Vietnam Ministry of Health

Medical Waste Management Plan for the Mekong Health Support Project
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>DOF</td>
<td>Department of Finance</td>
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<tr>
<td>DOHLM</td>
<td>Department of Housing and Land Management</td>
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<tr>
<td>DONRE</td>
<td>Department of Natural Resources and Environment</td>
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<td>DPI</td>
<td>Department of Planning and Investment</td>
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<tr>
<td>EPL</td>
<td>Environment Preservation Law</td>
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<tr>
<td>HCC</td>
<td>Health Care Center</td>
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<td>HCU</td>
<td>Health Care Unit</td>
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<td>HNAP</td>
<td>Health Network Assistance Program</td>
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<td>PPMC</td>
<td>Provincial Preventive Medicine Center</td>
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<td>MLW</td>
<td>Medical Liquid Waste</td>
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<td>MOC</td>
<td>Ministry of Construction</td>
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<td>MOF</td>
<td>Ministry of Finance</td>
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<td>MOH</td>
<td>Ministry of Health</td>
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<tr>
<td>MONRE</td>
<td>Ministry of Natural Resources and Environment</td>
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<td>MOSTE</td>
<td>Ministry of Science, Technology and Environment</td>
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<td>MPC</td>
<td>Municipal People’s Committee</td>
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<td>MW</td>
<td>Medical Waste</td>
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<td>MWM</td>
<td>Management Waste Management</td>
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<td>MWMP</td>
<td>Management Waste Management Plan</td>
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<td>MWW</td>
<td>Medical Waste Water</td>
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<td>NRC</td>
<td>National Regulation Commission</td>
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<td>PGH</td>
<td>Provincial General Hospital</td>
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<td>PPC</td>
<td>People’s Committee</td>
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<td>SWC</td>
<td>Strategy of Waste Control</td>
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<td>URENCO</td>
<td>Urban Environmental Company</td>
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<td>WSC</td>
<td>Water Supply Company</td>
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Forword

This report was developed in accordance with TOR issued by the Ministry of Health (MOH) to develop a medical waste management plan (MWMP) for public health facilities (PHFs) within the Health Network Assistance Program (HNAP) supported by the proposed WB Mekong Health Support Project (MHSP).

The inputs for this report is a draft Feasible Study for the Project designed by the MOH, related reports on waste management, in general, and MWMP, in particular, of MOH and other agencies.

The report represents the synthesis of the findings from a literature review and field studies. The consultants conducted field studies in five of the 13 Mekong Delta’s provinces (Can Tho, Tra Vinh, Soc Trang, An Giang and Hau Giang), from May 23 to June 5, 2005. The study team had discussions with different departments, general hospitals of the region and provinces, provincial urban and environment companies and other agencies to explore the actuality of the system of MWMP, and the requirements of theirs for support to improve this system within the MHSP. Based on this, the consultants suggest a MWMP that may be considered by the WB-supported HNAP in the Mekong Delta. As the implementation of MWMP in localities should be closely coordinated among different provincial departments and agencies, suggestions by consultants are not limited to health institutions as counterparts of the Project but also for state management agencies and related organizations that may have coordinating roles in the realization of proposed MWMP.
1. Overview of Legal and Institutional Framework on Waste Management in Vietnam

1.1. Existing Legal Framework on MWM

In Vietnam, the legal framework for WM in general and MWM in particular has been gradually improved over the last decades, especially following adoption of the Environment Preservation Law (EPL) in December 1993. Along with EPL, other by-laws on medical waste management (MWM) and legal documents are issued by the Government promulgated by state management on waste control and MWM.

a) The relevant laws and by-laws issued by the National Assembly and Government are as follows:

- The EPL (27/12/1993) has some articles, provisions on the duties of agencies and organizations for treatment of waste before it is disposed; responsibilities of state management agencies for monitoring, supervising the implementation of EPL; prohibition of disposing of hazardous waste into the environment. These provisions are:
  
  • Article 16 identifies the responsibilities of agencies, organizations and individuals for implementing managerial measures and treatment of waste to meet environmental standards;
  
  • Article 26 specifies that the collection, transporting, burning and treating of waste shall comply with rules promulgated by state management agencies, for hazardous wastes that are flammable, and should be treated before they are disposed;
  
  • Article 29 prohibits disposal of hazardous wastes considered to be highly harmful to human health;
  
  • Article 38 stipulates the responsibilities of state management agencies in environment preservation. These agencies include MOSTE, now MONRE, which is broadly responsible for state management over environment preservation. Other ministries and agencies, within their jurisdiction, are to coordinate with MONRE to achieve environmental protection; provincial and municipal PCs shall be responsible before the Government for the state management over environment preservation in their localities; department of resources and environment (DONREs) shall be responsible to their PPCs for the environment protection in their localities. Presently, a draft of revised EPL has been submitted to the National Assembly and going under the discussion among the National Assembly’s members at its 15th meeting. It is expected that the revised EPL will be soon approved by the National Assembly.

- Decree 175-CP (18/10/1994) of the Government on the instruction on the implementation of EPL provides details of environmental standards that need to be
followed (including those for health sector), state management agencies should have duties for undertaking control, monitoring the completion of the law.

- Order 199/1997/CT-TTg (3/4/1997) of the Prime Minister on taking urgent measures in the management of solid waste in the urban sector and in industrial zones, and specifies details of measures to be implemented in relation to collection, transporting and treating medical waste. The order requires the MOH to urgently undertake measures of monitoring and controlling medical waste. It also requires hospitals, health units to radically implement provisions on MWM, treating those that may induce harm to human health.

- Decision 152/1999/QD- TTg (10/7/1999) of the Prime Minister, approving the strategy of waste control (SWC) in urban sector and industrial zones by the year 2020, that it sets forth the goal that all kinds of hazardous medical waste to be treated by fighting by 2010.

