

SUSTAINABLE MANAGEMENT OF HEALTH CARE RISK WASTE IN GAUTENG

June 2003

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ABSTRACT

The special risk that Health Care Risk Waste (HCRW) poses to society, together with the present poor level of HCRW management in Gauteng, resulted in the need for a general improvement of HCRW management standards.

The first phase of the project on Sustainable Management of HCRW in Gauteng, focussed on the status quo of HCRW management in Gauteng; investigating the potential sources of HCRW, the magnitude of the HCRW stream as well as the available treatment capacity. The investigation then led to the evaluation of the viability of regionalisation of HCRW treatment facilities within Gauteng. Although not a primary objective of the first phase of the project, the investigation also evaluated the present state of HCRW management from generation and containerisation, through storage and transport to treatment and final disposal, for both private and public health care and treatment facilities in Gauteng.

Having determined the extent of the problem during the status quo study, the second phase of the project is aimed at addressing the identified problems in a sustainable manner. This phase, which is supported by the Danish Cooperation for Environment and Development (DANCED), commenced in May 2001.

The first objective of the second phase of the project was the development of a HCRW Management Policy for Gauteng, which was primarily focussed on environmentally sound treatment and disposal of HCRW.

Although the project is aimed at addressing the needs of both the private and public sector, it is appreciated that the HCRW generated at public health care facilities represent some 50% of the overall HCRW stream generated in Gauteng. A Feasibility Study was therefore undertaken to identify the most cost effective, yet healthy and safe HCRW management system that will be meeting the required environmental standards. The outcome of the Feasibility Study will then tested during full-scale Pilot Projects undertaken in a public- hospital and a clinic respectively.

The outcome of the Feasibility Study and Pilot Projects will then in turn be used for the development of an integrated HCRW management Strategy and Action Plan for Gauteng, which will finally form the basis for the Technical Specifications and Tender Documentation that will be used for outsourcing of HCRW management services by public health care facilities in Gauteng.

The first phase of the project was completed and the conclusions and recommendations are available, the second phase is still in progress. The latter part of the project will however be in an advanced stage and the results available for reporting, will provide valuable information not only to other provinces in South Africa, but also to other developing countries from the region that may wish to embark on a similar process.

KEYWORDS

Health care waste, health care risk waste, medical waste, infectious waste, clinical waste, infection control, minimum requirements, Gauteng, DACEL, hospitals, clinics, policy, feasibility study, guidelines, strategy, action plans, pilot studies, waste composition.

INTRODUCTION

Medical waste, also referred to as health care waste (HCW), is a combination of Health Care General Waste (HCGW) - similar to domestic waste, and HCRW that is considered to be the hazardous component of HCW. HCRW is further made up of a number of components such as infectious waste (including sharps), chemical waste (including pharmaceutical waste) and radioactive waste. The generators of HCW are generally grouped into two categories that represent major generators like hospitals and clinics, as well as minor generators like health practitioners, dentists, pharmacies etc. The approximate 600 major generators in Gauteng are responsible for some 90% of the estimated 1 200 tonnes of HCRW generated per month, with the 9 700 minor generators being responsible for the remaining 10%.

The special risk that HCRW poses to society, together with the poor standard of HCRW management in Gauteng, resulted in the need for general improvement of HCRW standards.

In meeting its constitutional responsibility to ensure that every South African lives in an environment that is not harmful to his/her health or well-being, the Gauteng Department of Agriculture, Conservation, Environment and Land Affairs (DACEL) together with the Gauteng Department of Health (GDOH), embarked on a comprehensive programme to improve the quality of the environment through the prevention of pollution, the promotion of conservation and the securing of ecologically sustainable development.

The following vision was therefore set for the process of facilitating the implementation of sustainable HCW management in Gauteng,

To ensure that integrated, environmentally sustainable and occupationally healthy and safe HCW management be established in Gauteng; within the frames and principles of the national waste management strategy (NWMS), and covering the full HCW stream.

Project Objectives in Brief

The project broadly entails the formulation of a HCW Policy as well as a detailed HCW Management Strategy and Action Plans. It also provides guidance for both HCW generators and HCW service providers when planning investments, preparing for increased performance standards and future market conditions, as well as during the development of suitable treatment facilities and equipment for service delivery to the HCRW generators. The project therefore appreciates the principles of the NWMS that, among others, requires:

- Improved delivery of basic waste management services;
- A shift in emphasis away from end-of-pipe treatment to pollution prevention and waste minimisation;
- Reduced risk to human health and environment from improved waste management practices;
- More effective integration of waste management across all environmental media (land, water and air), through the adoption of a more effective integrated approach to legislation.

