in 48 hours. Separate vehicle hiring cost for transportation of infectious & haxzardous waste may be borne out of the project fund.

6.2.1 The municipal body should set up a burial pit (as per design provided by Project Management Cell) at the landfill site for disposal of red (& yellow bags) - maintaining the standards prescribed for that - for the infectious and hazardous waste.Cost of construction of such pit may be borne out of the project fund .

6.2.2 The general waste should be disposed off by sanitary landfilling by the Municipality.

6.3.1 In non-municipal areas (rural and other hospitals) the infectious & hazardous waste should be disposed of by digging a burial pit in the hospital in the hospital campus itself (as per design provided by Project management cell) - maintaining the standards.

6.3.2 The general waste should be disposed of in a Trench (the compost to be used as a nutrient of the garden).

7.0 Disinfection of bins/ needle cutters

Bins should be disinfected daily with bleach soln and the needle cutter should be autoclaved daily.

8.0 Disposal of other wastes :

8.1 Disposal of radioactive wastes

Radioactive wastes should be disposed of as per guidelines of BARC/ WHO. Hazard at source can be minimised by lead-sealing in X-ray unit wherever it is currently not being done.

8.2 Disposal of laboratory waste.

The laboratory glass waste and biological material left after the laboratory tests has to be decontaminated by complete immersion in 10% bleach soln. and putting all biological material into it throughout the day and allowing it to stand over night right in the laboratory. Next morning the decontaminated solid material in the bucket should be put in the red bin and the liquid discharged in the sewer.

8.3 Disposal of liquid waste

All liquid waste chemicals, fluids and un-used blood should be treated with Na-hypochlorite soln and then poured into the sewer.

8.4 Disposal of expired drugs

Expired drugs should be returned to the Manufacturer/disposed of by observing existing formalities.

9.0 Management of accidental spillage of hazardous material

9.1 In case of accidental spillage of liquids (body fluid, blood etc.) absorbant materials such as cotton, gauge etc. should be used to contain the spillage, and appropiate disinfectants (1 % sodium hyproclorite solution) to be poured over the spillage. After half an hour contact time spillage can be clean and the materials can be collected in container for disposal. Normal tap water could be used for washing the area.

9.2 Management of Mercury

In case of mercury spillage sulpher powder to be poured to prevent mercury evaporisation. A regular syringe to be used for sucking the droplets.

Minor spills of Mercury may be collected by gathering of mercury droplets in stiff paper to scoop it (while handling hand gloves to be used).
All collected mercury droplets to be poured into a glass container with 5 to 10 ml of water. The container should be capped properly & sealed The used gloves and the glass container should be poured in the infectious & hazardous bin (possibility of recycling through appropiate treatment will be examined in due course).

The spillage area after removal of Mercury, should be washed with Mercury neutralising soln such as 20% calcium sulphide soln, 20% sodium thio-sulphate soln.

10.0 Implementation

10.1 Implementation at district level

At the district level the District Health Committee would be the nodal forum. The expected capacities on medical waste matters are as follows.

1. Supervisory capacity- to make sure that the earmarked hospitals are implementing the scheme.

2. Training capacity - to provide training for staff who handle medical waste.

3. Logistics capacity &

4. Co-ordination capacity

10.2 At the facility level

10.2.1 A small task force will be formed for implementation, supervision and monitoring the scheme with the Superintendent as Chairman comprising 3 Clinicians : 1 each from Medicine G&O, Surgery : 1 Pathologist, Nursing Supdt./O.T. incharge, 1 Wardmaster, 1 SWO, 1 group 'D' staff, 1 sweeper, Dy. CMOH-II (ACMOH in case of SD/SG and RH hospital and any other member Supdt. finds suitable and one representative of the chairman, Municipality / Panchayet Samity and one representative each from PHE & PWD Deptt.

10.2.2 The task force should arrange a series of training programmes for all health personnel.

10.2.3 The task force should launch a massive IEC campaign to educate the users particularly the visitors in the wards in the disposal of wastes in the identified bins. Strict vigilance by the task force must be kept for the use of bins by the providers, parients attendants.

10.2.4 the task force should decide about the procurement of necessary logistics as well as personal protective equipment of the cleaning staff.

10.2.5 The task force should keep an eye on the routine hygiene and maintenance activities.

10.2.6 The task force should also keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.

10.2.7 the task force should keep an eye on the procurement practices and recommend reuse of supplies and materials so as to reduce overall waste generation.

10.2.8 task force should keep DHC informed of the progress.

10.3 DHC should monitor the functioning of the Task force from time to time and seek the guidance of the Project Management Cell as and when required.

10 4.1 An agency (/ agencies) is (/are) being appointed to provide support to the health care institutions with a view to implementing the scheme within the project time period.

10.4.2 DHC should also monitor the functioning of the said agency (/ agencies) and keep PMC informed about the progress of work.

Existing System :

HEALTH CARE INSTITUTION

Operation Theatre	Laboratory	Kitchen	Indoor Wards	Outdoor Wards	Other Depts.

Non-Segregated Mixed Solid Waste

Storage Vat (Within premises)

Collection by Municipality

Landfilling (Uncontrolled air-dumping)

Disposal

System undetaken :

HEALTH CARE INSTITUTION

Operation Theatre	Laboratory	Kitchen	Indoor Wards	Outdoor Wards	Other Depts.

(General) (Infectious)

(Sharps) (Pathological waste)

(Segregated Collection in color coded container)

Packaging - Labelling

Handling

On-site treatment
(S D U)

Internal transportation
(Segregated)

Separate Storage Vat (Within premises) — Auto -claving — Collection and segregated transportation by Municipality

A. Urban

* Landfilling (Sanitary) — Disposal by Municipality

* Deep burial (for infectious & hazardous) — Disposal by Municipality

B. Rural

* Trench Composting for general waste — By WBHSDP

* Campus disposal for infectious & hazardous waste — By WBSHDP

HEALTH CARE WASTE MANAGEMENT

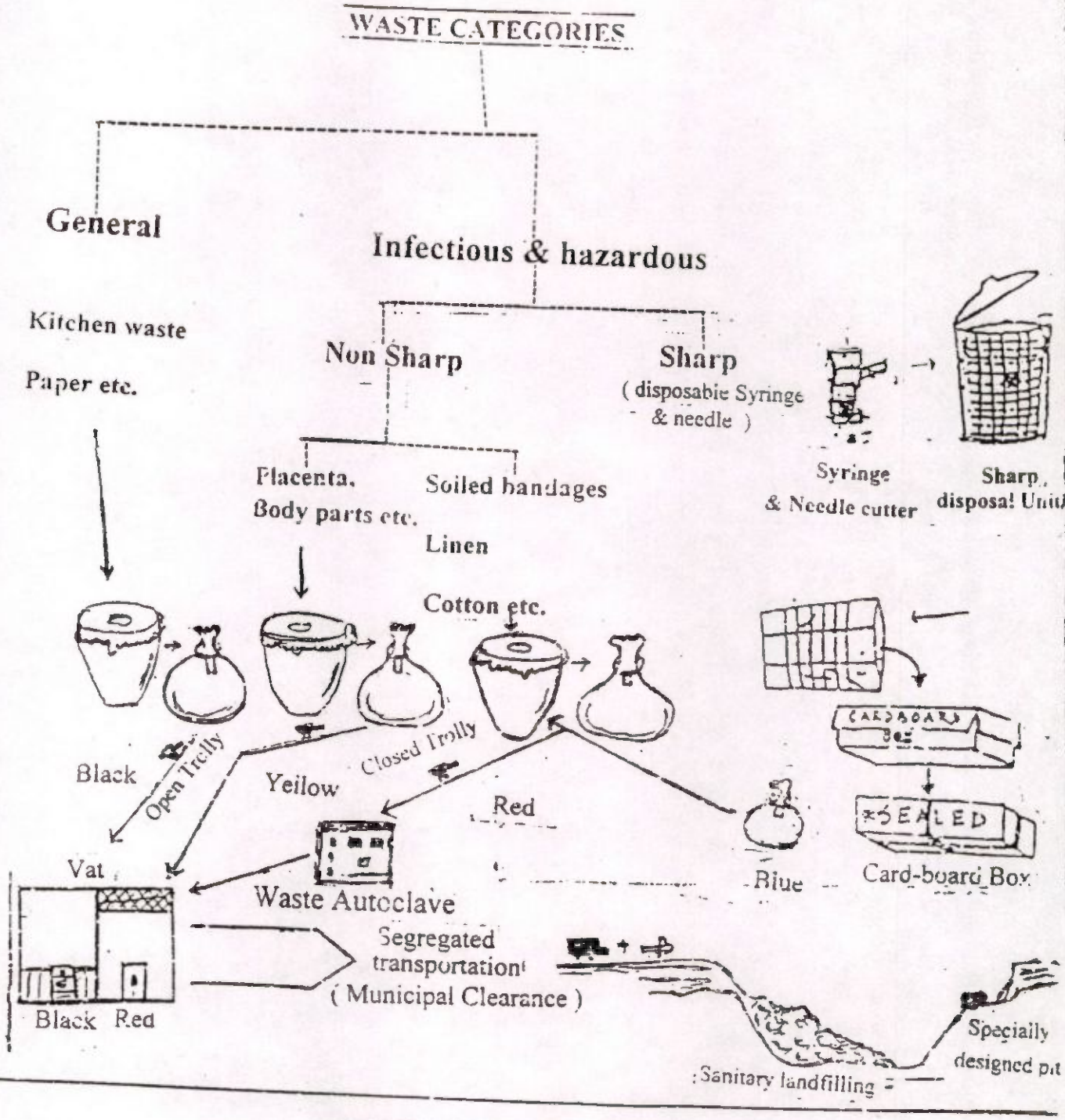
CATEGORIES

General	Pathoicgical	Infectious (non-sharp)	Sharps
Food waste Paper Card-board Floor- -Sweepings Earthen- -vessel, Woods, Shells, towel,	Human tissue/ organ, body parts, foetus, placenta, blood & body fluids, animal caracus.	Soiled waste contaminated with blood & body fluids (cotton, dressing, soiled plaster cut, linen, bedding, gloves, Lab.Coats microbiology & biotechnology waste isolation ward waste and solid waste containing disposable items other than waste sharps e.g tubing, catheter I.V. set etc.	Needles, syringes, scalpel, blade, broken glass nails & any other items that may cause puncture & cuts. Cutter SHARP DISPOSAL UNIT
Black bag	**Yellow bag** (biohazard)	**Red bag** (biohazard)	**Blue bag** (biohazard)

Health care waste management

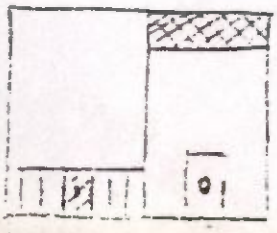
Action plan

URBAN AREA



Private establishments

RURAL AREA




WARNING
BIOHAZARD
(Infectious material)

Institutional Strengthening (Task-force at the institutional level)

Superintendent of the hospital as **Chairman**

Departmental Heads
Medicine, Surgery
Pathology & G.O.

Nursing Superintendent

Ward Master as **in-charge**--Social welfare Officer--Pharmacist as **E C - incharge**

Group ' D ' Staff - Technician - Sweeper

Dy. C M O H - II Representative of Chairman Municipality Engineer (P W D) Engineer (P H E)

Report to :

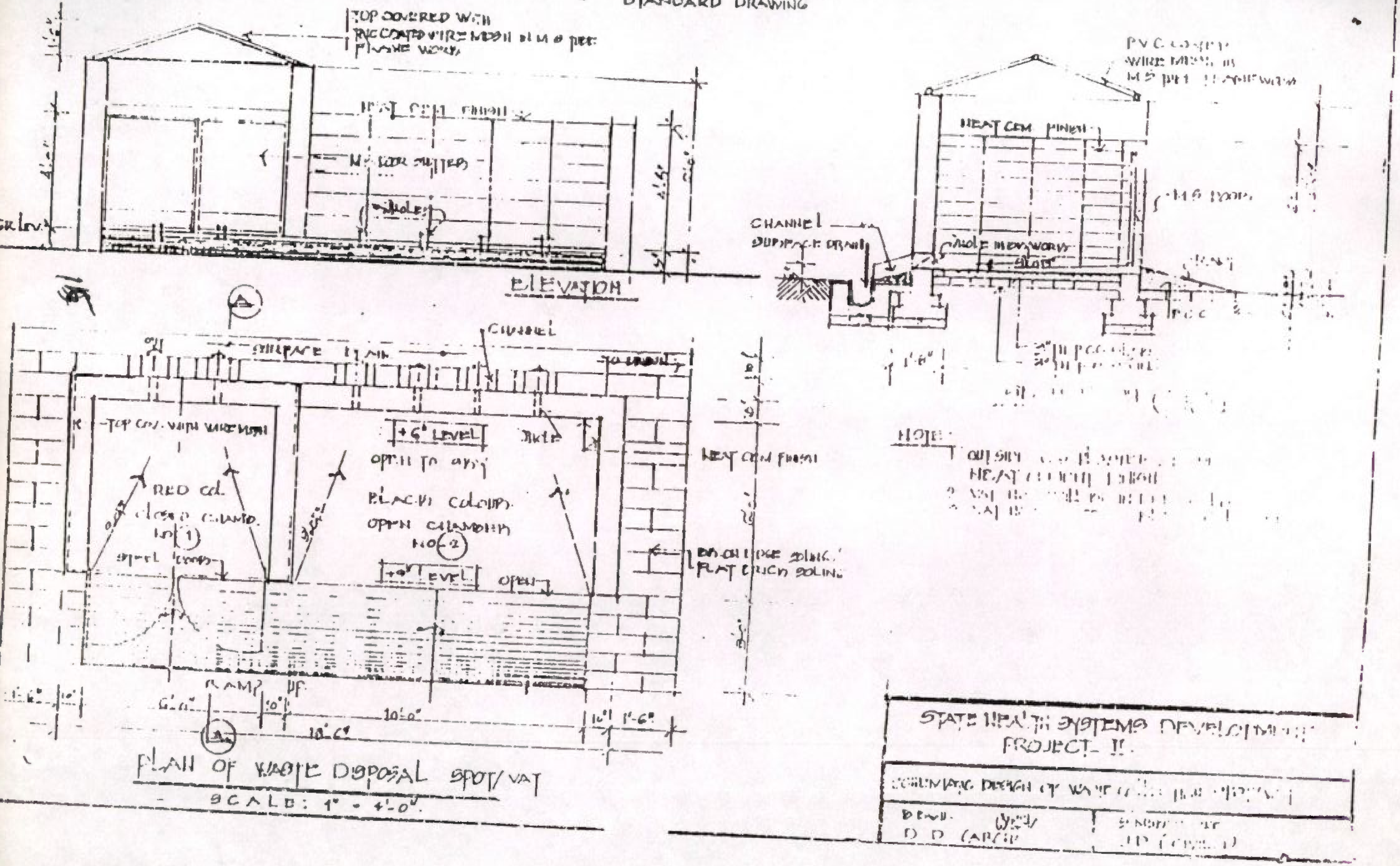
District Health Committee Office of the Chief Project Manager C M O H

P M C

Deptt. of Health & Family welfare
Govt. of W.B.

PROPOSED MEDICAL WASTE COLLECTION VAT.

STANDARD DRAWING



Standards for Waste Autoclaving

The autoclave should be dedicated for the puspises of disinfecting and treating bio-medical waste

1. When operating a vacuum autoclave. medical waste shall be subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air. The waste shall be subjected to the following :

i) A temperature of not less than 121 degree centigrade and pressure of 15 psi per an autoclave residence time of not less than 45 minutes ; or

ii) A temperature of not less than 135 degree centigrade and the pressure 31 psi for an autoclave residence time of not less than 30 minutes.

2. Medical waste shall not be considered properly treated unless the time. temperature and pressure in monitors indicate that the required time, temperature and pressure were reached during the autoclave process. If for any reason, time . temperature or pressure indicator indicates that the required temperature, pressue or residence time was not reached. the entire load of medical waste must be autoclaved again until the proper temperature. pressure and residence time were achieved

3.**Recording of operational parameters**

Each autocloave shall have graphic or computer recording devices which will automnatically and continuously monitor and record dates. time of day . load identification number and operating parameters throughout the entire length of the autoclave cycle.

4. **Validation test**

Spore testing:

The autoclave should completely and consistently kill the approved bio-logical indicator at the maximum design capacity of each autoclave unit. Bio-logical indicator for autoclave shall be Bacillus stearothermophilus spores using viais or spore strips, with at least 1 x 10 to the power 4 spores per nilimeter. Under no circumstances will an autoclave have minimum operating parametors less than a esidence time of 30 minutes. regardless of temperature and pressure. a temperature less than 121 egree centigrade or a pressure less than 15 psi.

Routine test

chemical indicator strip / tape that changes colour when a certain temperature is reached can be used verify that a specific temperature has been achieved. It may be necessary to use more than one strip ver the waste package at different location to ensure that the inner content of the package has been dequately autoclaved.

Standards for Deep Burial

1. A pit or trench should be dug about 2 meters deep. It should be half filled with waste, then covered with lime within 50 cm of the surface, before filling the rest of the pit with soil.

2. It must be ensured that animals do not have any access to burial sites. Covers of galvanized iron/ wire meshes may be used.

3. On each occasion, when wastes are added to the pit, a layer of 10 cm of soil shall be added to cover the wastes.

4. Burial must be performed under close & dedicated supervision.

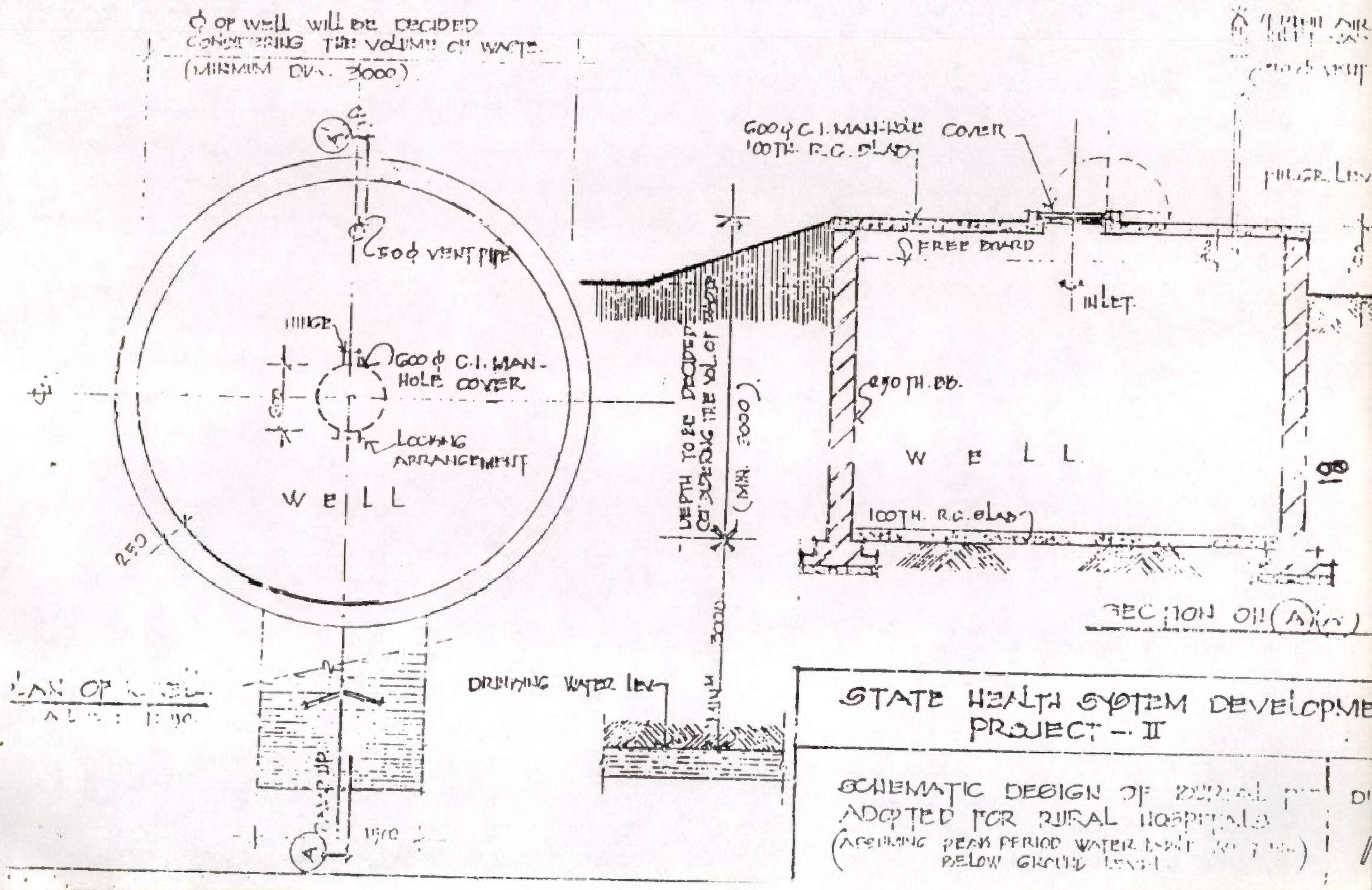
5. The deep burial site should be relatively impermeable and no shallow well should be close to the site.

6. The pits should be distant from habitation, and sited so as to ensure that no contamination occurs of any surface water or ground water. The area should not be prone to flooding or erosion

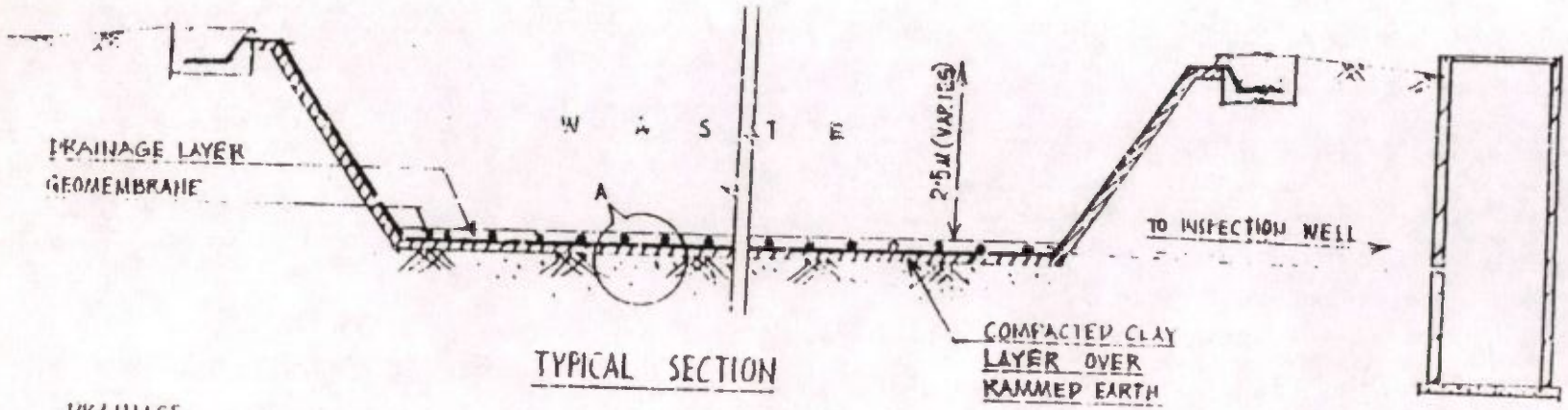
7. The location of the deep burial site will be authorised by the prescribed authority.

8. The institution shall maintain a record of all pits for deep burial.

24.10/akg/24imoenq

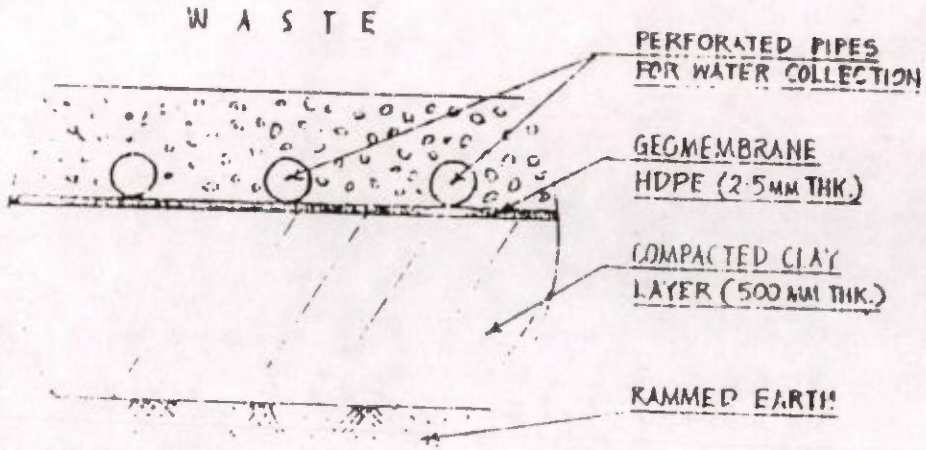


Ф OF WELL WILL BE DECIDED
CONSIDERING THE VOLUME OF WASTE
(MINIMUM DIA. 3000)
50 Ф VENT PIPE
HINGE
600 Ф C.I. MAN-HOLE COVER
LOCKING ARRANGEMENT
W E L L
250
DRINKING WATER LEV
DEPTH TO BE DECIDED CONSIDERING THE VOL. OF WASTE
(MIN. 3000)
3000
600 Ф C.I. MAN-HOLE COVER
100TH. R.C. SLAB
FREE BOARD
INLET
250 TH. BB.
W E L L
100TH. R.C. SLAB
STATE HEALTH SYSTEM DEVELOPME
PROJECT – II
SCHEMATIC DESIGN OF
ADOPTED FOR RURAL HOSPITALS
BELOW GROUND LEVEL

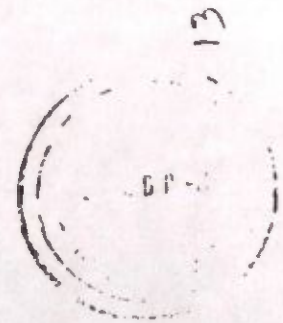


TYPICAL SECTION

DRAINAGE
LAYER (300 MM THK.)