- Decision 155/1999/QD- TTg (16/7/1999) of the Prime Minister on the issuing of Rules of hazardous waste control. It provides details of controlling waste that is hazardous for people’s health. It also promulgates the list of hazardous waste, including MW. It provides the responsibilities of organizations and individuals in sorting out, collecting and transporting hazardous waste, the duty of state management over it. Especially, this Decision has article 24 that specifies clearly the responsibilities of the MOH for MWM, as follows:

  ③ Controlling, monitoring and pushing hospitals and health units to implement rules of medical hazardous waste as provided by this Decision.
  ③ In the collaboration with the MONRE and the Ministry of Construction (MOC) developing plans, selecting technologies and building up treatment works to burn medical hazardous waste to the standard of Vietnam.
  ③ Issuing Rules on MWM.

- Decree 26 - CP on administrative penalty on the breaking the law and provisions of environment preservation.


- Order 23/2005/CT-TTg (21/6/2005) of the Prime Minister on accelerating solid waste management in cities and industrial areas. This document instructed ministries, local governments to strengthen their monitoring and guiding functions in solid waste management. The document set the goal of treating 100% of hazardous medical solid waste and over 60% of hazardous industrial waste by the year 2010 with appropriate technology.
b) **By-laws issued by ministries**

- Inter-ministry Circular 1590/1997/TTLB-KHCNMT-XD (17/7/1997) of Ministry of Science, Technology and Environment (MOSTE) and Ministry of Construction (MOC) on the instruction on the implementation Order 199/1997 of the Prime Minister on taking urgent measures for solid waste management in urban sector and industrial zones.

- Decision 62/2001/QD-BKHCNMT (21/11/2001) of the Minister of MOSTE on the temporary technical requirements for a MW burning facility (This decision was replaced by Vietnam’s criterion VNTC to be mentioned below);

- Decision 60/2002/QD-BKHCNMT (7/8/2002) of the Minister of MOSTE on the temporary technical guidelines on burning hazardous waste (This decision was replaced by Vietnam’s criterion VNTC to be mentioned below);

- Decision 1895/1997-QD-BYT (19/9/1997) of the Minister of MOH on the operational rules of hospitals, including provisions on their waste control, as follows:

  ③ For solid waste, this Decision provides to collecting, sorting out and keeping it in a certain place. Solid waste must be classified into 4 categories, put in separate nylon bags or bins and taken to disposal sites twice a day. Hospitals must have incinerators up to the technical standards and operational conditions as required. Waste management companies (URENCOs) are accountable for transportation of waste to certain places to be treated by contracts signed with hospitals.

  ③ For liquid waste, this Decision prohibits hospitals to dispose untreated liquid waste to public source of water. All hospitals must have treatment facilities before liquid waste is disposed.

  ③ For smoke, this Decision provides that hospitals must ensure that the chimneys of burning facilities should meet technical standards;

  ③ The above Decision also provides the accountabilities of hospitals' directors, their related divisions and offices for various stages of MW control and treatment.

- Decision 2575/1999/QD-BYT (27/8/1999) of the Minister of MOH provides for close management MW. Unlike the above Decision, this Decision is applicable to all kinds of health units, including hospitals, health research institutions, commune/ward health cares stations, standby health centers and health training institutions. This Decision is seen as the most important and fundamental legal document in relation to MWM. The main contents of this Decision include specific provisions on MWM like sorting, collection, and transporting of solid waste in and out health care places. It also introduces several models, technologies and measures of treating MW to Vietnam's criteria (See Annex).

c) **Vietnam's criteria in relation to MWM**

  ③ TCVN 5945. 1995: Criterion on industrial waste water;
TCVN 6696. 2000 - Place for burying waste, requirement for environment protection;
TCVN 6705. 2000 - Classifying non-hazardous waste;
TCVN 6706. 2000 - Classifying hazardous solid waste;
TCXDVN 261. 2001- Criteria of designing waste disposal site.

1.2. State management agencies in relation to MWM in Vietnam

At present, the state management agencies in relation to MWM in Vietnam are MONRE, MOH, Provincial People Committees (PPCs), Department of Natural Resource and Environment (DoNREs), Department of Health (DOH), and URENCOs under the supervision of PPCs. The main functions and duties of the agencies in relation to MWM are as follows:

- MoNRE (as provided by Decision 155/1999/QD-TTg) has the functions of: i) state management over hazardous waste and guiding the implementation of hazardous MWM activities; ii) working out policies, strategies, legislation on environment protection, including those on MWM, and submission to the Government; iii) Designing standards, including those of MWM, such as for disposal sites for hazardous waste, technical qualifications of hazardous waste containers, technologies for hazardous waste treatment; iv) together with the Ministry of Finance (MOF) working out environment fees for hazardous waste control; v) approving assessment reports on the environment impact of projects of treatment hazardous waste treatment; vi) undertaking monitoring work on environment preservation, coordinating enforcement on MWM to health care units; and vii) Conducting training, awareness increasing events on hazardous waste and provisions on hazardous waste control.

- MOH is responsible for i) monitoring MWM activities of health and medical units to ensure the completion of functioning provisions; ii) developing Medical Waste Management Plan, capital investment construction, selection of MW treatment technologies and equipment in coordination with the MoSTE and MOC; iii) monitoring the implementation of those policies and provisions.

- PPCs/MPCs monitor environment management, in general, MWM activities, in particular, of their subordinates that relate to MWM in their jurisdiction;

- DoNRE monitor environment protection work and implementation of laws on environment protection in their localities;

- DOHs supervise the implementation of MWMP provisions in localities, namely in health care units located in and under then management of their localities;

- Urban environment (waste management) companies (URENCOs) undertake of MW collection, burning and or disposing it in landfills, operating through contracts with health care units (HCUs).

