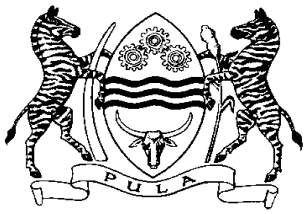

REPUBLIC OF BOTSWANA

THE REPORT OF THE AUDITOR GENERAL

ON

CLINICAL WASTE MANAGEMENT AT REFERRAL HOSPITALS; PRINCESS MARINA, NYANGWABGWE AND LOBATSE MENTAL HOSPITAL

MINISTRY OF HEALTH (DEPARTMENT OF CLINICAL SERVICES)

PERFORMANCE AUDIT REPORT NO. 3, 2007

PERFORMANCE AUDIT REPORT

ON

CLINICAL WASTE MANAGEMENT

AUDITING FOR BOTSWANA GOVERNMENT

The Auditor General is the Head of the Office of the Auditor General, appointed under the Constitution. The Auditor General carries out his duties under the Finance and Audit Act 1997 (as amended). He thereof, undertakes Performance Audits on the public sector bodies and submits reports to the Council. The aim is to improve the public sector administration and accountability.

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Office of the Auditor General
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12th March 2007

Honourable B. Gaolatlhe
Minister of Finance and Development Planning
Private Bag 008
Gaborone

Dear Sir

The Office of the Auditor General has undertaken a Performance Audit on Clinical Waste Management at Referral Hospitals: Princess Marina, Nyangabgwe andLobatse Mental Hospital in pursuant to Section 29 of Finance and Audit Act, 1997 as amended.

As you are aware the Finance and Audit Act was amended in 1997 to incorporate Performance Audit as one of the functions of my office. The amendment also included provisions that require Performance Audit reports to be laid down before the National Assembly by the Minister responsible for Finance.

Accordingly I submit the Performance Audit Report No. 3, 2007 on the audit of Clinical Waste Management at Referral Hospitals: Princess Marina, Nyangabgwe andLobatse Mental Hospital to be laid before the National Assembly in accordance with section 36 of Finance and Audit Act as amended.

Yours faithfully

P.E. Namogang
AUDITOR GENERAL

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ABRREVIATIONS

BCWMCP	**:**	Botswana Clinical Waste Management Code of Practice
DWMPC	**:**	Department of Waste Management and Pollution Control
HCWs	**:**	Health Care Workers
INTOSAI	**:**	International Organisation of Supreme Audit Institutions
LMH	**:**	Lobatse Mental Hospital
MOH	**:**	Ministry of Health
NRH	**:**	Nyangabgwe Referral Hospital
OAG	**:**	Office of the Auditor General
PMH	**:**	Princess Marina Hospital

0. EXECUTIVE SUMMARY

In Botswana as elsewhere in the world, there is increasing recognition of the risks to human health, environment and natural resources emanating from risks associated with clinical waste. According to the study conducted by Botswana Government assisted by German Agency for Technical Cooperation in 1995, the hazardous proportion of clinical waste produced in Botswana was "believed to amount to approximately 2500 tonnes a year", including clinical waste from the 3 Referral Hospitals (Princess Marina, Nyangabgwe and Lobatse Mental Hospital).

The Office of the Auditor General therefore, undertook the performance audit to assess whether clinical waste generated by the 3 Referral Hospitals was appropriately managed and disposed of through safe and environmentally sound methods, to protect employees' health, environment and the communities in which these hospitals operated. The audit coverage was for 3 financial years namely; 2003/04,2004/05 and 2005/06.

The significant observations made were in regard to planning, compliance to Botswana Clinical Waste Management Code of Practice, risk management, clinical waste management information, as well as the evaluation of BCWMCP.

1. PLANNING

There was no provision for clinical waste management issues in the Strategic Plans of either the Department of Clinical Services or those of the 3 Referral Hospitals. This made it difficult to establish the required level of performance against which clinical waste management could be judged.

2. COMPLIANCE TO BOTSWANA CLINICAL WASTE MANAGEMENT CODE OF PRACTICE (BCWMCP)

The Botswana Clinical Waste Management Code of Practice stipulates the requirements and specifies processes to be followed. It is therefore, important that Health Care Workers and Operatives involved in clinical waste are provided with guidance to manage clinical waste appropriately, so that the Botswana Clinical Waste Management Code of Practice requirements are complied with. Clear guidance also supports the peer review because it can provide a reference for checking that appropriate steps are being followed. This guiding document states the processes that

have to be followed from the generation/production to the landfills or areas excavated for clinical waste disposal. However, the OAG observed the following shortcomings in the clinical waste streams:

Clinical waste was not appropriately managed in that:

- It was not wholly segregated from the household waste as; syringes, needles, cannulas, soiled gloves were deposited with the soft drink cans and bottles, and other household waste.

- There was inadequate supply of receptacles such as red plastic bags, sharp containers and pedal bins, which compelled facilities to improvise and use detergent containers.

- Handling of bags containing clinical waste was haphazardously done, in that operatives conveyed red plastic bags containing such waste with hands from wards to the incinerators.

- Bags containing waste were not always securely fastened, to avoid spillage that could lead to serious health hazards and injuries.

- Bags containing clinical waste were left in the sun for unknown length of time and this posed the risk of infection and noxious smell.

- The regular mode of transport was hands and file trolleys whose surfaces were impermeable and this presented risk of dropping bags and/or spilling their contents.

- Waste destined for incineration and disposal off-site was transported in open trucks.

- Waste was loaded in the incinerators before adequate combustion temperatures had been reached and batches fed therein were large (10-20 bags a time) which led to black smoke emission thus polluting the environment and affecting nearby communities.

3. RISK MANAGEMENT

- The Botswana Clinical Waste Management Code of Practice requires that “all health care workers and operatives offered hepatitis B vaccination as and when they work” but OAG observed that the facilities were reactive in this regard, that is, the vaccination was offered after injuries had occurred.

- Clinical waste from operating theatres, maternity wards and laboratories was not prioritised for incineration and as such could wait there indefinitely without being incinerated.

- The residuals and ash was dumped at the landfills like household waste that is, without being compacted and covered with material specifically for that purpose.

- Training lacked continuity in that, it would be conducted once in a while or no training at all.

4. CLINICAL WASTE MANAGEMENT INFORMATION

Data on the quantities of waste generated, incinerated and ultimately disposed of was not maintained.

5. EVALUATION

The Botswana Clinical Waste Management Code of Practice had never been evaluated despite its existence since 1996. The evaluation would have assisted Ministry of Health to assess whether the document had addressed all clinical waste issues.

OVERALL CONCLUSION

Appropriate waste management is a vital initiative as it ensures protection of the human health and the environment. It is therefore important to understand that, improper waste management may cause adverse health effects by spreading infections and diseases and also lead to environmental problems resulting in the air and groundwater pollution. In this regard, OAG considers that, these risks need to be addressed if the clinical waste's efficiency and accountability are to be achieved.

RECOMMENDATIONS

1 STRATEGIC PLANS AND OBJECTIVES

- The OAG recommends that both the Department of Clinical Services and 3 Referral Hospitals should develop Strategic Plans that set aside assessment criteria, based on appropriate priorities which include, performance indicators and realistic time tables in order to address health and environmental risks and other stated strategies dealing

with clinical waste management issues and integrate them in their management systems.

- The Health Care Facilities should develop strategic objective for the management of clinical waste that are concise, realistic and measurable that outcome oriented of what the operation aims to achieve.

2. COMPLIANCE ASPECTS

- CWMCP should be complied with in its entirety by the 3 Facilities, in order to ensure proper segregation of clinical waste at source.

- Management of facilities level should ensure that all personnel involved in carrying and loading clinical waste in different transport modes treat bags with care.

- They should ensure that not under any circumstance are hands used to transport bags containing waste.

- Management at the facility level should ensure that waste, including ash and residuals is kept in adequate storage facilities that are specifically built and designed for that purpose in order to comply with the requirements of BCWMCP and international best practice.

- Health Care Facilities should ensure that waste produced within their jurisdiction is transported in safe and secure vehicles or other transport modes that are environmentally sound and efficient, in order to protect human health and the environment against the adverse effects which may result from that transportation.

- Facilities Management should ensure that waste generated is completely incinerated to reduce the effects that clinical waste can have on human health and the environment.

- Facilities should strive to ensure that waste collected within their jurisdiction is appropriately disposed of, in order to minimise the consequences thereof, of human health and the environment.

3. RISK MANAGEMENT ASPECTS

- MOH should encourage Facilities to manage their risks so as to protect human health and the environment from risks associated with

needles stick pricks and injuries and inappropriate management of clinical waste.

- The OAG recommends that as part of accountability and oversight processes, the Ministry of Health should encourage facilities to become more proactive in overseeing operations that impact on the environment and are likely to expose the country to significant risks.

4. CLINICAL WASTE MANAGEMENT INFORMATION

- Facilities should develop and maintain management information that allows recording of information to assist in making holistic informed decisions about clinical waste processes.

5. EVALUATION OF THE BOTSWANA CLINICAL WASTE MANAGEMENT CODE OF PRACTICE (BCWMCP)

The MOH should evaluate the BCWMCP in order to assess whether it is commensurable with International Standards on environmental issues, considering obligations acceded to by Government of Botswana in this regard.

CHAPTER ONE

1. 0 INTRODUCTION

In recognition of the significance of clinical waste management, the Government in cooperation with the German Agency for Technical Cooperation undertook the study on the Management of Medical Waste in 1995, to assess how that waste could be managed within the Referral, District and Primary Hospitals, Clinics and Health Posts. Consequently, Government in 1996 adopted the Clinical Waste Management Code of Practice developed during the study, to address the concerns that had been expressed in the study, as regards clinical waste. This Code of Practice sets out the best practices for the segregation, handling, storing, transporting and disposal of clinical waste.

Furthermore, in 1998, Government formulated Waste Management Policy to have an overarching vision to raise the environmental sustainability, human health and natural resources awareness, to meet the needs of current and future generations. From 2000, landfills were constructed throughout the country, in order to ensure that clinical waste residuals and ash are efficiently disposed of, so that the environment and natural resources are not at risk.

Administrative arrangements for clinical waste also involved formulation of the Clinical Waste Management Plan in addition to the General Strategy Management for Waste Management as adopted by Cabinet in December 1997.

The management of clinical waste therefore follows the Botswana's Strategy for Waste Management as accepted by the Government of Botswana and adopted by Cabinet in December 1997.
The strategy is therefore based on 3 cardinal objectives" as follows:

- To protect human health
- To protect the environment
- To protect the natural resources

According to the Clinical Waste Management Plan, the mission statement for clinical waste had been derived as follows:

"To collect, store, transport and dispose of clinical waste to minimise the risk to human health, environment and natural resources."

Definition of Clinical Waste

Clinical Waste is defined as:

(a) "Any waste which consists of wholly or partly of human or animal tissue, blood or other body fluids, excretions drugs or other pharmaceutical products swabs or dressings or syringes needles or other sharp instruments, being waste which unless rendered safe may prove hazardous to any person coming into contact with.

(b) Any other waste, arising from Medical, Nursing, Dental, Veterinary, Pharmaceutical or similar practice, investigation, treatment care, teaching or research or the collection of blood for transfusion, being waste which cause infection to any person coming into contact with."

Risks Associated with Clinical Waste

According to the documents reviewed, there are 2 types of risks associated with clinical waste, and they are health and environmental risks.