DETAIL AT 'A'



NOTE :
HYDRAULIC CONDUCTIVITY OF COMPACTED CLAY LAYER : 10^{-7} CM/SEC.

STATE HEALTH SYSTEMS DEVELOPMENT PROJECT II

SCHEMATIC DESIGN OF BURIAL PIT
FOR INFECTIOUS WASTE COLLECTION

Reporting format/ Check-list

Implementation of phase - I / Phase - II Health Care waste Management Programme

Sl.No.	Subject	Remarks
1)	a) Name of the Institution under reference - _____	
	b) Phase - I / Phase - II implemented w.e.f	
2)	Further Staff training held ---------- ---------- ----------	Nil.
3)	Task force constituted ----------	Yes / No
4)	Logistics procured ----------	No / Yes (if yes, name the logistics)
	(Name the logistics) 1.Bins.....2.Buckets..... ...3.Sieved buckets.....4.P.Bags i) red.....ii) black.....iii) Yellow.....5. Register.....6.Disposable Syringe &needle cutter..... ....7. PPEs i) Gloves..... ...ii) Gum-Boots..... iii) Aprons.....iv) Masks.....v) .....vi).....8.Bleaching Powder .....9.Threads/ Sutuli.....10.....	
5)	Storage Vat constructed ----------	No / Yes
6)	Municipal clearance of Waste is being done----------	daily/ by - weekly/ weekly.
7)	Birbed wire-fencinghas been done by Municipality ----------	yes / no.
8)	Sharp management system has been included---------- ----------	yes/ no.
9)	No. of Poly. Bags generated per month -- i) Red---------- ii) Black---------- iii) Yellow----------	
10)	Registers maintained (in Wards/ in Ward Master's Office)i)..... .....ii).....ii).....	
11)	Water quality is being examined ----------	Yes / No.?
12)	Care of sewerage system and sanitary facilities is being taken----------	Yes / No.
13)	Overall cleanliness has improved ---------- ---------- ----------	Yes / No
14)	NGOs have been involved ---------- ---------- ----------	Yes / No.
15)	Further requirements ---------- ----------	
16)	Suggestions---------- ----------	
17)	Overall comments on implementation of the programme.----------	

Signature

Superintendent of the ...

হাসপাতালের বর্জ্য পদার্থ নিষ্কাশন : কয়েকটি আবেদন

(দেওয়াল লিখনের জন্য)।

ক) না-খাওয়া খাবার, ফলের খোসা ইত্যাদি কালো পাত্রে ফেলুন ।

খ) রক্ত, পূঁজ যুক্ত গজ - ব্যান্ডেজ তুলো লাল পাত্রে ফেলুন ।

গ) বর্জ্য পদার্থ সংক্রামিত মনে হলে লাল পাত্রে ফেলুন ।

ঘ) ডিসপোসেবল সিরিঞ্জ, কাটারে কেটে ব্লিচ সলুশনে ফেলুন ।

ঙ) নোংরা যেখানে সেখানে ছড়াবেন না ।

চ) যেখানে সেখানে থুতু ফেলবেন না ।

ছ) এই হাসপাতাল আপনার - হাসপাতাল পরিষ্কার রাখুন ।

জ) পরিচ্ছন্নতাই পবিত্রতা ।

Implementation of Health care waste management scheme

Institutional structure (Task force for implementation as well as for sustainance)

Composition of Task force members :

<u>In larger hospitals (DH/ SDH/SGH)</u>

* Superintendent as the Chairman
* Senior Ward Master as Waste Management in-charge
* Heads of the Departments as members
* Chief (/ Senior) Pharmacist as Emergency control in-charge
* Nursing Superintendents as member
* Senior Social welfare Officer as member
* Nodal Engineer(/ Engineers) as member (/ members)
* Representative of Technicians as member
* Chief (/ senior) Storekeeper as member
* Representative of Group-D staff as member
* Representative of Swecpers as member

and

* Representative of local Municipal boby.
* Representative from Public Health Deptt. (Dy. CMOH-II)

<u>In smaller hospitals (RH)</u>

* Medical Officer in charge (/ BMOH) as the Chairman
* Senior Ward Master as Waste Management in-charge
* Heads of the Departments as members
* Chief (/ Senior) Pharmacist as Emergency control in-charge
* Nurse in-charge (/ Nursing Superintendent) as member
* Senior Social welfare Officer as member
* Nodal Engineer(/ Engineers) as member (/ members)
* Representative of Technicians as member
* Chief (/ senior) Storekeeper as member
* Representative of Group-D staff as member
* Representative of Sweepers as member

and

* Representative of local Panchayet boby.
* Representative from Public Health Deptt. (ACMOH)

FUNCTIONS OF THE TASK FORCE

1.1. The task force shall meet atleast once in a month.

1.2 The task force should arrange a series of training programmes for all health personnel.

1.3 The task force should launch a massive IEC campaign to educate the users particularly the visitors in the wards in the disposal of wastes in the identified bins. Strict vigilance by the task force must be kept for the use of bins by the providers, parients attendants.

1.4 the task force should decide about the procurement of necessary logistics as well as personal protective equipment of the cleaning staff.

1.5 The task force should keep an eye on the routine hygiene and maintenance activities.

1.6 **The task force should also keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.**

1.7 the task force should keep an eye on the procurement practices and recommend reuse of supplies and materials so as to reduce overall waste generation.

1.8 task force should keep DHC informed of the progress.

1.9 DHC should monitor the functioning of the Task force from time to time and seek the guidance of the Project Management Cell as and when required.

iob/99/akg

RESPONSIBILITIES OF KEY TASK FORCE MEMBERS .

1.1 **Role of Chairman (Superintendent** of the concerned hospital)

i) To assume overall responsibility of MWM at the health care unit.

ii) To send the monthly report on MWM to the CMOH/DHC & PMC

iii) To send an annual report to WBPCB by 31 January every year (with a copy to CMOH/ DHC/PMC/ Health DEptt.) as per the format given in Form II of the Bio-Medical Waste (Management and Handling) Rules 1998

iv)To apply in prescribed Form I as given in the Bio-Medical Waste (Management and Handling) Rules 1998 to WBPCB for granting of authorisation for MWM

v) To assume the overall responsibility of implementing the policies/directives of the PMC/ GOWB on MWM at the health care unit.

vi) To allocate adequate manpower, infrastructure and re-sources to the Waste management in-charge (WMI) for MWM at the health care unit.

vii) To arrange required training for the staff on MWM

viii) **To keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene**.

ix) To interact with the local municipal/ Panchayat Bodies and other Government Departments on any matter in relation with MWM including supply of safe water, sanitation facilities at the health care unit etc with a view to maintaining the hospital hygiene.

x) To interact with the local NGOs and local people to involve them with (off-site) transport, treatment and disposal of medical wastes.

1.2 **Role of Waste management in-charge** (WMI - **Senior Ward Master**)

i) To assume responsibility of day-to-day activities related to MWM including development and maintenance of greenbelt at the health care unit.

ii) To monitor the activities of hospital staff in relation with segregation, collection, transport, storage on-site treatment and disposal of medical wastes.

iii) To ensure regular supply of adequate resources and equipment including bags/ containers, protective gear, etc. for the hospital staff for MWM.

iv) To ensure availability of adequate manpower for MWM at the health care unit everyday.

v) To ensure proper fencing and locking of storage vats to prevent access to ragpickers,birds, and stray animals to medical wastes.

vi) To provide necessary assistance to the Emergency control in-charge (ECI) for matters in relation with

management and control of accidents and spillage.

vii) To investigate any accidents and prepare report on it in association with the ECI as per the format in Form III of the Bio-Medical Waste (Management and Handling) Rules 1998.

viii) To maintain daily record of medical waste generation at different wards at the health care unit

ix) To prepare monthly report on MWM and submit it to the Chairman.

x) To prepare annual report as per the format given in Form II of the Bio-Medical Waste (Management and Handling) Rules 1998 and submit it to the Chairman.

xi) To liaise with the Chairman, Nursing Superintendent and Heads of the various Departments to ensure scientific MWM at every ward at the health care unit.

xii) To organise training and awareness generation campaign for the hospital staff, visitors and the local community on the utility and benefits of scientific MWM practices.

1.3 Role of **Emergency control in-charge** (ECI - **Pharmacist**)

i) To assume overall responsibility of management and control of accidents (including needle stick injury) and spillage of hazardous substances.

ii) To liaise with other members of the HWMC to provide advice and guidance on matters relating to prevention of accidents and spillage of hazardous substances.

iii) To provide training to the hospital staff on preventive and emergency measures to avoid and prevent accidents and spillage of hazardous substances.

iv) To provide technical assistance to the WMI on matters in relation with management of chemical wastes.

v) To provide technical assistance to the WMi for preparation of report on accidents and spillage of hazardous substances as per the format III of the Bio-Medical Waste (Management and Handling) Rules 1998.

1.4 Role of **Head of the Departments**.

i) To assume overall responsibility of MWM at the department.

ii) To ensure availability of adequate manpower for day-to-day MWM at the department.

iii) To ensure that the departmental staff including nursing staff and sweepers receive adequate training on MWM.

1.5 Role of **Nursing Superintendent.**

i) To assume responsibility of monitoring MWM activities at various wards at the health care unit.

ii) To see that all her staffs keep daily records of the no. of coloured bags disposed.

iii) To see that all her staffs keep the logistics in stock in sufficient quantity.

iv) To see that all her staffs follow the norms, as framed by the authority, specially on management of sharps and on routine necessary clearance of coloured bags from the wards.

v) To liaise with the Chairman, WMI, ECI, Heads of the Departments and other members od the HWMC to ensure quality standards of MWM at the health care unit.

Action plan Flowchart **WBHSDP**

Mixed Waste

(General) (Infectious & hazardous)

Placenta **Sharps** inf & haz

Polythelene & Rubber disposables - Puncturing/ Cutting

Segregated Collection in color coded container

* *Composting in vermiculture*
* *Selling*
* *Burial Pit*

Packaging - Labelling

Carefull Handling (PPE)

Onsite treatment : Waste Autoclave/ Microwave

Cutting & On-site treatment (S D U)

Internal transportation (Segregated)

Bi-coloured Storage Vat

Waste treatment Autoclave/ Microwave

Collection and segregated transportation *by Municipality/ by Contractor*

DISPOSAL :

A. Municipal
* Landfilling (Sanitary) (for General) — *by Municipality*
* Deep burial Pit (for infectious & hazardous) — *by Municipality*

B. Rural
* Campus composting (Trenching) for General waste — By Health Deptt.
* Campus Pit (for infectious & hazardous) — By Health Deptt.

8bank01/15.5/wordpro

The Waste Survey study (done by M/S TCS)
[early 1999]

Range varies from :
(% by weight)

1. Pathological wastes-0.8 - 6.39

2. Infectious non-sharp waste - 14.9 - 26.78

3. Sharp - 8.77 - 15.18

4. Non-infectious chemical wastes - 0.13 - 0.19

5. General waste 52.29 - 63.59

Actual generation at the time of waste survey :

* *larger unts- 500 gm/ bed/ day..*

* *Smaller units- 230 gm/ bed / day.*

Average Waste generation taken as 1 KG/ bed / day

on consideration of following points :

1.Saline bottles, syringes, blood bags, uro bags Medicines foils, rubber tubes, surgical glaves, etc. are the items that are salvaged for re-selling.

2. Waste foods are being taken away for feeding of pet animals)

3.Placentas are not available

পশ্চিমবঙ্গ সরকার

পশ্চিমবঙ্গ স্বাস্থ্য ব্যবস্থা উন্নয়ন প্রকল্প

হাসপাতাল বর্জ্য পদার্থ নিয়ন্ত্রণ কর্মসূচি

গত ১৯৯৬ সাল থেকেই পশ্চিমবঙ্গের সমস্ত জেলায় পশ্চিম বঙ্গ স্বাস্থ্য উন্নয়ন প্রকল্পের কাজ চলছে। মধ্যবর্গীয় (Secondary Level) হাসপাতালসমূহের (জেলা/মহকুমা/স্টেট জেনারেল গ্রামীণহাসপাতাল) সামগ্রিক উন্নতিসাধন এই প্রকল্পের প্রধানতম উদ্দেশ্য।

এর একটি উল্লেখযোগ্য কর্মসূচি হল বর্জ্য পদার্থ নিয়ন্ত্রণ (Health Care Waste Management)। স্বল্পমেয়াদী/ মধ্যমেয়াদী / দীর্ঘমেয়াদী স্তরে ক্রমান্বয়ে এই কর্মসূচী রূপায়িত হবে।

বিজ্ঞানসম্মতভাবে হাসপাতালের বিভিন্ন বর্জ্য পদার্থের পৃথকীকরণ, পৃথকীকৃত সামগ্রীর পরিশোধন (Disinfection) ও সর্বশেষ পরিত্যজন এই সর্মসূচির লক্ষ্য।

বর্তমানে রাজ্যের কয়েকটি হাসপাতালে স্বল্পমেয়াদী কর্মসূচি চালু হয়েছে এবং তার মধ্যে কয়েকটিতে দীর্ঘমেয়াদী কর্মসূচি রূপায়ণের কার্যক্রম চলছে।

কর্মসূচিটি নিম্নরূপ

হাসপাতালের প্রতিটি বিভাগে (সমস্ত ওয়ার্ড বহির্বিভাগ, অপারেশন থিয়েটার, ল্যাবরেটরী ইত্যাদি) তিনটি ভিন্ন রঙ-এর (লাল, নীল, হলুদ ও কালো) সংগ্রহ পাত্র রাখা হবে।

★ একেকটি সংগ্রহ পাত্রের মধ্যে একই রঙ-এর প্লাস্টিকব্যাগ রাখা থাকবে।

★ সাধারণ বর্জ্য (প্রধানত অসংক্রামক আনাজ বা ফলের খোসা, কাগজ, খাদ্যাবশেষ ইত্যাদি) কালে রঙ-এর পাত্রের কালো ব্যাগে ফেলতে হবে।

★ সমস্ত সংক্রামক বস্তুসমূহ (ব্যবহৃত ব্যাণ্ডেজ, তুলো, অপারেশন থিয়েটারের পরিত্যক্ত জিনিষ ইত্যাদি) লাল রঙ-এর পাত্রের লাল ব্যাগে ফেলতে হবে।

★ তীক্ষ্ণ ধারল বস্তুসমূহ যেমন ডিসপোসেবল সিরিজ, সূঁচ্ ইত্যাদি কাটারে কেটে পরিশোধন দ্রবণে (১% ব্লিচ সল্যুশন) ফেলতে হবে যা রাখা থাকবে একটা বিশেষ ধরণের পাত্রে। পরিশোধনের পরে এগুলি একটি কার্ড বোর্ডর প্যাকেটে রেখে নীল পলিথিন প্যাকেটে ভরতে হবে। পরে এই নীল ব্যাগটি লাল রঙ-এর পাত্রের লাল ব্যাগে ফেলতে হবে।

★ প্লাসেন্টা ও অন্যান্য টিসু হলুদ ব্যাগে রাখতে হবে। ল্যাবরেটরীতে ১০% ব্লিচ সল্যুশন পরিশোধন দ্রবণ হিসাবে ব্যবহার করা হবে। হাসপাতাল প্রাঙ্গণের এক কোণে কালো ও লালরঙের পৃথক বর্জ্য সংগ্রাহক ভ্যাট থাকবে। লাল ভ্যাটটি পুরোপুরি সুরক্ষিত থাকবে। নির্দিষ্ট সময়ান্তরে সাফাইকর্মীরা পৃথকভাবে কালো ব্যাগগুলি (সাধারণ বর্জ্য) কালো ভ্যাটে ও লাল ব্যাগগুলি (সংক্রামক ও বিপজ্জনক) লাল ভ্যাটে ফেলবেন।

★ এই লাল ব্যাগগুলি সময়ান্তরে বিশেষ যন্ত্রের সাহায্যে পরিশোধন করে সাদারণ বর্জ্যে রূপান্তের ঘটা হবে। স্থানীয় পৌরনিগম নির্দিষ্ট সময়ান্তরে হাসপাতাল প্রাঙ্গণের সংগ্রাহক পাত্র থেকে পৃথকভাবে বিনের মাধ্যমে বর্জ্য পদার্থসহ পলিথিন ব্যাগটি তুলে নিয়ে যাবে ও চিহ্নিত ও সংরক্ষিত স্থানে বিশেষ ব্যবস্থা ফেলবে

★ কালো ব্যাগগুলি স্যানিটরী ল্যান্ডফিল ও লাল ব্যাগগুলি বিশেষভাবে নির্মিত গর্তে পরিত্যাজ্যিত হবে।

★ পঞ্চায়েত এলাকায় সংক্রামক বর্জ্যসমূহ হাসপাতেলের মধ্যেই বিশেষভাবে নির্মিত গর্তে পরিত্যাজ্যিত হবে এবং সাধারণ বর্জ্য ট্রেঞ্চ ব্যবস্থার মাধ্যমে "কমপোষ্ট" সার তৈরী করতে হবে।

★ সাফাই কর্মীদের ব্যক্তিগত নিরাপত্তার জন্য রবারের হাতমোজা, গামবুট, প্লাস্টিক অ্যাপ্রন ও মাস্ক দেওয়া হবে।

★ কর্মসূচির যথাযথ রূপায়ণের জন্য প্রশিক্ষণ দেওয়া হচ্ছে।

★ বর্জ্য পদার্থ তৈরী হয় এমন জিনিষের কম ব্যবহার, যেখানে যেখানে সম্ভব জিনিসপত্রের পূনঃ ব্যবহার এর উপর জোর দেওয়া হচ্ছে।

★ কর্মসূচি রূপায়ণার্থে হাসপাতাল সুপারিনটেনডেণ্ট-এর নেতৃত্বে একটি টাস্ক ফোর্স গঠিত হয়েছে। এই বর্জ্য পদার্থ নিয়ন্ত্রণ কর্মসূচি ক্রমান্বয়ে স্তরে উন্নীতি হবে। স্বাস্থ্যপরিষেবা উন্নয়নের সাথে হাসপাতাল বর্জ্যর বিপজ্জনক দিকগুলি থেকে রক্ষা পাওয়া যাবে। এই কাজে হাসপাতালের সকল শ্রেণীর কর্মচারীর নিবিড় অংশগ্রহণের সাথে সাথে অন্য সকলের আন্তরিক সহযোগিতা কাম্য।

Health care waste management

Dr. A.K.Ghosh, M.B.B.S, DPH
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West Bengal Health Systems Development Project
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Indtroduction:

Waste generation in hospitals and their disposal have always been a matter of concern to the medical profession ever since hospitals came into existence as institutions. Waste disposal system in the form of burial , land filling and incineration were existing. Those practices conformed to the then existing knowledge of public health, epidemiological concept or public health legislations enacted from time to time. No comprehensive law either in a state or the country was however brought forward to deal effectively with the subject. [Bio-medical waste (management & handling) rules, 1998 came into existence only on July, 1998]

The current practice observed is that all waste are mixed together as they are generated , collected, transported and finally disposed of . As a result of this failure to establish and follow segegation protocols and infrastructure, the waste leaving hospitals , as a whole is both potentially infectious and hazardous .

The wastes contain mercury and other heavy metal, Chemical solvents and preservative (formaldehyde)which are known carcinogens, and plastics (e.g. PVC) which when combusted produce dioxins and other pollutants which pose serious human health risk not only to workers but to the general public through inhalation, food supplies etc.

In order to safeguard the environment and community health it is necessary to establish a rational health care waste management system.

DEVELOPMENT IN INDIA

Some land mark decisions are :

1. The ministry of Environment and Forests, GOI issued a notification in April, 1995 (Establishment having more than 30 beds / catering to more than thousand patients per month should have a incinerator.

2. Draft Rules called the biomedical waste (Management and Handling) Rules, 1995 were also circulated.

3. Supreme Court ordered (first March, 1996) that :

i) hospitals with 50 beds should have incinerator or equally effective alternative method by 30 th November, 1996

ii) It should conform the standards laid down by CPCB

iii) Hazardous wastes should be segregated at source and to be collected in separate colour coded container (in bags) and disinfect the infectious wastes before its final disposal with knowledge of Zonal Health Officer of the local civic zone.

4. CPCB has also laid down specific guidelines including the specification of incinerators. Specification regarding temperature , emission levels, hight of incinerator and liquid effluent characteristics have also been laid down .

5.Biomedical waste (management and handling) Rules, 1998 published on July, 27,1998.

6. Ammendment of above rules, specially of 2nd June, 2000 defining the role of Municipalities.

Major categories

*A. **Hospital waste** -all waste generated from a facility (including cafeteria, office and construction wastes.*

*B. **Medical waste** (a subset of hospital waste) - wastes generated as a result of patient diagonosis,treatment or immunization of human beings or animals .*

*C. Potentially **infectious waste** (a subset of hospital waste) - that portion of medical waste that has the potential to transmit an infectious disease.*

" C " must be addressed first. It should be below 15%.

Composition of Medical waste in Govt. hospitals of W. B.
{ survey done by M/S TCS & AIIH & PH, Calcutta during early part of 1999}

Amount of waste generated -1 kg. per bed per day

Categories	(% by weight)
i) General waste	52.29% - 63.59%
ii) Infectious non-sharp waste	14.9% - 26.78%
iii) Sharp	8.77% - 15.18%
iv) Pathological / Anatomical waste	0.8% - 6.39%

(In the Act, ten categories have been made. With a view to develop a sustainable medical waste management system incremental approach need have to be undertaken .)

According to disposal type :

i) Incinerable waste	22.6%
ii) Non-Incinerable	8.03%

iii) Compostible *41.5%*

iv) Recyclable *27.87%*

The risk :

At greatest risk are the workers who handle the wastes (hospital workers, municipal workers and rag-pickers). Occupational health hazards/prick injuries - hepatitis-B/HIV/AIDS and others.

The risk to the general public is secondary and it occurs in three ways :

i) Accidental exposure from contact with wastes at various level and from unauthorised recycling of goods.

One has only to walk by street vendors selling latex gloves or use pesticides/ disinfectant containers to hold water for making tea, to understand the risk that unsecured waste disposal systems have.

In addition, the practice of cleaning and reselling of syringes , needles, medicine vials and bottles appears to have enough informal evidence to indicate that it is a serious concern.

ii) Exposure to chemical or bio-logical contaminants in water

iii) Exposure to chemical pollutants (e.g. mercury, dioxin) from incineration .

Besides that - general unhygienic condition of the hospital premises , blocking of sewers, breeding ground for mosquitoes and flies and attracting stray animals .

Problem definition :

If primary goal is managing medical waste from medical facilities with a view to prevent the accidental spread of disease then at the very beginning, it must first be acknowledged that there is only a small percentage of the waste stream that is contaminated in a manner that renders it capable of transmitting disease and that the only documented transmission of disease from medical waste has been from contaminated sharps (syringes etc).

Segregation first

No matter what final strategy for treatment and disposal of wastes is selected - it is critical that the wastes are segregated at the point of generation, prior to treatment and disposal and the most important step must be taken to safeguard the occupational health of workers.

Colour coding *of collection bins is an easy an effective system of segregating waste at source. The bins should be lined with similar coloured non-halogenated polythene bags . The bins and the polythene bags should be labelled with "* ***bio-hazard symbol*** *".*

1. General waste - black

2. Infectious non-sharp waste - red

3. Sharp - blue

4. Anatomical/ Pathological - yellow

Imposing segregation practices will result in a general solid waste stream (60 + %) which can be easily, safely and cost-effectively managed through recycling (paper, plastic , metal) , composting (high proportion of organic wastes) and land filling the residues .

There is actually very little that is disposable.

If ***proper segregation*** *is achieved through training , clear standards, and tough enforcement, then resources can be turned to the management of the small poortion of the waste stream needing special treatment.*

Training , proper containers, signs and protective gear for workers are all necessary components of this possess to assure that segregation takes place and is maintained.

Items that could potentially be reused illegitimately must be either rendered unsuable after their use (cutting needles/ gloves , puncturing IV bags etc.) or secured for legitimate recycling by a vendor or system that can be monitored for compliance.
Internal transportation , its temporary (secured) storing and external transportation should also be made in segregated manner.

Institution of a sharp management system

The most immediate threat to human health is the indiscriminate disposal of sharps (needles, syringes, lancets and other invasive tools) which is around 10% only.