For effective MWM, there is a need of close coordination among state management agencies. The Office of Government (OOG) has issued Official Letter 1153/VPCP-KG (March 22, 1999) and Letter 1069 (October 11, 1999) require the MOH to actively collaborate with related ministries and sectors in developing a nation-wide MWM master plan. The MOH has coordinated with these agencies and worked out that plan with technical assistance from French Government and submitted it to the Government for consideration and approval.
The draft of master MWMP suggests the establishment of a National Regulation Commission (NRC) on MWM, based in the MOH with representatives from MPI, MOH, MOF, MOC, MoNRE, and MOST. At the provincial level, there will be respective commissions. These commissions will undertake coordinating work over the operations of MWM of the whole country and in every locality. Their main functions would be as follows:

- Approving budget planning, estimation for MWM of provinces;
- Awarding licenses on activities in health sector;
- Inspecting the implementation of MWM to standardized rules;
- Providing training and increasing awareness;
- Designing policies, legislation for enforcement by higher level agencies;
- Providing technical analysis on MWM;
- Promoting and reporting the implementation process of the national master MWMP;
- Providing and analyzing data and information on MWM.

2. The present situation of MWM in Mekong Delta areas and challenges to MWM in the project area.

2.1. The present situation of MWM in Mekong Delta

According to available statistics, Mekong Delta area has 1,614 healthcare units (HCUs) with 24,346 beds, equal to 13.3% of the total HCUs and 15.6% of the total beds (Statistical Year Book of 2002), as follows:

- At provincial level: 55 HCUs and 9,709 beds
- At district level: 232 HCUs and 8,036 beds
- At commune level: 1,327 HCUs and 6,601 beds

Local HCUs in the Mekong Delta area are taking a step by step approach to implementing MWM as required by Decision 2575 (1999) of the MOH. However, the outcomes are not equally good in all Mekong Delta’s provinces. Below is the overview of the actual MWM in all Mekong Delta and specifically in the five studied provinces.

2.1.1. The situation of solid MWM in the Mekong Delta:

Annually, an estimated 6560 tons of solid MW is generated in the Mekong Delta area, of which about 1200 tons of hazardous waste requires treatment. The quantity of solid MW from provincial HCUs is about 77% of the total. Provinces that have larger amount of MW are Tien Giang, An Giang and Can Tho and those that have less are Hau Giang and Ca Mau.

The estimated amounts of MW in this area are summarized in Table 1.
Table 1: The amount of solid MW in all hospital and HCUs in the Mekong Delta (tons/year)

<table>
<thead>
<tr>
<th>Provinces</th>
<th>From provincial hospitals</th>
<th>From district/commune hospitals, HCUs</th>
<th>Total waste in province</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Hazardous waste</td>
<td>Total</td>
</tr>
<tr>
<td>Mekong Delta</td>
<td>5130</td>
<td>1026</td>
<td>1427</td>
</tr>
<tr>
<td>Long An</td>
<td>394</td>
<td>79</td>
<td>179</td>
</tr>
<tr>
<td>Dong Thap</td>
<td>548</td>
<td>110</td>
<td>80</td>
</tr>
<tr>
<td>An Giang</td>
<td>604</td>
<td>121</td>
<td>202</td>
</tr>
<tr>
<td>Tien Giang</td>
<td>704</td>
<td>141</td>
<td>59</td>
</tr>
<tr>
<td>Vinh long</td>
<td>274</td>
<td>55</td>
<td>100</td>
</tr>
<tr>
<td>Ben Tre</td>
<td>476</td>
<td>95</td>
<td>87</td>
</tr>
<tr>
<td>Kien Giang</td>
<td>515</td>
<td>103</td>
<td>176</td>
</tr>
<tr>
<td>Can Tho</td>
<td>706</td>
<td>141</td>
<td>77</td>
</tr>
<tr>
<td>Hau Giang</td>
<td>1</td>
<td>0</td>
<td>74</td>
</tr>
<tr>
<td>Tra Vinh</td>
<td>252</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Soc Trang</td>
<td>255</td>
<td>51</td>
<td>84</td>
</tr>
<tr>
<td>Bac Lieu</td>
<td>274</td>
<td>55</td>
<td>95</td>
</tr>
<tr>
<td>Ca Mau</td>
<td>124</td>
<td>25</td>
<td>84</td>
</tr>
</tbody>
</table>

Source: Statistical Year Book and data computed by consultant based on field study information from five provinces.

2.1.2. The situation of MW collection and classification in 5 provinces

All large hospitals of these five provinces carry out collection and sorting of MW. The sorting out of MW is often done by various sections and wards of hospitals. Ordinary waste is sorted out and carried to URENCOs’ grounds while hazardous wastes are kept in special nylon bags. Spent needles and other sharp objects are packaged and carried to incinerators. Many hospitals and HCUs have facilities for keeping MW as required by the MOH. However, sorting out MW has not been done equally well in different provinces, hospitals and HCUs, and is particularly weak at the district and commune levels. A number of private HCUs do not strictly follow what is required for sorting out and treating MW.

2.1.3. The situation of transporting and treating hazardous MW in studied provinces:

In the five studied in detail, large general hospitals are equipped with hazardous waste burning means and facilities. Though these facilities and equipment are based in provincial general hospitals, they are also used to treat MW from other HCUs in the Mekong Delta area. For example,

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1 For example, Can Tho and An Giang have good classification system for medical waste, while 3/8 hospitals in Tra Vinh did not classify hazardous medical waste immediately since it were dismissed; healthcare agencies at lower levels (districts and communes) in Hau Giang and Soc Trang all face difficulties due to lack of equipment for classification and handling.
In Can Tho province incinerator MZ4 provided by Project “Equipping 25 MW incinerators for the cluster of hospitals” that is financed by ODA of the Austrian Government, started its operation in 2002 with the capacity of 500 kg a day. The equipment is based in Can Tho Central General hospital-CCGH (under the construction and it is planned to be finished and become MOH's regional hospital in Mekong Delta Region). It will be the biggest one in the region. Since it started operating, it works twice a week because of the shortage of waste that is collected and brought there. Average volume of medical waste presently treated by this equipment is 2826 kg per month (compared with the max. capacity of 10 ton of medical waste can be treated monthly). This incinerator is to treat all hazardous coming from all hospitals located in the province, 3 of 8 district health centers and 8 of 63 commune/ward health centers. All hazardous medical waste is gathered on the grounds of provincial hospitals and centers and transported to the incinerator. The remaining hospitals and health care centers use manual MW treatment facilities (small capacity incinerators that use gasoline). Thus, the modern incinerator of the province's general hospital does not work at full capacity while other HCU's and HCCs still use traditional treatment tools that may pollute partially and be costly. At present, province's HCCs are financed from the state-provincial budget to PGH to cover costs of MW treatment. PGH has to arrange full-time staff to be in-charge of transportation and treatment of waste. There is also a dust burning facility of 900 kg a day capacity in the province's URENCO. However, it has not started operation due to the lack of funds for installation, maintenance and operation.