(a) Health Risks

"Health risks associated with clinical waste can cause injury, infection or death, either by inappropriate handling or inadequate disposal at poorly, controlled dumpsites or by inadequate incineration or open burning, which may release dangerous compounds to the environment.

(b) Risks to the Environment

"Clinical waste has the potential to cause damage to most aspects of the environment, especially to land, water, air and wildlife". Its thoughtless disposal may also cause an unnecessary waste of natural resources. The main risk is caused by deposit of sharps, mercury from thermometers and silver from the processing of X-ray films without treatment.

1.1. BACKGROUND

The Department of Clinical Services aims to improve the health status of Batswana by providing sustainable, effective and efficient, preventive, promotive, curative and rehabilitative services which are responsive to customer needs at both secondary and tertiary levels. The Department is composed of the Divisions of Treatment and Care and Hospital

Management. It coordinates services of 3 Referral Hospitals, the Princess Marina in Gaborone (530 beds) Nyangabgwe in Francistown (542 beds) and Lobatse Mental Hospital in Lobatse (111 beds), 6 District and 17 Primary Hospitals through out the country. The hospitals, including the referral ones produce clinical waste, which was "believed to amount to approximately 2 500 tonnes a year," in accordance with the study undertaken in 1995, by Government of Botswana assisted by the German Agency for Technical Cooperation.

1.1.1. Vision, Mission and Strategic Goals

The Department's Vision, Mission and Strategic Goals as stipulated in the Strategic Plan for 2005 to 2009 are as follows:

1. **Vision**

   To be a world leader in the provision of quality healthcare services.

2. **Mission**

   The Department of Clinical Services exists to provide evidence based promotive, preventive, diagnostic, curative and rehabilitative health care services.

3. **Strategic Goals**

   - To reduce infant mortality from 57 per 1000 live births to 51 per 1000 live births by 31st March 2009.
   - To reduce under five mortality from 74 per 1000 to 63 per 1000 live births by 2009.
   - To reduce hospital based maternal mortality from 170 to 120 per 100 000 live births by 2009.
   - To reduce morbidity and mortality related to 4 non-communicable diseases and conditions by 5% by 2009.
   - To reduce morbidity and mortality due to communicable diseases by 5% by 31st March 2009.
   - To provide rehabilitation services in 7 hospitals by 31st March 2009.

Moreover, each hospital developed its own Vision, Mission and the Strategic goals as depicted at **Appendix A.**

1.2 STAKEHOLDERS, THEIR ROLES AND RESPONSIBILITIES

The roles and responsibilities of some of clinical waste Stakeholders are as follows:

1.2.1 MINISTRY OF HEALTH

The Ministry of Health is responsible for:

- Health of the Nation
- Approval of the Waste Management Policy (developed by the Ministry of Local Government)
- The safe management of clinical waste inside all Government Health Institutions that is separation at source of clinical waste from household wastes, collections and preparing for transport.
- The safe incineration of clinical waste if done on site of Government Health Institutions.
- The safe transport of clinical waste from Government Health Institutions to other waste management facilities that is, Regional incinerators operated by another Government Institution or a Local Authority or a Private business (duty of care).
- Providing the necessary resources.
- Prescribing (with the advise from Department of Waste Management and Pollution) the type of containers (bags and sharps containers) to be used in health facilities, to collect and store clinical waste.
- Liaison with Ministry of Local Government (MLG) to ensure optimum use of resources.

1. **Environmental Health Unit**

The Environmental Health Unit is responsible for:

- Providing in-service training for all Health Care Workers
- Monitoring and audit of all health care facilities.

2. **Central Medical Stores**

The Central Medical Stores is responsible for the collection and disposal of obsolete drugs from all health facilities.

3. **Institute of Health Sciences**

The Institute is responsible for providing on a continuous basis, Clinical Waste Training for the healthcare students.

1.2.2. MINISTRY OF LOCAL GOVERNMENT

The Ministry of Local Government is responsible for:

- Ensuring safe disposal of clinical waste from clinics, health posts and private practice premises.
- Providing necessary resources for health facilities operated by Local Authorities.
- Liaising with MOH on Clinical Waste Management. Ensuring the safe disposal of clinical waste at the landfill sites.
- Preparing Waste Management Plans, which include Clinical Waste Management Plans as well (the latter in close cooperation with and the approval from MOH).

1.2.3. MINISTRY OF ENVIRONMENT, WILDLIFE AND TOURISM

1. Department of Sanitation and Pollution Control

The Department is responsible for:

- Setting standards of clinical waste management licensing and monitoring clinical waste management facilities.
- Monitoring implementation of Clinical Waste Code of Practice.

- Preparing Clinical Waste Management Plans for the Primary and Referral Hospitals in close cooperation with and the approval from MOH

1.3 FINANCES

The financial resources spent by the 3 Health Facilities individually or collectively on clinical waste activities for the last 3 financial years were not clearly stated. This was due to the fact that, activities related to clinical waste were not easily distinguished from other associated activities and health issues. Therefore, there may be gaps in the figures indicated below, as clinical waste activities' expenditure for 3 Referral Hospitals for the period under review.

Health Facility	Expenditure Period	Expended Amount
Lobatse Mental Hospital	2003/04 to 2005/06	P75 729.97
Nyangabgwe Referral Hospital	2003/04 to 2005/06	P471 350.36
Princess Marina Hospital	2003/04 to 2005/06	P1 222 911.15

Source: Pharmacy and Supplies Departments' Records at 3 Health Facilities

1.4. MOTIVATION

There is a growing public awareness and Media concern about clinical waste in Botswana. According to the concern expressed by the Media, across the country, the principal problem with the clinical waste is inappropriate segregation, collection, handling, storage, transportation, treatment and ultimate disposal. Due to these concerns, the Auditor General decided to conduct the audit in order to examine the administrative process established for clinical waste and how it impacts on Health Care Workers, Operatives, the environment and natural resources, if not appropriately managed.

1.5. AUDIT DESIGN

1.5.1 Audit Object

The audit object is the Ministry of Health (3 Referral Hospitals namely; Princess Marina, Nyangabgwe and Lobatse Mental Hospital).

1.5.2 Audit Objectives

The overall objective of the audit was to assess the efficiency and administrative effectiveness and associated accountability arrangements in place in relation to clinical waste management. The sub objectives were therefore:

- To determine the extent to which 3 Referral Hospitals implemented and complied with the Clinical Waste Management Code of Practice and all other strategies in relation thereof.

- To assess the impact at which inappropriate management of clinical waste affected the human health, environment and natural resources.

- To assess the extent to which management prioritises the activities involving clinical waste

- To assess how risks relating to clinical waste were managed.

- To determine the extent to which information relating to clinical waste generation and ultimate disposal was being collected and compiled to assist in making informed decisions about allocation of resources, or provide sound advice on the appropriateness, success, shortcomings and future directions of the operation.

- To assess whether the 3 Facilities measure the effectiveness of the implemented actions leading to the protection of human health, environment and natural resources.

1.5.3 Audit Scope

The focus of the audit was the entire waste stream from generation/production that is, from the cradle to the grave (hospital wards and units to ultimate disposal of waste residuals and ash at

the appropriate places) and administrative arrangements in place in relation to clinical waste at the 3 Referral hospitals. The audit coverage was for 3 financial years namely; 2003/04, 2004/05 and 2005/06.

1.5.4 Limitation

Clinical waste is generated at 3 Referral, 6 District and 17 Primary Hospitals, Clinics and Health Posts throughout the country. However, it was not intended that the audit examined clinical waste generated at all the health facilities. Rather, the audit examined the clinical waste generated at the 3 Referral Hospitals, namely; the Princess Marina, Nyangabgwe and Lobatse Mental Hospital. This was due to financial, human resources and time constraints.

1.5.5 Methodology

The audit criteria were developed from the following sources.

1.5.5.1. Interviews

A total of 119 people were interviewed, to solicit basic information about the clinical waste operation, its sources of production/generation and ultimate disposal and its associated risks. The interview sampled 20 (16.8%) professionals representing Doctors, Pharmacists, Radiologists and Laboratory Staff, 44 (36.9%) Nursing staff, 31(26.2%) Operatives, 18 (15.1%) Others, including Engineers, Administrators and a Contractor engaged to collect and dispose of waste at PMH and 6 Environmentalists representing 5% of total number of interviewees.

1.5.5.2. Documents Review

The following documents were reviewed to gather more information regarding the administrative procedures and policy framework, to direct and guide the operations of management and those involved in the clinical waste processes and strategies to be employed in the clinical waste stream:

- Public Health Act of 1981

- National Policy on Natural Resources Conservation and Development - Government Paper N0. 1 of 1990

- Waste Management Act, 1998

- Environmental Impact Assessment Act of 2005

- Draft National Policy on Infection Prevention Control and Focusing On Injection Safety and Sharps Waste Management submitted by national Injection Safety Advisory Group (NISAG) – September 2005

- Study on the Management of Clinical Wastes – Report No NCS/GTZ 7/96

- Clinical Waste Management Plan – April 1998 (Revised January 2001)

- Botswana Clinical Waste Management Code of Practice as adopted in 1996.

- Guidelines for the Disposal of Waste by the Landfill (first Edition, 1997)

- Botswana Strategy for Waste Management
- ISO 14001/ 2004 Environmental Management Standard

- Botswana Strategy for Waste Management (First Edition, 1998)

- Situation Analysis Report - Health Care Waste Management, Gaborone District by John Snow, Inc. Botswana, April 2006.

- Towards Auditing Waste Management-INTOSAI Working Group on Environmental Auditing.

1.5.5.3. **Observation**

The team observed the processes from the cradle to the grave to obtain first hand information. Observation was made at 43 places, including wards, departments

and units within the 3 Hospitals, incinerators and landfills. The reason for observing, was to see whether; there were segregation rules placed strategically to assist in that regard, clinical waste receptacles provided, waste was deposited in the appropriate containers, handled, stored and transported appropriately and incinerated according to the Manufacturers' Instructions and disposed of in a safe manner to avoid environmental effects in the long-run.

1.5. 6. **Conduct of the Audit**

The audit was conducted in accordance with the INTOSAI Environmental Auditing Standards and the Office of the Auditor General Auditing Standards on performance auditing.

CHAPTER TWO

2.0. CLINICAL WASTE MANAGEMENT PROCESSES

2.1. SEGREGATION

Clinical waste is required to be separated from household waste at source (where it is generated): The reason being that the clinical waste presents greater risks and needs to be handled with caution. Moreover, clinical waste is also segregated from each other because certain clinical waste needs to be handled, treated and disposed of differently and appropriately. For instance, sharps/syringes, needles, cartridges, broken glass and any other contaminated disposal of sharp instruments or items are to be handled differently. Use of clearly and unique identifiable containers are used for various kinds of waste for ultimate disposal. Household waste is to be deposited in black refuse bags, traditional wheelie bins/receptacles. Sharps containers should be either red/yellow, or red and white containers and all other clinical waste is to be deposited in red bags.

The red storage bags need to be removed daily or when ¾ full. They are then deposited in a clinical waste storage container. The contents are not supposed to be directly emptied into the container. Each container has to be identified with its place of origin (ward/units).