Proper segregation of these materials in rigid, puncture proof containers (may be a card-board box),use of needle cutter cutter equipment alongwith its onsite chemical disinfection (with Pottassium hypochlorite or Bleach soln to start with) which are then monitored for safe treatment and disposal - is the highest poriority for any health care institutions.

If proper sharp management system is instituted most of the risk of disease transmission from medical waste would be solved.

Onsite disinfection :

Onsite disinfection of infectious waste is advisable .

Choices of treatment technologies should be made in line with clear knowledge of the waste stream to be managed and the goal to be achieved through treatment.

Waste autoclaving/ microwaving may be done.

Temporary storing & transportation :

Internal and external transportation should also be in segregated manner. For infectious waste covered vehicle with proper logo should be used.

Temporary storing in the hos[pital campus should also be in segregated manner and the vat for infectious waste should be a secured one (so that it is not accessible to the scavengers).

The infectious and hazardous wastes must be cleared once in every 48 hours.

Disposal :

Incineration may be an " overkill" technology

It does not reduce risk to workers (disease transmission or chemical exposure.) and will actually create a greater threat to the general public as mercury and other heavy metals are spewed out into the air or dioxins and furans are created from the combustion of plastics such as P.V.C. Additionally the ash generated is also tainted with heavy metals and other toxic residues.

Lessar risk are through other treatment technologies such as autoclaving , hydroclaving, microwaving, chemical disinfection which affect workers more than the general; public and contaminate water sources rather than air if improperly operated.

Land :

Availability of disposal land is a constraint considering the quantity of waste. But till an alternative technology, which besides disinfection can reduce the volume of the waste, is being finalised - land disposal in a specially designed pit may be preferred.

For the present infectious and hazardous wastes can be disposed of in a burial pit (as per approved design - duly cleared by West Bengal Pollution Control Board) at the municipal land fill site maintaining the standards prescribed for that and the general waste through sanitary land fill.

In the rural areas infectious wastes may be disposed of in a specially designed burial pit at the hospital campus itself and the general wastes by Trenching.

Focus on reduction

Establishing clear guidelines for product purchasing that emphasised waste reduction will keep waste management problems in focus. (gradual substitution of mercury based products/ discouraging disposable syringes etc.)

Training :

Proper education and training must be offered to all workers from Doctors to ward-boys , labourers to ensure an understanding of the risks that wastes pose, how to protect themselves and how to manage wastes, specially segregation .

Development of an infrastructure for the said disposal and recycling for hazardous materials

There is little observable capacity for the management , treatment, recycling or final disposal of hazardous wastes in India (e.g. chemicals, mercury, batteries). Recovery technology for silver from developing solution is only available.
Onsite reprocessing technology is not available for other materials. These technologies are required but may be cost prohibitive at this time.
The development of an industry which is capable of managing hazardous wastes is essential.
Pollution prevention and the choice of less hazardous or non-hazardous mateial is the only real option left.

Development of an infrastructure for the said disposal for municipal solid waste.

Sanitary landfill, Sewege treatment plants & other waste management facilities is required.

This is to be remembered that out of total waste - 50% organic and a large segment includes recyclable material .Only a small portion requires actual disposal.

With clear cut motivation, problem of land / segregated transportation etc can be sorted out. At this juncture minimum infrastructural support is being given by the WBHSDP with a view to develop a system.

Plans and policies

Hospitals should develope clear plans and policies
They need to be integrated into routine employee training , continuing education and hospital management evaluation pocesses for systems and personnel.
Investment in training an equipment for reprocessing or supplies.
Legislation (ammendment of Municipal & panchayet act).
The science of the reprocessing of equipment and materials for reuse in medical facilities , as being practiced should be supported.
A reprocessing industry must however be supported with investment in proper equipment and training so that it is carried on in a safe and efficient manner.
Investment in environmentally sound and cost effective medical waste treatment and disposable technologies.

Proper segregation and pollution prevention, combined with a clear definition of the problem and the goal will provide the best, most environmentally safe and cost-effective solution to waste problem.

GOVT. OF WEST BENGAL
HEALTH & FAMILY WELFARE DEPARTMENT
Project Branch
GN 29, BIDHAN NAGAR, SECTOR-V, CALCUTTA-91.

No. 801(18)/HF/P/PC/ 1W-5/97 Dated 4th April, 2000

From : S.K.Das
Joint Secretary (Project)

To : 1-17) District Magistrate & Chief Project Manager
---------- (All)
18) Principal Secretary, DGHC.
Lalkothi, Darjeeling

Sub. - Implementation of Health care waste management scheme in project hospitals - **standard estimate for infectious waste disposal "burial pit".**

Sir,

I am directed to send you the district-wise standard estimate for construction of " burial pit " in the Municipal disposal ground required for scientific disposal of red bags (infectious waste) while implementing the health care waste management scheme in project hospitals. The estimate is for a single unit (2 pit at a time).

A copy of engineering design is also enclosed alongwith. An estimate based on this design may kindly be prepared by the Municipal Engineer and if the estimated value is within this standard estimate for the particular district - the work may be undertaken.

A copy of the estimate may please be send while asking for placement of fund.

Considering the available project time period the work may kindly be initiated at an earliest.

Thanking you,

Yours faithfully

(S.K.Das)

Dated ~~8th November, 1999~~ 4th April 2000

ENCLO: As stated.

No. /HF/P/PC/ 1W-5/97
Copy to :
1) Secretary, Health, DGHC, Darjeeling
2) Dr. B.N.Gupta, Adl. Dir (P)
3) Assistant Secretary, Project
4) Sri S. Ghosh, E.E, Project
5) Chief Engineer (P)
6) P A to Project Director.

Joint Secretary (Project)

2pit/akg/4.4

STANDARDISED ESTIMATE FOR WASTE DISPOSAL BURIAL PIT(SINGLE UNIT) (2 PIT AT A TIME) AT DIFFERENT DISTRICTS

SL NO	ITEM OF WORKS	QTY.	Unit	DISTRICT													
				24 Parganas(N/S)		HOWRAH/HOOGHLY		MIDNAPORE/ BANKURA		BURDWAN-I		BURDWAN-II (Asansol/Durgapur)		BIRBHUM		PURULIA	
				RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
1	Earthwork in excavation of foundation .....complete.Depth of excavation upto 3 M	355	Cu.M	45	15975	38	13490	22	7810	20.5	7277.5	20.5	7277.5	19	6745	19	6745
2	Earth work in filling in comound ..... Complete.	340	CUM	17.4	5916	16	5440	12	4080	12	4080	12	4080	11	3740	11	3740
3	compacted earth (clay layer) .... Complete (150 thick compaction at a time)	15	CUM	20	300	18	270	14	210	14	210	14	210	12	180	12	180
4	Reinforced cement concrete (4:2:1)	50	CUM	2373	118650	2210	110500	2196	109800	2115	105750	2002	100100	1988	99400	1960	98000
5	Reinforcemetn for R.C. work ...	200	KG	21	4200	21	4200	21	4200	21	4200	21	4200	21	4200	21	4200
6	Brick work wigth 1st calss brick in cement mortar (6:1) in foundation & plinth	12	Cu.M	1602	19224	1535	18420	1367	16404	1622	19464	1600	19200	1379	16548	1409	16908
7	15 mm plaster to wall (1:6)... (inside)	24	Sq.M	45	1080	36	864	36	864	37	888	36	864	36	864	36	864
8	Neat cement punning ...	24	Sq.M	15	360	14.7	352.8	11.75	282	13.3	319.2	13.3	319.2	13.3	319.2	13.3	319.2
9	Supply , fitting & fixing of Polythine pipes with specials etc including perforation of 2.5 MM dia holes (upto 30 holes per litre) 75 dia pipe	85	M	82	6970	82	6970	82	6970	82	6970	82	6970	82	6970	82	6970
10	Supplying and laying polythene sheet ..... (150 gm/sqm)	320	Sq. M	8	2560	8	2560	8	2560	8	2560	8	2560	8	2560	8	2560
11	Supplying and laying geomembrane HDPE 2.5 mm including jointing, sealing etc. complete	320	Sq. M	3	960	3	960	3	960	3	960	3	960	3	960	3	960
12	Filling with Jhama Khoa (75 mm to 150 mm size)	20	Cu.M	400	8000	400	8000	400	8000	400	8000	400	8000	400	8000	400	8000
13	Supplying angle iron post (40X40X6)	460	Kg	24	11040	24	11040	24	11040	24	11040	24	11040	24	11040	24	11040
14	Fixing post of iron including base concreting etc. complete	40	No.	107	4280	107	4280	107	4280	107	4280	107	4280	107	4280	107	4280
15	MS Gate made of MS frame with intermediate stiffner round or square bar etc. With MS sheet not less than 2 mm thick etc.(upto 750 mm depth & dia upto 400 mm) ..... complete	60	Kg.	30	1800	30	1800	30	1800	30	1800	30	1800	30	1800	30	1800
16	Supplying fitting & fixing chainlink mesh of aproved brand etc. complete (50 mm X 50 mm x 8 g)	220	Sq.M	241	53020	241	53020	241	53020	241	53020	241	53020	241	53020	241	53020
	Subtotal				254335		242166.8		232280		230818.7		224880.7		220626.2		219586.2
	Add 5% Contingencies				12716.75		12108.34		11614.00		11540.94		11244.04		11031.31		10979.31
	Total				267051.8		254275.1		243894		242359.6		236124.7		231657.5		230565.6
	say				267100		254300		243900		242400		236150.00		231700		230600

STANDARDISED ESTIMATE FOR WASTE DISPOSAL BURIAL PIT(SINGLE UNIT) (2 PIT AT A TIME) AT DIFFERENT DISTRICTS

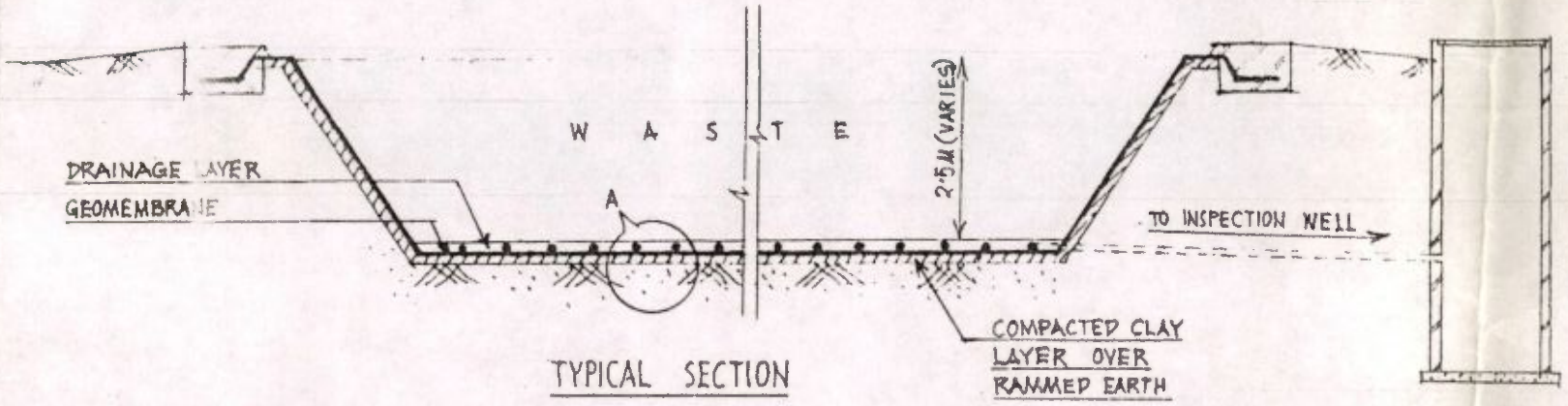
ITEM OF WORKS	QTY.	Unit	DISTRICT													
			DARJEELING(HILL)		JALPAIGURI/ DARJEELING(PLANE)		COOCHBEHAR		DINAJPUR (N/S)		MALDA		MURSHIDABAD		NADIA	
			RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
Earthwork in excavation of foundation .....complete.Depth of excavation upto 3 M	355	Cu.M	29	10295	23	8165	23	8165	23	8165	21	7455	21	7455	21	7455
Earth work in filling in comound ..... Complete.	340	CUM	15	5100	12	4080	12	4080	12	4080	11	3740	11	3740	11	3740
compacted earth (clay layer) .... Complete (150 thick compaction at a time)	15	CUM	18	270	13	195	13	195	13	195	12	180	12	180	12	180
Reinforced cement concrete (4:2:1)	50	CUM	2502	125100	1729	86450	1770	88500	1997	99850	2064.3	103215	2081.25	104062.5	2203	110150
Reinforcemetn for R.C. work ...	200	KG	25.2	5040	21	4200	21	4200	21	4200	21	4200	21	4200	21	4200
Brick work wigth 1st calss brick in cement mortar (6.1) in foundation & plinth	12	Cu.M	2286	27432	1472	17664	1472	17664	1538	18456	1277.5	15330	1332.95	15995.4	1391.95	16703.4
15 mm plaster to wall (1:6)... (inside)	24	Sq.M	50	1200	43	1032	43	1032	44	1056	37	888	45	1080	50	1200
Neat cement punning ...	24	Sq.M	12	288	10	240	10	240	10	240	10.9	261.6	10.9	261.6	10.9	261.6
Supply , fitting & fixing of Polythine pipes with specials etc.including perforation of 2.5 MM dia holes (upto 30 holes per Mitre) 75 dia pip	85	M	100	8500	82	6970	82	6970	82	6970	82	6970	82	6970	82	6970
Supplying and laying polythene sheet ..... (150 gm/sqm)	320	Sq. M	9.6	3072	8	2560	8	2560	8	2560	8	2560	8	2560	8	2560
Supplying and laying geomembran HDPE 2.5 mm including jointing, sealing etc complete	320	Sq. M	3.6	1152	3	960	3	960	3	960	3	960	3	960	3	960
Filling with Jhama khoa (75 mm to 150 mm size)	20	Cu.M	480	9600	400	8000	400	8000	400	8000	400	8000	400	8000	400	8000
Supplying angle iron post (40X40X6)	460	Kg	28.8	13248	24	11040	24	11040	24	11040	24	11040	24	11040	24	11040
Fixing post of iron including base concreting etc. complete	40	No.	128	5120	107	4280	107	4280	107	4280	107	4280	107	4280	107	4280
MS Gate made of MS frame with intermediate stiffner round or square bar etc. With MS sheet not less than 2 mm thick etc.(upto 750 mm depth & dia upto 400 mm) ..... complete	60	Kg.	36	2160	30	1800	30	1800	30	1800	30	1800	30	1800	30	1800
Supplying fitting & fixing chainlink mesh of aproved brand etc. complete (50 mm X 50 mm x 8 g)	220	Sq.M	289	63580	241	53020	241	53020	241	53020	241	53020	241	53020	241	53020
Subtotal				281157		210656		212706		224872		223899.6		225604.5		232520
Add 5% Contingencies				14057.85		10532.80		10635.30		11243.60		11194.98		11280.23		11626.00
Total				296214.86		221188.80		223341.3		236116.6		235094.6		236884.7		244146
Say				296260		221200		223360		236160		235100		236900		244150

STANDARDISED ESTIMATE FOR WASTE DISPOSAL BURIAL PIT(SINGLE UNIT) (2 PIT AT A TIME) AT DIFFERENT DISTRICTS

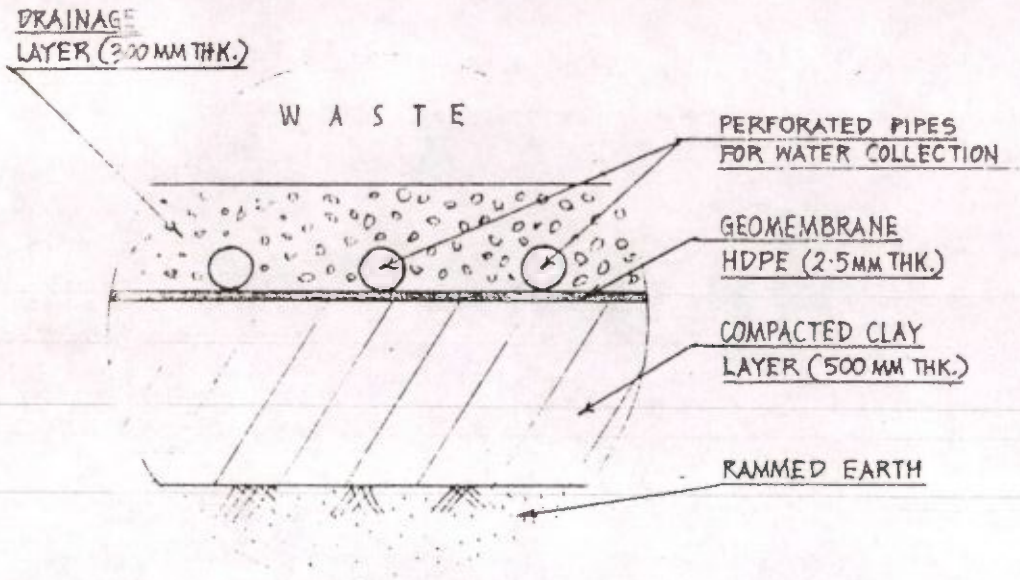
	ITEM OF WORKS	QTY.	Unit	DISTRICT													
				DARJEELING(HILL)		JALPAIGURI/ DARJEELING(PLANE)		COOCHBEHAR		DINAJPUR (N/S)		MALDA		MURSHIDABAD		NADIA	
				RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
1	Earthwork in excavation of foundation .....complete.Depth of excavation upto 3 M	355	Cu.M	29	10295	23	8165	23	8165	23	8165	21	7455	21	7455	21	7455
2	Earth work in filling in comound ..... Complete	340	CUM	15	5100	12	4080	12	4080	12	4080	11	3740	11	3740	11	3740
3	compacted earth (clay layer) Complete (150 thick compaction at a time)	15	CUM	18	270	13	195	13	195	13	195	12	180	12	180	12	180
4	Reinforced cement concrete (4:2:1)	50	CUM	2502	125100	1729	86450	1770	88500	1997	99850	2064.3	103215	2081.25	104062.5	2203	110150
5	Reinforcemetn for R.C. work	200	KG	25.2	5040	21	4200	21	4200	21	4200	21	4200	21	4200	21	4200
6	Brick work wgth 1st calss brick in cement mortar (6:1) in foundation & plinth	12	Cu.M	2286	27432	1472	17664	1472	17664	1538	18456	1277.5	15330	1332.95	15995.4	1391.95	16703.4
7	15 mm plaster to wall (1:6)... (inside)	24	Sq.M	50	1200	43	1032	43	1032	44	1056	37	888	45	1080	50	1200
8	Neat cement punning ...	24	Sq.M	12	288	10	240	10	240	10	240	10.9	261.6	10.9	261.6	10.9	261.6
9	Supply , fitting & fixing of Polythine pipes with specials etc.including perforation of 2.5 MM dia hole (upto 30 holes per Mitre) 75 dia pipe	85	M	100	8500	82	6970	82	6970	82	6970	82	6970	82	6970	82	6970
10	Supplying and laying polythene sheet ..... (150 gm/sqm)	320	Sq. M	9.6	3072	8	2560	8	2560	8	2560	8	2560	8	2560	8	2560
11	Supplying and laying geomembrane HDPE 2.5 mm including jointing, sealing etc complete	320	Sq. M	3.6	1152	3	960	3	960	3	960	3	960	3	960	3	960
12	Filling with Jhama khoa (75 mm to 150 mm size)	20	Cu.M	480	9600	400	8000	400	8000	400	8000	400	8000	400	8000	400	8000
13	Supplying angle iron post (40X40X6)	460	Kg	28.8	13248	24	11040	24	11040	24	11040	24	11040	24	11040	24	11040
14	Fixing post of iron including base concreting etc complete	40	No.	128	5120	107	4280	107	4280	107	4280	107	4280	107	4280	107	4280
15	MS Gate made of MS frame with intermediate stiffner round or square bar etc. With MS sheet not less than 2 mm thick etc (upto 750 mm depth & dia upto 400 mm ..... complete	60	Kg.	36	2160	30	1800	30	1800	30	1800	30	1800	30	1800	30	1800
16	Supplying fitting & fixing chain link mesh of aproved brand etc. complete (50 mm X 50 mm x ...g)	220	Sq.M	289	63580	241	53020	241	53020	241	53020	241	53020	241	53020	241	53020
	Subtotal				281157		210656		212706		224872		223899.6		225604.5		232520
	Add 5% Contingencies				14057.85		10532.80		10635.30		11243.60		11194.98		11280.23		11626.00
	Total				296214.85		221188.80		223341.3		236115.6		236094.6		236884.7		244146
	Say				296250		221200		223360		236160		236100		236900		244160

ESTIMATE RURAL - EXL

MUNICIPAL BURIAL PIT



TYPICAL SECTION



DETAIL AT 'A'

NOTE :
HYDRAULIC CONDUCTIVITY OF COMPACTED CLAY LAYER = 10^{-7} CM/SEC.

STATE HEALTH SYSTEMS DEVELOPMENT PROJECT - II

SCHEMATIC DESIGN OF BURIAL PIT
FOR INFECTIOUS WASTE COLLECTION

No. 249/CMDA/FW(US)/IPP-VIII/I-17/2000 22nd August, 2000.

ORDER

Administrative approval and financial sanction is hereby accorded to the implementation of bio-waste management scheme in Municipal Hospitals/Maternity Homes/ESOPDs/ Laboratories including Regional Diagnostic Centres created under the F.W. (US) Project -IPP-VIII, Calcutta in 10 (ten) local bodies at the initial phase viz., (i) Naihati (ii) North Barrackpore (iii) New Barrackpore (iv) Dum Dum (v) Madhyamgram (vi) Rajpur - Sonarpur (vii) Budge Budge (viii) Uttarpara - Kotrung (ix) Bhadreswar and (x) Chandannagar at a total cost of Rs. 29.37 lakhs in the following manner :-

1. Civil construction cost for burial pits [2(two) units at a time] @ Rs. 2.37 lakhs x 10 = Rs. 23.70 lakhs.
2. Purchase of covered cycle vans for transportation of the infected Wastes from the Health Institutions to burial pit @ Rs. 12000 x 10 = Rs. 1.20 lakhs.
3. a) Procurement of disposables per municipality per year : 5 nos of plastic vats with cover, plastic bags (inner lining) of 4 colours @ Rs. 6300 x 2 (one time replacement) per unit x 10 = Rs. 1.26 lakhs.

   b) Purchase of chemical disinfectants, Kerosine oil for ~~burning polythene (plastic) bags after emptying the same in the burial pit~~ @ Rs. 3000 per unit x 10 = Rs. 0.30 lakhs.

   c) Procurement of rubber gum boots, rubber gloves @ Rs. 1500 per unit x 10 = Rs. 0.15 lakhs.

   Total of 3(a), (b) & (c) = Rs. 1.71 lakhs.

4. Operation and Maintenance :
   a) Salary of cycle van puller @ Rs. 100/- per day x 3 days per week x 52 weeks x 10 = Rs. 1.56 lakhs

   b) Contingency @ Rs. 12000 p.a. per unit x 10 = Rs. 1.20 lakhs

   Total of 4 (a) & (b) = Rs. 2.76 lakhs

   Grand Total: 1 + 2 + 3 + 4 = Rs. 29.37 lakhs.

The concerned municipalities shall prepare estimate through the Municipal Engineers based on the standard design of the State Health System Development Project for civil construction of burial pits within the sanctioned cost indicated in this order and shall undertake the construction as early as possible as well as take follow-up actions on the construction of burial pits are completed by December, 2000.

The cost involved will be met from the provision under the head " Innovative Schemes " in the budget of FW(US) Project - IPP-VIII, Calcutta during the project period.

The Chairpersons of the concerned municipalities are being informed.

Project Director,
IPP-VIII & Secretary,
CMDA

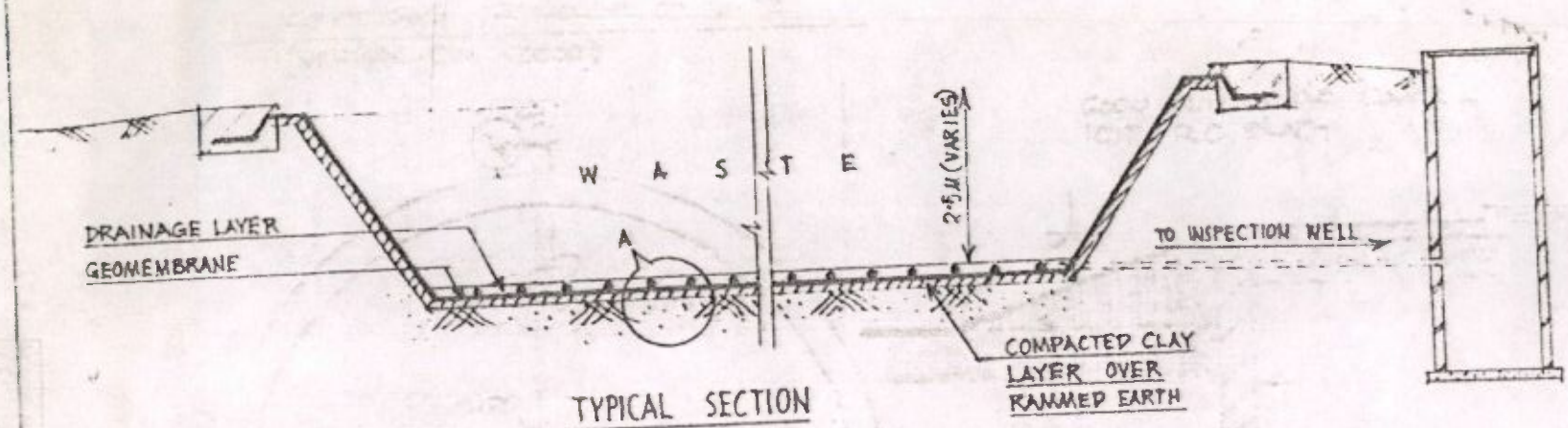
[P.T.O]

/1(Pf.)
No.12-9/CMDA/FW(US)/IPP-VIII/I-17/2000 22nd August, 2000.