An Giang province now has two incinerators with total capacity of 250-300 kg/day. They are in An Giang PGH and PGH of Chau Doc area. The one (MZ 2) based in PGH is funded by Austrian Government. They burn MW from PGHs as well as from all HCU's and HCCs, including private ones in the province. The Province has set forth the target to 2006 that 100% of MW of all PGHs, HCU's and HCCs will be collected and treated. With the available MW burning and treatment equipment this target will surely reached because they have been working at half of designed capacity. Now, the PPC allows PGHs with incinerator to charge fees for hazardous waste treatment at VND 10 thousand VND a kilogram with small portion subsidized from the province's budget.

Tra Vinh province has one MW incinerator equipped by Project “Equipping 25 MW incinerator for the cluster of hospitals”, funded by Austrian Government, which started operation since 2003. It burns MW from 3 of 8 PGHs. It works perfunctorily, under capacity while MW from other rest 5 of 8 hospitals is still treated by traditional ways (even one burns MW outdoors in the open air). All district and commune HCU’s and HCC’s do not have hazardous waste treatment equipment because of the lack of investment. The province's GH has to cover all the costs of treatment while the other two beneficiary-GHs pay only transportation fees (fuel).
Soc Trang province has five incinerators, of which one is of two chambers with a 400 kg/day capacity. It was funded and installed in PGH in 1998. The other 4 are based in district HCCs and they all are traditional burning ones. PGH’s kiln is run by staff for treating its own MW. Its monthly operational cost is about VND 18 million. However, PGH has had to contract out to URENCO to bury some MW when the facility is stopped for maintenance. District and commune HCCs and HCUs which do not burning facilities also have to rely on URENCO to take MW and dispose of it in landfills.

Hau Giang province is behind in terms of MW treatment equipment and management as it is newly separated. PGH that has just been upgraded, uses manual treatment facility and with small capacity. It only treats hazardous waste of PGH. Other provincial HCCs and HCUs have incinerators but they are not up to required standards or they contract out to URENCO.

2.1.4. The situation of water pollution management and control in HCUs:

The situation of liquid waste treatment measures of hospitals and HCUs in all 5 studied provinces is still poor. Very few have invested in comprehensive treatment equipment for medical liquid waste (MLW), others use bio-technologies that may not ensure safe sterilization and prevention of liquid absorbent. The remaining district, commune and private HCUs and HCCs dispose all polluted water into the common drainage.

Can Tho: Four of seven hospitals have installed MLW treatment equipment, one of them has modern equipment and the others do not.

An Giang: An Giang PGH and 2 other district centers have MLW treatment facilities equipped, while others treat MLW by bio-technologies. However, An Giang province has a target that by 2010 all public and private hospitals in the province will have MLW treatment systems. This represents a challenging target for the provincial health sector in terms of funds as compared to its now financial situation.

Tra Vinh: So far, provincial hospitals have not been financed to build up MLW. As a result, all MLW run through a biological filter system by using simple chemicals.

Soc Trang: The PGH has been equipped with MLW treatment system and started operation in 1997, with capacity of 400m3 a day. MLW coming from Center for lung and tuberculosis care is also treated in this hospital. Other provincial HCUs are not provided with any MLW treatment facilities.

Hau Giang: Only two HCCs, Chau Thanh and Long My have been funded with VND 180 million for installing MLW treatment facilities. However, one now does not work any longer. Other HCUs do not treat their MLW and consequently dump it to any drainage.
2.2. Challenges to MWM in Mekong Delta provinces within the project area

Vietnam has formulated a system of legislation on MWM that is being partially or initially implemented by the network of HCUs in the country and in the Mekong Delta provinces. Local authorities, namely DOHs in this area have initially directed local HCUs to undertake MWM activities in their localities. The available information indicates that MWM practices in the Mekong Delta provinces are not orderly arranged; the outcomes are not equally achieved by all provinces, HCUs and HCCs and MWM institution. As a result, there have emerged problems that need solutions. The most important challenges Mekong Delta's provinces face now are as follows:

**First, there is a shortage of funds for development of physical facilities and operations for MW treatment.** These provinces have not yet developed local master MWMPs because the national plan is not yet proved. Consequently, adequate funds for MWM has not been sufficiently allocated. There have not been any budget lines for MWM in the budget plans of state-funded institutions like URENCOs and DONREs. At present, MWM has been started within DOHs thanks to the direction from MOH and initiatives provincial state management agencies, it is not yet considered and implemented provincially and among related agencies. In other words, the issue of waste planning and control, generally, and MWMP, particularly, have not yet linked to the issue of urban or regional (Mekong Delta) management. This has led to the fact of shortage, inconsistency and irregular funds from the state budget.

**Second, the mechanisms for effectively running MWM systems in the Mekong Delta provinces are not fully functional.** HCUs in the Mekong Delta have relatively well come out MW, but the organization for implementation of the following stages has had limitations. Some large hospitals have been equipped with incinerators that meet required standards, thanks to assistance from the Austrian Government, but those kilns have not been effectively running, as, so far, most of kilns are run by hospitals. Some of them serve other HCUs and HCCs in the provinces but they serve without charge, while, at the same time, hospitals do not have funds to cover costs and maintain kilns. Some of district and commune HCUs and HCCs still use manual, traditional incinerators that may be convenient for running and require smaller initial funds but which may not ensure adequate treatment. Local health care management institutions and hospitals should have centrally equipped MW treatment facilities rather than the dispersed, traditional or manual ones that exist now. Provincial URENCOs in the Mekong Delta are just able to transport and treat all kinds of waste together, i.e. to carry all dusts to burying grounds, regardless if it is MW or that comes from industries or from households. URENCOs themselves have not provided with treatment equipment for hazardous waste, in general, and MW, in particular.