2.2. HANDLING

Clinical waste operatives and all other people involved with waste handling are to handle it appropriately and with caution bearing in mind the risks that may occur. In order to prevent injuries from sharps, porters and other operatives are to wear overalls, heavy duty or industrial gloves and sturdy shoes including goggles and masks for incineration. These protective clothing are to be worn when handling, transporting or incinerating the waste. All cuts, abrasions and other injuries sustained during the handling are to be reported to the Infection Control Officer. Safety rules, precautionary measures and action to be followed are to be clearly and strategically displayed. HCW, operatives and all other persons involved in handling waste are to be given Hepatitis B vaccination as a means of protection from infection. Personnel responsible for Health and Safety are to ensure that all persons including contractors handling wastes are suitably protected**.** Waste is to be put in red bags and carried in larger containers; red trolleys or wheelie bins clearly marked “Clinical Waste Only” and show the generation point.

2. 3. **STORAGE**

When containers are full to the required capacity, the waste is removed from the collection points on 24 hourly basis of its generations. The plastics containing clinical waste are to be stored in a secured room or adequate area of reasonable size related to the quantity and frequency of collection. The place for red bag waste's storage in bulk is to be built near incineration building and be a purpose built structure to store such waste. Waste is not supposed to be stored for more than 48 hours. The storage is not supposed to be accessible to unauthorised personnel or scavengers. Bulk storage areas are to be kept locked and access to these areas is limited to those responsible for handling, transporting, incinerating and ultimate disposal but kept secure from wild and domestic animals, birds, rodents and insects by means of a locked wire mesh cage. The clinical waste for removal off site for incineration is to be stored in an appropriate manner and in accordance with the Clinical Waste Management Code of Practice. All inside and outside storage containers are to be kept clean and disinfected and easily drained. This process is to be followed regularly.

2.4 **TRANSPORTATION**

Where waste is transported within the facility red bags and/rigid containers need to be labeled "Clinical Waste," the places of production indicated and conveyed by red wheelie bins, trolleys and carts, which are specially for that purpose. Trolleys are to be steam cleaned or disinfected at the end of each working day.

The surfaces of conveyance are to be smooth and impervious. The covering needs to prevent and protect sharp edges and they need not harbour infection. They need to be easily cleaned, drained and allow waste to be handled without difficulty.

Where waste is transported from the facilities to disposal places by the respective Local Authorities' vehicles or contractor, there has to be a liaison between waste producers and those responsible for its disposal. Purpose designed vehicles are to be used solely for the transportation of such waste.

2.5 **TREATMENT/ INCINERATION**

Sharps are sterilized/incinerated before disposal, to reduce them to harmless particles. They are calcinated so that they are rendered safe and will not cause injuries or illness to any one coming in contact with. Therefore clinical waste needs not be compacted by mechanical or any

means prior to disposal except through incineration. The expired drugs and all other discarded drugs are to be returned to Central Medical Stores (CMS) for distraction. Mercury from thermometers is to be collected in a plastic container and when 1 kg has been collected it is also returned to CMS for recycling. X-ray plates are also sent to CMS for sale to a Silver-recycling organisation.
In order to ensure complete combustion of all waste, the incineration is to have two combustion chambers. The incinerator's temperature is to reach 700-900°C in the primary chamber and 1000°C with a residence time of 2 seconds in the secondary chamber. Incinerators are to be at least 50 metres from buildings and areas with access by the general public. The incinerators are to be designed for an economic life of at least 15 years.

The respective Local Authorities or Contracted Licenced Company transport clinical waste residual and ash from the places of production/generation to disposal places. In the event that a Local Authority transports waste, there has to be a liaison between waste producers and those responsible for its disposal and purpose-designed vehicle are to be used solely for the transportation of waste.

2.6. DISPOSAL

Waste residual and ash is collected and disposed of by the respective Local Authorities or companies contracted for that purpose. The responsibility of permitting it to leave the premises is supposed to be vested in authorised persons and those persons are to ensure that it is identified. The ash and residual from the incinerators is to be placed in covered containers or approved receptacles/ skips for transportation to the landfill. It is to be buried in a special excavation and covered with soil immediately after deposit. Its location within the landfill is to be clearly identified and recorded.

2.7. TRAINING

Health Care Worker, Drivers, Orderlies and all Operatives including Incinerator Operators whose duties include segregation and ultimate disposal of clinical waste residual/ashes are to be trained in the following areas; that;

a) Correct segregation is applied and as such pressurised containers are not to be placed with waste, which is to be incinerated;

b) Storage bags are to be effectively sealed at all times;

c) Bags and sharps containers are to be correctly handled to avoid injuries;

d) Procedures in the event of accidental spillage are correctly followed and implemented;

d) Sharps are completely incinerated to avoid health risks that may occur in the event that needles are not appropriately treated;

f) Awareness increases, about the risks associated with clinical waste;

g) The need to report injuries so that appropriate action is taken with immediate effect and that appropriate information is compiled to make informed decision;

h) Operators are to be properly trained in removal of residuals and ash techniques and wear protective clothing all the time during this process.

In addition, Incinerator Operators are to be given specialist training in how to operate incinerators. Incinerator Manufacturers are to run courses jointly with the Training Personnel and training is to be repeated at suitable intervals.

The Trainers are therefore, to develop the Training Plan/Schedules and keep a record of all training undertaken.

CHAPTER THREE

3.0. FINDINGS

This part of the report discusses the findings that have been developed on the basis of the review of records of 3 Referral Hospitals. The findings highlight significant issues that were identified and pertained to the aspects such as planning, compliance, risk management, clinical waste management information, duty of care etc. The findings as discussed below emphasise the need to streamline the functioning of clinical waste management. The report was submitted to the Ministry who in their response concurred with our findings and stated that, they had started addressing the identified deficiencies in order to improve the way clinical waste was being segregated, handled and disposed of.

3.1. PLANNING

3.1.1. Strategic Plans and Objectives

According to the study on Management of Medical Waste 1995, the average quantity of waste generated by 3 Referral Hospitals was projected to be .57kg/capita/year. Furthermore, strategic planning for clinical waste management is therefore vital to ensure that set obligations and targets are met. However, OAG observed that clinical waste management issues was not part of the activities of either the Department of Clinical Services or the 3 Health Facilities. It was not shown in Department's Strategic Plan and the 3 Health Facilities' Annual Performance Plans for the years under review. As a consequence, clinical waste management was afforded low priority, thus not given the seriousness it deserved by both the Department and the Facilities.

Non-inclusion of the clinical waste operation in the Strategic Plans to address the clinical waste issues meant that it would be difficult to assess the efficiency and effectiveness of clinical waste management, in the absence of defined objectives, targets, performance indicators and outcomes.

It is therefore, OAG's considered view that, clear, comprehensive and coordinated strategic planning for clinical waste generated by the health facilities would serve the following purposes:

- Identify the roles and responsibilities for all the stakeholders involved with the management of clinical waste.

- Identify strategic objectives for clinical waste.
- Provide the coordinated implementation of the clinical waste objectives.
- Provide for consistency and coordination in planning and management process throughout the Facilities.
- Facilitate a coordinated approach of clinical waste.

Strategic Clinical Waste Management objectives establish an overarching clinical waste principle for hospitals. Moreover, given the different processes for clinical waste, clear and measurable strategic objectives are vital to provide direction for the management of clinical waste and need to be reflected in the Strategic Plans. However, the audit revealed that such objectives were not reflected in the 3 Health Facilities' Strategic and Annual Performance Plans, to establish the required level of clinical waste management performance against which subsequent actions were to be judged.

3.2 COMPLIANCE TO BOTSWANA CLINICAL WASTE MANAGEMENT CODE OF PRACTICE (BCWMCP)

The Botswana Clinical Waste Management Code of Practice stipulates the requirements and specifies processes to be followed. It is therefore, important that Health Care Workers and Operatives involved in clinical waste are provided with guidance to manage clinical waste appropriately, so that the Botswana Clinical Waste Management Code of Practice requirements are complied with. Clear guidance also supports the peer review because it can provide a reference for checking that appropriate steps are being followed. This guiding document, states the processes that have to be followed from the generation/production to the landfills or areas excavated for clinical waste disposal. However, the OAG observed the following shortcomings in the clinical waste stream:

3.2.1. Segregation

The Botswana Clinical Waste Management Code of Practice (BCWMCP) requires that, clinical waste be "separated from household waste at source (where it is generated): The reason being that the clinical waste presents greater risks and need to be handled with caution." The hospital wards made attempt to

segregate clinical waste from household waste although it was not 100%, that is, this was not absolute as the waste in the incinerator was not wholly clinical. The OAG observed that clinical waste was mixed with household waste in red colour coded plastic bags. Syringes, needles, cannulas, gloves and swabs smeared with blood were observed deposited with other types of waste awaiting incineration at both PMH and Nyangabgwe Referral Hospital (NRH). This anomaly was also observed from residuals and ash that showed a mixture of tins and clinical waste residuals/ash. This was contrary to the prescribed procedures, because household waste was not supposed to be deposited in the incinerators as this could lead to emission of black smoke, which was not good for both the environment and people. **See pictures below:**

Picture 1: *Clinical Waste mixed with household waste*

Picture 2: *Residuals mixed with tins*

According to interview, inappropriate segregation was exacerbated by shortage of receptacles such as pedal bins, red plastic bags and sharps containers and unsuitable red plastic bags and sharps containers. This view was corroborated by review of documents that revealed the following:

1. Red plastic bags

Proper clinical waste bags were not always supplied by Central Medical Stores (CMS). For instance, the red plastic bags that were ordered from CMS by PMH during the year 2005/06 were unsuitable in that;

a) The plastics were light, transparent and easily breakable and this made them unsuitable for clinical waste.

b) They were soluble in water that made them to leak and spill and as such they would not be used for blood and other liquid waste.

c) They had soft texture that made them not suitable for heavier clinical waste components, as they could tear up. These receptacles had to be returned to CMS, and this left them with no other option but to use black plastic bags in this regard, (See picture below). Review of Inventory Cards revealed shortage of red plastic bags at facilities as indicated at **Appendix B** of this report.

Picture 3: *Black plastic bags used for clinical waste instead of Red ones*

In some cases the black bags used for the segregation of clinical waste were placed along side those containing household waste. Therefore, there was a possibility of clinical waste vis-a-vis household waste deposited into the wrong containers. The reason for using black plastic bags was said to be due to the shortages that hit the hospitals during 2005/06.

2. Sharps disposing containers

BCWMCP requires that "A sharps container should, once assembled, have a lid which cannot be removed, have a handle (not part of the closure device) and a lid so designed as to enable items to be dropped in by one hand." However, at PHM the sharps containers that were available at the Pharmacy and the CMS during 2005/06 had manufacturing defects. The lids did not properly fit the containers. This led to short supply of these containers for 3 months in May 2005 to August 2005 and November 2005 to February 2006 respectively. This therefore, compelled the hospital to improvise by using 5 litre detergent containers for depositing sharps. This was contrary to the BCWMCP which states that, "On no account should soft drink cans, plastic bottles or similar

containers be used for the disposal of needles, since these could cause serious hazards to disposal staff if they were disposed of in the household waste stream."