Problems Experienced in Gauteng

Visits conducted to numerous health care facilities and HCRW treatment plants clearly demonstrated that in Gauteng, there are serious shortcomings in the way in which HCW is managed internally and externally. The most critical problems identified can be classified as environmental, occupational health and public health impacts caused by, among others, excessive and incorrect manual handling of HCRW, the use of unsafe equipment as well as excessive emission of pollutants from HCRW treatment plants. For example, it is considered that none of the current on-site HCRW incinerators meet the Emission Guidelines of Department of Environmental Affairs and Tourism (DEAT) whilst it is also expected that the

current commercially operated regional incinerators are only meeting the DEAT Emission Guidelines on some of the critical pollution parameters.

Gauteng has for several years experienced critical HCRW management problems caused by among others insufficient availability of treatment capacity and poor environmental performance of treatment plants. Furthermore, the public acceptance of incineration as a form of HCRW treatment has reduced, inter alia due to the poor environmental performance by most of the existing incinerators operating in Gauteng.

With the increased awareness of a need for additional HCRW treatment capacity in Gauteng, several proponents have submitted applications to DACEL and other relevant authorities for the establishment of HCRW treatment plants in various locations in Gauteng and are proposing technologies with a wide range of environmental as well as occupational health and safety standards.

Although not fully implemented and enforced as yet, there are signals that most of the problems related to HCRW management in Gauteng will be under control in the not too distant future. This statement is based on an expected increase in compliant treatment capacity and the implementation of the Gauteng HCW Management Policy of 2001, which sets the Gauteng Minimum Requirements for the management and treatment of HCRW in the Province.

Scope of the Project on “Sustainable Health Care Waste Management in Gauteng”

The project “Sustainable HCW Management in Gauteng” is aimed at achieving ambitious but important goals during the implementation period from May 2001 to September 2003. All Project outputs and the waste information data base are available at: <http://www.csir.co.za/ciwm/hcrw> :

1. Gauteng HCW Management Policy endorsed by the Gauteng Legislature;
2. Implementation of HCRW Information System (web-based prototype being pilot tested August 2002 – January 2003 available at <http://deviation.icomtek.csir.co.za/wastemanagement/>);
3. Feasibility Study of various Provincial HCW Management Scenarios (Draft presented August 2002);
4. Development of an Integrated HCW Management Strategy and Action Plans for Gauteng (Mid 2003);
5. Publishing of HCW Management Guidelines on sustainable HCW management for Gauteng (to be completed after Pilot Projects);
6. Execute HCW Management Pilot Projects that include: testing of equipment, HCW composition and generation study, capacity building and awareness programme, testing of HCRW Information System, testing of proposed specifications for incorporation in next provincial tender for HCRW Management (on-going);
7. Development of technical specifications and tender documents for coming tender for outsourcing of HCRW Management for all provincial hospitals and clinics (on-going);
8. Draft and promulgate (2001) i) Gauteng Health Care Waste Management regulations and ii) Gauteng Waste Reporting Regulations
9. Provincial Capacity Building and Awareness Programme for HCW Management (on-going);
10. Host an International Conference on HCW Management (25-26 August 2003).

The Gauteng initiative was designed to serve as a national pilot project for implementation of selected components of the National Waste Management Strategy that is expected to commence towards the end of 2002. This national initiative would include, among others, a component sustainable HCW management in the whole of South Africa.

Project Development Process

The Gauteng project is developed and guided by a list of provincial and national stakeholders that include Department of Environment Affairs and Tourism (DEAT), Department of Water Affairs and Forestry (DWAFF), National Department of Health (NDoH), Gauteng Department of Health (GDoH), Gauteng Department of Public Transport, Roads and Works (GDPTRW) as well as several non-governmental organisations (NGOs) and other representatives of the health care sector. The private sector, through the health care facilities as well as the HCW management industry, are consulted and communicated with as part of the process.