Only a few hospitals and HCUs have had MW treatment systems, of them only some can meet required standards, while more of them use biotechnology to filter or deposit it before disposing it to the environment. Most of the rest HCUs do not treat MW but pore it into common drainage. There has not, so far, any study to do an overall
assessment on whether treated MLW in the Mekong Delta meet the requirement. Therefore, it is impossible to make any evaluation on the pollution degree of water in this area. Decree 67 of the Government on the environment preservation fees on waste water is not applied to MWW in the Mekong Delta. Here HCUs pay waste water fees to water supply companies (WSCs) at the similar rate as for households pay, as high as 10% of clean water use price.

Third, there is a weak coordination, control and monitoring over MWM by state management agencies in Mekong Delta provinces. According to the state legal documents, as described in part I, the responsibilities of waste control, generally, and MWM in particular, belong to various agencies at both central and local levels. For the Mekong Delta area, along with the state management role of central ministries and sectors, related local authorities like the PPCs, DPIs, DONREs, DOHs, and DOST, DOCS, URENCOs are agencies which directly undertake the coordination, control and monitoring over MWM practices and activities within the province. However, this work is mainly done by the DOHs without close coordination and collaboration with other agencies in any of these provinces. At the same time, DOHs are not able to effectively monitor and supervise MWM activities at their subordinate HCUs (including those of MW and MWW), especially at the district and commune levels. On the other hand, DOHs can only do this work over MWM within HCUs rather than process of transport, treatment of MW as soon as URENCOs take. The segment and fragmentation in MWM lead to inability of radical treatment MW to ensure that it meets required procedures and technical standards. Especially, due to the lack of treatment facilities many of small HCUs cannot treat it on their own and they come to contract with URENCOs to transport and bury MW of all kinds. Collection of data on MWM is mainly based on reporting from HCUs rather than using any system of independent measurements, assessment of provincial state management agencies on MWM.

Fourth, awareness and understanding among HCUs and people about the necessity of MWM is weak; the work of advocacy, propagandizing, management skill training is not done regularly. According to the provision of MWM by the MOH, the responsibility of this work belongs to DOHs and in turn they delegate this duty to different groups of stakeholders, namely:

③ Directors of hospitals are responsible for the organization and delegation of responsibilities and work to their departments, divisions and offices, and all their staff involved in the process of MW treatment; provision of needed facilities and means, tools to ensure the safety for these staff who directly work with treatment of MW. In addition, this provision also specifies that hospitals to have standardized treatment facilities.

③ Infectious sections of hospitals are responsible for the implementation and supervision of MW treatment of the hospitals. Directors of these sections are responsible for undertaking monitoring, and guiding their staff about MW treatment procedures, technical requirements for every stage of these procedures.
Staff that directly work with MW collection and treatment have to strictly follow technical requirements for collection and treatment.

Provision of the MOH also specifies that other sections and individuals have to sort out, put and keep any MW in stated places, special bags and boxes.

Recently, large hospitals in Mekong Delta area have implemented MWM well within hospitals. MWM practices of Mekong Delta provinces show that where leaders and managers of HCUs understand the importance of MWM and are active in directing this job, MWM has been carried out with good results. On the contrary, MWM activities are slowly started and poorly done.

In hospitals where incinerators have been installed, teams have been created. These teams comprise of from two to five people who operate incinerators. These team members have been trained on operation processes and technical requirements of MW treatment. Also, many provinces have organized training courses for their leaders, managers, medical doctors, sisters and nurses of HCUs on how to sort, collect and treatment MW. However, there is a long way from what they learned in classes and practices. That is:

Many district and commune HCUs do not do sort out MW properly, using the wrong packages for MW;

Training courses have not covered all target-groups. Therefore, at places, HCUs’ staff do not understand properly about proper collection and sorting out MW. Consequently, HCUs have not made adequate investments in standardized MW treatment facilities; and

Private practitioners are not aware of MW treatment, are not active in collecting and treating it.

Fifth, there is weak involvement of private sector, organizations and individuals in MWM. At present, MWM is conducted by state management agencies, as a result, other organizations and individuals have not popularly participated in this work. By now, beside state-owned HCUs, URENCOs that directly involved, there have not been any private ones provide services in MW treatment or consulting services in this field in the Mekong Delta area. When state management agencies are limited in financial capacities and competence, the private sector may be complementary investors and service suppliers. This can be seen as a direction of service development in the Mekong Delta in the coming years in order to strengthen the socialization public services and improving the quality of MWM in the Mekong Delta.

3. Recommendations on MWMP for project counterparts.

The MWMP for Mekong Delta provinces within the Project as presented below is based on the following grounds:
The Master plan of the system of health for the period of 2010 – 2020 of the MOH (Draft in May 2005);

Project document “Assistance to the network of health in Mekong Delta’s provinces” MOH, March 2005);

Analysis of actual situation of MWM and challenges for provinces in Mekong Delta have been described and analyzed in sections 2.1 and 2.2. of this report.

There are expected to be 16 hospitals (one national hospital, 11 provincial hospitals, a heart care center and 3 sub-regional hospitals) and 13 health standby centers built up and upgraded in the Mekong Delta area under the Project. (Table 2)

Table 2: Equipment upgrading plan for 16 hospitals

<table>
<thead>
<tr>
<th>Provinces, cities</th>
<th>Central GH</th>
<th>PGHs</th>
<th>Cardiology vascular center</th>
<th>Subregional hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit Beds</td>
<td>Unit Beds</td>
<td>Unit Beds</td>
<td>Unit Beds</td>
</tr>
<tr>
<td>Can Tho</td>
<td>1 700</td>
<td></td>
<td>2 400</td>
<td></td>
</tr>
<tr>
<td>Long An</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dong Thap</td>
<td></td>
<td>1 450</td>
<td></td>
<td>1 200</td>
</tr>
<tr>
<td>An Giang</td>
<td></td>
<td>1 754</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tien Giang</td>
<td></td>
<td>1 590</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinh Long</td>
<td></td>
<td>1 500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ben Tre</td>
<td></td>
<td>1 650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kien Giang</td>
<td></td>
<td>1 934</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hau Giang</td>
<td></td>
<td>1 250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tra Vinh</td>
<td></td>
<td>1 400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soc Trang</td>
<td></td>
<td>1 500</td>
<td></td>
<td>1 200</td>
</tr>
<tr>
<td>Bac Lieu</td>
<td></td>
<td>1 500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ca Mau</td>
<td></td>
<td>1 600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1 700</td>
<td>11 6128</td>
<td>1 200</td>
<td>3 600</td>
</tr>
</tbody>
</table>

Source: Project on Mekong Delta health support project , table 47

Along with this, the project will also support training, increasing staff qualification in order to improve their management skills, provides assistance to the implementation of projects and setting up information systems.