Moreover, the BCWMCP requires that, "sharps containers should be of a capacity adequate to hold items of all shapes and sizes at the point of production." However, irrespective of this requirement, the OAG observed that, at NRH, the Theatre Ward was not provided with suitable containers for tracor for chest drainage tubes. Review of the requisitions forms from the ward, to the Supply Department revealed that whenever the requisition in this regard was made, they would be provided with small containers or at times given lesser quantities than those requisitioned. This led to this waste placed on top of used sharps containers for onward transportation to the incinerator. **See Appendix B for details on shortages.** Moreover, at this ward, OAG observed that, needles were not appropriately disposed of. The containers were overflowing and needles had spilt on the floor/sticking out of the containers. This posed great danger to operatives who ultimately picked them up. At PMH, OAG observed instances where sharp containers were overflowing (in Orthopedic Ward Male) and thoracic needles protruding from small sharp containers (Surgical Ward Female).

Furthermore, observation made at the 3 Facilities was that, sharps containers and red plastic bags had not been identified with their places of origin of waste, as required by the BCWMCP. In addition, observation made at PMH and NRH was that, household waste receptacles were sometimes placed alongside the clinical waste ones, with the possibility of clinical waste being placed into the wrong containers, yet safety rules, precautionary measures and action to be followed were not prominently and strategically displayed at the segregation points to assist in this regard.

3. **Pedal bins**

In almost all the hospital wards visited, the primary storage used (pedal bins) had no lids on. The reason given was that the lids were not properly fitting. According to interview with Management of the PMH and NRH there were few pedal bins in some wards and they were used as required whilst in others they were not there by choice because even if they were there, they were not accordingly used. Some pedal bins had no lids at all which defeated the purpose of having complete pedal bins with lids to ensure that contents therein did not spill. For instance, at the PMH in the Male Medical Ward, 9 pedal bins were seen and 2 out of the 9

representing 22.2% had lids, in the Private ward 15 were seen and only 1 representing 6.7% had a lid, 2 were seen in the Female Medical Ward but both of them had no lids and 4 were seen in the Female Surgical Ward but only 2 representing 50% had lids. At NRH, in the Theatre, 7 pedal bins were seen and 5 out of the 7 representing 71.4% were without lids, in the Male Surgical Ward 3 were seen and 1 representing 33.3% had no lid and in the Mortuary there were 4 pedal bins but 3 representing 75% had no lids. In the Maternity/labour Ward, 12 pedal bins were seen and 10 out of the 12 representing 83.3% had no lids. The OAG also observed that there was a shortage of pedal bins, in that facilities improvised by covering boxes with red plastics for use in place of pedal bins. For instance at NRH in the Male Surgical Ward, 5 plastic buckets/ basins were used as receptacles for red plastic bags.

Inadequate supply/shortage of receptacles leads to inappropriate segregation of clinical waste, which in turn does not only pose a serious threat to the general public, operatives and the environment but mostly to refuse collectors for both contractors and Local Authorities Employees, who are usually not equipped with appropriate protective facilities to handle such waste.

Picture 4: *Pedal bin without lid used for clinical waste* (*SOURCE*: DWMPC Report Nov. 2005-PMH)

Furthermore, interviews with PMH Management and Incinerator Operators revealed that some of inappropriately segregated clinical waste was from Private Practitioners who continuously and secretly dumped their waste at the incinerator. Therefore, the hospital

Management and Operatives did not know what was brought in and as such, residuals to the landfill might be containing hazardous effects to the environment. Waste that might have been autoclaved might then be incinerated and waste residuals disposed of at the landfill, thus posing risk to the environment and resulting in contamination of ground water.

3.2.2. **Handling**

Operatives and all other people involved with handling clinical waste are to handle it appropriately and with caution. However, OAG observed that, handling of clinical waste bags was haphazard. Waste collectors from the hospital wards to the incinerators were observed carrying red plastic bags containing clinical waste with hands where 1 or 2 red plastic bag(s) was/were conveyed to the incinerator. For instance, observation made to ascertain how this process was undertaken revealed the following:

- At PMH 20 Operatives were observed conveying waste on the 22nd May 2006.The results were that 9 out of the 20, representing 45% used hands whilst 11 of them representing 55% used other mode of transport.

- At NRH 15 Operatives were observed conveying waste on the 24th July 2006 and the results stood as follows;
  9 out of 15 representing 60% used hands whilst 6 out of 15, thus representing 40% used brown wheelie bins, file trolleys and laundry bags.

- No observation was made at the Lobatse Mental Hospital but 1 Operative was accidentally seen carrying a red bag to the storage using hands. However, interview with Operatives revealed that, red plastic bags containing clinical waste, had been conveyed to the storage room using hands until 27 July 2006, when they were provided with red wheelie bins. This was seen to be an improvement by the Hospital Management.

By this practice, handlers are exposed to all forms of infections, not forgetting the nauseating stench that may make handling almost impossible. *Proper handling of different types of clinical waste is of paramount importance for health and safety at workplaces. Therefore, it is imperative for Operatives to know the dangers and hazards that may occur.*

Picture 5: *Clinical waste being conveyed with hands*

Furthermore, these bags were not always securely fastened as required by BCWMCP, to avoid spillages that could lead to serious health hazards and injuries, while handling such waste. At Nyangabgwe Hospital and PMH, red plastic bags that were supposed to be containing clinical waste, were at times inserted in black plastic bags. The reason for doing this was that, red plastic bags were small and therefore, could not hold large quantities and as such, waste needed to be collected in larger bag for ease of carry. These bags were not even marked "Clinical Waste Only" and the generation points were not even indicated.

3.2.3. **Storage**

Primary Storage

There is a need to have secluded temporary storages in the hospital wards but instead sluice rooms were used though they were inadequate in terms of space**.**

Secondary Storage

The BCWMCP requires that, "the place for red bag waste storage in bulk should be near an incinerator building and should be a purpose-built structure to store waste." However, at PMH, OAG observed that the wire storage built near the incinerator was not used to store waste awaiting incineration. Instead, waste was dumped outside the incinerator house. This attracted rodents, birds and dogs. Moreover, this waste was left in the direct sun for unknown length of time and thus accessible to scavengers and rain that might seep through it and absorb hazardous components and carry them into surface and ground water

(See picture below). Therefore, there was a risk of infection and noxious smells as well as risks to the environment where waste has been washed away by rain. In addition, the big storage wheelie bins provided for this purpose were also not used because they were said to be not user friendly, as they were deep. Therefore, it was difficult to retrieve waste once thrown therein. NRH has one of the best permanent storage built to store clinical waste. The only problem was that, waste was thrown indiscriminately thus damaging bags, leaving them torn and resulting in spillage outside the storage facility. Moreover, waste was sometimes thrown next to the storage entrance at both PMH and NRH **(See picture below)**.

Picture 6: *Wire Storage not being used, PMH*

Picture 7: *Waste left in direct sun*

Picture 8: *Example of Clinical Waste spilled from the red bags, observed at both PMH and NRH*

Picture 9: *Waste thrown next to the storage entrance*

Waste produced at these 2 Facilities was not secured in that storage areas were not kept locked, and yet they were positioned

close to the entrance gates, thus posing risk to both patients and the public. Furthermore, at Nyangabgwe Hospital, the storage area was adjacent to food preparation area and bulk food storage facility.
The effect of improper storage facilities to effectively control clinical waste and its indiscriminate throwing, could lead to uncontrolled waste within the hospital premises, which in turn could cause environmental and health risks.

The BCWMCP requires that, “residuals and ash be placed in rigid containers with their lids sealed, but if this is not possible it should be double –bagged, in heavy grade polyethylene plastic sack of 200 microns and sealed for disposal”. However, observation made was that, this requirement was not adhered to. For instance, at PMH, the residuals and ash was piled in open area at the corner of the incinerator yard or just piled by the incinerator.**(See pictures below)**

At NRH, the Francistown City Council provided the skip for this purpose, but it was not used accordingly, as residuals was found heaped next to the skip provided, from 19 July to 24 July 2006.

With last year’s continuous rains, there was the possibility of the residuals and ash being washed away, thus affecting the environment, that is, the ground water which is a vulnerable resource.

Picture 10: *Residuals and ash piled in an open area at PMH*

Picture 11: *Residual stored in unsealed boxes at PMH*

3.2.4. Transportation

In-house transport is supposed to be red wheelie bins but instead black ones were used at PMH whilst brown ones were used at NRH. This was the practice throughout these hospitals. Furthermore, the regular mode of transport was the file trolleys whose surfaces were impermeable, laundry bags and hands (refer to para 3.3.2 above). Carrying of clinical waste by hands left much to be desired, because at times blood or liquid substances leaked all through passages from hospital wards to the incinerators. Transporting of bags with file trolleys, presented a risk of bags dropping and or their contents spilling. Moreover, the bags were not clearly labelled “CLINICAL WASTE ONLY”.

If the labelling is done it will allow for determination of the source of the waste at anytime en-route to incineration.

In addition, where waste was to be destined for incineration and disposal off-site, vehicles carrying such waste would not be covered. The Department of Waste Management and Pollution reiterated this view; vide their Report of 11 November 2005. This was also corroborated with interview with PMH and NRH Hospital Management and Incinerator Operators of the 2 hospitals, who confirmed that where waste was transported for incineration off-site the vehicles used for that purpose were not covered so long as waste containers were tightly sealed.

Picture 12: *Waste transportation in Open Trucks,* **(Source: DWMPC Report of November, 2005- PMH).**

Furthermore, the BCWMCP requires that “purpose designed vehicles” be used solely for transport of clinical waste. However, OAG observed that, there were no designated vehicles for transporting waste for incineration off-site at both NRH and PMH. At NRH they used a 5-ton truck to transport waste to various places

for incineration, whilst at PMH they used any other vehicle that was available at the time of need. The John Snow, Inc. Botswana-Consultants vide their Situation Analysis Report of April 2006 confirmed the PMH case. Interview with Mortuary staff at PMH revealed that the Mortuary vehicles were used for transporting mortuary waste to the incinerator, but there was no concrete proof that they were disinfected immediately after use. The above practice does not only contravene the requirements of the BCPCWM but also that of "best practice universal precautions required in hospitals and clinical settings – John Snow, Inc. Botswana Situation Analysis Report of April 2006" and this posed major hazards to the Public, HCWs, Operatives and Patients.
At least at Lobatse, the waste produced by Lobatse Mental Hospital (LMH) was collected and transported by Lobatse Town Council in their vehicles, which were designed for that purpose and labelled "CLINICAL WASTE ONLY"

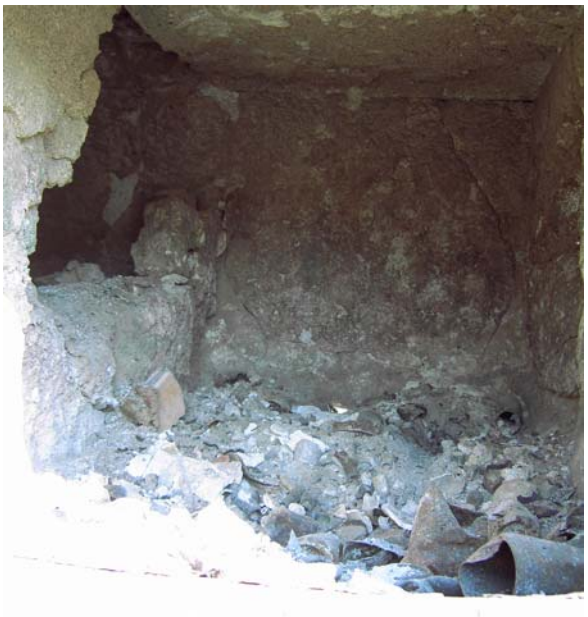
The waste carriers were also not steam cleaned or disinfected at the end of each working day, as required by the Botswana Clinical Waste Management Code of Practice. The Cleaners, Porters and Drivers interviewed, confirmed that they rarely disinfect them as required.

