

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DEPARTMENT OF HEALTH

JOINT DENR-DOH

ADMINISTRATIVE ORDER NO. 02

AUG 24 2005

Series of 2005

SUBJECT : Policies and Guidelines on effective and proper handling, collection, transport, treatment, storage and disposal of health care wastes.

I. RATIONALE

The Department of Environment and Natural Resources (DENR) and the Department of Health (DOH) hereby jointly provide the following guidelines on the management of health care wastes pursuant to, among others, the following laws, rules and regulations:

- Clean Air Act of 1999 (Republic Act 8749);
- Toxic Substances, Hazardous Waste, and Nuclear Waste Control Act of 1990 (Republic Act 6969);
- Ecological Solid Waste Management Act of 2000 [Republic Act 9003]
- Refuse Disposal of the Sanitation Code of the Philippines [Chapter XVIII, Implementing Rules and Regulations, Presidential Decree 856];
- Clean Water Act of 2004 [Republic Act 9275];
- Environmental Impact Statement (EIS) System (Presidential Decree 1586);
- Hospital Licensure Act [Republic Act 4226]

II. OBJECTIVES

- A. To provide guidelines to generators, transporters and owners or operators of treatment, storage, disposal (TSD) facilities of health care waste on the proper handling, collection, transport, treatment, storage and disposal thereof;
- B. To clarify the jurisdiction, authority and responsibilities of the DENR and DOH with regard to health care waste management; and
- C. To harmonize efforts of the DENR and DOH on proper health care waste management.

III. SCOPE AND COVERAGE

These policies and guidelines shall apply to health care waste generators, transporters and owners or operators of TSD and final disposal facilities.

IV. DEFINITION OF TERMS

A. **Health Care Wastes** - include all wastes generated as a result of the following:

1. Diagnosis, treatment, management and immunization of humans or animals;
2. Research pertaining to the above activities;
3. Producing or testing of biological products; and
4. Waste originating from minor or scattered sources (i.e. dental clinics, alternative medicine clinics, etc.)

The categories of health care wastes are enumerated in Annex "A".

B. **Health Care Waste Generators** - include health care facilities, institutions, business establishments and other similar health care services with activities or work processes that generate health care waste.

1. Hospitals (Primary Care, Secondary Care and Tertiary Care)
2. Infirmaries
3. Birthing homes
4. Clinics

- | | |
|---|--------------------------|
| [a] Medical | [e] Surgical |
| [b] Ambulatory | [f] Alternative medicine |
| [c] Dialysis | [g] Dental |
| [d] Health care centers and
dispensaries | [h] Veterinary |

5. Laboratories and Research Centers

- | | |
|--|--------------------------------------|
| [a] Medical and biomedical
laboratories | [e] Nuclear medicine
laboratories |
| [b] Medical research centers | [f] Biotechnology laboratories |
| [c] Blood banks and blood
collection services | [g] Animal research and
testing |
| [d] Dental prosthetic
laboratories | [h] Drug testing laboratories |
| | [i] HIV testing laboratories |

6. Drug Manufacturers

7. Institutions

- | | |
|---|---|
| [a] Drug rehabilitation
center | [d] Schools of Radiologic
Technology |
| [b] Training centers for
embalmers | [e] Medical Schools |
| [c] Med-tech intern training
centers | [f] Nursing Homes |
| | [g] Dental Schools |


8. Mortuary and Autopsy Centers

- C. Health Care Waste Transporter** - a person licensed by the DENR Environmental Management Bureau to convey health care waste through air, water or land.
- D. Treatment, Storage and Disposal (TSD) Facilities** - facilities where hazardous wastes are stored, treated, recycled, reprocessed and/or disposed of, as prescribed under DENR AO No. 2004-36, Chapter 6-2 (Categories of TSD Facilities).

V. RESPONSIBILITIES OF IMPLEMENTING & COOPERATING AGENCIES

This Joint Administrative Order shall be implemented by the DENR through the Environmental Management Bureau (EMB) and its Regional Offices, the National Solid Waste Management Commission (NSWMC), and by the DOH through its Centers for Health Development (CHD), Bureau of Health Facilities and Services (BHFS), Bureau of Health Devices and Technology (BHDT), Environmental and Occupational Health Office (EOHO) of the National Center for Disease Prevention and Control (NCDPC), the National Center for Health Facility Development (NCHFD), and the National Reference Laboratory (NRL)-East Avenue Medical Center, Quezon City.