With this support scope, it is projected that annual amount of MW from 16 hospitals will be some 4200 tons, of which an estimated 835 tons of DMW will need treatment. This amount of MW accounts for about 80% of the total DMW in Mekong Delta area presently and it is distributed among those provinces as follows: Can Tho: 77 tons; Long An: 44 tons; Dong Thap: 49 tons; An Giang 104 tons; Tien Giang: 65 tons; Vinh Long: 55 tons; Ben Tre: 71 tons; Kien Giang: 102 tons; Hau Giang: 27 tons; Tra Vinh: 44 tons; Soc Trang: 55 tons; Bac Lieu: 77 tons; Ca Mau: 66 tons. From the analysis earlier in this report, the hazardous solid waste generated from the project supported sites can be handled properly with certain improvements relating to institutional arrangement and funding mechanisms.
The actual situation of MWM of HGUs assisted by the project is as follows:

Table 3: The actual situation of MWM of HCUs to be assisted by the Project

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>Average amount of MW</th>
<th>MWWM practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sorting, collection</td>
<td>Transportation</td>
</tr>
<tr>
<td>Can Tho GH</td>
<td>satisfied</td>
<td>satisfied</td>
</tr>
<tr>
<td>Long An</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dong Thap</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>An Giang</td>
<td>satisfied</td>
<td>satisfied</td>
</tr>
<tr>
<td>Tien Giang</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vinh Long</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ben Tre</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kien Giang</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tra Vinh</td>
<td>satisfied</td>
<td>satisfied</td>
</tr>
<tr>
<td>Soc Trang</td>
<td>satisfied</td>
<td>satisfied</td>
</tr>
<tr>
<td>Bac Lieu</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ca Mau</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

For Provincial Preventive Medicine Centers, MW is either burned manually or contracted out to URENCOs for disposal in landfills. Their MWW is mainly unseparated from ordinary waste water and is untreated.

3.1. Objectives to be achieved:

The objectives of MWMP are to design and run effectively the system of MWM in HCUs in the project area. Specific criteria to be reached to by the year 2010 are:

1. 100% of MW coming out from hospitals and PPMCs are classified and treated up to the requirement;
2. 100% of MWW coming out from 16 hospitals in the project area will be separated and treated;
3. 100% of hospitals and PPMCs in the project area have their own approved and implemented MWMPs; employees of hospitals and centers are well aware of MWM in their work places.

3.2. Specific outputs to be achieved

3.2.1. MWMP will be developed and implemented in 16 hospitals and 13 PPMCs
It is projected that during the project time, all hospitals, PPMCs under project should develop MWMPs. The project will partially support development and implementation of this plan. Implementation of the MWMPs will greatly improve the general situation of MWM in all the project area of Mekong Delta, as they present about 80% of the total MW in the area.

For the master MWMPs to be realized, they must be approved by hospital directors and they should be responsible for managing their implementation with steering commissions to support them in regular promoting and monitoring. Besides, it should be an assessment mechanism, namely, the project should organize the collection of information of MWM of the hospitals, PPMCs within the project to carrying out this assessment together with that of other activities of the project.

3.2.2. Processes of sorting out, collection and radical treatment MW in hospitals and PPMCs within the project area and operating them; Approved and implemented effective operation and management mechanism for treatment facilities.

At present, MW sorting out and collecting in supported hospitals have been done. However, at places the quality is not good. Therefore, all hospitals, HCUs in the project area must ensure good implementation the process of sorting out and collecting MW as provided by the MOH.

For the time being, modern incinerators are ineffectively used and used under their capacity in some provinces. The main reasons for this are weak management insufficient funds for proper and effective operation of facilities. These facilities are directly managed and run by hospitals, while they can be used to treat MW of various hospitals and HCUs. Financial mechanisms for charging MW collecting and treating has not been created, and result in constraints to the effective use of equipment. Within the project, hospitals in the project area must work with related departments and sectors of the provinces such as DOHs, DONREs and Department of Housing and Land Management (DOHLM), URENCOs, DOFs, etc.) to agree on management options of incinerators. Three options for addressing this are as follows:

Option 1: Allowing hospitals to continue running burning facilities, but with accounting for management and operating facilities and collecting fees for collecting and treating MW to cover their costs. This option has the advantage that hospitals can use their man power, but they may face problem that they have to run this business, making investments in vehicles and collection. Based on the field study hospitals do not want to choose this option.

Option 2: Burning facilities are transferred to URENCOs and they will charge services of collecting and treating MW from hospitals and HCUs in and out the project area based on the MW amount of treated MW quantity. URENCOs of provinces have had already transport means, collectors, however, they also need training more staff for treating MW and facility operators. They must also work out measures for classifying DMW and living waste collected from hospitals and HCUs.
Option 3: Giving this work to an independent institution, not necessarily a state-owned one, in the province specialized in waste treatment, including MW. This institution will take the work of operating MW burning facilities, working as a business unit, as non-profit but based on use fee payment.

Given the current under-used capacity of incinerators available in the hospitals assisted by the projects it is expected that hazardous solid waste from these hospitals will be treated during the project implementation period. In addition, it is also projected that local governments in Mekong region will put more efforts to support the PGHs to handle medical waste management in order to achieve the goal of 100% of medical waste treated by 2010 set by the Central government.