3.2.5 **Incineration/Treatment**

Most clinical waste is wet and the rate at which it burns is very slow as such it needs a pre-heated incinerator. Pre-heating of the incinerator is therefore, a fundamental issue, which needs to be appropriately done because it promotes quick extraction of humidity from clinical waste thereby reducing smoke emission. However, the OAG observed that, the incineration process was not always appropriately carried out at PMH and NRH. Waste was loaded/thrown at the back of the incinerator before any ignition. The incinerators were not always preheated before throwing in waste, thus contravening the Manufacturer's Operating Instructions, which requires that the incinerator should be allowed to "heat up until operating temperatures are reached, about 10 minutes." This was corroborated by an observation made on 26 July 2006 and 4 September 2006 at NRH and PMH respectively. Moreover, on the same dates, OAG observed that the incinerators were not completely cleared and cleaned. For instance, at the PMH, interview with the Incinerator Operator revealed that the incinerator was ignited without clearing ash and residuals from 1 September 2006. This may lead to incomplete combustion of waste.

At PMH and NRH, the OAG observed heaps of ash of incinerated waste that looked like the waste had not been appropriately incinerated, since bottles, needles and incomplete burnt sharps' containers were visible.
Residues and ash that is, from the incinerator that had not reached optimal temperatures, contain sharp objects and needles that are harmful to the public as well as workers especially those directly handling and disposing of such waste. There is also a risk of forming dioxins, which are extremely toxic substances, thus causing air pollution.

The batches deposited in the incinerator were too large because one clinic within the PMH (HIV/AIDS) used very large black and red plastics (not suitable for incinerator) and transparent ones to store waste for incineration. In addition, at NRH 3 to 6 red bags containing various type of clinical waste were deposited in one black one. This has the effect of reducing the combustion temperature thus leading to black smoke emission and noxious fumes that can be risky to both humanbeings and the environment, thus harmful to the environment by means of air pollution. (**See pictures below)**



Picture 13: *Incinerator not cleared and cleaned of old ash and residuals*

Picture 14: *Incinerator ignited without first being cleaned and cleared at PMH*

Furthermore, the BCWMCP requires that clinical waste be incinerated within 24 hours of production. At times this requirement was not adhered to, due to diesel shortages. This therefore, led to it being piled and piled next to the incinerator for days. For example, during the audit, it was observed that, there was shortage of diesel from 12 June to 14 June 2006 and 24 July to 26 July 2006 at PMH and NRH respectively. The contention was that re-order levels were observed, but the Supplies Officers did not act upon requisitions made by Incinerator Operators. However, this contention could not be substantiated and the delays established at both hospitals due to the fact that at NRH diesel requisitioning was done verbally whilst requisitioning documents from Incinerator Operators to Supplies Officer could not be availed for audit at PMH. In addition at PMH, waste was not incinerated accordingly, due to the fact that the incinerator chimney leaked from July 2005 and it finally broke around 29 August 2005. The breakdown stretched from 29 August to 16 November 2005, that is, the downtime was for a period of approximately 2.5 months. The effect was that the waste was not frequently incinerated as required, due to shortage of transport to convey waste to various places such as Lobatse, Mochudi and Thamaga, for incineration.

In addition, there was an indication that the incinerator was being overloaded as 20 bags were said to be deposited instead of 5 at a time, which led to noxious black smoke emission. Moreover, interview with Management revealed that they had observed that, the incinerator would be on, but the Operators would not be there to continuously load waste, as such; incinerator combustion burnt without burning anything, thus exposing the refractory, which may lead to its failure. This may shorten the incinerator life span, which is said to be 15 years. Furthermore, the Incinerator Operators were hardly supervised to ascertain whether they followed the designed specifications and Manufacturer's Operating Instructions.

The observation made on 4 August 2006, at Lobatse landfill, revealed that the clinical waste that was collected by the Lobatse Town Council from the LMH on 23 July 2006 had not been incinerated, at the time. The waste had been there for a period of 2 weeks, thus resulting in nauseating stench, which might make its ultimate handling impossible.

3.2.6 **Disposal**

According to BCWMCP, "residuals and ash should be buried in a special excavation and covered with soil immediately after deposit. Its location within the landfill should be clearly identified and recorded." However, the OAG observed that this requirement had not

been adhered to. For instance, at NRH the FCC provided the hospital with the identifiable skip for residuals and ash but it had never been used specifically for that purpose, as both household and clinical waste was deposited therein. Therefore, the disposal of such waste was not given the clinical waste disposal status, where trenches were dug to bury it and use the cover material to cover the trenches and compacted. Residuals and ash from the clinical waste produced at PMH was disposed of at the landfill, that is operated more or less like a dumping site and as such the Contractor just threw it any where just like any other waste and it ended up not being covered up with soil and compacted. The residuals and ash for the clinical waste collected from the Lobatse Mental Hospital and incinerated at Lobatse Town Council's incinerator was indiscriminately disposed of throughout the landfill and was not compacted and covered with soil. On enquiry, the OAG was informed that this was due to the fact that, the compactor had been down for almost the whole of 2005/06 financial year and the first quarter of 2006/07.

The inappropriate disposal of residuals and ash of clinical waste that was previously not appropriately incinerated may have adverse effects on the environment in the long run. This may lead to contamination of ground water.

The responsibility for ensuring that the waste was appropriately collected from the facilities' premises and disposed of was not assigned to anybody at Management level except that the Incinerator Operators were the ones responsible. For instance, at PMH the Incinerator Operator was the one dealing with the contractor collecting and disposing of the residuals/ashes. The Operator therefore, did not maintain any records for the collection of residuals except that she/he signed the contractor's delivery notes to ensure that they got paid.

3.2.7 **Training**

Proper handling of different types of waste is of paramount importance for Health and Safety at workplace in order to minimise risks. It is therefore, imperative for HCWs and Operatives to be conversant with the dangers and hazards that may occur during the course of duty. They need to be trained/oriented on the health and safety measures at their respective workplaces. The training will inculcate awareness, as it will cover all stages of clinical waste stream. However, interview with HCWs and Operatives revealed that, the training was informal as it would be peer orientation, inadequate in that at times it was just a mini lecture/ a days workshop and lacked continuity in that it would be conducted once in a while or no training at all. In addition, the training did not include

Doctors, who were noticed to segregate clinical waste haphazardously and facilities' Management who was to ensure that waste produced by hospitals within their jurisdictions was appropriately managed. Furthermore, according to interview, at least at LMH about 75% of staff including HCWs and Operatives had been trained through the workshop organised and sponsored by John Snow, INC. Botswana from 28 June to 30 June 2005. Moreover, interview with 16 people in the hospital wards including Doctors, HCWs and Operatives at PMH revealed that 7 of them, representing 44% were oriented on how clinical waste was managed, whilst interview with 12 people of same calibre of staff at NRH, revealed that 5 of them, representing 42% were oriented in that regard. The lack of continuity in training was said to be exacerbated by time and human resources constraints.

It is OAG's considered view that, the lack of adequate training makes it difficult for New Staff and Operatives to be conversant with processes and hazards involved in the clinical waste stream as pointed out elsewhere in this report.

Furthermore, the BCWMCP requires that, those who had been trained be "awarded Certificate of Proficiency after appropriate training". However, these Certificates could not be availed for audit on request.

It is incumbent upon Management of the 3 Health Facilities to ensure that compliance to established procedures, in respect of clinical waste management are adhered to, in order to avoid risks associated with improper waste management.

3.3. RISK MANAGEMENT ASPECTS

Exposure to risks associated with clinical waste poses potential risks to the health staff and operatives, the public and the environment. Therefore, Health Facilities need to manage their risks so as to protect human health and environment from risks associated with inappropriate management of clinical waste. In this regard, OAG acknowledges achievements made but identified shortcomings regarding risk management across the 3 Facilities some of which include the following:

3.3.1 Sharps/ Needle Prick Injuries and Blood Splashes

The BCWMCP requires that "all Health Care Workers and Operatives be offered vaccination against Hepatitis B as and when they start work." However, the observation made was that Management of the 3 Health Facilities had been mainly reactive in their endevour to handle clinical waste issues. Consequent priorities tended to be in response rather than reduction of risks. For instance, OAG noticed that, the Hepatitis B

vaccination was offered after injuries had occurred during the years under review. The statistics obtained revealed that, 81 people (including HCWs and Operatives) representing 7.9% of the entire staff (1032), 112 representing 11.4% of 1044 (total number of staff) and 1 person representing .3% of 322, at PMH, NRH and LMH respectively were given Hepatitis B vaccination after sharps injuries/blood splashes. The reason for not giving the vaccination was that, it was not Government Policy at the time. However, in June 2006, NRH Management took a firm stand where 72% of the entire staff was given the vaccination. OAG was informed that the first and second dose would be given in August 2006, to those not previously given the vaccination and those given in June 2006 respectively. The effect for not being appropriately protected is that, there may be transmission of diseases and infections in the long run.

3.3.2 **Protective Clothing**

According to BCWMCP, in order to prevent injuries from sharps, “Porters, and other Operatives handling clinical waste should wear overalls, heavy duty gloves and sturdy shoes” and the International Best Practice also requires that HCWs should be provided with adequate and relevant protective clothing. However, interviews with different Staff levels and documents review at the 3 Facilities revealed that, there was lack of continuity of the protective clothing, in that HCWs and the Operatives were not provided with adequate supplies, in terms of quality and quantity. For instance, the orthopedic thick gloves were said to have been out of stock for 6 months at the PMH (Main Theatre), different sizes of gloves were out of stock at the PMH and Lobatse Mental Hospital(LMH) for periods ranging between 3days to 6 months and face masks were also out of stock at LMH for period ranging between 14 days to 1 year.(**Appendix C**) According to interview, protective clothing was available but not of the right type. For instance, latex gloves were provided instead of industrial ones, especially those used by the Incinerator Operators. In addition, both the Operatives and HCWs were not provided with water repellant uniforms but given those that soak quickly. This poses the risk of conveying infection from hospitals to homes. In addition, the Operatives that used hands to sluice linen at LMH complained that they were not provided with shoulder gloves for protection from being infected. On enquiry, Management of the 3 Facilities stated that, where protective clothing was available the Operatives were reluctant to put it on because of ignorance of hazards that might occur.

Workers who do not wear protective clothing accordingly, may run the risk of serious injury. For instance, “ resulting in skin burns, or inhaling organic solvents that can injure lungs, the liver and other internal organs.”(INTOSAI –Working Group on Environmental Auditing- Towards

Auditing Waste Management: 74). This may also lead to liability claims by staff against the Government.

3.3.3. **Mercury**

The BCWMCP requires that “mercury from broken thermometers should be collected in a plastic container and when sufficient quantity has been collected about 1 kilogram (kg), it should be returned to the Central Medical Stores (CMS) for recycling”. The requirement for storing the mercury in the container appeared to be adhered to. The problem was its return to CMS because it took time for it to be returned. For instance, at LMH, OAG observed that mercury weighing 12.5 millitres had been there from 2000, kept in the Pharmacist Office, and it was not possible for it to reach the required weight for disposal very soon. The effect for keeping such a neurotoxin substance for such a long time is that, it may affect the nervous system or cause kidney failure. Furthermore, the storing of mercury until it is 1kg full encourages its accumulation at rather dangerous quantities that can end up having further breakages and spillages and thus causing more harm.