A. The DENR-EMB shall:

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- 1. Be the primary government agency responsible for implementing pertinent rules and regulations on the management of health care waste in the Philippines, particularly concerning the issuance of necessary permits and clearances for the Transport, Treatment, Storage, and Disposal of such wastes, as governed by RA 6969, RA 8749, RA 9275, RA 9003 and PD 1586;
 - 2. Formulate policies, standards, and guidelines on the transport, treatment, storage, and disposal of health care wastes.
 - 3. Oversee compliance by generators, transporters, TSD facility operators, and/or final disposal facility operators with the proper transport, treatment, storage, and disposal of health care wastes;
 - 4. Conduct regular sampling and monitoring of wastewater in health care and TSD facilities to determine compliance with the provisions of RA 9275;
 - 5. Require TSD facility operators and on-site treaters to present to the DENR copies of the results of microbiological tests on the health care waste treated using autoclave, microwave, hydroclave and other disinfection facilities prior to the renewal of their Permits under RA 6969;
 - 6. Provide technical assistance and support to the advocacy programs on health care waste management; and
 - 7. Notify DOH on cases of non-compliance or notice of violation issued to health care facilities, institutions and establishments licensed by the DOH.

B. The DOH shall:

1. Regulate all hospitals and other health facilities through licensure and accreditation under the Hospital Licensure Act (Republic Act No. 4226);
2. Formulate policies, standards, guidelines, systems and procedures on the management of health care waste;
3. Develop training programs and corresponding modules on health care waste management;
4. Provide technical assistance in the preparation of health care waste management plan as a requirement for licensing or the renewal thereof;
5. Provide technical assistance to ensure an effective and efficient implementation of health care waste management program;
6. Require all health care waste TSD facility operators and health care waste generators with on-site waste treatment facilities to use DOH-BHDT registered equipment or devices used for the treatment of health care wastes;
7. Conduct regular performance evaluation of equipment/devices used for the treatment of health care wastes by the DOH-BHDT;
8. Monitor the microbiological test of treated wastes to ensure compliance with DOH standards;
9. Evaluate DOH hospitals' compliance with proper health care waste management program;
10. Issue Department Circulars to ensure that all environmental requirements are complied with; and
11. Notify DENR on actions taken on cases of non-compliance or notice of violation issued to health care facilities, institutions, and business establishments.

C. The DOH-Centers for Health Development shall:

1. Advocate health care waste management [HCWM] practices to the Local Chief Executives, key leaders and other stakeholders;
2. Monitor health care waste management practices in all hospitals and other health care facilities;
3. Provide technical assistance on health care waste management [HCWM] through:
 - a. Training
 - b. Advisory on the preparation of HCWM plans as a requirement for licensing or the renewal thereof
 - c. Dissemination of policies, guidelines and information

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- d. Monitoring and validation of the implementation of HCWM
- e. Develop, reproduce, and disseminate HCWM IEC materials
Participation in any public hearings related to HCWM
- f. Ensure compliance by health care waste generators with all pertinent laws, rules and regulations on HCWM.

VI. GUIDELINES AND PROCEDURES

A. ENVIRONMENTAL COMPLIANCE REQUIREMENTS

A.1 Documentary Requirements

A.1.1 Health Care Waste Generators

Health care waste generators are required, based on existing laws, rules and regulations, to register and secure the following permits:

A.1.1.1 From the DENR-Environmental Management Bureau

1. **Environmental Compliance Certificate (ECC)** - for the establishment of hospitals, health care facilities covered by the provisions of PD 1586 from the EMB Central Office or its Regional Offices.
2. **Permit to Operate (P/O)** - for Air Pollution Source and Control Installation from the EMB Regional Office.
3. **Discharge Permit** will be issued by the EMB Regional Office and the Laguna Lake Development Authority (LLDA) based on RA 9275 or the Clean Water Act of 2004 (See Annex "B" LLDA Jurisdiction)
4. **Hazardous Waste Generator's Registration** in compliance with the implementing rules and regulations of RA 6969 (DAO 29 series of 1992 and DAO 36 series of 2004) from the EMB Regional Office.