Copy forwarded for information and necessary action to :-

1. The C.E.O., CMDA.
2. The D.G.O.F. , CMDA.
3. The Chairperson _____ . A copy each of the standard design and standard estimate prepared by the State Health System Development Project is enclosed. A site map where the burial pits are proposed to be constructed be forwarded to the undersigned along with a certificate from the chairperson that civil construction work for burial pits could be executed within the ceiling limit of sanctioned estimate of Rs. 2.37 lakhs.
4. The C.E.(P &M), CMDA
5. Accounts Officer- I, IPP-VIII, CMDA

Chief of Health
IPP-VIII/CMDA 22/8/2000



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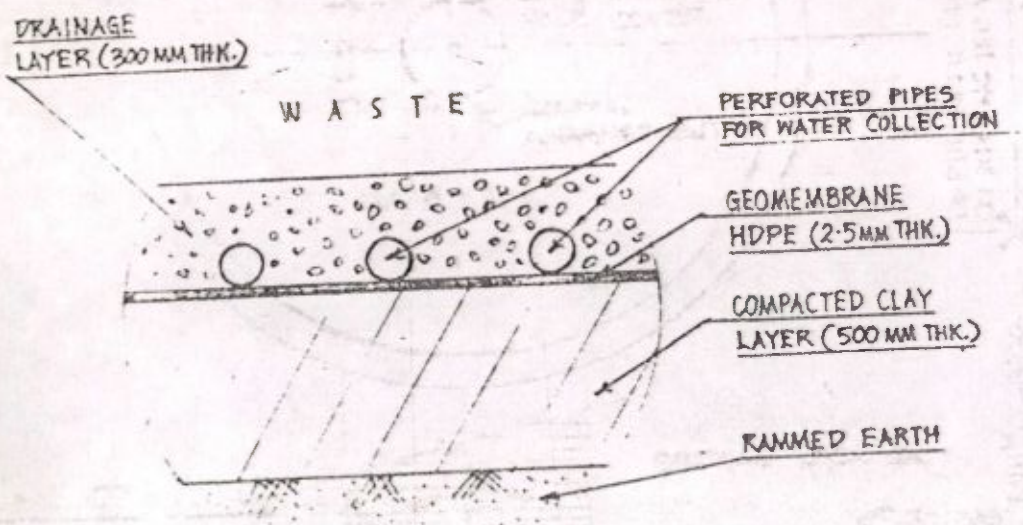

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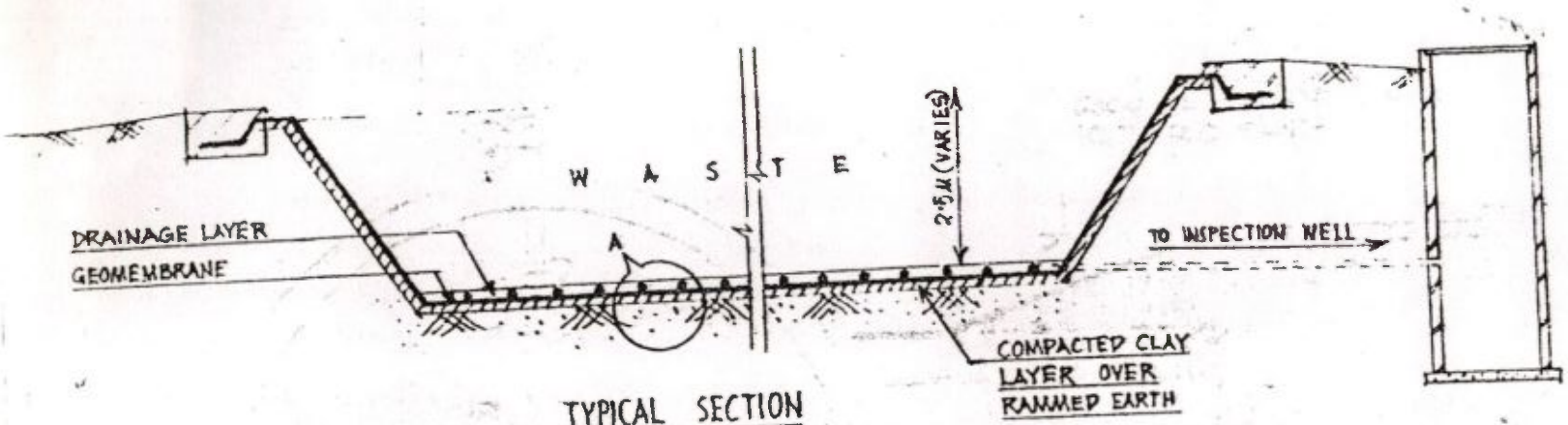
STATE HEALTH SYSTEMS DEVELOPMENT PROJECT - II

SCHEMATIC DESIGN OF BURIAL PIT
FOR INFECTIOUS WASTE COLLECTION

BASIC DRG.



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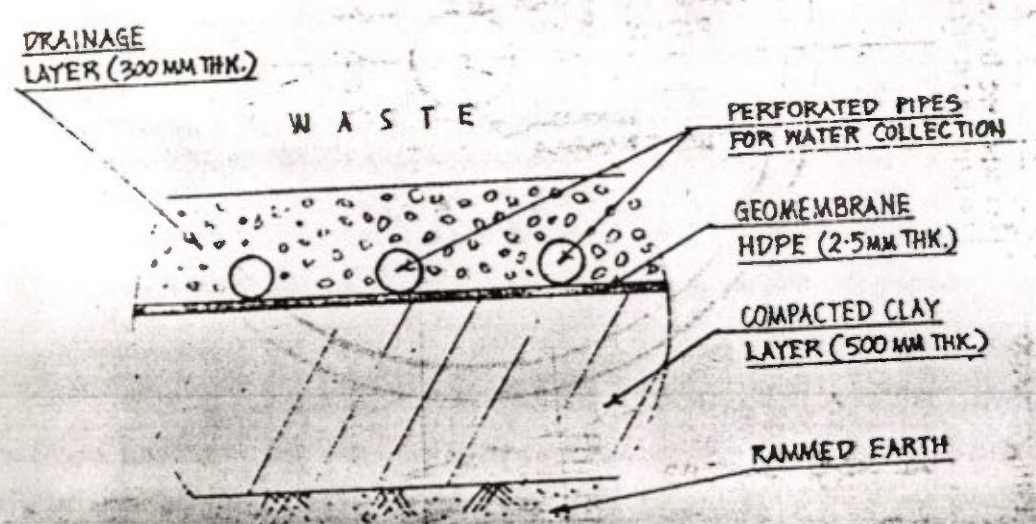

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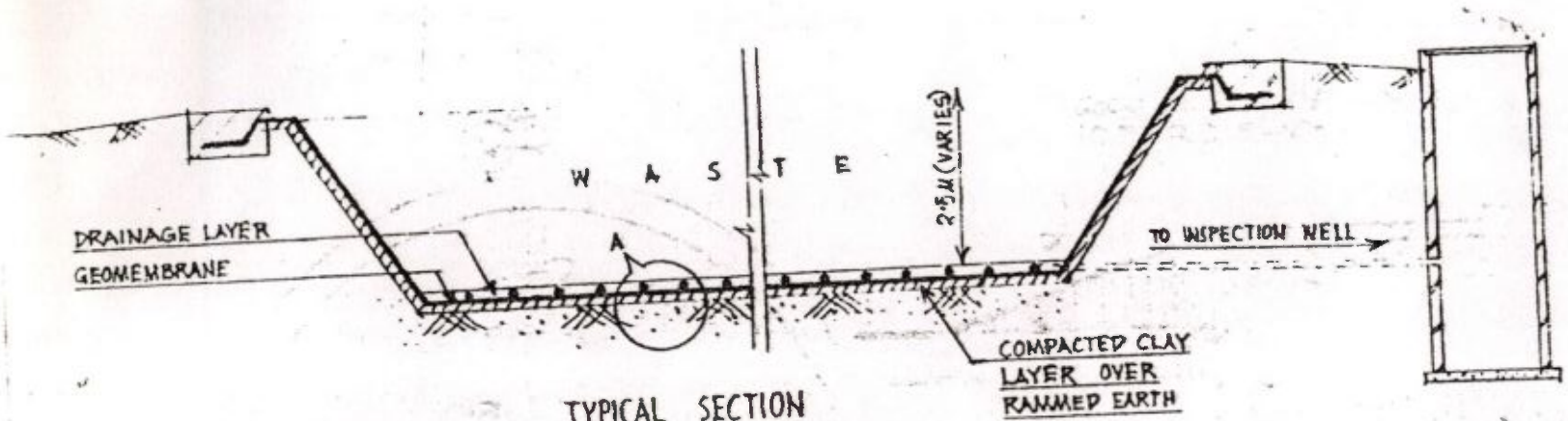

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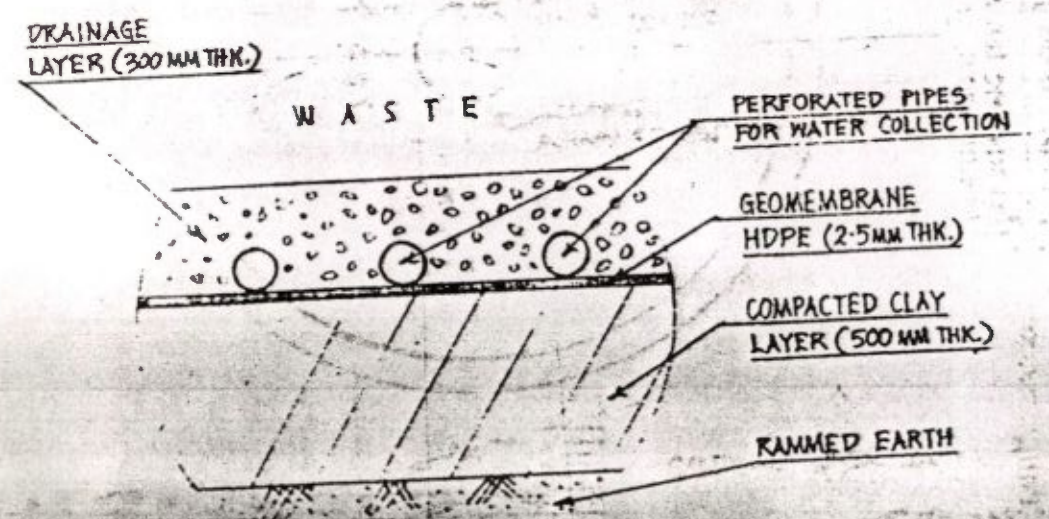

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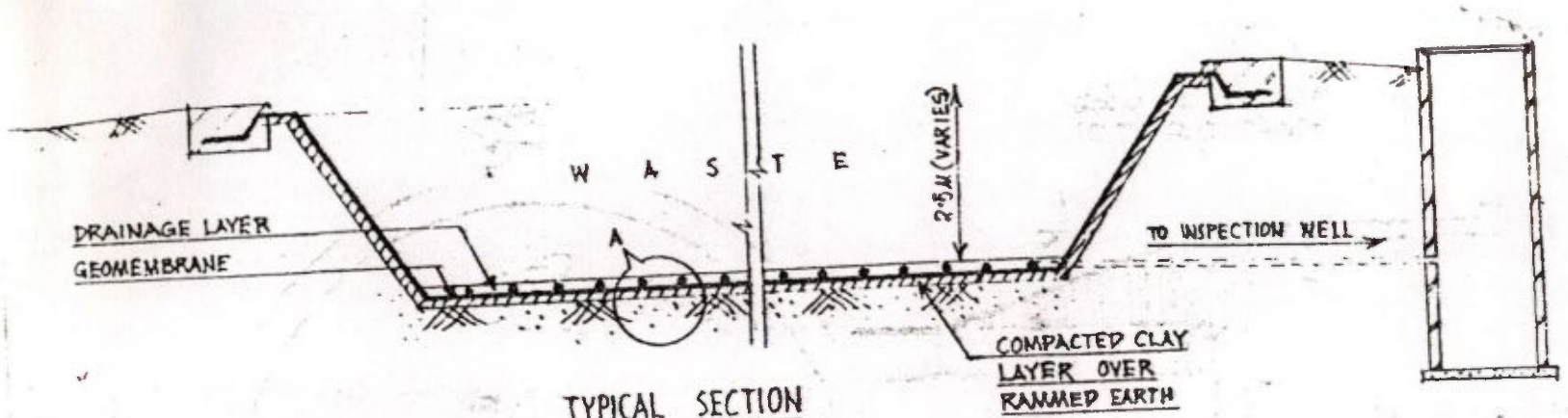

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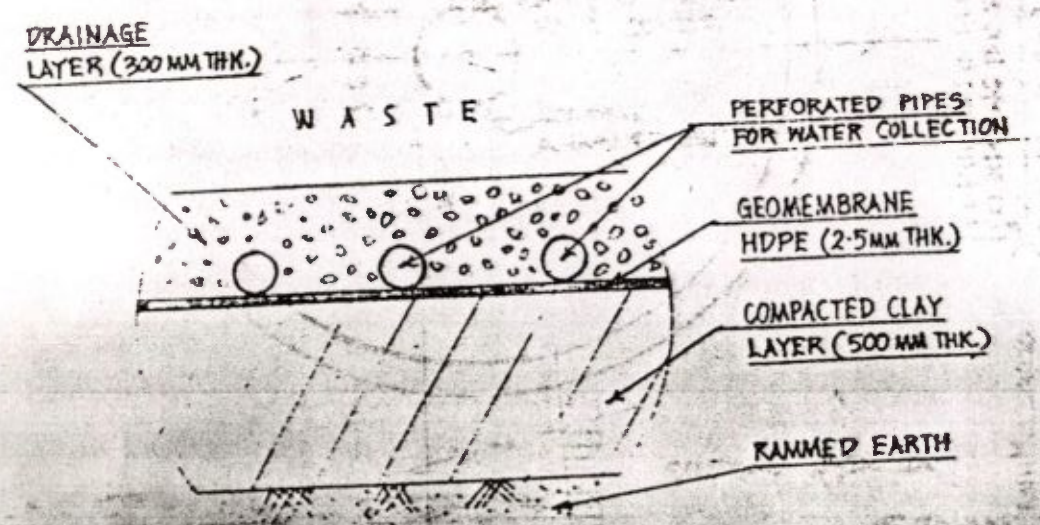

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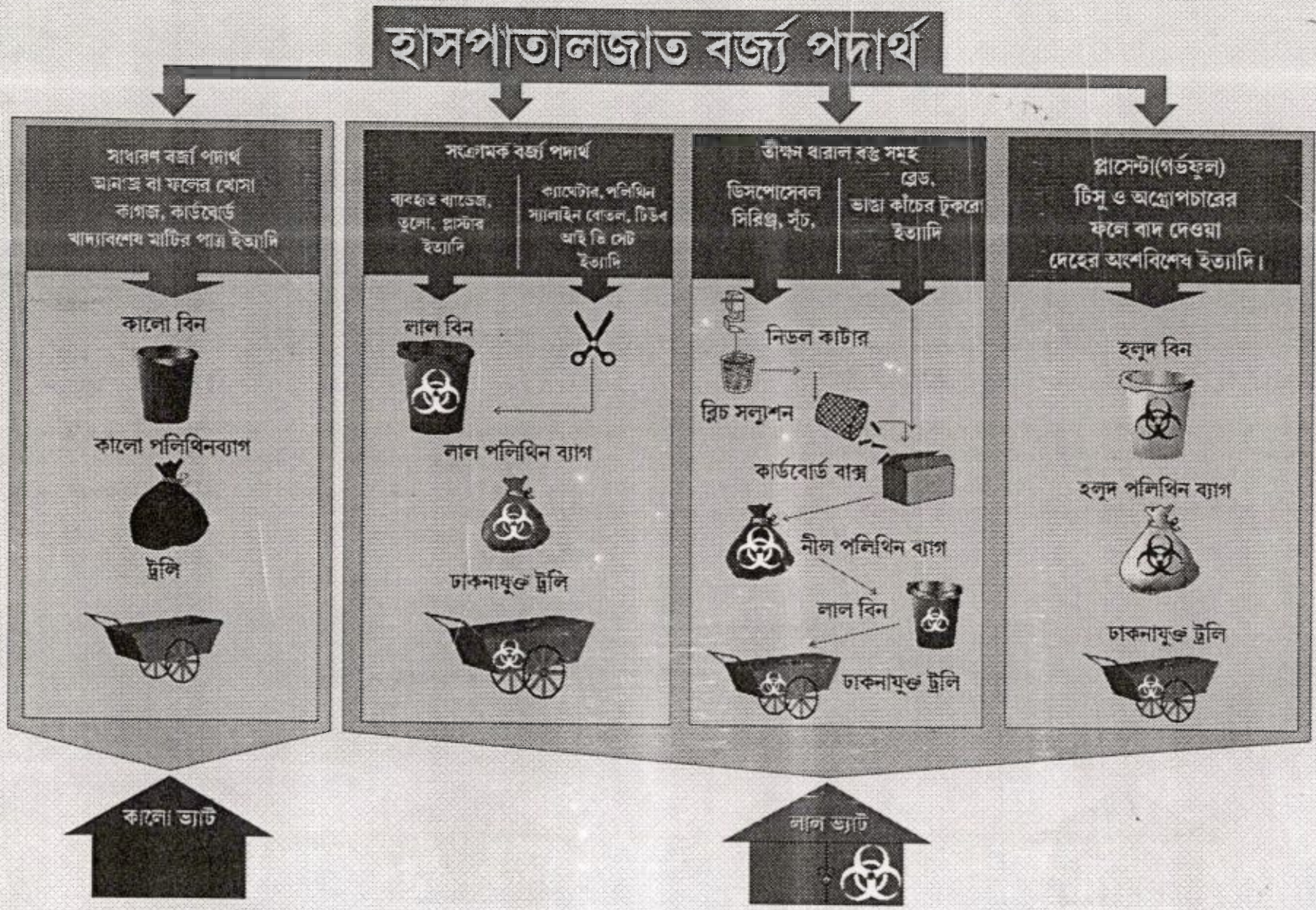
STATE HEALTH SYSTEMS DEVELOPMENT PROJECT - II

SCHEMATIC DESIGN OF BURIAL PIT FOR INFECTIOUS WASTE COLLECTION

BASIC DRG.

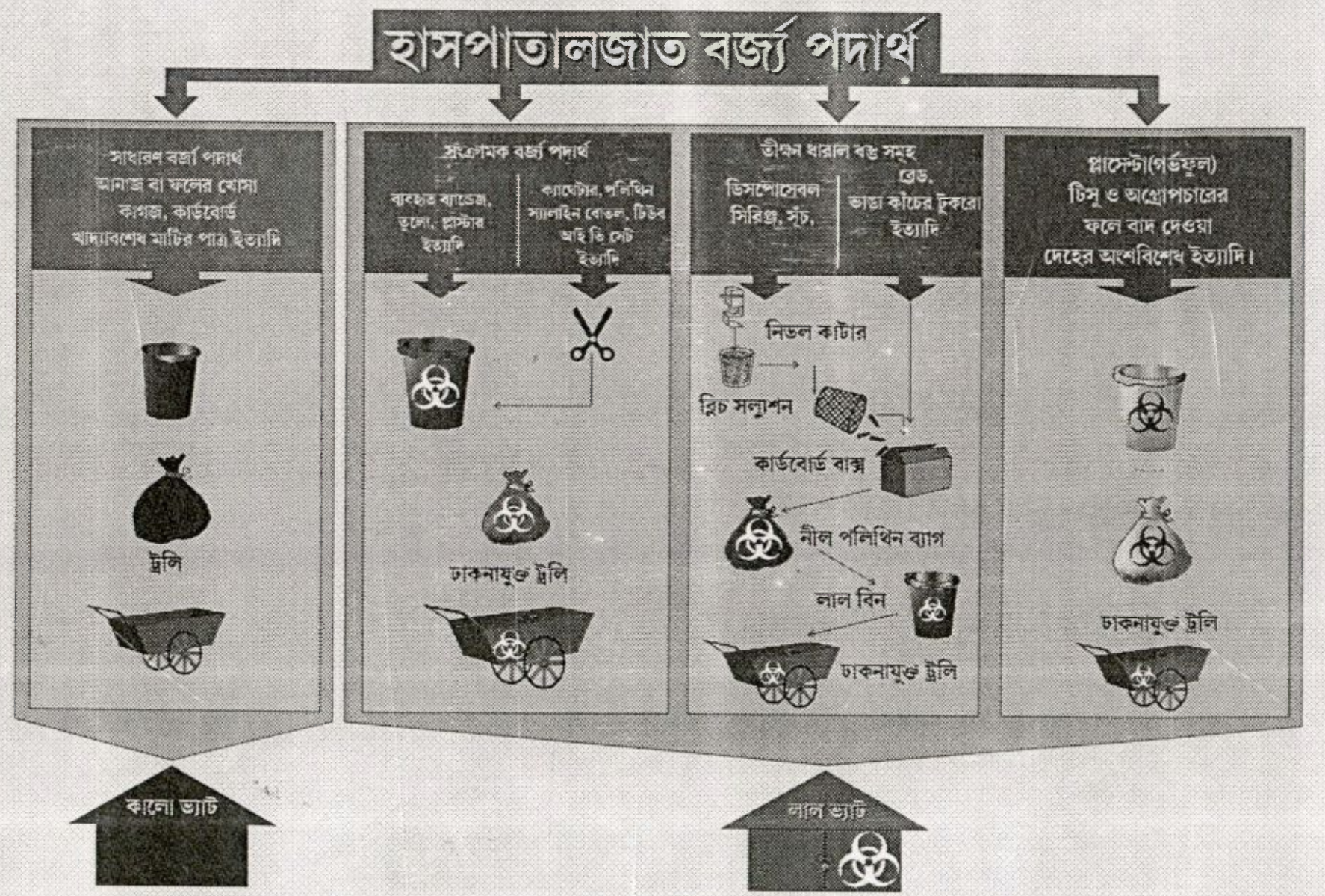
হাসপাতালজাত বর্জ্য পদার্থ নিয়ন্ত্রণ কর্মসূচী



পশ্চিমবঙ্গ স্বাস্থ্য ব্যবস্থা উন্নয়ন প্রকল্প

পশ্চিমবঙ্গ সরকার

হাসপাতালজাত বর্জ্য পদার্থ নিয়ন্ত্রণ কর্মসূচী



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পরিচ্ছন্ন হাসপাতাল সুস্থ দেশের রক্ষাতল

পশ্চিমবঙ্গ স্বাস্থ্য ব্যবস্থা উন্নয়ন প্রকল্প
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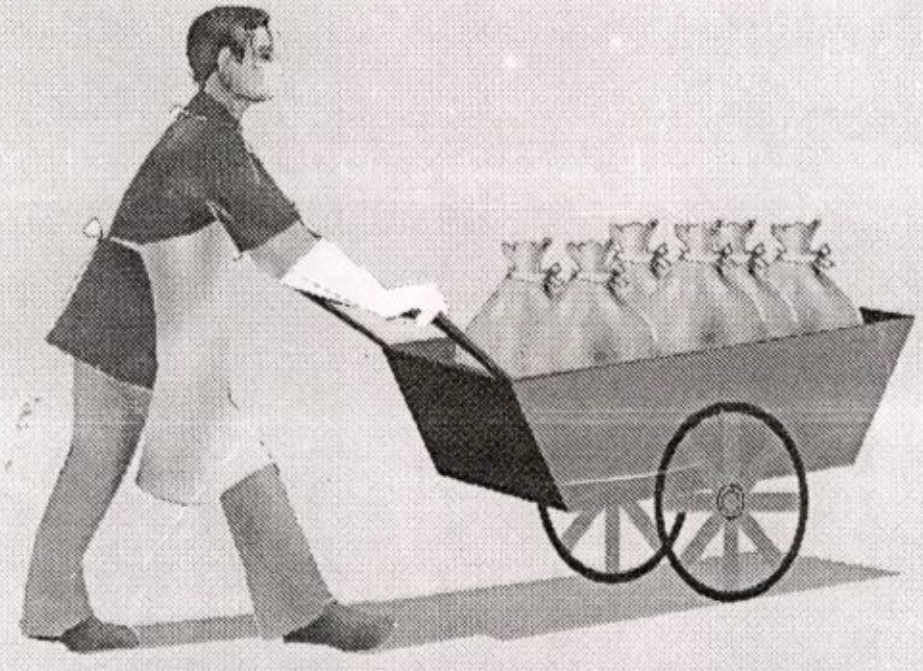
ভীড় বাড়ালে রোগীর বেড়ে দেরী হবে সুস্থ হতে