3.3.4. **Expired Drugs and Old Linen**

Expired drugs were said to be incinerated at the incinerators within the PMH and NRH facilities. This is dangerous because the ash and residual for waste that had been inappropriately incinerated may end up being disposed of at the landfill. If not appropriately dispose of it may result in contaminating underground water.

The above practice does not only contravene the requirements of the BCWMCP but also that of “best practice universal precautions required in hospitals and clinical settings”(John Snow, Inc. Botswana - Situation Analysis Report of April 2006). The practice also poses major hazards to the public, HCWs and Operatives and Patients.

Moreover, the old dirty linen was seen piled along the passage, next to the main laundry door at Nyangabgwe Hospital. According to interview with the Officer–Incharge, it had been there for at least 1 month. At Lobatse Mental Hospital, such linen was piled at the back of the Supplies Office for the last 6 months at the time of audit on 4 August 2006. It had been there since March 2006, irrespective of rains that down poured last year. The effect is that, the dirt that had been washed by rains could be carried into the surface water and used as drinking water, thus resulting in negative health effects.

3.3.5. Sluice Rooms

At LMH, the OAG observed that there were no sluice rooms as sluicing was performed in the bathrooms in very small face and hands basins. Moreover, there were no sluice showers, as such, Orderlies improvised (end up using hands at the open pits) when they wanted to sluice the messed up linen and blankets. The safety of these Operatives may be seriously compromised, as there is possibility of nosocomial infection, considering that there is increase of HIV/AIDS in Botswana.

3.3.6. Clinical Waste from Operating Theatres, Maternity Wards and Laboratories

The BCWMCP states that, waste that is not required for histology should be "incinerated without delay on site, and if not feasible, ideally such items should be taken by special collection to an off-site facility for immediate incineration." However, at PMH and NRH, OAG observed that, the blood specimen, human tissues and flesh, placentae and other biological waste were not prioritised for immediate incineration, and not always incinerated at the optimal temperatures like waste from the mortuary. This waste was given to Cleaners/Orderlies like any other clinical waste for transportation to the incinerator. There was also no follow-up to observe/check whether it was incinerated immediately without delay, which meant that; it could be there indefinitely without being incinerated (See paragraph 3.3.3 above). This might lead to it getting rotten and releasing noxious smell that was not healthy to the public and environment. Red plastics containing this waste were also not labelled to indicate contents and place of origin. The labelling might assist the handlers and Incinerator Operators to be cautious in their handling and might have also assisted in prioritising incineration of such waste.

3.3.7. Environmental Risks

The OAG found that the Facilities oversight of clinical waste performance, in terms of managing environmental risks was patchy. Management at these institutions had never shown interest to ascertain how residuals from their hospitals had been disposed of. For instance, Nyangabgwe Referral and Lobatse Mental Hospitals had standing arrangements with Francistown City Council for the collection and disposal of residuals and Lobatse Town Council for the collection, incineration of waste and its ultimate disposal, respectively. At the PMH the services of collection and disposal of the residual/ash had been outsourced to a Private Company. In all the cases management had not taken any initiative to follow up in order to ascertain whether BCWMCP had been accordingly complied with. In addition, OAG observed that residuals from the NRH was thrown in the FCC skip and thus mixed with household waste and therefore, when

reaching the landfill it was not given the status of clinical waste, where it could have been compacted and covered with material of 30metres thickness. The residuals/ash from PMH was collected in an open van, without being packed in containers. As it was being transported, the ash was blown out by the wind and at the landfill it was thrown anywhere just like household waste as the landfill was more or less like a dumping site, thus not given clinical waste burial status. At LMH the waste that was collected for incineration and disposal would be there for more than 1 to 2 weeks when the incinerator was not working. The environment ended up being polluted, because such waste would be rotten and noxious smell emitted.

Furthermore, OAG observed that the clinical waste ash and residuals was not regularly tested to ascertain whether there were no harmful substances that could affect human health and the environment. The effect in this regard is that, the ash and residuals from incinerators that did not operate at optimal temperatures as already pointed out in the preceding paragraphs, might contain small grains that were prone to be swept away by the wind and difficult to control thus ending up being a threat to the environment and the public at large.

This showed that the Facilities were not proactive in over sighting environmental issues within their portfolios. The benefits of a proactive position will relate to the achievement of Government's objective of protecting the environment.

3.4. DUTY OF CARE

A duty of care is owed by the GFcilities, as owners of premises. They owe a duty to exercise care to avoid foreseeable risk of injury or damage to persons. The discharge of this care requires that the public be adequately warned of the foreseeable risks of injury associated with their entry to the facilities' premises. However, OAG noticed that there were no signs/notices erected in and around the incinerators at the PMH and NRH to visibly display safety and risks classifications to inform the members of the public of the risks and hazards involved. Furthermore, at and NRH there were no notices displayed at the entrances near the incinerator place to inform the public that there was no way through. This was so, although the waste was insecure as it was positioned to the incinerators' gates thus posing risk to both patients and the public.

Moreover, the Waste Management Act, of 1998 requires that" each Local Authority and any person who produces, carries, treats or disposes of controlled waste, shall take all measures applicable to him in circumstances to prevent the escape of the waste from his control and to

prevent contravention of any of the provision of this Act". This implies that the waste producers retain the ultimate responsibility for ensuring that waste is produced, handled, stored, transported, incinerated and disposed of in an environmentally sound and efficient manner. However, OAG observed that this duty of care was not adhered to at PMH and NRH, in that residuals and ash piles were left uncovered and accumulated for along time without being disposed of. For instance, at NRH there was clinical waste residuals that had been lying next to the Francistown Council skip for at least 3 weeks, that is, from 3rd July 2006 and was collected for disposal on 24th July 2006. At PMH residuals and ash that was seen piled at the far end of the incinerator yard on 8th August 2006 was still there on 9th September 2006.

Removal of waste by Local Authorities/Contractors does not indemnify the Management of hospitals of their obligation to ensuring safety of the HCWs, Operatives and the public and as such this duty of care need not be compromised. Waste producers are therefore, responsible for ensuring that applicable Legislations, regulations and procedures are adhered to.

3.5. CLINICAL WASTE MANAGEMENT INFORMATION

Management information is a management tool for planning future work priorities and monitoring progress to address clinical waste management issues. If the recordings are maintained, such data will assist management in the process of assessing the nature and extent of health risks, environmental and natural resources risks, options for remediation and advice on the future of appropriate clinical waste process thus making informed decisions.

However, at the time of audit, Registers for Sharps Injuries were not maintained. For instance, the PMH and LMH did not have consolidated data of sharps pricks and blood splashes. The information available at PMH was not complete, as it did not provide an indication of injuries overtime. It was also abstract and therefore, could not make informed decisions. Other information that was patchy was that of a number of Health Care Workers (HCWs) and Operatives pricked by sharps and those received Hepatitis B for the years under review. There were unknown numbers of injuries being associated with needle stick injuries or other sharps. At least at Nyangabgwe Hospital such data was provided for audit.

The reasons for incomplete/ lacking data in this connection, was that;

- The infected feared that they might be positive

- There was no compensation for such cases as motivational incentives for reporting

- Infected might decide to visit the Private Practitioners

- Under reporting due to increase in HIV/AIDS.

It is likely that the extent of clinical waste risks to the HCWs and Operatives might be underestimated and risks of further injuries and fatalities would probably increase and HCW and Operatives get infected, with the increase in HIV/AIDS. Furthermore, it had been very difficult to know how much clinical waste was generated and disposed of at the 3 Facilities due to absence of data on clinical waste management as such data was not collected on a systematic basis, so that it could influence management decisions. Discussions with the 3 Facilities Management indicated that, the quantities of waste generated, removed, incinerated and ultimately disposed of at the 3 Facilities were unknown. Particular difficulty was that records for generation, incineration and ultimate disposal of clinical waste residuals were non-existent and that facilities did not have weighing facilities to weigh the generated and disposed of waste. According to interview, at PMH the supposed to be weighing scale was an old laundry scale that had been there since 1966 and could not be used at all, due to its inadequacy. At least at the PMH, information was recorded only during period 9 February 2004 to September 2004, where 13460 bags were incinerated. There were gaps in such information, due to lack of continuity, that is, the recordings were inconsistent and irregular and were also not done during the years 2002/03,2003/04 and part of 2004/05 and 2005/06. On enquiry, the OAG was informed that the absence of such information was attributable to;

- Constant breakdown of the incinerator

- Lack of /inaccurate recordings by the Incinerator Operator

- Poor supervision of the Incinerator Operators, in that they were not followed to ascertain whether that important information was recorded.

- Operators were not supplied with records to enable them record such data

- Lack of/obsolete weighing facilities

- Inadequate capacity in terms of skills to undertake such important activity

- Lack of knowledge as to why such information was to be maintained

If necessary records were maintained, they would show:

- The production/generation area
- Quantities of clinical waste produced in kilograms etc
- Quantities of clinical waste incinerated and ultimately disposed of residuals and ash.

Furthermore, a follow-up of the waste to the landfill to ascertain the quantities disposed of, could not bear fruits as the Local Authorities weighing equipment was also down for along period of time. For instance, according to interview with workers at Gaborone landfill, the weighing equipment had not been operating since beginning of 2005. At Lobatse the exact quantities of waste from Mental Hospital could not be established due to the fact that waste from different facilities was collected on the same day and disposed of as such. In addition, waste had not been weighed, due to the fact that, the weighing equipment at the landfill had been down since January 2005 and only worked for 5 days in July 2006 (14/07-18/07/06). At Nyangabgwe Hospital the quantities could not be known either because residuals and ash was mixed with household waste and was therefore collected and disposed of as such.

Without a well maintained management information on clinical waste injuries to employees or collection of clinical waste and final disposal of its residuals, there is a danger, such information may be lost/overlooked when functions are transferred/staff movements occur. Management can use clinical waste decisions on the basis of inadequate or absent knowledge. Furthermore, the lack of quantitative information on the production and disposal of such waste and the lack of the resulting health risks may severely hamper efforts to control problems associated clinical waste.

OAG therefore, considers that Ministry of Health (MOH) and the Facilities would benefit from a management information system that would allow staff at all levels to record and maintain easily accessible information on the existence and the extent of injuries/collection and disposal of waste.

3.6. PERFORMANCE OF WASTE MANAGEMENT SYSTEM

Performance information includes the qualitative and quantitative data gathering to measure how successful data gathering is, in achieving stated activities. However, OAG observed absence of clearly defined outcomes/results and performance indicators as regards clinical waste management. As such, OAG was unable to determine how the 3 Facilities had progressed in terms of achieving the mission statement for clinical waste of " To collect, store, transport and dispose clinical waste to minimise the risk to human health, environment and to natural resources" as stated in the Clinical Waste Management Plan. There was no specific information directly relevant to the achievement of the stated activities. Even the simple imputed related information such as; the number of those staff and operatives who had been protected from risks emanating from clinical waste and quantity of residuals and ash that had been disposed of appropriately, to protect both the environment and natural resources from clinical waste risks was unavailable/lacking. Even the quantity of clinical waste produced by each facility was not known, particularly because there were no recordings at all. Without adequate information, particularly in relation to activity effectiveness, management could not make informed decisions about allocation and use of resources or provide sound advice on appropriateness, success, shortcomings and future directions of the clinical waste management.