A.1.1.2 From the DOH-Bureau of Health Facilities and Services:

1. **Licenses** for hospitals, laboratories, dialysis clinics, birthing homes, infirmaries, psychiatric hospitals, dental prosthetic laboratories, blood banks, ambulatory clinics, and drug treatment and rehabilitation centers.
2. **Certificate of Accreditation** for Overseas Filipino Workers (OFW) medical clinics, surgical clinics, drug testing laboratories, HIV testing laboratories, water testing laboratories, medical technologist intern training centers and training centers for embalmers.

A.1.2 Health Care Waste Transporters

Health care waste transporters are required, based on existing laws, rules, and regulations, to undertake the following:

1. Register with EMB Central Office as healthcare waste transporter;
2. Secure Transport Permit from the DENR-EMB Regional Office;
3. Comply with the DENR Manifest System; and
4. Comply with other requirements specified in the Implementing Rules and Regulations of RA 6969.

A.1.3 TSD Facilities

Owners or Operators of TSD facilities are required based on existing rules and regulations to secure the following permits and clearances from DENR-EMB and DOH:

1. **Environmental Compliance Certificate (ECC)** for the Sanitary Landfill (SLF) and TSD Facility from the EMB Central Office or Regional Office
2. **Notice to Proceed** for controlled dump facility to be used as repository of health care waste from the EMB Regional Office
3. **Registration as TSD facility** based on the Implementing Rules and Regulations of RA 6969 from EMB Central Office
4. **Technology Approval** for non-burn technologies from the EMB Central Office prior to the issuance of Permit to Operate.
5. **Permit to Operate (P/O)** Air Pollution Source and Control Installation from EMB Regional Office
6. **Discharge Permit** from the EMB Regional Office or LLDA
7. **Certificate of Product Registration** for equipment or devices used for treating health care wastes from the DOH- BHDT
8. **Certificate of Technical Evaluation** for equipment or devices used for treating health care wastes from the NRL-EAMC

B. PROCEDURES FOR SECURING PERMITS AND LICENSES

Permits and licenses shall be secured following the established procedures of the DENR and DOH.

C. SPECIFIC CRITERIA, STANDARDS, AND GUIDELINES

C.1 Handling, Collection, Storage and Transport

Handling, collection, storage and transport of health care wastes shall be in accordance with the provisions of RA 8749, RA 6969, and RA 9003, and the DOH Health Care Waste Management Manual (Chapter 5).

C.2 Treatment

1. Facilities shall consider technologies and processes used in health care waste treatment such as (1) thermal, (2) chemical, (3) irradiation, (4) biological processes, (5) encapsulation, and (6) inertization, as outlined in the DOH Health Care Waste Management Manual and subject to compliance with the provisions of RA 8749, RA 6969, and RA 9003.
2. Autoclave, microwave and hydroclave facilities shall use microbiological test to determine the treatment efficiency of the units. The results of the microbiological test shall be recorded and reported to DENR under RA 6969 and RA 9003.
3. Health care waste generators and TSD facilities shall observe a level of microbial inactivation of $6\log_{10}$ reduction or greater than the most resistant microorganism of concern in a given process.
4. Treated wastes and inert residues from TSD facilities must be disposed in controlled disposal or sanitary landfill facilities duly licensed by the DENR to handle the same.
5. Inertization is a suitable treatment for pharmaceutical wastes while encapsulation and other immobilization techniques are treatment methods considered for sharps, chemicals and pharmaceutical wastes and should therefore be placed in final disposal facilities indicated under the subsequent Section.


C.3 Final Waste Disposal Systems and Facilities

The use of the proceeding disposal facilities should only be limited to health care wastes which have undergone the necessary treatment provided under the prescribed standards stipulated in the DOH Health Care Waste Management Manual.

C.3.1 Controlled Dump Facility

1. A Controlled Dump Facility (CDF) is an interim¹ disposal facility for municipal solid waste or those that are considered as non-hazardous and non-toxic substances. In the absence of a sanitary landfill, a controlled dumpsite could accept health care waste after the indicative treatment thereof.