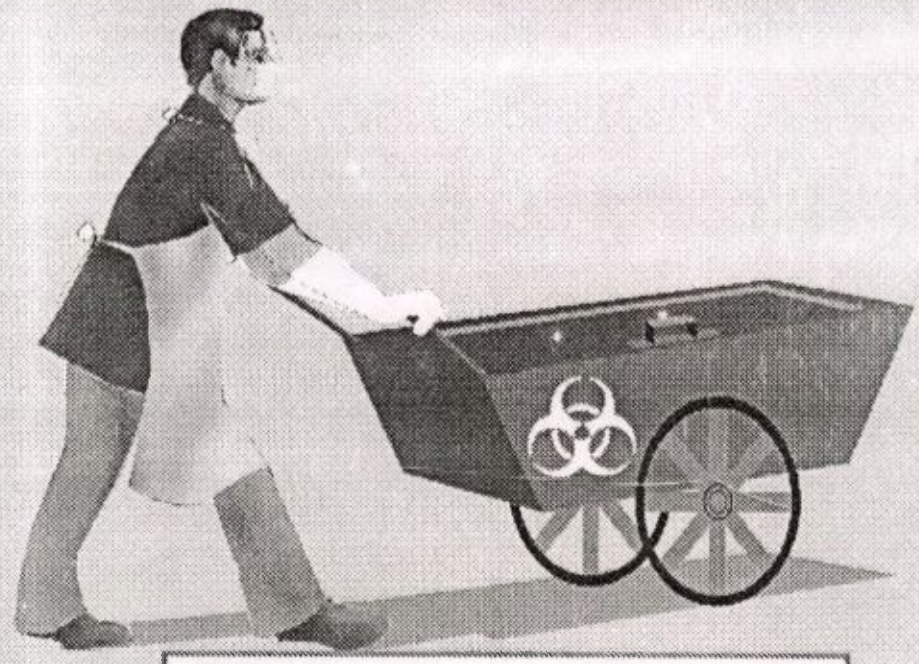
পশ্চিমবঙ্গ স্বাস্থ্য ব্যবস্থা উন্নয়ন প্রকল্প

পশ্চিমবঙ্গ সরকার

হাসপাতালজাত বর্জ্য পদার্থ নিয়ন্ত্রণ কর্মসূচী



সংগৃহীত বর্জ্য পদার্থ ট্রলিতে করে নিয়ে ভ্যাটে রাখুন



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রক্তমাখা গজ বা তুলো
নোংরা কাপড় - ব্যান্ডেজগুলো
সংক্রামক চিনে নিন
লাল পাত্রে ফেলে দিন

পশ্চিমবঙ্গ স্বাস্থ্য ব্যবস্থা উন্নয়ন প্রকল্প
পশ্চিমবঙ্গ সরকার

হাসপাতালজাত বর্জ্য পদার্থ নিয়ন্ত্রণ কর্মসূচী

বর্জ্য পদার্থ নিয়ে কাজ করার সময় নিরাপত্তামূলক পোষাক পরিধান করুন।

পশ্চিমবঙ্গ স্বাস্থ্য ব্যবস্থা উন্নয়ন প্রকল্প
পশ্চিমবঙ্গ সরকার

An overview of Medical waste management activities in USA vis-a-vis ongoing practices in West Bengal

Acts/regulations governing M W M in USA

- The R C R A, '76 - Resource Conservation & Recovery Act - framework for management & disposal of solid waste, including industrial toxic waste. To protect human health & environment from solid & hazardous waste
- The M W T A, '88 - Medical Waste Tracking Act - specific guidelines on regulated medical waste management. Discarded MW found in US seabeaches = addresses the def^{n}, collection, segr^{n}, storage, packaging, transportation & treatment of RMW
- The O S H A, '70 - Occupational Safety & Health Act - regulates the handling, containment, labeling and storage of regulated medical waste (RMW) through the 'blood-borne pathogen standard' to prevent injuries / risk to workers (No such matching ACT in India).

The most basic workers' safety legislation

It provides for standards of even exposure to ethylene oxide, formaldehyde.

Serious & wilful violation attracts exhaustive fine & imprisonment

- The H M R - Hazardous Material Regulations (HMR).
- The Clean Air Act, 1970, The Clean Water Act, 1970.

Authorises EPA to regulate source of pollution, to compel the air polluters to setup expensive but effective technology

It addresses the quality of drinking water & ground water. It regulates release of chemicals through drain viz. HCHO, chemotherapy waste, X-ray/film developer etc.

Acts/regulations governing M W M in India

- The Environment Protection Act, 1986.
- The Bio-medical Waste (Management & Handling) Rules, 1998.
- The Water Act, 1974.
- The Air Act, 1981.
- The Hazardous Waste Management Rules, 1989 (Hazardous Industrial & Chemical Waste Rules.
- The Atomic Energy (Safe disposal of radioactive waste) Rules, 1989

Deptt./agencies associated with M W M in USA

- Environmental Protection Agency (EPA) - the Regulatory authotity.
- American Health Association (AHA)/State Health Association.
- Deptt. Of Public Health & Environment (State DOH).
- Deptt. of Environmental Conservation (State DEC).
- Deptt. Of Transport (State D O T) - Research & Special Program Administration.
- Deptt. Of Labour - Occupational Safety & Health Administration.

  (EPA & AHA are striving to help hospitals reduce production of medical waste).

DOH & DEC jointly administer state programmes.

Deptt./agencies associated with M W M in India

- Ministry of Environment & Forest, GOI.
- Ministry of Health & Family Welfare, GOI/DOH&FW.
- Central Pollution Control Board(CPCB)/WBPCB.

Genl – 55-65%.
Inf except sharps & path – 15-25%.
Sharps – 8-15%.
Path/ana – 0·8-8%.

Medical Waste Management Practices

Sl.No.	USA	West Bengal
1	Regular orientation programme of staff on modern MWM - personal protective equipment provided	Started recently, PPE provided
2	Segregation of wastes e.g. general, infectious & hazardous, sharps radio-active, pathological sincerely done at source	Started for general, infectious and hazardous waste (Sharp, non-sharp, pathological)
3	Appropriate colour coding and tracking followed - black, red, yellow with biohazard symbol	Black, red and blue, yellow colour coding with plastics & biohazard symbol & cytotoxic 'C' symbol
4(i)	Sharp - Collected in a rigid puncture - resistant container, no cutting or crushing, cleared once a week by Vendor, Off-site Autoclaving, Shredding & then transferred to landfill Container re-used	Cut in a syringe & needle cutter - equipment and decontaminated on-site, collected in a card-board box, cleared within 48 hours along with Red bags Disposal in secured pit

Sl.No.	USA	West Bengal
(ii)	Ana/Patho - Frozen until removed once a week, taken by Vendor for off-site Incineration Container re-used	Collected in yellow bags. i) Disposal in secured Pit along with red bags ii) Given to medicine / cosmetic manufacturer for Reprocessing iii) A study on disposal of Placenta in Vermiculture Pit under consideration (may be suitable in Rural area)
(iii)	Culture & Stocks - Chemical disinfection, all containers disposed in red bags - for treatment (similar with inf. waste) by Vendor-Liquid in Sewer.	Chemical disinfection, some re-used, some disposed in red bags Liquid goes to Sewer.
(iv)	Infectious (Human blood-soaked products) - i) Autoclaved or ii) Microwaved (On-site or Off-site) or iii) Incinerated Off-site All by Vendors (including Transportation).	Transported by Municipality/Contractor & disposed in a secured burial Pit Transportation (of red bags) & Pit const. cost being supported by WBHSDP. Procurement process (for Piloting 3 waste autoclave & 2 Microwave) process is on. ** Campus Pit disposal in Non-Municipal areas.

TREATMENT & DISPOSAL OPTIONS

1. **Chemical disinfection** (Bleach/Na-hypochloride) - cost effective, does not require large investment -
All wastes except body parts and body fluids.
Advisable - Plastic, rubber, glass, metals

2. **Microwave** - M. System uses high frequency waves. The generated heat kills the microbes - All waste except cytotoxic, radioactive, hazardous, body parts & large metal items.
Level III microbial inactivation i.e. Bacillus Subtilis 10^4 or B. Stearothermophilus 10^4

3. **Autoclave** - Uses steam at high temp (121 degree centigrade, 30 psi, 60m - 135 degree centigrade, 60 psi, 30m)

Two types :

(i) **Gravity displacement type** - Air is pushed out by entering steam (left out air pockets reduces the temp. and therefore reduces the efficacy of the system).

(ii) **Pre-vacuum** - a vacuum is created and all the air from the chamber is removed.
All waste except body fluids, cytotoxic, radioactive, hazardous, body parts.
Remmains recognizable.

4. **Incineration** - Pathological and other wastes except chlorinated plastics, heavy metals - reduces wt. & vol. - does not reduce risk to the workers - ash also tainted with heavy metals & toxic residues - harmfull emissions - pollution control devices need to be installed - CPCB standards to be followed.
Becomes un-recognizable.

5. **Deep Burial** - ~~does not reduces risk,~~ neither vol. nor wt. is reduced. Infectious waste including body parts can be disposed of in a specially designed pit. Land is a constraint.

Special areas of emphasis on MWM in USA

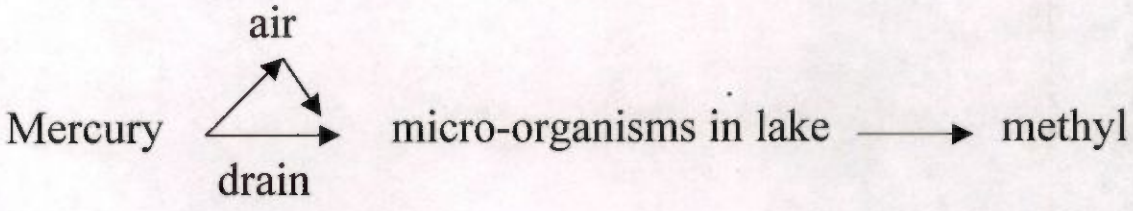
a. Waste reduction - USA - 20-25 lbs/day/bed

India - 1-2 kg/day/bed, WB - 1.0 kg/day/bed

b. Recycle & re-use - Paper, cardboard, plastics, metal glass, X-ray developing solution, laboratory chemicals.

WB - Glass syringe, earthen glass & cup.

c. Substitution -



mercury ⟶ fish ⟶ human beings

1 gram of mercury can contaminate 20 acre lake.Methyl mercury bio-accumulates in muscle tissues of living being - neurotoxin - affects brain, kidney & lever - 80,000 infants & females affected in USA.

Health Care Without Harm (HCWH) campaign launched by 170 organisation - EPA & AHA signed MOU to eliminate use of mercury in health care units by 2005.

Mercury Products	Substitutes
Thermometer	electronic (digital), aneroid
Sphygmomanometer	electronic, aneroid
Batteries	lithium, zink, alkaline
Dental amalgam	gold, ceramic, polymer, porcelin
Lamps & Switches	other types

(ii) **Dioxin** - A common name for a class of 75 chemicals - Toxic waste by-product formed when waste containing chlorine is burnt - PVC (polyvinyl chloride) plastic a major source of chlorine.

Dioxin enters food chain - bioaccumulates in fatty tissues - human carcinogen - affects lever, lung, stomach.

PVC plastics replaced with non-chlorinated plastics e.g. polyethylene or other polyolefins.

(iii) Attempts are on to eliminate use of Ethylene oxide (carcinogen) ↓ sterilizer, formalin (car) ↓ sterilizer, Xylene (toxic) used in lab as clearing agent, solvent

Lessons Learnt

1. Regional approach of off-site decontamination of infectious and hazardous waste by vendors.

ADB project for Bangalore, AUSAID for Delhi → Centralised MW Treatment facility by end of 2000. Calcutta, Silliguri, finally districts –

2. Co-ordination among DOH&FW, PCB, MA Deptt / Municipalities, PWD

until contracting out of hospitals, treatment & disposal is done, Municipalities play an important role

3. Appropriate procurement policy with objective to reduce waste, to make health care units free from mercury & dioxin

4. Sufficient budgetary support and sustainability of MWM practices

Like procurement of equipment, mercury thermometer ← in budget; – MWM should be a component – one designated office to act as resource person to conduct occasional training – Doctors, nurses need to be trained oriented on MWM for efficient segregation

5. Penal provision and amendment of the provisions of the concerned Acts/Regulations

US legislations are stringent with fines & imprisonment. Ours doesn't provide for penalty ~~except~~

Action Plan on Health care waste Management

1.0 Introduction

Waste generation in hospitals and their disposal has always been a matter of concern to the medical profession ever since hospitals came into existence as institutions. Waste disposal systems in the form of burial, landfilling & incineration were existing. Those practices conformed to the then existing knowledge of public health, epidemiological concept or public health legislations enacted from time to time. No comprehensive law either in a state or the country was however brought forward to deal effectively with the subject.

The apparent risks include :

a) Occupational health hazards to doctors, nurses and other staff patients (nosocomial infection) & attendants.

b) Source of foul odour

c) Blocking of sewers, drains (and by polythene bags) and general unhyginic condition in the hospital premises.

d)Breeding ground for rodents/reptiles, mosquitoes and flies and attracting stray animals

e) Uncontrolled dumping causing underground water contamination

f) Burning causing air-pollution (adding toxogenic gases)

The potential risk include transmission of HIV/AIDS, Hepatitis B or C virus.

Other problems are :

g) Disposables are being repacked & sold without being even washed.

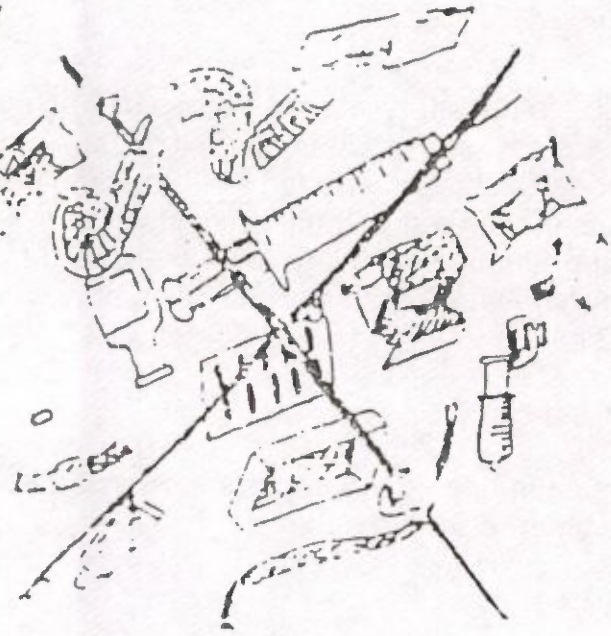
h) Discarded drugs disposed being re-packed & sold.

Therefore, scientific health care waste management should be a part of routine hospital management.

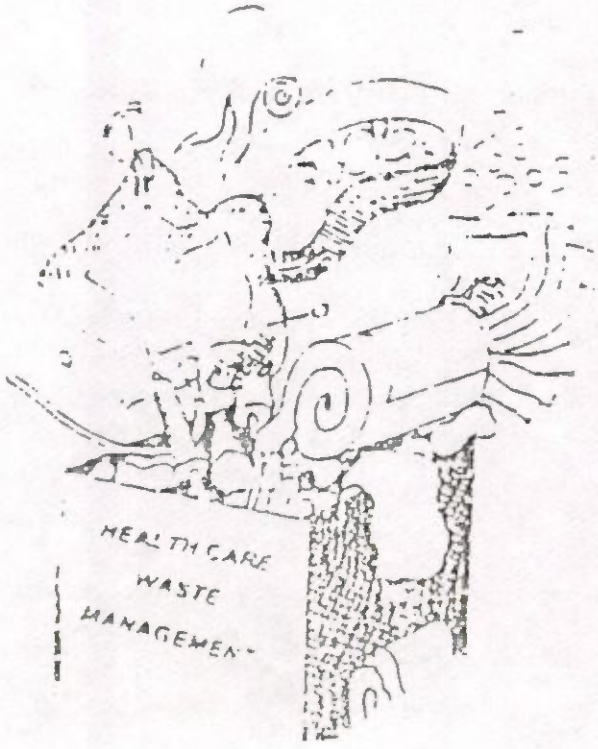
WEST BENGAL HEALTH SYSTEMS DEVELOPMENT PROJECT

Department of Health & Family Welfare

Government of West Bengal



ACTION PLAN
on
HEALTH CARE WASTE MANAGEMENT



Basic requirements such as safe water supply sanitation facilities, disinfection etc. are vital to keep a health care facility clean and safe. Health care waste should be carefully and scientifically handled from the point of generation upto the point of final disposal.

An effective waste management programme is an integral part of a hospital's infection control programme and therefore, critically linked to the quality of patient care as well as the health and safety of hospital workers, visitors and the general public at large. Further, when properly implemented and enforced, effective waste management can have distinct benefits, in terms of improved procurement practices and streamlined consumption of various supplies.

2.0 Composition of hospital wastes:

2.1 Health care wastes is produced in hospitals, health centres, clinics, nursing homes, laboratories, research institutions, vetenerary clinics, midwifery centres and other medical cares conducted at home. The amount of wastes generated varies according to type of facilities. A study estimated that health care waste generated in hospitals is about 1 kg. per bed per day. About 38% of this is infectious and hazardous (infectious non-sharp 14.9 % to 26.78 %; infectious sharp 8.77 % to 15.18 %; pathological 0.8 % to 6.39 %). The rest 62% is non-infectious/ non-hazardous waste (52.29 % to 63.59 %) which implies that ensuring segregation of the first two categories of waste at source is the first and foremost step in waste management. Under the current practice, the infectious and hazardous waste is often mixed with the non-hazardous general waste which multiples the problem in handling the final disposal. Handling of sharps (the hazardous waste) is extremely critical. It calls for separate attention from others disposables in a waste management scheme.

3.0 Segregation in colour coded containers :

Colour coding of collection bins is an easy and effective system of segregating waste at source. The bins should be lined with similar colour plastic bags (non-halogenated). The red / blue/ yellow bins and red / blue/ yellow polythelene bags should be labelled with the internationally accepted ' Biohazard' symbol (symbol of infectious and hazardous material).

A simple system of colour coding is as follows :

3.1 Categories of waste	Colour code of polythelene bags	Colour code of bins
a) General waste(non-hazardous,non-infectious)	Black	Black
b) Infectious waste	Red	red
c) Sharps (after keeping sharps in the Card-board Box)	Blue	Red
d) Pathological	Yellow	Yellow

3.2 This category excludes toxic metals, such as mercury contained in broken thermometers and B.P. apparatus and radio active isotopes. Those items will be put in designated containers and managed accordingly.

3.3 Training, awareness activities and supervision of staff is essential for ensuring segregation at source and handling infectious and hazardous health care waste.

4.0 Collection and storage.

4.1 Each facility i.e. O.T. wards, investigation units, OPD, kitchen, Morgue etc. is to be provided with a set of two plastic bins preferably with lid. The bins should be located just outside and adjacent to the facilities. Further one bin should be kept in all the nursing stations for onsite disinfection of sharps and other infectious material with 1% bleach solution

4.2 The general waste should be put into the black polythelene lined bin.

4.3 All infected materials should be put into the red polythelene lined bin.

4.4 Management of sharps

4.4.1 All sharps should be put in the bleach Solution (1% i.e. 10 gms of Bleaching powder in 1 litre of water) containing bin (one sieved bucket to be kept inside the bin) for onsite disinfection (at least for one hour). However it must be cautioned that the disinfected materials should continue to be treated as hazardous and should be dealt with accordingly.

4.4.2 Needle & nozzoles of disposable syringes should be cut with the neddle cutter prior to being put into the bleach Solution.

4.4.3 The sieved bucket is to be taken out from the bin containing bleach soin. After allowing time for graining out the last drop of bleach soin - the sharps including cut syringes should be put in a card -board box. The box should be tied & then placed in the blue polythelene bag which is then put in the red polythelene lined red bin.

4.5 The cleaning staff should change the polythelene bags when they are 3/4th full. after tying up, it should be placed in the hand driven trolly & the bin shoud be lined with a new polythelene bag. The general waste (black P bags to be put in the black Vat , the infectious wastes & sharps & pathoogical waste (red & yellow P bags) to be placed in the red vat being constructed for the purpose in the remotest corner of the hospital campus - easily accessible to the Municipal vehicle. The key of the vats should be with the concerned Ward-master/ incharge of the waste management scheme of the particular institution, like collection and storage - segregation should be maintained during internal as well as external transportation.

4.6 Nursing staff should keep a record of the number of coloured bags transported to the vats only.

5.0 Wet thermal treatment (waste autoclaving)

Wet thermal treatment (waste autoclaving) is being pilotted in one District hospital (Howrah D H). After a few months,- functional efficacy will be examined and if O.K., will be extended to other health care institutions.

5.1 Placenta & body parts should be segregated and kept in a yellow bin lined with yellow polythene bag marked with bio-hazard symbol.

5.2 Rest infectious waste to be treated in waste autoclave.

5.3 The effectiveness of waste autoclaving disinfection is to be checked through " Bacillus stearothermophillus " - spore testing.

6.0 Transport and disposal:

6.1 All vat waste should be transported in a segregated manner to the Municipal disposal ground - atleast once in 48 hours. Separate vehicle hiring cost for transportation of infectious & haxzardous waste may be borne out of the project fund.

6.2.1 The municipal body should set up a burial pit (as per design provided by Project Management Cell) at the landfill site for disposal of red (& yellow bags) - maintaining the standards prescribed for that - for the infectious and hazardous waste.Cost of construction of such pit may be borne out of the project fund .

6.2.2 The general waste should be disposed off by sanitary landfilling by the Municipality.

6.3.1 In non-municipal areas (rural and other hospitals) the infectious & hazardous waste should be disposed of by digging a burial pit in the hospital in the hospital campus itself (as per design provided by Project management cell) - maintaining the standards.

6.3.2 The general waste should be disposed of in a Trench (the compost to be used as a nutrient of the garden).

7.0 Disinfection of bins/ needle cutters

Bins should be disinfected daily with bleach soln and the needle cutter should be autoclaved daily.

8.0 Disposal of other wastes :

8.1 Disposal of radioactive wastes

Radioactive wastes should be disposed of as per guidelines of BARC/ WHO. Hazard at source can be minimised by lead-sealing in X-ray unit wherever it is currently not being done.

8.2 Disposal of laboratory waste.

The laboratory glass waste and biological material left after the laboratory tests has to be decontaminated by complete immersion in 10% bleach soln. and putting all biological material into it throughout the day and allowing it to stand over night right in the laboratory. Next morning the decontaminated solid material in the bucket should be put in the red bin and the liquid discharged in the sewer.

8.3 Disposal of liquid waste

All liquid waste chemicals, fluids and un-used blood should be treated with Na-hypochlorite soln and then poured into the sewer.

8.4 Disposal of expired drugs

Expired drugs should be returned to the Manufacturer/disposed of by observing existing formalities.

9.0 Management of accidental spillage of hazardous material

9.1 In case of accidental spillage of liquids (body fluid, blood etc.) absorbant materials such as cotton, gauge etc. should be used to contain the spillage, and appropiate disinfectants (1 % sodium hyproclorite solution) to be poured over the spillage. After half an hour contact time spillage can be clean and the materials can be collected in container for disposal. Normal tap water could be used for washing the area.

9.2 Management of Mercury

In case of mercury spillage sulpher powder to be poured to prevent mercury evaporisation. A regular syringe to be used for sucking the droplets.

Minor spills of Mercury may be collected by gathering of mercury droplets in stiff paper to scoop it (while handling hand gloves to be used).
All collected mercury droplets to be poured into a glass container with 5 to 10 ml of water. The container should be capped properly & sealed. The used gloves and the glass container should be poured in the infectious & hazardous bin (possibility of recycling through appropiate treatment will be examined in due course).

The spillage area after removal of Mercury, should be washed with Mercury neutralising soln such as 20% calcium sulphide soln, 20% sodium thio-sulphate soln.

10.0 Implementation

10.1 Implementation at district level

At the district level the District Health Committee would be the nodal forum. The expected capacities on medical waste matters are as follows.

1. Supervisory capacity- to make sure that the earmarked hospitals are implementing the scheme.

2. Training capacity - to provide training for staff who handle medical waste.

3. Logistics capacity &

4. Co-ordination capacity

10.2 At the facility level

10.2.1 A small task force will be formed for implementation, supervision and monitoring the scheme with the Superintendent as Chairman comprising 3 Clinicians : 1 each from Medicine G&O, Surgery : 1 Pathologist, Nursing Supdt./O.T. incharge, 1 Wardmaster, 1 SWO, 1 group 'D' staff, 1 sweeper, Dy. CMOH-II (ACMOH in case of SD/SG and RH hospital and any other member Supdt. finds suitable and one representative of the chairman, Municipality / Panchayet Samity and one representative each from PHE & PWD Deptt.

10.2.2 The task force should arrange a series of training programmes for all health personnel.

10.2.3 The task force should launch a massive IEC campaign to educate the users particularly the visitors in the wards in the disposal of wastes in the identified bins. Strict vigilance by the task force must be kept for the use of bins by the providers, parients attendants.