OAG considers that relevant information need to be maintained to enable Government make informed decisions about clinical waste. If such information is collected as part of each facility operations and passed to MOH Headquarters and Department of Waste Management and Pollution Control annually, it can be used to assess whether clinical waste management was undertaken in cost-effective and efficient manner.

Moreover, OAG noticed that that there were no targets or measures for clinical waste operations. None of the 3 Facilities had developed performance indicators that addressed the issue of compliance with Clinical Waste Management Code of Practice. Measuring compliance with Clinical Waste Management Code of Practice would prove valuable to all the 3 Facilities and all other Facilities across the country.

3.7. OUTSOURCING OF CLINICAL WASTE COLLECTION AND DISPOSAL

3.7.1 Contractor Engagement

The core principle of Government service delivery includes value for money, open and effective competition for accountability. The use of competitive tendering promotes open and effective

competition calling for offers that can be evaluated against clear and previously stated requirements to obtain value for money. This therefore, creates a framework for defensible and accountable method of selecting a service deliverer to achieve value for money. However, the OAG observed that contract engaged by PMH to collect and dispose of residuals and ash was not competitively tendered. It was a layman's arrangement. There was no written agreement entered into between hospital and the contractor, which could specify the arrangement. There was also no request for proposal to identify as far as possible the full scope and work to be undertaken and nature of services required which could be reflected in the contract. That is, the PMH had not formulated the expected output prior to engagement of the contractor, to suit their needs. Therefore, collection frequency and quantities to be collected were not specified. This meant that the output was not quantified and clearly specified. According to the contractor, he was engaged as a Casual contractor and as such, he did not know how long the contract would last.

It is OAG's considered view that, a successful contract management requires articulation of standards of service and deliverables in the contract together with specified obligations for the contractor to submit verifiable information. Moreover, a signed contract is a fundamental tenet of sound contracting process, as this binds both the client and the contractor.

3.7.2. **Records**

Record keeping is a vital tool as it allows staff at different levels to record up to date performance information that enables comparison over time. It also provides a common base that assists management in making informed decisions. However, OAG noticed that, there were no records (registers) kept to substantiate the movement of waste during collection, transportation and disposal of residuals and ash. This was so, due to the fact that the responsibility for ensuring that waste was collected for disposal rested with the Incinerator Operators. The Incinerator logbooks were also not maintained to show:

a) The date and time waste was incinerated

b) Date and time the ash and residual was removed from the incinerator

c) Date and time it was collected and transported for disposal

d) The quantity incinerated and disposed of.

e) Date when the incinerator was out of operation and when it resumed working.

Furthermore, there were no records maintained for disposal with the result that no audit trail existed of ash and residuals, except that the contractor produced the Delivery Notes. Payments were correctly made but no supporting documents such as, disposal certificates were produced for audit.

3.8. EVALUATION

Evaluation as the key management activity that assists in ensuring that frameworks comprehensively address all relevant issues and that organisations are performing in accordance with the laid down requirements need to be integrated into the overall management processes. However, OAG noticed that the Botswana Clinical Waste Management Code of Practice that was regarded as one of the Government's initiative, to provide officials with guidance for managing clinical waste had not been evaluated, despite being in existence since 1996. The evaluation would have assisted Ministry of Health to assess whether the document was comprehensive enough and had addressed all clinical issues. Moreover, clinical waste management operation had never been evaluated to assess whether the 3 Referrals Hospitals complied with BCWMCP and that waste was disposed of through safe and responsible methods to protect the environment, the employees and the communities in which the hospitals operated. The evaluations would have assisted 3 Referral Hospitals in:

- Monitoring their performance in terms of managing all issues associated with clinical waste and accordingly report their performance in this regard.

- Determining the root causes of non-compliance to laid down requirements.

- Developing and implementing plans of corrective and preventive actions to address the root causes.

It is imperative that the operation be evaluated taking into account the international obligations that Botswana Government had signed regarding environmental issues.

3.9. COORDINATION OF ROLES AND RESPONSIBILITIES

Clearly defined roles and responsibilities are essential if the accountability standards are to be achieved. Therefore the responsibilities of individuals need to be clear. Consultation for any shared roles and responsibilities need to be established and be specified. However, OAG observed that there was no Senior Management Representative to take the responsibility for corporate clinical waste performance. The responsibilities were at the line management and very low levels. There was no dedicated officer at the planning level to ensure that all sanitation issues were appropriately handled, that is, clinical waste issues were relegated to triviality. This responsibility was vested on the Industrial Class Employees. For instance, at the Princess Marina Hospital, Domestic Supervisor and Incinerator Operators ensured that waste was appropriately handled, incinerated and ultimately disposed of respectively. The Hospital Ward Supervisors and Infection Control Nurses ensured that Operatives in different hospital wards collected and transported waste to the incinerator for incineration and also ensured that diesel for incineration was ordered. The Incinerator Operators ensured that such diesel was available for incinerating delivered waste and also dealt with the Contractor responsible for collecting and disposing of ash/residuals. The Operators signed delivery notes to enable the Contractor paid for services delivered. At the Nyangabgwe Hospital, such responsibilities were assigned the Cleaners' Leading Hand and Incinerator Operators (ash/residuals was collected by the Francistown City Council Employees). According to Nyangabgwe Hospital Management, they had not been having a Domestic Supervisor, since 2000 and this exacerbated to a lot of deficiencies pertaining to clinical waste management.

In addition, at the 3 Referral Hospitals, Nurses were appointed Infection Control Officers. As such; they were expected to ensure that the Botswana Clinical Waste Management Code of Practice was followed to the letter. This was not achieved, because at Lobatse Mental and Nyangabgwe Hospitals, these nurses had not relinquished their normal duties. Whilst at the PMH, the nurse was overwhelmed with work, as she also covered all environmental issues, outbreaks of diseases such as diarrhea, TB control and other hospital acquired infections and yet the hospital is such a big institution.

The absence of the Senior Management level involvement in clinical waste management, contributed to the low status and priority given to clinical waste issues. This implied that clinical waste issues had been regarded by Facilities as a low and non-core business priority, that is, sound clinical waste stewardship was not regarded as an integral part of management. Moreover, the absence of well-defined management

responsibilities can lead to spasmodic and inconsistent environmental performance and inefficient allocation of resources regarding this activity.

3.10. OTHER OBSERVATIONS

3.10.1 Maintenance of Autoclaves

Maintenance of equipment is vital to enhancing its value and preventing it from being eroded overtime, which may lead to it being idle. However, OAG observed that the autoclaves numbers 12 and 13 used by the Central Sterilisation Supply Department, at Nyangabgwe Hospital were continually down, for periods ranging between 7 days to approximately 8 months. According to interview, the machines were down for so long, due to non-availability of spare parts locally/ shortages experienced in the neighbouring countries. Instances of down time is given in the Table below:

TABLE 1: Autoclaves Downtime

Machine No	Date that machine was down	Period machine was down
12	30 March 2001 08 April 2001 22 May 2001 01 August 2001 12 November 2001 16 March 2005 - 24 March 2005 12 September 2005 14 September 2005 21 November 2005 - 13 July 2006	1 day 1 day 1 day 1 day 1day 7 days 1 day 1 day 7 months 3 weeks that is, approximately 8 months
13	03 October 2004- 9 November 2004 01 July 05- 16 August 2005	1 month 6 days 1 month 16 days

Source: CSSD Register

It is OAG's considered view that whenever equipment is purchased, management needs to have established sources of spare parts to avoid long down time periods.

3.10.2 **Use of Clinical Waste Receptacles (Red plastic Bags)**

OAG observed that the red plastic bags were not wholly used for the intended purposes. For instance, they were used for;

- Storage of patients clothes (when patients died or discharged from the hospitals)

- Protecting hospital mattresses instead of approved linen/ bed covers (mackintosh plastics) thus resulting in infectious waste sometimes stored in black plastic waste due to shortages of red plastic bags.

- Creating weights by filling red plastic bags with water, thus creating wrong impression to the public that red plastic bag is a garget that can be used for any other purpose as long as is within a hospital.

- Operatives use them as handbags.

The effect is that, this anomaly may lead to further shortages of red plastics bags. It also endangers the public thinking that, the said plastic bag is a utility for anything.

OVERALL CONCLUSION

Although the Botswana Clinical Waste Management Code of Practice provides Officials with a framework for addressing clinical waste issues, Ministry of Health would benefit from a well-developed clinical waste management system consistent with best practice. This would facilitate the management of clinical waste to protect human health, environment and natural resources. Across Botswana, the principal problem with clinical waste arises from risks activities such as; on site segregation, handling, storage, transportation, treatment/incineration and ultimate disposal of this waste. OAG acknowledges existence of internal initiatives that are used to manage clinical waste, but has identified problems across the 3 Facilities including;

- Non existence of clinical waste strategic plans and objectives
- Inappropriate segregation, handling, storing, treatment/incineration and disposal
- Shortages of receptacles
- Lack of recording arrangements for clinical waste quantities
- The lack of easily accessible data on clinical waste collected and disposed of on regular and systematic basis, so that it can influence clinical waste management decisions.
- A general attitude that clinical waste issues were of a low priority and non-core business activities.

Appropriate waste management is a vital initiative as it ensures protection of human health and the environment. It is therefore, important to understand that improper waste management may cause adverse health effects by spreading infections and diseases and also lead to environmental problems resulting in the air and groundwater pollution. In this regard, OAG considers that, these risk areas need to be addressed, if the operation's efficiency and accountability are to be achieved.

CHAPTER FOUR

4.0. RECOMMENDATIONS

In order to improve the clinical waste efficiency and accountability, the facilities should seriously address shortcomings mentioned at Chapter 3 of this report and consider the following recommendations:

4.1. STRATEGIC PLANS AND OBJECTIVES

- The OAG recommends that both the Department of Clinical Services and 3 Referral Hospitals should develop strategic Plans for dealing with clinical waste issues, that set assessment criteria based on appropriate priorities, which include, performance indicators and realistic time tables in order to address health and environmental risks and other stated strategies and integrate them in their management systems.

- The Health Care Facilities should develop strategic objectives for clinical waste management that are concise, realistic, and measurable, outcome oriented and fully capture the operation.

4.2. COMPLIANCE ASPECTS

4.2.1. Segregation

- BCWMCP should be complied with by the 3 facilities in order to ensure proper segregation of clinical waste at source.

- Facilities should ensure that different types of receptacles are adequate in terms of number, quality and durability and that they are continuously available in order for waste to be appropriately segregated.

- Facilities management should conduct spot checks to ascertain compliance to local and international laws and to ensure that environmentally sound principles are adhered to.

4.2.2. **Handling**

- Management at facilities level should ensure that all personnel involved in carrying and loading clinical waste in different transport modes treat bags with care.

- Management should ensure that, not under any circumstances are hands used to transport bags containing waste.

4.2.3. **Storage**

- Management at the facility level should ensure that waste, including ash and residuals is kept in adequate storage facilities that are specifically built and designed for that purpose in order to comply with the requirements of BCWMCP and International Best Practice.

- Health Facilities Management should encourage personnel involved with clinical waste issues to use provided storage facilities accordingly and desist from throwing waste indiscriminately to avoid spillage and tearing of bags.