¹As stipulated in Section 37 of RA 9003, no open dumps shall be established and operated, nor any practice or disposal of solid waste by any person, including LGUs, which constitutes the use of open dumps for solid waste, be allowed after the effectivity of this Act (February 16, 2001): Provided, that within three (3) years after the effectivity of this Act (February 16, 2004), every LGU shall convert its open dumps into controlled dumps, in accordance with the guidelines set in

2. In addition to the operational guidelines stipulated under Section 2 of Rule XIII of the Implementing Rules and Regulations of RA 9003 or as indicated in the conditions stipulated in the issuance of the NTP, a CDF that is commissioned to accept treated health care waste should also be operated in accordance with the following specific requirements:
 - a. Identify a particular cell within the facility to serve as a site for the disposal of treated health care waste. The capacity of the allotted cell/cell(s) should be measured in order to determine the actual volume of wastes that can be accommodated in the facility.
 - b. Adequate signage should be placed in the health care waste deposition area.
 - c. The cell should be lined with a material of low permeability, such as clay or a geo-membrane such as a high-density polyethylene (HDPE) plastic liner to contain the leachate and prevent contamination of groundwater sources within the area.
 - d. Ensure that adequate soil cover is placed on the cells right after each waste spreading.
 - e. Basic record keeping of the incoming wastes indicating the time of receipt, volume or weight, source identification (i.e. name of generator or source), certification of treatment (or any similar form indicating that the waste have undergone the necessary treatment) and the general condition of the waste to be disposed.
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C.3.2 Sanitary Landfill Facility


1. A Sanitary Landfill Facility [SLF] is a disposal site designed, constructed, operated and maintained in a manner that exerts engineering control over significant potential environmental impacts arising from the development and operation thereof.
2. The required dedicated cells for treated health care wastes should be built or developed prior to its operation to prevent the mixing thereof with municipal solid wastes and other wastes.
3. Aside from the ECC, which is required for such facility, the construction and development of an SLF must conform to RA 9003 and its Implementing Rules and Regulations, particularly Sections 1 and 2, Rule XIV.

4. Existing sanitary landfill with approved ECC for the disposal of municipal solid waste must secure an amendment of their ECC before accepting health care waste for disposal thereat.

C.3.3 Safe Burial on Healthcare Facility Premises

1. Safe burial within the premises of healthcare facilities shall be allowed in remote locations and rural areas where no TSD facilities are available. In such activity of safe burial, the health care facility must ensure that the load or capacity of the on-site burial pit is not exceeded.
2. Chemical treatment or disinfection is required prior to safe burial on hospital premises.
3. The standards for safe burial within the healthcare facility premises shall follow the guidelines specified in the DOH Health Care Waste Management Manual (See Annex "C").
4. Relative to the guidelines provided by DOH, the operation of safe burial should be in accordance with the minimum requirements for landfill.

C.3.4 Sharps and Syringes Disposal Through Concrete Vault

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1. Disposal using concrete vault shall be allowed only as an alternative means of disposal of used sharps and syringes.
 2. Concrete vault shall be marked with proper signage: CAUTION: HAZARDOUS WASTE OR SHARPS DISPOSAL AREA-UNAUTHORIZED PERSONS KEEP OUT.
 3. Concrete vault should be watertight and must be constructed at least 1.5 meters above the groundwater level.
 4. The procedures for the safe burial of sharps and syringes through concrete vault shall follow the guidelines in the DOH Health Care Waste Management Manual (See Annex "D").

C.4 Wastewater Treatment Facility

Healthcare facilities shall have their own Wastewater Treatment Facilities (WTF) or maybe connected into a sewage treatment plant. However, facilities with laboratories shall be required to pre-treat their wastewater prior to discharge into a sewage treatment plant.

VII. REPEALING CLAUSE

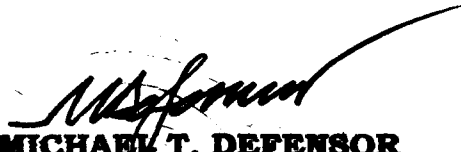
All other issuances whose provisions of DENR and DOH Administrative Order, Memorandum Circulars or other issuances inconsistent herewith are hereby repealed or modified accordingly.


VIII. PENALTY CLAUSE

Failure to comply with the policies/guidelines shall be subject to the penalty provision(s) of the applicable laws stated herein.

IX. EFFECTIVITY

This Order shall take effect immediately.