3.2.3. System of MWW treatment installed and operated in some hospitals in the project area and relevant technologies

Along with a few hospitals that have invested in MWW treatment facilities, most of the rest have not made any investment in this equipment. Therefore, to meet the stated objective of treating 100% MW, HCU s in the project area need new facilities or upgrading of existing ones. The list of hospitals asking for fund support from the Project will be made based on the suggestions from provinces.

3.2.4. The information of MW is gathered, upgraded frequently in the hospitals and PPMCs in the project area;

Recently, the information of the amount and quality of MW in the project area is very limited and is not collected regularly and in systematic way. For the purpose of management and as ground for assessing the effectiveness of MWMP, there should built up systems of information of the quantity and quality of MW from HCU s in the project area.

This information system will provide basic information of the quantity and quality of MW and MWW coming from HCU s, applied treatment system and management mechanism. This information must be provided by HCU s and used for reporting the project implementation progress, generally, and be kept as an area of project’s data.

3.2.5. Created and functioning effective coordination mechanism in MWM among local management agencies;

3.2.6. Improved awareness of MWM stakeholders
The following groups of stakeholders should receive training or attend workshops on MWM:

- Managers, medical doctors, health care employees working in HCU s in the project area should improve their awareness of MWM in hospitals and state provisions on MWM;
- Managers and employees who directly work with MW treatment should improve their managerial skills, qualifications and equipment operation techniques.
3.3. Suggested measures needing the project’s support for the implementation MWMP

a) Support to the development and implementation of master MWMPs of hospitals and PPMCs.

③ Support to the development of MWMPs of 16 project’s beneficiary hospitals. These plans must include processes of collection, transport and treating MW in hospitals, creating system running commissions of hospitals, clear-cut dividing functions, tasks and duties of every member in relation to MWM of the hospitals; monitoring and supervising mechanisms of commissions, coordination mechanism among related state management agencies, information collection and processing mechanism on MW of hospitals; investment, upgrading planning for MW treatment facilities. These plans of MWM should be approved by hospitals’ directors and their implementation must be under directors’ leadership. Regulatory commissions should take responsibilities for monitoring the process of implementation, preparation of reports to hospitals’ directors and PMUs.

③ Support to the hospitals: The DOHs of provinces have proposed plans for operating incinerators effectively. For several hospitals, it is proposed to transfer MW treatment facilities to specialized institutions for management. Hospitals should not be involved in operating large-scale equipment as they may experience shortages of funds.

③ Hospitals allocate their running cost for MW treatment.

③ PMCs design MWM alternatives for their own. In short-run, those which have been funded for manual burning facilities, will continue to use them and those which have not been financed have to work out options of funding or carry MW to the closest incinerator to ensure that MW of hospitals and HCUs in the project area are completely treated.

b) Support to strengthen state management over MWM

③ Developing periodical monitoring plan for MWM (quarterly, annually).

③ Conducting periodical assessment on the quality of waste water and the completion of provision on MWM in the hospitals.

③ Provincial budgets should set aside funds to support MWM activities in HCUs in the provinces.

c) Assistance in increasing the awareness about MWM for stakeholders:
Conducting seminars, training workshops on MWMPs, advocacy, disseminating pamphlets in HCUs to promote MWM and prevent the harm of MW, etc.

Providing training to HCUs’ staff in the project area on the procedures of collecting, transporting and protecting during MW treatment.

Providing training to Health Private's staff in the project area on the procedures of collecting, transporting and protecting during MW treatment.

d) Providing equipment:

For the first stage, it is recommended that the project will assist hospitals to undertake mentioned above measures without additional procurement of waste treatment facilities. In the second phase, project support in providing waste treatment facilities may be considered based on the following:

- Actual performance of MWMPs in the assisted hospitals. The need for further upgrading the existing waste treatment facilities and purchasing new ones may occur after the project’s first stage period.

- List of needed waste treatment facilities will be made basing on hospitals’ and HCUs’ suggestions during the implementation of the project in first stage, in general, and MWMP, in particular.

- Support of WM facilities will be decided on competition principle depending on how good the proposals are made by the hospitals.

References

- MOH Feb, 2005, Medical waste management plan for HIV/AIDS program in Vietnam;
- MOH, March 2005, Feasible report of the “Mekong Health Support Project”;
- Legal documents on environmental protection and medical waste management;
Appendix 1: Some pictures about medical waste management in some project’s targeted healthcare agencies

Water waste management system in An Giang Hospital

Specialized van for collecting medical waste

Outdoor management system of water waste in Tra Vinh hospital

Incinerator in Tra Vinh hospital
Incinerator in regional hospital in Can Tho

Medical waste before burning

Out-door water waste management system in Tra Vinh hospital
Appendix 2: Issues discussed during the meetings with concerned authorities and agencies in the field work

A. Provincial health care department and general hospital:

1. Overview on management system of medical waste diffused by all health care agencies in the provinces, in which:
   - Total waste volume? Rate of medical waste? ordinary waste. Ratio of treated medical waste?
   - What is current management system now? technology and equipment? is there modern incinerator ? what is its capacity? the ratio of utilization? cost for maintenance? who is operating and managing this incinerator?
   - Total cost for medical waste collection?

2. Number of patients in each healthcare agency in the province? the over-used situation in each hospital and healthcare level? ratio of bed utilization ? ratio of patient from other provinces? annual growth of patient number?

3. Potential for healthcare development? how those healthcare agency satisfy the demand for healthcare after the project is implemented?

4. Plan for waste management for coming time? demand for new equipment’s?

5. How relevant is the current system for waste collection and processing? What should be changed and how?

B. Questions for urban and environmental companies in each province

1. The situation of solid waste emission: in which hazardous waste? medical waste?

2. How does the company organize their waste collection and treatment. The detail figures on annual capacity and output. Ratio of collection and treatment?
   - The detail on medical waste collection and treatment? is the link between the company and hospital, contract mechanism? how fees is calculated?