- Health Facilities Management should ensure that storage facilities under their jurisdictions are secure and adequate to prevent unauthorized accessibility and scavenging.

4.2.4. **Transportation**

- Health Care Facilities should ensure that waste produced within their jurisdictions is transported in safe and secure vehicles or other transport modes that are environmentally sound and efficient, in order to protect human health and the environment against the adverse effects which may result from that transportation.

- Ministry of Health should encourage Health Care Facilities Management to ensure that waste, which is subject to transportation for incineration off-site, is packed, labelled and transported in conformity with the requirements of BCWMCP and Generally Accepted and Recognised International Standards.

- Health Care Facilities management should ensure that waste carriers are regularly steam cleaned or disinfected in conformity with BCWMCP to reduce possibility of infection that may occur as a result.

- Health Care facilities should regularly conduct inspections to;

  (i) Ascertain whether companies engaged to transport waste comply with the requirements of BCWMCP and Waste Management Act, 1978.

  (ii) Ensure that waste-leaving facilities is packed and clearly labelled according to local and international laws, free from spill and tightly capped where necessary.

4.2.5. **Incineration/Treatment**

- Facilities Management should ensure that waste generated is completely incinerated to reduce the effects that clinical waste can have on human health and the environment.

- Facilities management should ensure that clinical waste is not relegated to triviality and as such they should nominate Senior Officers who will supervise Incinerator Operators' activities and make appropriate decisions where appropriate.

4.2.6. **Disposal**

- Facilities should dispose of clinical waste according to BCWMCP and International Best Practice.

- Facilities should review their on-site disposal of residuals and ash, and introduce programmes to identify and remediate the risks areas.

- Facilities should strive to ensure that waste collected within their portfolios is appropriately disposed of, in order to minimise the consequences thereof, of human health and the environment.

- Facilities should ensure that not only is waste treated to eliminate the risks of infection but should ensure that the final deposit is managed in an efficient manner to prevent any other human injuries and pollution to the environment.

4.2.7. **Training**

- Staff at all level should be continuously trained to ensure complete awareness of and compliance to the Botswana Clinical Waste Management Code of Practice.

- MOH should develop a clinical waste awareness handbook in understandable languages to assist personnel to understand their clinical waste responsibilities.

- Facilities should conduct training needs assessments across their portfolio to facilitate the development of training modules on clinical waste management procedures for personnel at different levels.

4.3. **Risk Management Aspects**

- MOH should encourage facilities to manage their risks so as to protect human health and the environment from risks associated with needles stick pricks and injuries and inappropriate management of clinical waste.

- OAG recommends that the Ministry of Health should prioritise the development of common standards and processes affecting HCWs, Operatives and health care as a whole as a means of delivering a more uniform quality service to all HCWs and Operatives.

- The OAG recommends that as part of accountability and oversight processes, the Ministry of Health should encourage Facilities to become more proactive in overseeing operations that impact on the environment and are likely to expose the country to significant risks.

- Facilities should initiate a more rigorous approach to follow up clinical waste collected from their Facilities so as to ensure that it is disposed off in an environmentally sound and efficient manner.

- Facilities should routinely undertake screening of infectious diseases and health promotion testing, to assess the extent to which clinical waste affects Operatives especially the Incinerator Operators.

- Facilities should ensure that adequate protective clothing is available and is of the right type.

- Facilities should encourage Operatives to wear full protective clothing at all times.

- Facilities management should encourage hospital wards personnel to ensure that waste leaving their wards is labelled with the type and source of waste for ease of identification and urgent incineration.

- MOH should establish mitigatory measures to protect the environment and these should be accordingly implemented.

4.4. Duty of Care

- Facilities should take reasonable measures to prevent unauthorized access to incinerator and storage areas so as to avoid scavenging and injury.

- Management should ensure that “No Entry” signs are strategically placed to inform unauthorized persons of the dangers of entering controlled areas.

4.5. Clinical Waste Management Information

- Facilities should develop and maintain management information that allows recording of information to assist in making holistic informed decisions about clinical waste processes.

- Facilities should maintain a complete database that will indicate;

    - The quantities of clinical waste generated and disposed of.

    - Number of Health Care Workers and the Operatives that were pricked by sharps and vaccinated against hepatitis B or those declined.

- Facilities should have weighing facilities so as to have qualified statistics that will assist them in making informed decisions as regards waste produced and disposed of.

4.6. Performance of Waste Management System

Ministry of Health should encourage facilities to develop appropriate performance indicators, targets and milestones to assist measuring the performance of clinical waste processes consistent with Botswana Clinical Waste Management Code of Practice and International Best Practice principles.

4.7. Outsourcing of Clinical Waste Collection and Disposal

Facilities Management should ensure open, competitive tendering arrangements where appropriate for the collection, transportation and ultimate disposal of waste, so that value for money can be achieved.

4.8. Evaluation Aspects

- The MOH should evaluate the BCWMCP in order to identify if it is commensurable with the International Standards on environmental issues.

- The 3 Facilities should evaluate clinical waste operation within their jurisdictions in order to assess whether they efficiently and effectively comply with BCWMCP requirements and take corrective actions where there is non-compliance.

4.9. Coordination of Roles and Responsibilities

- MOH should ensure that the Facilities nominate Senior Officers with a sound appreciation of environmental management practices to;

    - Have a prime responsibility for portfolio wide clinical waste coordination as one of the major components of their duties.

    - Have the responsibility for focusing strategic clinical waste actions and reporting so as to raise the status and priority of clinical waste issues such as prevention and remediation of risks associated thereof.

APPENDIX A (i)

PRINCESS MARINA HOSPITAL

1. **VISION**

We will be a model of excellence in the provision of specialized tertiary health care service.

2. **MISSION**

We provide holistic specialised health care through a multidisciplinary team of dedicated and well-trained staff in spirit of 'Botho'.

3. **STRATEGIC GOALS**

- Princess Marina Hospital strategic goals are as follows:
- To ensure customer satisfaction by providing holistic specialized quality health services.
- To enhance institutional efficiency and effectiveness through implementation of performance improvement initiatives.
- To enhance staff development through implementation of human resource management strategy.
- To ensure customer satisfaction by providing quality services.

4. **STRATEGIC OBJECTIVES**

- To ensure optimal use of essential equipment and skilled human resources.
- To uphold the status of PMH as a referral specialist centre by 31/03/2005.
- To identify possible existing partners and negotiate for bilateral exchange programs by 31/03/2004.
- To review, formulate and implement comprehensive operational policies and standards of each department by 31/03/2004.

- To develop and implement HIV/AIDS and other communicable diseases programme by 31/03/2005.

- To train adequate number of staff from various disciplines by 31/03/2005.

- To promote customer service skills at all levels by 31/03/2005.

- To develop an effective monitoring and evaluation system to ensure customer satisfaction by 31/03/2005.

- To establish and implement security and safety measures in PMH by 31/03/2004.

APPENDIX A(ii)

NYANGABWE HOSPITAL VISION

Nyangabgwe Hospital shall be a leader in the promotion and provision of Heath Care Services. "*Leadership position would be considered to have been attained when NH is accredited nationally, regionally and internationally and is considered as preferred hospital by all the stakeholders*".

MISSION

Nyabgabwe Hospital is dedicated to providing the highest quality, most comprehensive, compassionate and integrated Healthcare Service. This will be guided by our Core Values of Botho, Customer Focus, Service Excellence and teamwork.

STRATEGIC GOALS

- To reduce infant mortality by 57 per live 1000 live births to 51 per 1000 live births live births by 2009.
- To reduce under five mortality from 74 per 1000 live births to 63 per 1000 live births.
- To reduce hospital based maternal mortality from 170 to 120 per 100 000 live births by 2009.
- To reduce morbidity and mortality related to non-communicable diseases by 10% by March 2009.
- To provide customer focused service by March 2009.
- To improve management of finance in the Ministry of Health by 2006.
- To support and monitor the implementation of performance improvement and initiatives by March 2009.
- To develop ten professional standards by March 2008.
- To recruit and retain competent personnel.

APPENDIX A (iii)

LOBATSE MENTAL HOSPITAL

VISION

We, the Lobatse Mental Hospital will lead in the provision of comprehensive and effective mental health services which are in line with global standards.

MISSION

The Lobatse Mental Hospital exists to provide promotive, curative and rehabilitative mental health services which are anchored on the Primary Health Care strategy.

STRATEGIC GOALS

1. To reduce morbidity related to mental disorders by 10% by 31st March 2009.

2. To implement HIV AIDS intervention programmes at LMH by 31st March 2009.

3. To provide support services for the mentally ill by 31st March 2009.

4. To provide customer focused mental health services in all departments in LMH by 31st March 2009.

5. To implement PMS initiatives at LMH by 31st March 2009.

6. To implement mental health policies and standards by 31st March 2009.

7. To improve resource management practices at LMH by 31st March 2009.

8. To plan and budget for the recruitment and retention of competent staff by 31st March 2009.

APPENDIX B (i)

SHORTAGES OF RED PLASTIC BAGS

Facility	Date of shortages	Period of shortages
PMH	10/07/03 - 16/08/03 16/11/03 – 16/12/03 04/01/04 – 13/02/05 15/02/05 – 23/03/05 29/03/05 – 28/11/05 28/11/05 – 19/05/06	1 month 5 days 1 month 1 year 9 days 1 month 7 days 8 months approx 6 months
NRH	07/12/04 – 13/07/05 14/10/05 – 22/12/05	7 months 6 days 2 months

APPENDIX B (ii)

Sharps Disposing Containers (18 L)

Facility	**Date of shortages**	**Shortages (length of time)**
PMH	15/05/05 – 01/09/05 12/11/005 – 11/02 /006	3 months 16 days 3 months
NRH	02/02/04 – 03/04/06	2 years
Sharps containers 4 L		
PMH	15/05/05 – 20/06/05 27/09/05 – 07/10/05	1 month 9 days
NRH	26/02/04 – 06/07/04 21/10/05 – 05/07/06	4 months 11 days 8 months 14 days

Source: Inventory cards

APPENDIX B (iii)

Pedal Bins

Facility	Date of shortages	Shortages (length of time
LMH	26/08/05 – 06/ 12/05	4 months

Source: Inventory cards

APPENDIX C

PROTECTIVE CLOTHING

Facility	Item Description	Date of shortages	Shortages (length of time)
PMH	Mask face disposable (2 ply)	18/04/04 - 07/05/04 17/05/04 – 19/05/05 18/10/04 – 15/1/04 07/09/05 – 11/10/05 14/02/06 – 08/03/06	3 weeks 3 days 1 month 1 month Approximately 1 month
LMH	Gloves – medium	26/05/03 – 29/06/05 11/11/05 – 14/11/05	1 month 3 days
	Gloves - large	24/04/03 – 10/10/03 24/0/05 – 26/04/05 13/05/05 – 14/11/05	6 months 3 months Approximately 6 months
	Gloves – surgical	26/04/05 – 19/08/05 08/03/06 – 15/06/06	Approximately 4 months 3 months
LMH	Face masks	05/01/05 – 19/01/05 14/02/05 – 11/04/05 27/06/05 – 27/07/05 21/10/05 – 14/11/05 20/12/05 – 28/03/06	14 days 2 months 1 month 3 weeks 3 months
	Apron plastics	26/04/05 – 04/10/05	5 months 3 days

Source: Inventory cards