MICHAEL T. DEFENSOR
Secretary *in of*
Department of Environment and
Natural Resources


FRANCISCO T. DUQUE III, MD, MSc
Secretary
Department of Health

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ANNEX "A" - Categories of Health Care Waste

1. **General Waste** - Comparable to domestic waste, this type of waste does not pose special handling problem or hazard to human health or to the environment. It comes mostly from the administrative and housekeeping functions of health care establishments and may also include waste generated during maintenance of health care premises. General waste should be dealt with by the municipal waste disposal system.
2. **Infectious Waste** - This type of waste is suspected to contain pathogens (bacteria, viruses, parasites, or fungi) in sufficient concentration or quantity to cause disease in susceptible hosts. This includes:
 - 2.1 Cultures and stocks of infectious agents from laboratory work;
 - 2.2 Waste from surgery and autopsies on patients with infectious diseases (e.g. tissues, materials or equipment that have been in contact with blood or other body fluids);
 - 2.3 Waste from infected patients in isolation wards (e.g. excreta, dressings from infected or surgical wounds, clothes heavily soiled with human blood or other body fluids);
 - 2.4 Waste that has been in contact with infected patients undergoing hemodialysis (e.g. dialysis equipment such as tubing and filters, disposable towels, gowns, aprons, gloves, and laboratory coats);
 - 2.5 Infected animals from laboratories; and
 - 2.6 Any other instruments or materials that have been in contact with infected persons or animals.
3. **Pathological Waste** - Pathological waste consists of tissues, organs, body parts, human fetus and animal carcasses, blood and body fluids. Within this category, recognizable human or animal body parts are also called anatomical waste. This category should be considered as a subcategory of infectious waste, even though it may also include healthy body parts.
4. **Sharps** - Include needles, syringes, scalpels, saws, blades, broken glass, infusion sets, knives, nails and any other items that can cause a cut or puncture wounds. Whether or not they are infected, such items are usually considered as highly hazardous health care waste.
5. **Pharmaceutical waste** - Includes expired, unused, spilt, and contaminated pharmaceutical products, drugs, vaccines, and sera that are no longer required and need to be disposed of appropriately. This category also includes discarded items used in handling of pharmaceuticals such as bottles or boxes with residues, gloves, masks, connecting tubing and drug vials.
6. **Genotoxic Waste** - Genotoxic waste may include certain cytostatic drugs, vomit, urine, or feces from patients treated with cytostatic drugs, chemicals, and radioactive materials. This type of waste is highly hazardous and may have mutagenic, teratogenic, or carcinogenic properties.
 - 6.1 Harmful cytostatic drugs can be categorized as follows:
 - 6.1.1 Alkylating agents: cause alkylation of DNA nucleotides, which leads to cross-linking and miscoding of the genetic stock:

6.1.2 Anti-metabolites: inhibit the biosynthesis of nucleic acids in the cell; mitotic inhibitors: prevent cell replication

6.2 Cytotoxic wastes are generated from several sources and include the following:

6.2.1 Contaminated materials from drug preparation and administration, such as syringes, needles, gauges, vials, packaging; outdated drugs, excess (left over) solutions, and drugs returned from the wards;

6.2.2 Urine, feces, and vomit from patients which may contain potentially hazardous amounts of the administered cytotoxic drugs or of their metabolites and which should be considered genotoxic for at least 48 hours and sometimes up to 1 week after drug administration.

7. **Chemical Waste** - Chemical waste consists of discarded solid, liquid, and gaseous chemicals, for example from diagnostic and experimental work and from cleaning, housekeeping, and disinfecting procedures. Chemical waste from health care may be hazardous or non-hazardous.

7.1 Chemical waste is considered hazardous if it has at least one of the following properties:

7.1.1 Toxic

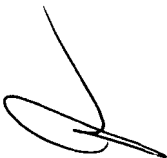
7.1.2 Corrosive (e.g. acids of pH <2 and bases of pH >12)

7.1.3 Flammable

7.1.4 Reactive (explosive, water-reactive, shock-sensitive)

7.1.5 Genotoxic (e.g. cytostatic drugs)

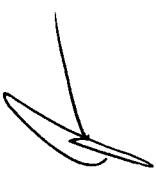
7.2 Non-hazardous chemical waste consists of chemicals with none of the above properties, such as sugars, amino acids, and certain organic and inorganic salts.



8. **Waste with high content of heavy metals** - Wastes with a high heavy-metal content represent a subcategory of hazardous chemical waste, and are usually highly toxic. Mercury wastes are typically generated by spillage from broken clinical equipment (thermometers, blood pressure gauges, etc.). Whenever possible, spilled drops of mercury should be recovered. Residues from dentistry have high mercury content. Cadmium waste comes mainly from discarded batteries. Certain "reinforced wood panels" containing lead is still being used in radiation proofing of X-ray and diagnostic departments. A number of drugs contain arsenic but these are treated here as pharmaceutical waste.