3. Development plan and the capacity strengthening of the company for the coming time; how will the company update their equipment. What is the company commendation when the private sector involvement will be introduced to the waste treatment system?
Appendix 3:  
Decision 2575/1999/QD-BYT (27/8/1999) of the Minister of MOH regulating the medical waste management in health establishments.  

(Summary)  

1. Waste classification and identification: wastes derived from health establishments can be categorized into 5 types:
   - Clinical waste. This waste is divided into 5 groups:
     i) Group A waste: infection waste: is waste containing pathogenic organisms like bacteria, viruses, parasites and fungi in sufficient quantities to cause disease in susceptible hosts. Infectious wastes are materials or equipment that have been in contact with patient blood and excretion (e.g. bandages, cotton wool, dressings, gloves, swabs, etc.)
     ii) Group B: sharp items: all items that pose a risk of injury and infection due to their puncture and cutting properties such as discarded syringes, needles, scalpels, knives, broken glass, pipettes, blades and similar items having a pointed or sharp edge or that are likely to break during transportation and result in such an edge
     iii) Group C: clinic waste generated from laboratories (e.g. pathology, hematology, and blood transfusion, microbiology, histology) such as: gloves, test-tubes, cultures and stocks of infectious agents, blood bags etc.
     iv) Group D waste: Pharmaceutical waste
     v) Group E waste: human and animal tissues and body parts.

2. Collecting process of solid waste at the health establishments:
   2.1. General principles: segregation should be taken place as close as possible to where the waste is generated and hazardous waste are not mixed with general waste.
   2.2. Standards of waste bags, boxes and bag-holders:
     - Color coding of waste bags, boxes, and bag-holders: yellow used to contain clinical wastes, marked with symbol of biological hazard, green used for
general wastes, black used for chemical wastes, radioactive materials and cytotoxic drugs.

- Criteria of a box containing sharp-pointed things: should be intact without any puncture or any leak. It should be made of rigid material and can be destroyed with fire. There need some different capacities of the boxes that can be suitable for containing different kinds of sharp-point things. The box should have an appropriate design for containing needles, syringes and other sharp-pointing things without any leakage of waste during normal. It requires handles and a lid for sealing. That is a yellow box with a horizontal line to indicate when the box is two third full.

2.3. General and hazardous waste location must be clearly defined and as close as possible to where the waste is generated.

2.4. Waste collection at the source: orderlies are responsible for collecting waste from the source to storage area. Before being taken away from department and ward, all clinical wastes should be enclosed in regulated color plastic bags. These bags must be bound tightly. Do not close these bags by stapling.

2.5. Transportation of waste inside health establishments: the health establishments should have regulations on route and time, means of transportation from departments to waste storage area. These means of transportation should be only used for carrying wastes; they should be washed after being operated.

2.6. Storage of waste in health establishments:
- The storage area of waste should have safe distance to food stores or food preparation areas or roads. It should be possible to lock the store to prevent access by authorized persons. A supply of cleaning equipment, protective clothing and waste bags or containers should be located conveniently. Easy access for waste – collection vehicles is essential. There should be a water supply for cleaning purposes. Hazardous waste should be kept separately from general waste.
- Storage time for healthcare waste: i) In hospital, waste should be disposed daily, and storage time for hazardous waste is 48 hours; ii) In small health establishments, storage time for wastes in group A,B,C,D does not exceed 1 week.; waste in group E should be burned or buried immediately.

3. Off-site transportation of hazardous waste: health establishments should make a contract with waste transportation and disposal services approved by local authorities and should have consignment note.

4. Treatment and disposal technologies for healthcare solid waste:
4.1. Incinerator models for hazardous solid waste: the regional incinerating center is recommended for all health establishments in the city or for the cluster of hospitals and the industrial hazardous waste incinerator is recommended for the big city. Incinerator for the cluster of hospitals or for each health unit is recommended for health units in town
The rudimentary incinerator can be used for district health centers and open burning or using rudimentary incinerator are recommended for policlinic, lying in post, commune healthcare station.
4.2. Technique for incinerating hazardous solid waste of health unit is based on incinerating models and budgets, health establishments select one of the following technologies:

- Double chamber incinerator with high temperature, large capacity (5000-7000 kg/day);
- Double chamber incinerator with high temperature, appropriate capacity (800-1000 kg/day);
- Double chamber incinerator with capacity of 150-300 kg/day (appropriate for hospital with 250 beds or more);
- The rudimentary incinerator made of brick or iron drum being used for small – scaled health units;
- Open burning being used for commune health station in rural and remote areas.

4.3. Hygienically burying is only recommended for health unit that has no condition to incinerate hazardous healthcare waste. Do not mix hazardous waste and general waste. Waste should be buried in regulated areas that meet environmental standards and techniques.

4.4. Method of primary treatment only recommended for waste in group C and materials or equipment after contacting with blood or fruits of HIV/AIDS patients, syphilitic patients or sputum of tuberculosis patient… Primary treatment includes boiling, chemical disinfection and wet and dry thermal sterilization.

4.5. Destruction of clinical wastes:

<table>
<thead>
<tr>
<th>Waste classification</th>
<th>Primary treatment</th>
<th>Incineration</th>
<th>Bury</th>
<th>Sewer</th>
<th>Return to generating source</th>
<th>Re-use</th>
<th>Destroyed as general waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Clinical waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Group A</td>
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<td>X</td>
<td>X</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>- Group B</td>
<td>Sharp are put into boxes</td>
<td>X</td>
<td>X</td>
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<tr>
<td>- Group C</td>
<td>X</td>
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<tr>
<td>- Group D</td>
<td>X</td>
<td>X</td>
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<td>+ Cytoxic</td>
<td>High temp.</td>
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<td>- Group E</td>
<td>X</td>
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<td>2. Chemical waste</td>
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<td>- Non - hazardous</td>
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<td>X</td>
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<td>- Hazardous</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>3. Pressurized</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
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<tr>
<td>containers</td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

4.6. Treatment of liquid.
- Treatment of liquid waste: every hospital should have a complete system of collecting and treatment of liquid waste. The liquid waste discharged from hospital should meet Vietnam standards (TCVN 5945-19595).