10.2.4 the task force should decide about the procurement of necessary logistics as well as personal protective equipment of the cleaning staff.

10.2.5 The task force should keep an eye on the routine hygiene and maintenance activities.

10.2.6 The task force should also keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.

10.2.7 the task force should keep an eye on the procurement practices and recommend reuse of supplies and materials so as to reduce overall waste generation.

10.2.8 task force should keep DHC informed of the progress.

10.3 DHC should monitor the functioning of the Task force from time to time and seek the guidance of the Project Management Cell as and when required.

10 4.1 An agency (/ agencies) is (/are) being appointed to provide support to the health care institutions with a view to implementing the scheme within the project time period.

10.4.2 DHC should also monitor the functioning of the said agency (/ agencies) and keep PMC informed about the progress of work.

Existing System :

HEALTH CARE INSTITUTION

Operation Theatre	Laboratory	Kitchen	Indoor Wards	Outdoor Wards	Other Depts.

Non-Segregated Mixed Solid Waste

Storage Vat (Within premises) — Collection by Municipality

Landfilling (Uncontrolled air-dumping) — Disposal

System undetaken :

HEALTH CARE INSTITUTION

Operation Theatre	Laboratory	Kitchen	Indoor Wards	Outdoor Wards	Other Depts.

(General) (Infectious)

(Sharps) (Pathological waste)

(Segregated Collection in color coded container)

Packaging - Labelling

Handling

On-site treatment
(S D U)

Internal transportation
(Segregated)

Separate Storage Vat (Within premises) | Auto - -claving | Collection and segregated transportation by Municipality

A. Urban

* Landfilling (Sanitary) — Disposal by Municipality

* Deep burial (for infectious & hazardous) — Disposal by Municipality

B. Rural

* Trench Composting for general waste — By WBHSDP

* Campus disposal for infectious & hazardous waste — By WBSHDP

HEALTH CARE WASTE MANAGEMENT

CATEGORIES

General	Pathoicgical	Infectious (non-sharp)	Sharps
Food waste Paper Card-board Floor- -Sweepings Earthen- -vessel, Woods, Shells. towel,	Human tissue/ organ, body parts, foetus, placenta, blood & body fluids, animal caracus.	Soiled waste contaminated with blood & body fluids (cotton, dressing, soiled plaster cut, linen, bedding, gloves, Lab.Coats microbiology & biotechnology waste isolation ward waste and solid waste containing disposable items other than waste sharps e.g tubing, catheter I.V. set etc.	Needles, syringes, scalpel, blade, broken glass nails & any other items that may cause puncture & cuts. Cutter SHARP DISPOSAL UNIT

Black bag

Yellow bag (biohazard)

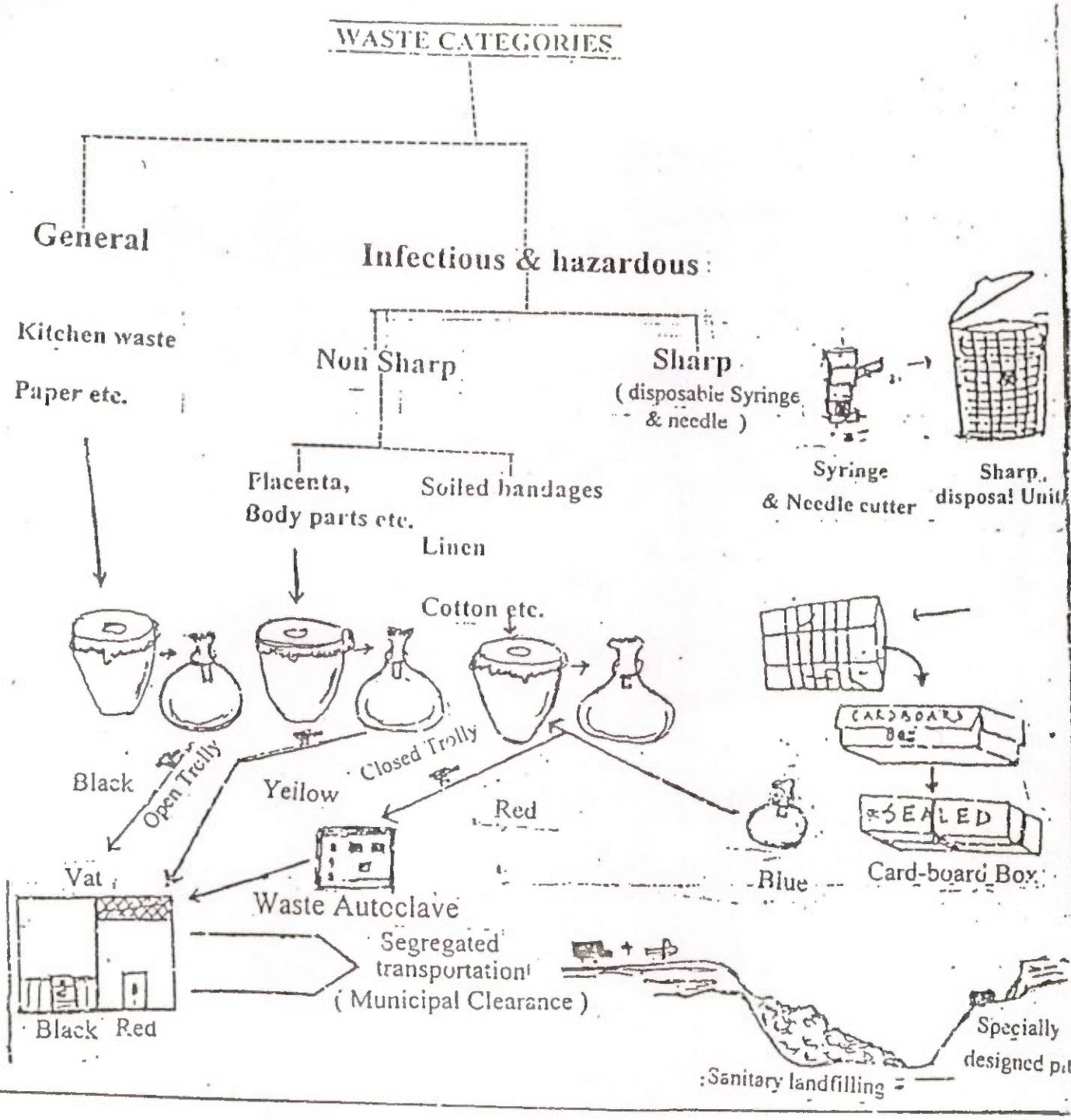
Red bag (biohazard)

Blue bag (biohazard)

Health care waste management

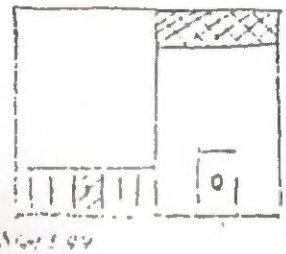
Action plan

URBAN AREA



Private establishments

RURAL AREA



12

WARNING

BIOHAZARD

(Infectious material)

B

Institutional Strengthening (Task-force at the institutional level)

Superintendent of the hospital as **Chairman**

Departmental Heads
Medicine, Surgery
Pathology & G.O.

Nursing Superintendent

Ward Master as **in-charge**--Social welfare Officer--Pharmacist as **E C - incharge**

Group ' D ' Staff - Technician - Sweeper

Dy. C M O H - II Representative of Chairman Municipality Engineer (P W D) Engineer (P H E)

Report to :

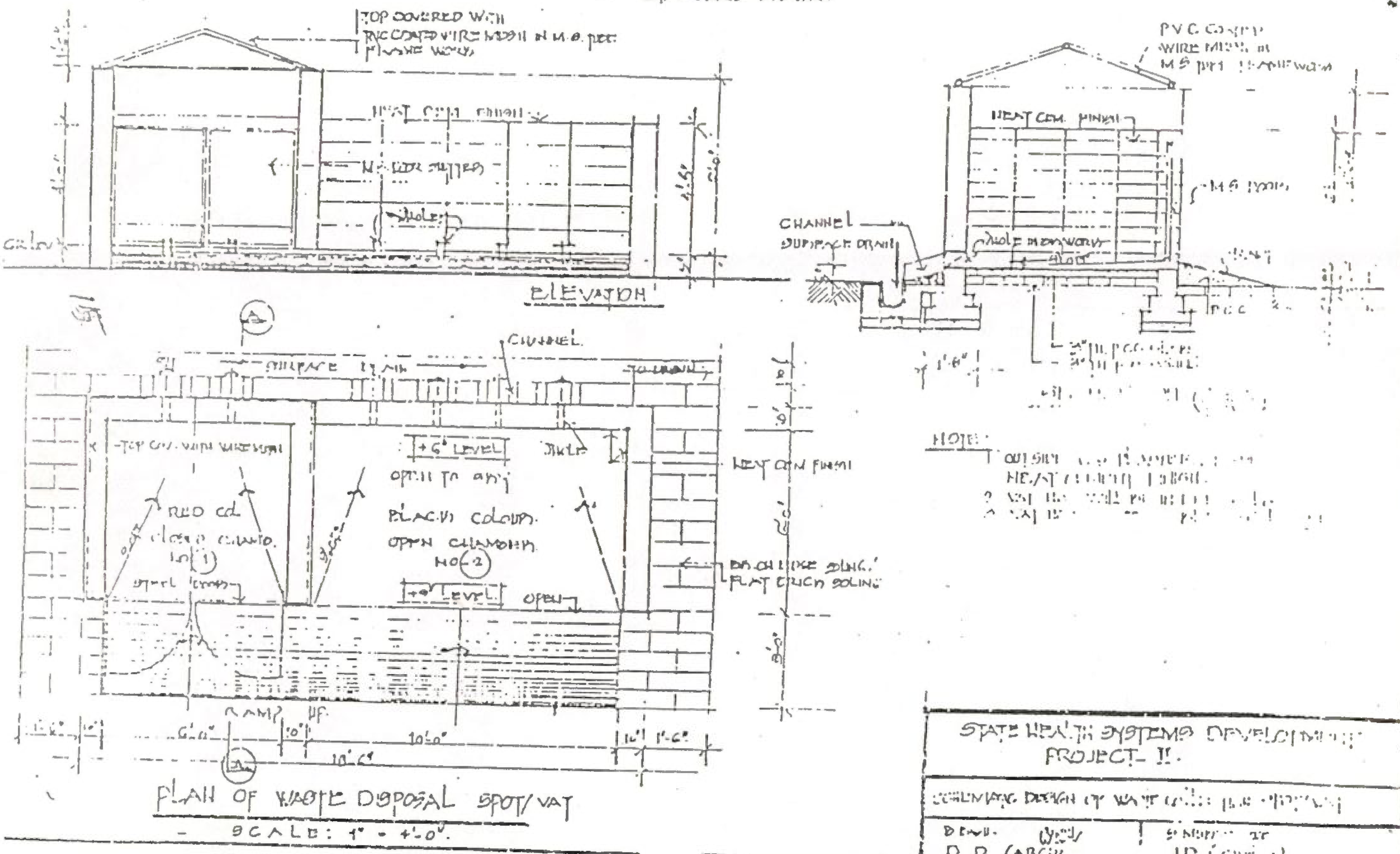
District Health Committee Office of the Chief Project Manager C M O H

P M C

Deptt. of Health & Family welfare
Govt. of W.B.

PROPOSED MEDICAL WASTE COLLECTION VAT.

– STANDARD DRAWING



Standards for Waste Autoclaving

The autoclave should be dedicated for the puspises of disinfecting and treating bio-medical waste

1. When operating a vacuum autoclave, medical waste shall be subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air. The waste shall be subjected to the following :

i) A temperature of not less than 121 degree centigrade and pressure of 15 psi per an autoclave residence time of not less than 45 minutes ; or

ii) A temperature of not less than 135 degree centigrade and the pressure 31 psi for an autoclave residence time of not less than 30 minutes.

2. Medical waste shall not be considered properly treated unless the time, temperature and pressure in monitors indicate that the required time, temperature and pressure were reached during the autoclave process. If for any reason, time , temperature or pressure indicator indicates that the required temperature, pressue or residence time was not reached, the entire load of medical waste must be autoclaved again until the proper temperature, pressure and residence time were achieved

3.Recording of operational parameters

Each autocloave shall have graphic or computer recording devices which will automnatically and continuously monitor and record dates, time of day , load identification number and operating parameters throughout the entire length of the autoclave cycle.

4. Validation test

Spore testing:

The autoclave should completely and consistently kill the approved bio-logical indicator at the maximum design capacity of each autoclave unit. Bio-logical indicator for autoclave shall be Bacillus stearothermophilus spores using vials or spore strips, with at least 1 x 10 to the power 4 spores per milimeter. Under no circumstances will an autoclave have minimum operating parametors less than a residence time of 30 minutes, regardless of temperature and pressure, a temperature less than 121 degree centigrade or a pressure less than 15 psi.

5. Routine test

A chemical indicator strip / tape that changes colour when a certain temperature is reached can be used to verify that a specific temperature has been achieved. It may be necessary to use more than one strip over the waste package at different location to ensure that the inner content of the package has been adequately autoclaved.

Standards for Deep Burial

1. A pit or trench should be dug about 2 meters deep. It should be half filled with waste, then covered with lime within 50 cm of the surface, before filling the rest of the pit with soil.

2. It must be ensured that animals do not have any access to burial sites. Covers of galvanized iron/ wire mesnes may be used.

3. On each occasion, when wastes are added to the pit, a layer of 10 cm of soil shall be added to cover the wastes.

4. Burial must be performed under close & dedicated supervision.

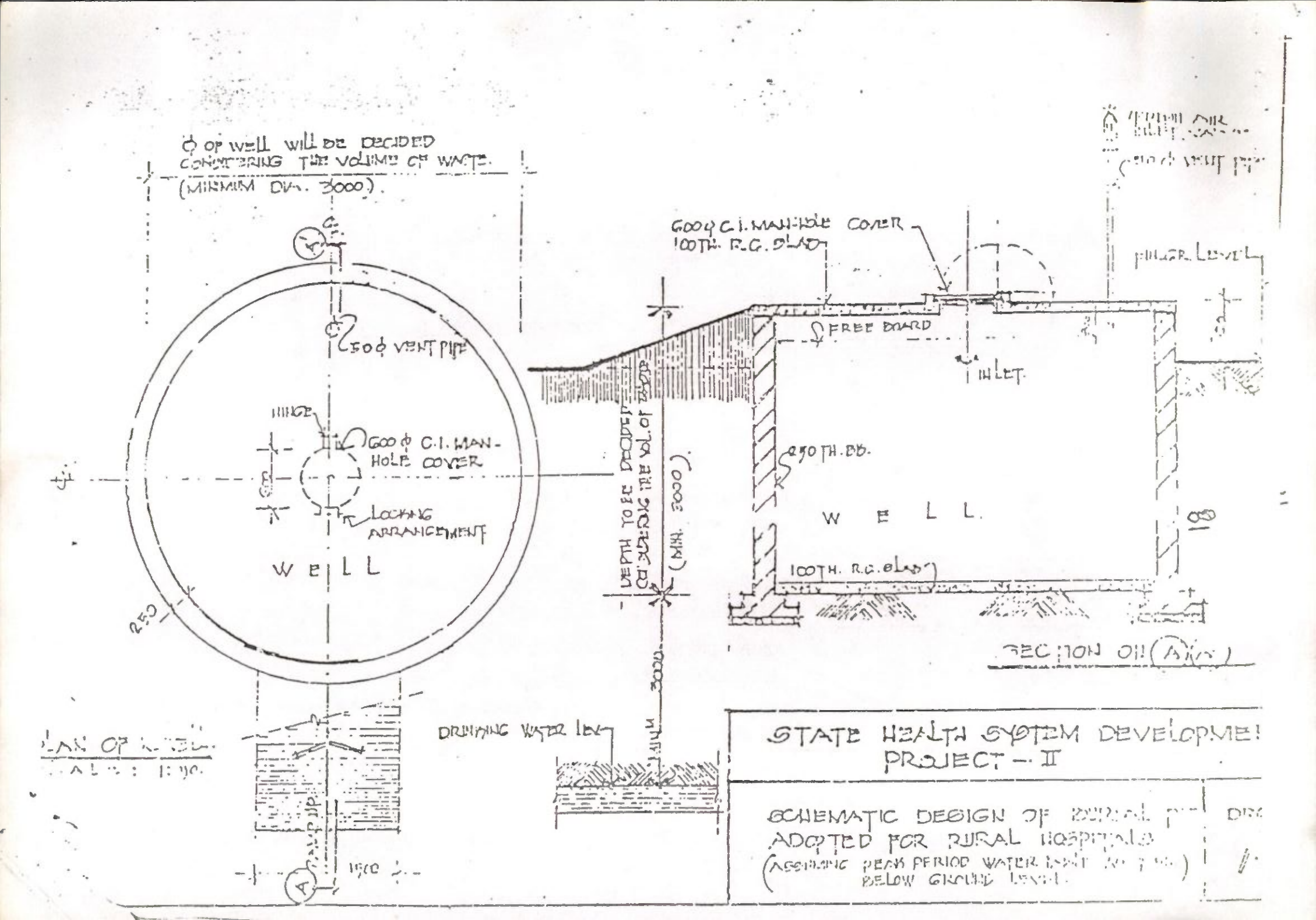
5. The deep burial site should be relatively impermeable and no shallow well should be close to the site.

6. The pits should be distant from habitation, and sited so as to ensure that no contamination occurs of any surface water or ground water. The area should not be prone to flooding or erosion.

7. The location of the deep burial site will be authorised by the prescribed authority.

8. The institution shall maintain a record of all pits for deep burial.

24.10/akg/24imoeng


ϕ OF WELL WILL BE DECIDED CONSIDERING THE VOLUME OF WASTE. (MINIMUM DIA. 3000).
600ϕ VENT PIPE
600ϕ C.I. MAN-HOLE COVER
LOCKING ARRANGEMENT
WELL
600ϕ C.I. MAN-HOLE COVER
100TH. R.C. SLAB
FREE BOARD
INLET
250TH. BB.
WELL
100TH. R.C. SLAB
DEPTH TO BE DECIDED CONSIDERING THE VOL. OF WASTE (MIN. 3000).
3000
DRINKING WATER LEVEL
SECTION ON (A)
STATE HEALTH SYSTEM DEVELOPMENT PROJECT – II
SCHEMATIC DESIGN OF
ADOPTED FOR RURAL HOSPITALS
(ASSUMING PEAK PERIOD WATER DEMAND
BELOW GROUND LEVEL

TYPICAL SECTION

DETAIL AT 'A'

NOTE :
HYDRAULIC CONDUCTIVITY OF COMPACTED CLAY LAYER = 10⁻⁷ CM/SEC.

SCHEMATIC LAYOUT OF LEACHATE COLLECTION AND INJECTION WELL SYSTEMS FOR INJECTION WASTE COLLECTION

Reporting format/ Check-list

Implementation of phase - I / Phase - II Health Care waste Management Programme

Sl.No.	Subject	Remarks

1) a) Name of the Institution under reference - ____________________

b) Phase - I / Phase - II implemented w.e.f ....

2) Further Staff training held ---------- ---------- ----------/ Nil.

3) Task force constituted -- Yes / No

4) Logistics procured ---------------- No / Yes (if yes, name the logistics)

(Name the logistics) 1.Bins.........2.Buckets..... ...3.Sieved buckets............4.P.Bags i) red........ii) black...........iii) Yellow..............5. Register............6.Disposable Syringe &needle cutter...... ....7. PPEs i) Gloves.........ii) Gum-Boots............. iii) Aprons.............iv) Masks............v) ....vi).............8.Bleaching Powder . . ..9.Threads/ Sutuli................10.......... ......

5) Storage Vat constructed -- No / Yes

6) Municipal clearance of Waste is being done-----------daily/ by - weekly/ weekly.

7) Birbed wire-fencinghas been done by Municipality ---------------- yes / no.

8) Sharp management system has been included-------------------- yes/ no.

9) No. of Poly. Bags generated per month -- i) Red------ ii) Black------ iii) Yellow------

10) Registers maintained (in Wards/ in Ward Master's Office)i).... ......ii)........iii)..........

11) Water quality is being examined ---------------------------- Yes / No.?

12) Care of sewearage system and sanitary facilities is being taken------- Yes / No.

13) Overall cleanliness has improved ------- ---------- ---------- Yes / No.

14) NGOs have been involved -- ---------------------------- ------ Yes / No.

15) Further requirements -------- --

16) Suggestions--------------- --

17) Overall comments on implementation of the programme.--------------------

Signature
Superintendent of the [illegible]

[illegible]

হাসপাতালের বর্জ্য পদার্থ নিষ্কাশন : কয়েকটি আবেদন

(দেওয়াল লিখনের জন্য)।

ক) না-খাওয়া খাবার, ফলের খোসা ইত্যাদি কালো পাত্রে ফেলুন ।

খ) রক্ত, পূঁজ যুক্ত গজ - ব্যান্ডেজ তুলো লাল পাত্রে ফেলুন ।

গ) বর্জ্য পদার্থ সংক্রামিত মনে হলে লাল পাত্রে ফেলুন ।

ঘ) ডিসপোসেবল সিরিঞ্জ, কাটারে কেটে ব্লিচ সলুশনে ফেলুন ।

ঙ) নোংরা যেখানে সেখানে ছড়াবেন না ।

চ) যেখানে সেখানে থুতু ফেলবেন না ।

ছ) এই হাসপাতাল আপনার - হাসপাতাল পরিষ্কার রাখুন ।

জ) পরিচ্ছন্নতাই পবিত্রতা ।

Implementation of Health care waste management scheme

Institutional structure (Task force for implementation as well as for sustainance)

Composition of Task force members :

In larger hospitals (DH/ SDH/SGH)

* Superintendent as the Chairman
*Senior Ward Master as Waste Management In-charge
* Heads of the Departments as members
* Chief (/ Senior) Pharmacist as Emergency control in-charge
* Nursing Superintendents as member
* Senior Social welfare Officer as member
* Nodal Engineer(/ Engineers) as member (/ members)
* Representative of Technicians as member
* Chief (/ senior) Storekeeper as member
* Representative of Group-D staff as member
* Representative of Swecpers as member

and

* Representative of local Municipal boby.
* Representative from Public Health Deptt. (Dy. CMOH-II)

In smaller hospitals (RH)

* Medical Officer in charge (/ BMOH) as the Chairman
*Senior Ward Master as Waste Management In-charge
* Heads of the Departments as members
* Chief (/ Senior) Pharmacist as Emergency control in-charge
* Nurse in-charge (/ Nursing Superintendent) as member
* Senior Social welfare Officer as member
* Nodal Engineer(/ Engineers) as member (/ members)
* Representative of Technicians as member
* Chief (/ senior) Storekeeper as member
* Representative of Group-D staff as member
* Representative of Sweepers as member

and

* Representative of local Panchayet boby.
* Representative from Public Health Deptt. (ACMOH)

FUNCTIONS OF THE TASK FORCE

1.1. The task force shall meet atleast once in a month.

1.2 The task force should arrange a series of training programmes for all health personnel.

1.3 The task force should launch a massive IEC campaign to educate the users particularly the visitors in the wards in the disposal of wastes in the identified bins. Strict vigilance by the task force must be kept for the use of bins by the providers, parients attendants.

1.4 the task force should decide about the procurement of necessary logistics as well as personal protective equipment of the cleaning staff.

1.5 The task force should keep an eye on the routine hygiene and maintenance activities.

1.6 The task force should also keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.

1.7 the task force should keep an eye on the procurement practices and recommend reuse of supplies and materials so as to reduce overall waste generation.

1.8 task force should keep DHC informed of the progress.

1.9 DHC should monitor the functioning of the Task force from time to time and seek the guidance of the Project Management Cell as and when required.

job/99/akg

RESPONSIBILITIES OF KEY TASK FORCE MEMBERS .

1.1 **Role of Chairman (Superintendent** of the concerned hospital)

i) To assume overall responsibility of MWM at the health care unit.

ii) To send the monthly report on MWM to the CMOH/DHC & PMC

iii) To send an annual report to WBPCB by 31 January every year (with a copy to CMOH/ DHC/PMC/ Health DEptt.) as per the format given in Form II of the Bio-Medical Waste (Management and Handling) Rules 1998

iv)To apply in prescribed Form I as given in the Bio-Medical Waste (Management and Handling) Rules 1998 to WBPCB for granting of authorisation for MWM

v) To assume the overall responsibility of implementing the policies/directives of the PMC/ GOWB on MWM at the health care unit.

vi) To allocate adequate manpower, infrastructure and re-sources to the Waste management in-charge (WMI) for MWM at the health care unit.

vii) To arrange required training for the staff on MWM

viii) **To keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.**

ix) To interact with the local municipal/ Panchayat Bodies and other Government Departments on any matter in relation with MWM including supply of safe water, sanitation facilities at the health care unit etc with a view to maintaining the hospital hygiene.

x) To interact with the local NGOs and local people to involve them with (off-site) transport. treatment and disposal of medical wastes.