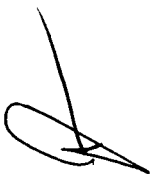
9. **Pressurized Containers** - Many types of gas are used in health care and are often stored in pressurized cylinders, cartridges, and aerosol cans. Many of these, once empty or of no further use (although they may still contain residues), are reusable, but certain types notably aerosol cans, must be disposed of. Whether inert or potentially harmful; gases in pressurized containers should always be handled with care; containers may explode if incinerated or accidentally punctured.

10. **Radioactive Waste** – Includes disused sealed radiation sources, liquid and gaseous materials contaminated with radioactivity, excreta of patients who underwent radio-nuclide diagnostic and therapeutic applications, paper cups, straws, needles and syringes, test tubes, and tap water washings of such paraphernalia. It is produced as a result of procedures such as in vitro analysis of body tissues and fluids, in vivo organ imaging, tumor localization and treatment, and various clinical studies involving the use of radioisotopes. Radioactive health care wastes generally contain radionucleides with short half-lives, which lose their activity in a shorter time. However, certain radionucleides e.g. C-14 contaminated wastes have much longer half-life, more than a thousand years, which need to be specially managed in a centralized treatment facility for radioactive wastes. The same is required for the management of disused sealed radiation sources used for cancer treatment.



ANNEX "B" - Laguna Lake Development Authority Jurisdiction

The Laguna Lake jurisdiction is limited to the water shed of the Laguna Lake which is consist of the following: Rizal Provinces (13 towns); Laguna Provinces (27 towns); chartered cities of San Pablo, Antipolo, Tagaytay, Tanauan, Calamba, Sta. Rosa; Sto. Tomas and Malvar, Batangas; Silang, Carmona and GMA, Cavite; Lucban, Quezon; Taguig and Pateros, Metro Manila; chartered cities of Pasay, Caloocan, Quezon, Manila, Muntinlupa, Marikina and Pasig.



ANNEX "C" - Guidelines for Safe Burial within Hospital Premises

Safe burial within the hospital premises shall be in accordance with the guidelines specified in the DOH Health Care Waste Management Manual as follows:

1. Access to the disposal site should be restricted to authorized personnel only.
2. The burial site should be lined with a material of low permeability, such as clay or a geo-membrane such as a high-density polyethylene (HDPE) plastic liner at the bottom of the pit to prevent contaminating groundwater and avoid pollution.
3. Only hazardous health care waste should be buried. If general health care waste were also buried on the premises, available space would be quickly filled-up.
4. Large quantities (> 1kg) of chemical/pharmaceutical wastes should not be buried.
5. The burial site should be managed as a landfill, with each layer of waste covered with a layer of earth to prevent odor, as well as to prevent proliferation of rodents and insects.
6. Burial site should not be located in flood prone areas.
7. Hospital ground should be secured. (e.g. fenced with warning signs).
8. The location of waste burial pit should be downhill or down-gradient from any nearby wells and about 50 meters away from any water body such as rivers or lakes to prevent contaminating sources of water.
9. Health care facilities should keep a permanent record of the size and location of all their on-site burial pits to prevent construction workers, builders, and others from digging in those areas in the future.
10. The safe burial of waste depends critically on rational operational practices. The bottom of the pit should be at least 1.50 meters higher than the ground water level.
11. It should be noted that safe on-site burial is practicable only for relatively limited period, say 1 to 2 years, and for relatively small quantities of waste, say up to 5 to 10 tons in total. Where these conditions are exceeded, a longer-term solution will be needed.

**ANNEX "D" - Procedures for the Safe Burial of Sharps and Syringes
through Concrete Vault**

The procedures for the safe burial of sharps and syringes through concrete vault shall be in accordance with the guidelines in the DOH Health Care Waste Management Manual as follows:

1. Dig a pit (minimum size of 1 m x 1 m x 1.8 m depth), enough to accommodate sharps and syringes for an estimated period of time without reaching the groundwater level. The site must be isolated and at least 152 meters away from the groundwater supply sources and dwelling units.
2. Construct concrete walls and slabs of the pit. Provide slab with opening or manhole for easy deposition of collected sharps and syringes. The manhole should be extended a few centimeters above the soil surface to overcome infiltration of surface water.
3. Deposit the collected safety boxes filled with used sharps and needles inside the concrete vault.
4. Install a security fence around the site.