1.2 **Role of Waste management in-charge** (WMI - **Senior Ward Master**)

i) To assume responsibility of day-to-day activities related to MWM including development and maintenance of greenbelt at the health care unit.

ii) To monitor the activities of hospital staff in relation with segregation, collection, transport, storage on-site treatment and disposal of medical wastes.

iii) To ensure regular supply of adequate resources and equipment including bags/ containers, protective gear, etc. for the hospital staff for MWM.

iv) To ensure availability of adequate manpower for MWM at the health care unit everyday.

v) To ensure proper fencing and locking of storage vats to prevent access to ragpickers,birds, and stray animals to medical wastes.

vi) To provide necessary assistance to the Emergency control in-charge (ECI) for matters in relation with

management and control of accidents and spillage.

vii) To investigate any accidents and prepare report on it in association with the ECI as per the format in Form III of the Bio-Medical Waste (Management and Handling) Rules 1998.

viii) To maintain daily record of medical waste generation at different wards at the health care unit

ix) To prepare monthly report on MWM and submit it to the Chairman.

x) To prepare annual report as per the format given in Form II of the Bio-Medical Waste (Management and Handling) Rules 1998 and submit it to the Chairman.

xi) To liaise with the Chairman, Nursing Superintendent and Heads of the various Departments to ensure scientific MWM at every ward at the health care unit.

xii) To organise training and awareness generation campaign for the hospital staff, visitors and the local community on the utility and benefits of scientific MWM practices.

1.3 Role of **Emergency control in-charge (ECI - Pharmacist)**

i) To assume overall responsibility of management and control of accidents (including needle stick injury) and spillage of hazardous substances.

ii) To liaise with other members of the HWMC to provide advice and guidance on matters relating to prevention of accidents and spillage of hazardous substances.

iii) To provide training to the hospital staff on preventive and emergency measures to avoid and prevent accidents and spillage of hazardous substances.

iv) To provide technical assistance to the WMI on matters in relation with management of chemical wastes.

v) To provide technical assistance to the WMi for preparation of report on accidents and spillage of hazardous substances as per the format III of the Bio-Medical Waste (Management and Handling) Rules 1998.

1.4 Role of **Head of the Departments.**

i) To assume overall responsibility of MWM at the department.

ii) To ensure availability of adequate manpower for day-to-day MWM at the department.

iii) To ensure that the departmental staff including nursing staff and sweepers receive adequate training on MWM.

1.5 Role of **Nursing Superintendent.**

i) To assume responsibility of monitoring MWM activities at various wards at the health care unit.

ii) To see that all her staffs keep daily records of the no. of coloured bags disposed.

iii) To see that all her staffs keep the logistics in stock in sufficient quantity.

iv) To see that all her staffs follow the norms, as framed by the authority, specially on management of sharps and on routine necessary clearance of coloured bags from the wards.

v) To liaise with the Chairman, WMI, ECI, Heads of the Departments and other members od the HWMC to ensure quality standards of MWM at the health care unit.

Action Plan on Health care waste Management

1.0 Introduction

Waste generation in hospitals and their disposal has always been a matter of concern to the medical profession ever since hospitals came into existence as institutions. Waste disposal systems in the form of burial, landfilling & incineration were existing. Those practices conformed to the then existing knowledge of public health, epidemiological concept or public health legislations enacted from time to time. No comprehensive law either in a state or the country was however brought forward to deal effectively with the subject.

The apparent risks include :

a) Occupational health hazards to doctors, nurses and other staff patients (nosocomial infection) & attendants.

b) Source of foul odour

c) Blocking of sewers, drains (and by polythene bags) and general unhyginic condition in the hospital premises.

d)Breeding ground for rodents/reptiles, mosquitoes and flies and attracting stray animals

e) Uncontrolled dumping causing underground water contamination

f) Burning causing air-pollution (adding toxogenic gases)

The potential risk include transmission of HIV/AIDS, Hepatitis B or C virus.

Other problems are :

g) Disposables are being repacked & sold without being even washed.

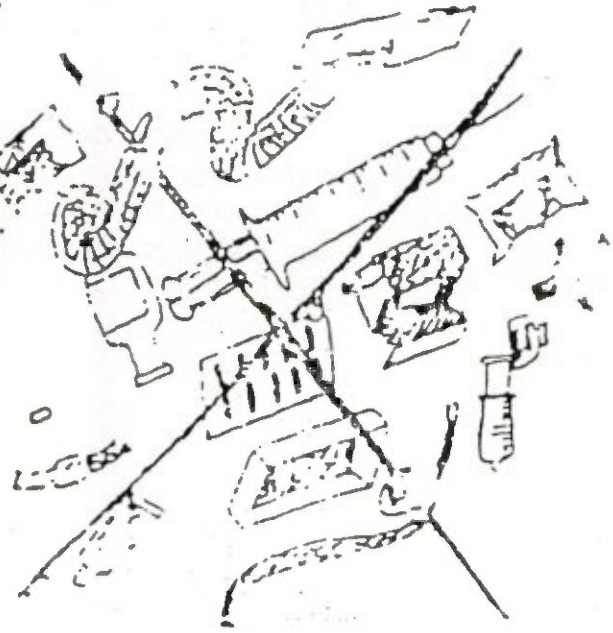
h) Discarded drugs disposed being re-packed & sold.

Therefore, scientific health care waste management should be a part of routine hospital management.

WEST BENGAL HEALTH SYSTEMS DEVELOPMENT PROJECT

Department of Health & Family Welfare

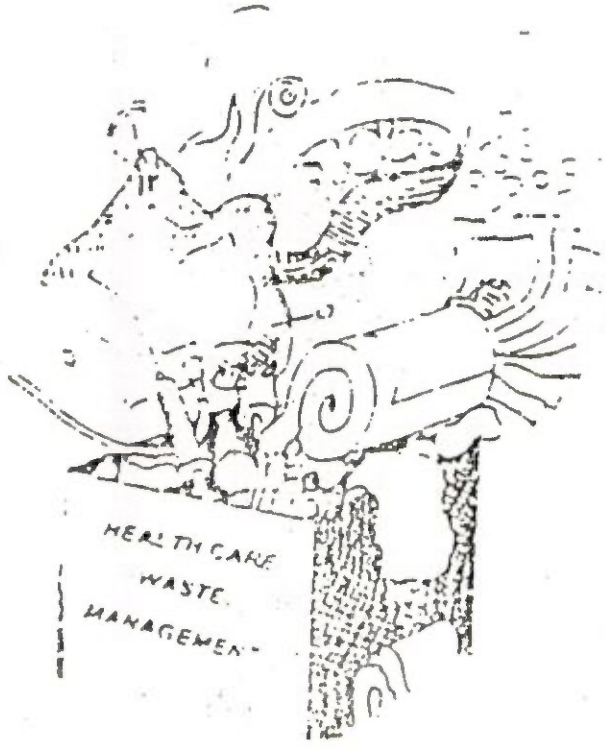
Government of West Bengal



ACTION PLAN

on

HEALTH CARE WASTE MANAGEMENT



GA 29, Sector - V, Bidhannagar, Calcutta - 91

Basic requirements such as safe water supply sanitation facilities, disinfection etc. are vital to keep a health care facility clean and safe. Health care waste should be carefully and scientifically handled from the point of generation upto the point of final disposal.

An effective waste management programme is an integral part of a hospital's infection control programme and therefore, critically linked to the quality of patient care as well as the health and safety of hospital workers, visitors and the general public at large. Further, when properly implemented and enforced, effective waste management can have distinct benefits, in terms of improved procurement practices and streamlined consumption of various supplies.

2.0 Composition of hospital wastes:

2.1 Health care wastes is produced in hospitals, health centres, clinics, nursing homes, laboratories, research institutions, vetenerary clinics, midwifery centres and other medical cares conducted at home. The amount of wastes generated varies according to type of facilities. A study estimated that health care waste generated in hospitals is about 1 kg. per bed per day. About 38% of this is infectious and hazardous (infectious non-sharp 14.9 % to 26.78 %; infectious sharp 8.77 % to 15.18 %; pathological 0.8 % to 6.39 %). The rest 62% is non-infectious/ non-hazardous waste (52.29 % to 63.59 %) which implies that ensuring segregation of the first two categories of waste at source is the first and foremost step in waste management. Under the current practice, the infectious and hazardous waste is often mixed with the non-hazardous general waste which multiples the problem in handling the final disposal. Handling of sharps (the hazardous waste) is extremely critical. It calls for separate attention from others disposables in a waste management scheme.

3.0 Segregation in colour coded containers :

Colour coding of collection bins is an easy and effective system of segregating waste at source. The bins should be lined with similar colour plastic bags (non-halogenated). The red / blue/ yellow bins and red / blue/ yellow polythelene bags should be labelled with the internationally accepted ' Biohazard' symbol (symbol of infectious and hazardous material).

A simple system of colour coding is as follows :

3.1 Categories of waste	Colour code of polythelene bags	Colour code of bins
a) General waste(non-hazardous,non-infectious)	Black	Black
b) Infectious waste	Red	red
c) Sharps (after keeping sharps in the Card-board Box)	Blue	Red
d) Pathological	Yellow	Yellow

3.2 This category excludes toxic metals, such as mercury contained in broken thermometers and B.P. apparatus and radio active isotopes. Those items will be put in designated containers and managed accordingly.

3.3 Training, awareness activities and supervision of staff is essential for ensuring segregation at source and handling infectious and hazardous health care waste.

4.0 Collection and storage.

4.1 Each facility i.e. O.T. wards, investigation units, OPD, kitchen, Morgue etc. is to be provided with a set of two plastic bins preferably with lid. The bins should be located just outside and adjacent to the facilities. Further one bin should be kept in all the nursing stations for onsite disinfection of sharps and other infectious material with 1% bleach solution

4.2 The general waste should be put into the black polythelene lined bin.

4.3 All infected materials should be put into the red polythelene lined bin.

4.4 Management of sharps

4.4.1 All sharps should be put in the bleach Solution (1% i.e. 10 gms of Bleaching powder in 1 litre of water) containing bin (one sieved bucket to be kept inside the bin) for onsite disinfection (at least for one hour). However it must be cautioned that the disinfected materials should continue to be treated as hazardous and should be dealt with accordingly.

4.4.2 Needle & nozzoles of disposable syringes should be cut with the neddle cutter prior to being put into the bleach Solution.

4.4.3 The sieved bucket is to be taken out from the bin containing bleach soin. After allowing time for graining out the last drop of bleach soin - the sharps including cut syringes should be put in a card -board box. The box should be tied & then placed in the blue polythelene bag which is then put in the red polythelene lined red bin.

4.5 The cleaning staff should change the polythelene bags when they are 3/4th full. after tying up, it should be placed in the hand driven trolly & the bin shoud be lined with a new polythelene bag. The general waste (black P bags to be put in the black Vat , the infectious wastes & sharps & pathoogical waste (red & yellow P bags) to be placed in the red vat being constructed for the purpose in the remotest corner of the hospital campus - easily accessible to the Municipal vehicle. The key of the vats should be with the concerned Ward-master/ incharge of the waste management scheme of the particular institution, like collection and storage - segregation should be maintained during internal as well as external transportation.

4.6 Nursing staff should keep a record of the number of coloured bags transported to the vats only.

5.0 **Wet thermal treatment (waste autoclaving)**

Wet thermal treatment (waste autoclaving) is being pilotted in one District hospital (Howrah D H). After a few months,- functional efficacy will be examined and if O.K., will be extended to other health care institutions.

5.1 Placenta & body parts should be segregated and kept in a yellow bin lined with yellow polythene bag marked with bio-hazard symbol.

5.2 Rest infectious waste to be treated in waste autoclave.

5.3 The effectiveness of waste autoclaving disinfection is to be checked through " Bacillus stearothermophillus " - spore testing.

6.0 **Transport and disposal:**

6.1 All vat waste should be transported in a segregated manner to the Municipal disposal ground - atleast once in 48 hours. Separate vehicle hiring cost for transportation of infectious & haxzardous waste may be borne out of the project fund.

6.2.1 The municipal body should set up a burial pit (as per design provided by Project Management Cell) at the landfill site for disposal of red (& yellow bags) - maintaining the standards prescribed for that - for the infectious and hazardous waste.Cost of construction of such pit may be borne out of the project fund .

6.2.2 The general waste should be disposed off by sanitary landfilling by the Municipality.

6.3.1 In non-municipal areas (rural and other hospitals) the infectious & hazardous waste should be disposed of by digging a burial pit in the hospital in the hospital campus itself (as per design provided by Project management cell) - maintaining the standards.

6.3.2 The general waste should be disposed of in a Trench (the compost to be used as a nutrient of the garden).

7.0 Disinfection of bins/ needle cutters

Bins should be disinfected daily with bleach soln and the needle cutter should be autoclaved daily.

8.0 Disposal of other wastes :

8.1 Disposal of radioactive wastes

Radioactive wastes should be disposed of as per guidelines of BARC/ WHO. Hazard at source can be minimised by lead-sealing in X-ray unit wherever it is currently not being done.

8.2 Disposal of laboratory waste.

The laboratory glass waste and biological material left after the laboratory tests has to be decontaminated by complete immersion in 10% bleach soln. and putting all biological material into it throughout the day and allowing it to stand over night right in the laboratory. Next morning the decontaminated solid material in the bucket should be put in the red bin and the liquid discharged in the sewer.

8.3 Disposal of liquid waste

All liquid waste chemicals, fluids and un-used blood should be treated with Na-hypochlorite soin and then poured into the sewer.

8.4 Disposal of expired drugs

Expired drugs should be returned to the Manufacturer/disposed of by observing existing formalities.

9.0 Management of accidental spillage of hazardous material

9.1 In case of accidental spillage of liquids (body fluid, blood etc.) absorbant materials such as cotton, gauge etc. should be used to contain the spillage, and appropiate disinfectants (1 % sodium hyproclorite solution) to be poured over the spillage. After half an hour contact time spillage can be clean and the materials can be collected in container for disposal. Normal tap water could be used for washing the area.

9.2 Management of Mercury

In case of mercury spillage sulpher powder to be poured to prevent mercury evaporisation. A regular syringe to be used for sucking the droplets.

Minor spills of Mercury may be collected by gathering of mercury droplets in stiff paper to scoop it (while handling hand gloves to be used).
All collected mercury droplets to be poured into a glass container with 5 to 10 ml of water. The container should be capped properly & sealed. The used gloves and the glass container should be poured in the infectious & hazardous bin (possibility of recycling through appropiate treatment will be examined in due course).

The spillage area after removal of Mercury, should be washed with Mercury neutralising soln such as 20% calcium sulphide soln, 20% sodium thio-sulphate soln.

10.0 Implementation

10.1 Implementation at district level

At the district level the District Health Committee would be the nodal forum. The expected capacities on medical waste matters are as follows.

1. Supervisory capacity- to make sure that the earmarked hospitals are implementing the scheme.

2. Training capacity - to provide training for staff who handle medical waste.

3. Logistics capacity &

4. Co-ordination capacity

10.2 At the facility level

10.2.1 A small task force will be formed for implementation, supervision and monitoring the scheme with the Superintendent as Chairman comprising 3 Clinicians : 1 each from Medicine G&O, Surgery : 1 Pathologist, Nursing Supdt./O.T. incharge, 1 Wardmaster, 1 SWO, 1 group 'D' staff, 1 sweeper, Dy. CMOH-II (ACMOH in case of SD/SG and RH hospital and any other member Supdt. finds suitable and one representative of the chairman, Municipality / Panchayet Samity and one representative each from PHE & PWD Deptt.

10.2.2 The task force should arrange a series of training programmes for all health personnel.

10.2.3 The task force should launch a massive IEC campaign to educate the users particularly the visitors in the wards in the disposal of wastes in the identified bins. Strict vigilance by the task force must be kept for the use of bins by the providers, parients attendants.

10.2.4 the task force should decide about the procurement of necessary logistics as well as personal protective equipment of the cleaning staff.

10.2.5 The task force should keep an eye on the routine hygiene and maintenance activities.

10.2.6 The task force should also keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.

10.2.7 the task force should keep an eye on the procurement practices and recommend reuse of supplies and materials so as to reduce overall waste generation.

10.2.8 task force should keep DHC informed of the progress.

10.3 DHC should monitor the functioning of the Task force from time to time and seek the guidance of the Project Management Cell as and when required.

10 4.1 An agency (/ agencies) is (/are) being appointed to provide support to the health care institutions with a view to implementing the scheme within the project time period.

10.4.2 DHC should also monitor the functioning of the said agency (/ agencies) and keep PMC informed about the progress of work.

Existing System :

HEALTH CARE INSTITUTION

Operation Theatre	Laboratory	Kitchen	Indoor Wards	Outdoor Wards	Other Depts.

Non-Segregated Mixed Solid Waste

Storage Vat (Within premises) — Collection by Municipality

Landfilling (Uncontrolled air-dumping) — Disposal

System undetaken :

HEALTH CARE INSTITUTION

Operation Theatre	Laboratory	Kitchen	Indoor Wards	Outdoor Wards	Other Depts.

(General) (Infectious)

(Sharps) (Pathological waste)

(Segregated Collection in color coded container)

Packaging - Labelling

Handling

On-site treatment
(S D U)

Internal transportation
(Segregated)

	Separate Storage Vat (Within premises)	Auto - -claving	Collection and segregated transportation by Municipality
A. Urban	* Landfilling (Sanitary)		Disposal by Municipality
	* Deep burial (for infectious & hazardous)		Disposal by Municipality
B. Rural	* Trench Composting for general waste		By WBHSDP
	* Campus disposal for infectious & hazardous waste		By WBSHDP

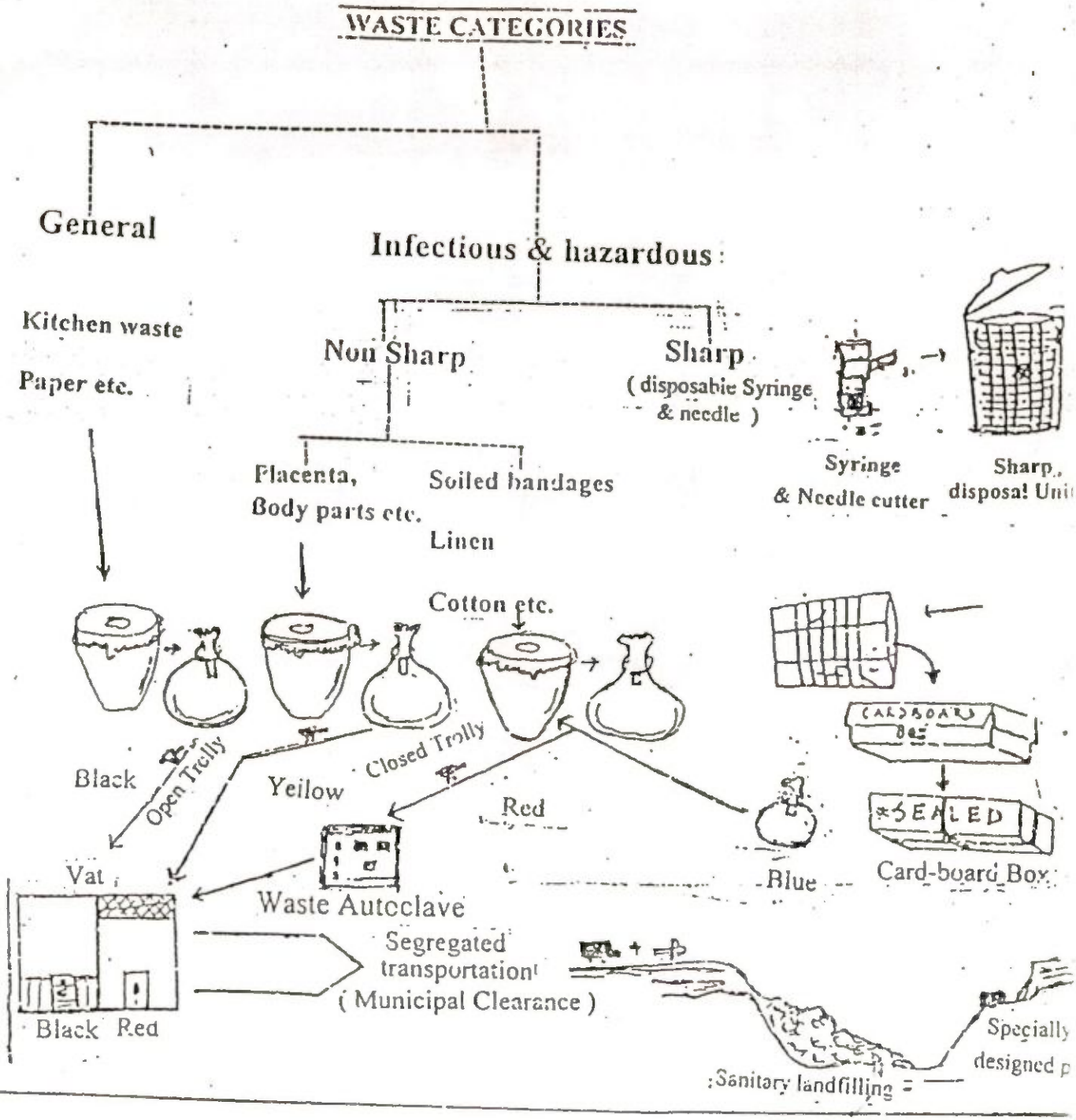
HEALTH CARE WASTE MANAGEMENT

CATEGORIES

General	Pathological	Infectious (non-sharp)	Sharps
Food waste Paper Card-board Floor--Sweepings Earthen--vessel, Woods, Shells. towel,	Human tissue/ organ, body parts, foetus, placenta, blood & body fluids, animal caracus.	Soiled waste contaminated with blood & body fluids (cotton, dressing, soiled plaster cut, linen, bedding, gloves, Lab.Coats microbiology & biotechnology waste isolation ward waste and solid waste containing disposable items other than waste sharps e.g tubing, catheter I.V. set etc.	Needles, syringes, scalpel, blade, broken glass nails & any other items that may cause puncture & cuts. Cutter SHARP DISPOSAL UNIT
Black bag	Yellow bag (biohazard)	Red bag (biohazard)	Blue bag (biohazard)

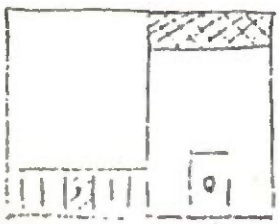
Action plan

URBAN AREA



Private establishments

RURAL AREA



B

WARNING

BIOHAZARD

(Infectious material)

圖 13

Institutional Strengthening (Task-force at the institutional level)

Superintendent of the hospital as **Chairman**

Departmental Heads
Medicine, Surgery
Pathology & G.O.

Nursing Superintendent

Ward Master as **in-charge**--Social welfare Officer--Pharmacist as **E C - incharge**

Group ' D ' Staff - Technician - Sweeper

Dy. C M O H - II | Representative of Chairman Municipality | Engineer (P W D) | Engineer (P H E)

Report to :

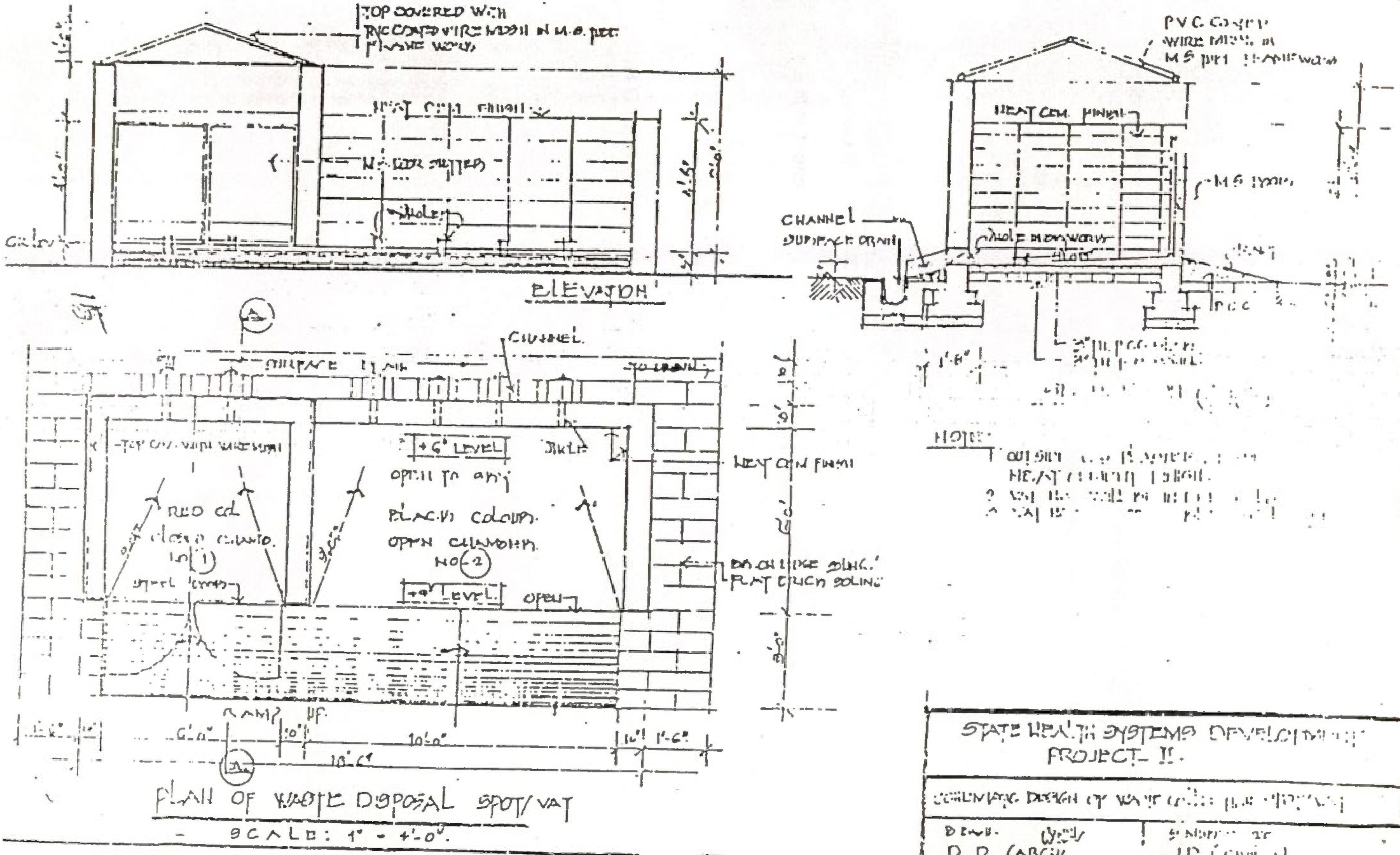
District Health Committee | Office of the Chief Project Manager | C M O H

P M C

Deptt. of Health & Family welfare
Govt. of W.B.

PROPOSED MEDICAL WASTE COLLECTION VAT.

STANDARD DRAWING



Standards for Waste Autoclaving

The autoclave should be dedicated for the puspises of disinfecting and treating bio-medical waste

1. When operating a vacuum autoclave, medical waste shall be subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air. The waste shall be subjected to the following :

i) A temperature of not less than 121 degree centigrade and pressure of 15 psi per an autoclave residence time of not less than 45 minutes ; or

ii) A temperature of not less than 135 degree centigrade and the pressure 31 psi for an autoclave residence time of not less than 30 minutes.

2. Medical waste shall not be considered properly treated unless the time, temperature and pressure in monitors indicate that the required time, temperature and pressure were reached during the autoclave process. If for any reason, time , temperature or pressure indicator indicates that the required temperature, pressue or residence time was not reached, the entire load of medical waste must be autoclaved again untii the proper temperature, pressure and residence time were achieved

3.Recording of operational parameters

Each autocloave shall have graphic or computer recording devices which will automnatically and continuously monitor and record dates, time of day , load identification number and operating parameters throughout the entire length of the autoclave cycle.

4. Validation test

Spore testing:

The autoclave should completely and consistently kill the approved bio-logical indicator at the maximum design capacity of each autoclave unit. Bio-logical indicator for autoclave shall be Bacillus stearothermophilus spores using vials or spore strips, with at least 1 x 10 to the power 4 spores per milimeter. Under no circumstances will an autoclave have minimum operating parameters less than a residence time of 30 minutes, regardless of temperature and pressure, a temperature less than 121 degree centigrade or a pressure less than 15 psi.

5. Routine test

A chemical indicator strip / tape that changes colour when a certain temperature is reached can be used to verify that a specific temperature has been achieved. It may be necessary to use more than one strip over the waste package at different location to ensure that the inner content of the package has been adequately autoclaved.

Standards for Deep Burial

1. A pit or trench should be dug about 2 meters deep. It should be half filled with waste, then covered with lime within 50 cm of the surface, before filling the rest of the pit with soil.

2. It must be ensured that animals do not have any access to burial sites. Covers of galvanized iron wire meshes may be used.

3. On each occasion, when wastes are added to the pit, a layer of 10 cm of soil shall be added to cover the wastes.

4. Burial must be performed under close & dedicated supervision.

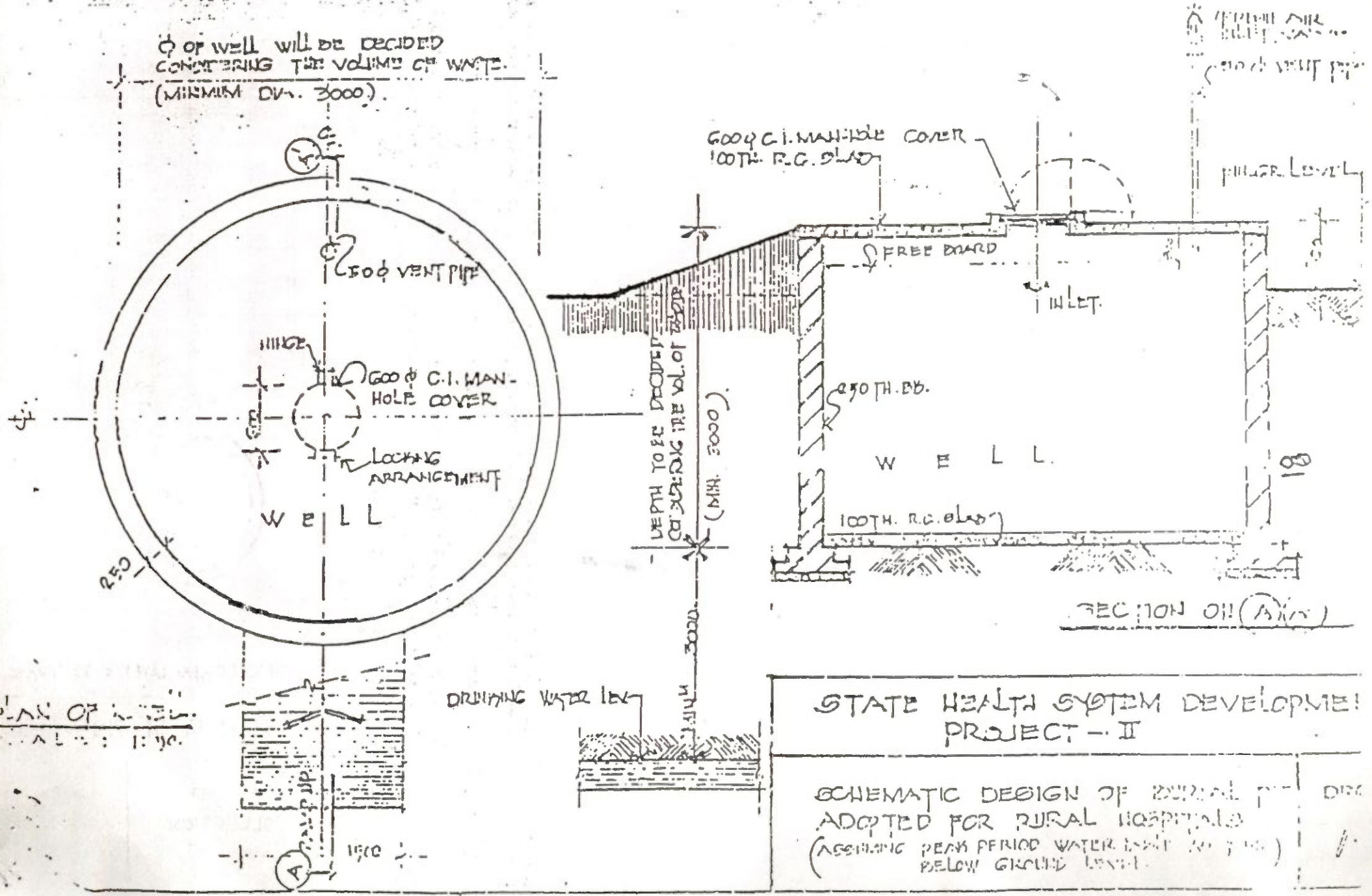
5. The deep burial site should be relatively impermeable and no shallow well should be close to the site.

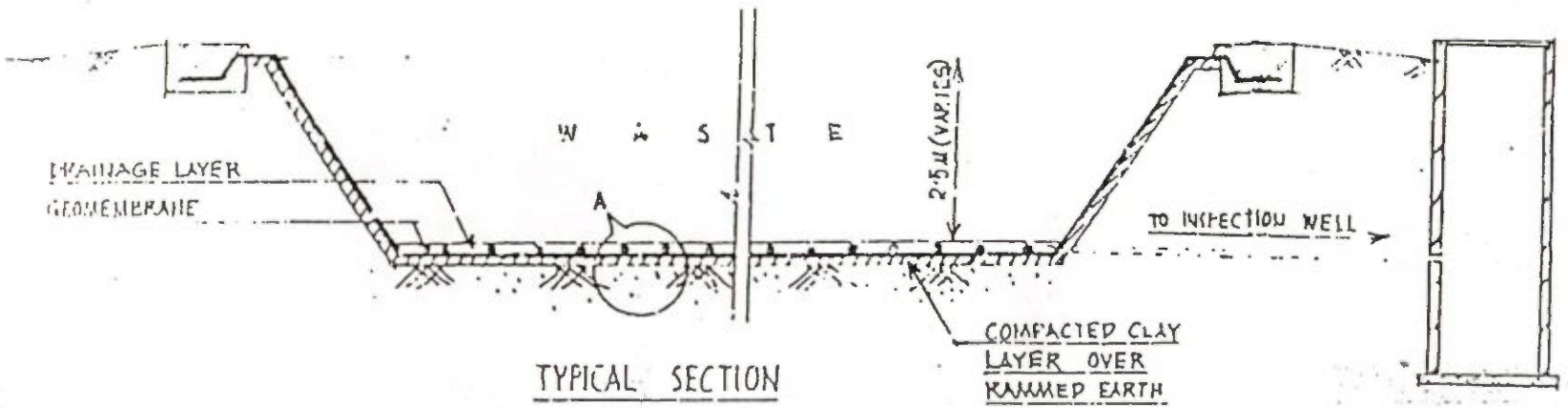
6. The pits should be distant from habitation, and sited so as to ensure that no contamination occurs of any surface water or ground water. The area should not be prone to flooding or erosion.

7. The location of the deep burial site will be authorised by the prescribed authority.

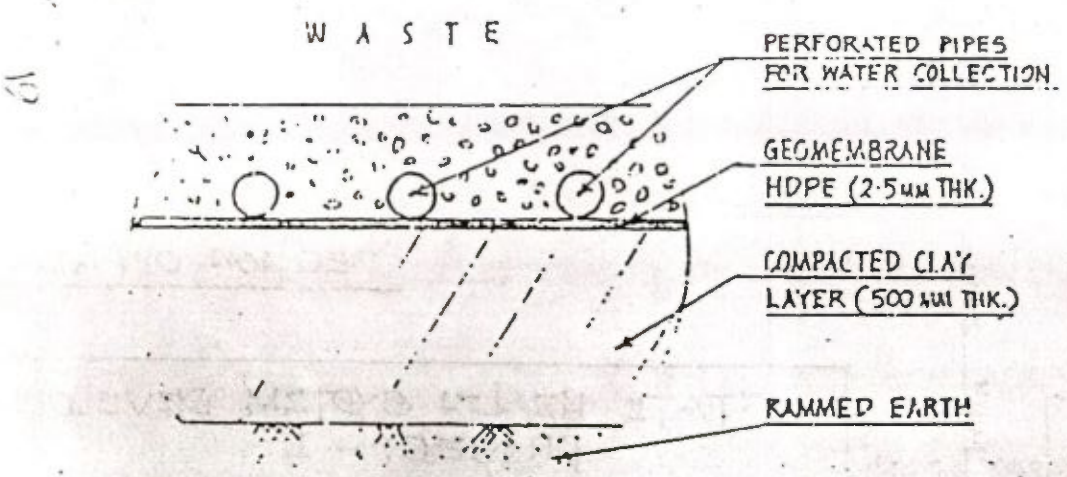
8. The institution shall maintain a record of all pits for deep burial.

24.10/akg/24imoenq


Φ OF WELL WILL BE DECIDED CONCERNING THE VOLUME OF WATER. (MINIMUM DIA. 3000).
600φ VENT PIPE
HINGE
600φ C.I. MAN-HOLE COVER
LOCKING ARRANGEMENT
W E L L
250
600φ C.I. MAN-HOLE COVER 100TH. R.C. SLAB
FREE BOARD
INLET
250TH. BB.
W E L L
100TH. R.C. SLAB
DEPTH TO BE DECIDED CONCERNING THE VOL. OF WATER (MIN. 3000).
3000
DRINKING WATER LEVEL
SECTION ON (A-A)
STATE HEALTH SYSTEM DEVELOPMENT PROJECT - II
SCHEMATIC DESIGN OF
ADOPTED FOR RURAL HOSPITALS
(ASSUMING PEAK PERIOD WATER
BELOW GROUND



TYPICAL SECTION



DETAIL AT 'A'

NOTE :
HYDRAULIC CONDUCTIVITY OF COMPACTED CLAY LAYER = 10^{-7} CM/SEC.

STATE HEALTH SYSTEMS DEVELOPMENT PROJECT - II

SCHEMATIC DESIGN OF BURIAL PIT FOR INFECTIOUS WASTE COLLECTION

Reporting format/ Check-list

Implementation of phase - I / Phase - II Health Care waste Management Programme

Sl.No.	Subject	Remarks

1) a) Name of the Institution under reference - ____________________

b) Phase - I / Phase - II implemented w.e.f ....

2) Further Staff training held --/ Nil.

3) Task force constituted -- Yes / No

4) Logistics procured -------------------------- No / Yes (if yes, name the logistics)

(Name the logistics) 1.Bins.........2.Buckets..... ...3.Sieved buckets............4.P.Bags i) red........ii) black...........iii) Yellow..............5. Register............6.Disposable Syringe &needle cutter...... ....7. PPEs i) Gloves.........ii) Gum-Boots............. iii) Aprons.............iv) Masks............v) ....vi).............8.Bleaching Powder ....9.Threads/ Sutuli................10.......... ......

5) Storage Vat constructed -- No / Yes

6) Municipal clearance of Waste is being done--------------daily/ by - weekly/ weekly.

7) Birbed wire-fencinghas been done by Municipality ------------------------- yes / no.

8) Sharp management system has been included------------------------------ yes/ no.

9) No. of Poly. Bags generated per month -- i) Red-------- ii) Black------- iii) Yellow------

10) Registers maintained (in Wards/ in Ward Master's Office)i).... ......ii)........iii)..........

11) Water quality is being examined -- Yes / No.?

12) Care of sewearage system and sanitary facilities is being taken------- Yes / No.

13) Overall cleanliness has improved ------- --------------- ------------ Yes / No

14) NGOs have been involved --- ----------------------------------- ------ Yes / No.

15) Further requirements --------- --

16) Suggestions------------------- ---

17) Overall comments on implementation of the programme.-----------------------------

Signature

Superintendent of the Hospital

Simpendingly.98

হাসপাতালের বর্জ্য পদার্থ নিষ্কাশন : কয়েকটি আবেদন

(দেওয়াল লিখনের জন্য)।

ক) না-খাওয়া খাবার, ফলের খোসা ইত্যাদি কালো পাত্রে ফেলুন ।

খ) রক্ত, পূঁজ যুক্ত গজ - ব্যান্ডেজ তুলো লাল পাত্রে ফেলুন ।

গ) বর্জ্য পদার্থ সংক্রামিত মনে হলে লাল পাত্রে ফেলুন ।

ঘ) ডিসপোসেবল সিরিঞ্জ, কাটারে কেটে ব্লিচ সলুশনে ফেলুন ।

ঙ) নোংরা যেখানে সেখানে ছড়াবেন না ।

চ) যেখানে সেখানে থুতু ফেলবেন না ।

ছ) এই হাসপাতাল আপনার - হাসপাতাল পরিষ্কার রাখুন ।

জ) পরিচ্ছন্নতাই পবিত্রতা ।

Implementation of Health care waste management scheme

Institutional structure (Task force for implementation as well as for sustainance)

Composition of Task force members :

In larger hospitals (DH/ SDH/SGH)

* Superintendent as the Chairman
* Senior Ward Master as Waste Management In-charge
* Heads of the Departments as members
* Chief (/ Senior) Pharmacist as Emergency control in-charge
* Nursing Superintendents as member
* Senior Social welfare Officer as member
* Nodal Engineer(/ Engineers) as member (/ members)
* Representative of Technicians as member
* Chief (/ senior) Storekeeper as member
* Representative of Group-D staff as member
* Representative of Swecpers as member

and

* Representative of local Municipal boby.
* Representative from Public Health Deptt. (Dy. CMOH-II)

In smaller hospitals (RH)

* Medical Officer in charge (/ BMOH) as the Chairman
* Senior Ward Master as Waste Management in-charge
* Heads of the Departments as members
* Chief (/ Senior) Pharmacist as Emergency control in-charge
* Nurse in-charge (/ Nursing Superintendent) as member
* Senior Social welfare Officer as member
* Nodal Engineer(/ Engineers) as member (/ members)
* Representative of Technicians as member
* Chief (/ senior) Storekeeper as member
* Representative of Group-D staff as member
* Representative of Sweepers as member

and

* Representative of local Panchayet boby.
* Representative from Public Health Deptt. (ACMOH)

FUNCTIONS OF THE TASK FORCE

1.1. The task force shall meet atleast once in a month.

1.2 The task force should arrange a series of training programmes for all health personnel.

1.3 The task force should launch a massive IEC campaign to educate the users particularly the visitors in the wards in the disposal of wastes in the identified bins. Strict vigilance by the task force must be kept for the use of bins by the providers, parients attendants.

1.4 the task force should decide about the procurement of necessary logistics as well as personal protective equipment of the cleaning staff.

1.5 The task force should keep an eye on the routine hygiene and maintenance activities.

1.6 The task force should also keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.

1.7 the task force should keep an eye on the procurement practices and recommend reuse of supplies and materials so as to reduce overall waste generation.

1.8 task force should keep DHC informed of the progress.

1.9 DHC should monitor the functioning of the Task force from time to time and seek the guidance of the Project Management Cell as and when required.

job/99/akg

RESPONSIBILITIES OF KEY TASK FORCE MEMBERS .

1.1 Role of Chairman (Superintendent of the concerned hospital)

i) To assume overall responsibility of MWM at the health care unit.

ii) To send the monthly report on MWM to the CMOH/DHC & PMC

iii) To send an annual report to WBPCB by 31 January every year (with a copy to CMOH/ DHC/PMC/ Health DEptt.) as per the format given in Form II of the Bio-Medical Waste (Management and Handling) Rules 1998

iv)To apply in prescribed Form I as given in the Bio-Medical Waste (Management and Handling) Rules 1998 to WBPCB for granting of authorisation for MWM

v) To assume the overall responsibility of implementing the policies/directives of the PMC/ GOWB on MWM at the health care unit.

vi) To allocate adequate manpower, infrastructure and re-sources to the Waste management in-charge (WMI) for MWM at the health care unit.

vii) To arrange required training for the staff on MWM

viii) To keep an eye on the basic requirements e.g. reliable water supply , sanitary facilities - disinfection procedures and equipment which are vital to keep a health facility clean and at a satisfactory level of hygiene.

ix) To interact with the local municipal/ Panchayat Bodies and other Government Departments on any matter in relation with MWM including supply of safe water, sanitation facilities at the health care unit etc with a view to maintaining the hospital hygiene.

x) To interact with the local NGOs and local people to involve them with (off-site) transport. treatment and disposal of medical wastes.

1.2 Role of Waste management in-charge (WMI - Senior Ward Master)

i) To assume responsibility of day-to-day activities related to MWM including development and maintenance of greenbelt at the health care unit.

ii) To monitor the activities of hospital staff in relation with segregation, collection, transport, storage on-site treatment and disposal of medical wastes.

iii) To ensure regular supply of adequate resources and equipment including bags/ containers, protective gear, etc. for the hospital staff for MWM.

iv) To ensure availability of adequate manpower for MWM at the health care unit everyday.

v) To ensure proper fencing and locking of storage vats to prevent access to ragpickers,birds, and stray animals to medical wastes.

vi) To provide necessary assistance to the Emergency control in-charge (ECI) for matters in relation with

management and control of accidents and spillage.

vii) To investigate any accidents and prepare report on it in association with the ECI as per the format in Form III of the Bio-Medical Waste (Management and Handling) Rules 1998.

viii) To maintain daily record of medical waste generation at different wards at the health care unit

ix) To prepare monthly report on MWM and submit it to the Chairman.

x) To prepare annual report as per the format given in Form II of the Bio-Medical Waste (Management and Handling) Rules 1998 and submit it to the Chairman.

xi) To liaise with the Chairman, Nursing Superintendent and Heads of the various Departments to ensure scientific MWM at every ward at the health care unit.

xii) To organise training and awareness generation campaign for the hospital staff, visitors and the local community on the utility and benefits of scientific MWM practices.

1.3 Role of **Emergency control** in-charge (ECI - Pharmacist)

i) To assume overall responsibility of management and control of accidents (including needle stick injury) and spillage of hazardous substances.

ii) To liaise with other members of the HWMC to provide advice and guidance on matters relating to prevention of accidents and spillage of hazardous substances.

iii) To provide training to the hospital staff on preventive and emergency measures to avoid and prevent accidents and spillage of hazardous substances.

iv) To provide technical assistance to the WMI on matters in relation with management of chemical wastes.

v) To provide technical assistance to the WMi for preparation of report on accidents and spillage of hazardous substances as per the format III of the Bio-Medical Waste (Management and Handling) Rules 1998.

1.4 Role of **Head of the Departments.**

i) To assume overall responsibility of MWM at the department.

ii) To ensure availability of adequate manpower for day-to-day MWM at the department.

iii) To ensure that the departmental staff including nursing staff and sweepers receive adequate training on MWM.

1.5 Role of **Nursing Superintendent.**

i) To assume responsibility of monitoring MWM activities at various wards at the health care unit.

ii) To see that all her staffs keep daily records of the no. of coloured bags disposed.

iii) To see that all her staffs keep the logistics in stock in sufficient quantity.

iv) To see that all her staffs follow the norms, as framed by the authority, specially on management of sharps and on routine necessary clearance of coloured bags from the wards.

v) To liaise with the Chairman, WMI, ECI, Heads of the Departments and other members od the HWMC to ensure quality standards of MWM at the health care unit.

No. 1249/CMDA/FW(US)/IPP-VIII/1-17/2000 22nd August, 2000.

ORDER

Administrative approval and financial sanction is hereby accorded to the implementation of bio-waste management scheme in Municipal Hospitals/Maternity Homes/ESOPDs/ Laboratories including Regional Diagnostic Centres created under the F.W. (US) Project -IPP-VIII, Calcutta in 10 (ten) local bodies at the initial phase viz., (i) Naihati (ii) North Barrackpore (iii) New Barrackpore (iv) Dum Dum (v) Madhyamgram (vi) Rajpur - Sonarpur (vii) Budge Budge (viii) Uttarpara - Kotrung (ix) Bhadreswar and (x) Chandannagar at a total cost of Rs. 29.37 lakhs in the following manner :-

1. Civil construction cost for burial pits [2(two) units at a time] @ Rs. 2.37 lakhs x 10 = Rs. 23.70 lakhs.
2. Purchase of covered cycle vans for transportation of the infected Wastes from the Health Institutions to burial pit @ Rs. 12000 x 10 = Rs. 1.20 lakhs.
3. a) Procurement of disposables per municipality per year : 5 nos of plastic vats with cover, plastic bags (inner lining) of 4 colours @ Rs. 6300 x 2 (one time replacement) per unit x 10 = Rs. 1.26 lakhs.

   b) Purchase of chemical disinfectants, Kerosine oil for burning polythene (plastic) bags after emptying the same in the burial pit @ Rs. 3000 per unit x 10 = Rs. 0.30 lakhs.

   c) Procurement of rubber gum boots, rubber gloves @ Rs. 1500 per unit x 10 = Rs. 0.15 lakhs.

   Total of 3(a), (b) & (c) = Rs. 1.71 lakhs.

4. Operation and Maintenance :
   a) Salary of cycle van puller @ Rs. 100/- per day x 3 days per week x 52 weeks x 10 = Rs. 1.56 lakhs

   b) Contingency @ Rs. 12000 p.a. per unit x 10 = Rs. 1.20 lakhs

   Total of 4 (a) & (b) = Rs. 2.76 lakhs

   Grand Total: 1 + 2 + 3 + 4 = Rs. 29.37 lakhs.

The concerned municipalities shall prepare estimate through the Municipal Engineers based on the standard design of the State Health System Development Project for civil construction of burial pits within the sanctioned cost indicated in this order and shall undertake the construction as early as possible as well as take follow-up actions on the construction of burial pits are completed by December, 2000.

The cost involved will be met from the provision under the head " Innovative Schemes " in the budget of FW(US) Project - IPP-VIII, Calcutta during the project period.

The Chairpersons of the concerned municipalities are being informed.

Project Director,
IPP-VIII & Secretary,
CMDA

[P.T.O]

/1(R1)
No.12-9/CMDA/FW(US)/IPP-VIII/1-17/2000 22nd August, 2000.

Copy forwarded for information and necessary action to :-

1. The C.E.O., CMDA.
2. The D.G.O.F., CMDA.
3. The Chairperson _____. A copy each of the standard design and standard estimate prepared by the State Health System Development Project is enclosed. A site map where the burial pits are proposed to be constructed be forwarded to the undersigned along with a certificate from the chairperson that civil construction work for burial pits could be executed within the ceiling limit of sanctioned estimate of Rs. 2.37 lakhs.
4. The C.E.(P &M), CMDA
5. Accounts Officer- I, IPP-VIII, CMDA

Chief of Health
IPP-VIII/CMDA 22/8/2000