Since there are presently a number of initiatives being undertaken in South Africa, aimed at improving HCW management standards (for instance the revision of SABS Code 0248 on Management of HCW),

one of the important objectives of the Gauteng project is to ensure ongoing communication and interaction with any other similar projects that will ensure uniformity in standards.

Availability of Treatment Capacity in Gauteng

Based on the Status Quo Study undertaken for Gauteng in 2000, it is estimated that approximately 1200 tonnes of HCRW is generated every month. Of this 1200 tonnes a considerable amount cannot verifiably be accounted for, as HCRW generated by many sources, particularly small generators such as vets, general practitioners, tattoo artists etc. are not being serviced by commercial HCRW service providers.

Table 1 illustrates the current estimated HCRW generation rate and treatment capacity in Gauteng for various types of treatment plants that are either in operation or alternatively expected to be commissioned in the near future.

Table 1: *Estimated Current and Planned Availability of Treatment Capacity for HCRW in Gauteng*

Status of HCRW Treatment Plants July 2002 in Gauteng	Company	No. of Treatment Plants	Estimated Capacity (Tonnes/month)
Commercial HCRW Treatment Plants in operation	Pikitup	1	80
	Evertrade Medical Waste	1	1,500
	Clinical Waste Management	2	210 to 400
	DisposTech (Enviroserv)	4(5)	460
	Sub-total	8 (9)	2,250-2,440
Commercial HCRW Treatment Plants being planning or assessed for approval	Proponent 1	1	250
	Proponent 2	1	220
	Proponent 3	1	75
	Sub-total	4	545 to 545
	Total Commercial Plants	11 (12)	2,795 to 2,985
On-site incinerators (potentially operational)	(Various small scale incinerators located at hospitals and other institutions)	Approx. 58	Approx. 280
HCRW Generation		HCRW (Tonnes/month)	
Estimated HCRW generation in Gauteng	Hospitals and Clinics managed by province or local governments		Approx. 580
	Hospitals, clinics, general practitioners etc. Managed by private sector or military		Approx. 601
	Total		Approx. 1,181

Note: It should be noted that the vast majority of existing HCRW treatment plants, most of which are incinerators, which are based on relatively old technology, and are not expected to comply with the minimum requirements for the environmental performance and microbial inactivation to be achieved in the Province, as laid down by the recently adopted Gauteng HCRW policy.

THE GAUTENG MINIMUM REQUIREMENTS FOR HEALTH CARE WASTE MANAGEMENT

Short-comings in Current National Regulations and Guidelines

The Air Pollution Control Act of 1965 is very lenient compared to air pollution control regulations in most developed countries. DEAT has issued guidelines for emissions to the air from HCRW incinerators. These guidelines do not constitute a regulatory requirement as such but are comparable with the current European Union (EU) Directive on Emissions from incinerators except for some parameters, noticeably particles, where the DEAT Guidelines are still very lenient.

In addition to incineration there is a growing interest in the introduction of alternative HCRW treatment technologies, often referred to as non-burn technologies. As this is a new concept in South Africa, there are no guidelines or regulations concerning the microbial inactivation to be achieved by such non-burn HCRW treatment technologies. For this reason it was agreed that the EU standards would be the most appropriate standards to apply for South African conditions. In Gauteng the first non-burn treatment plant received its Record of Decision in 2002 and has subsequently commenced operation.

Gauteng Minimum Requirements

The Gauteng Provincial Government has, as part of the Gauteng Policy on HCW management, during November 2001 endorsed a comprehensive list of Minimum Requirements for management of HCRW. The main requirements are summarised below:

1. All HCRW Incinerators shall comply with the DEAT Emission Guidelines and bottom ash shall have an Ignition Loss of less than 5%;
2. Non-burn treatment plants shall achieve the microbial in-activation level equal to a reduction of 6 log₁₀ or greater for vegetative bacteria, fungi, lipophilic/hydrophilic virus, parasites and mycobacteria and 4 log₁₀ or greater for *Bacillus Stearothermophilus* or *Bacillus Subtilis*;
3. Disposal of residues from both HCRW incinerators and non-burn treatment plants shall observe all regulatory requirements, for example the DWAF Minimum Requirements for Waste Disposal by Landfill;
4. January 1, 2004, is set as the deadline for all existing HCRW treatment plants to comply with the set Minimum Requirements;
5. Various Minimum Requirements are also set for equipment and disposable materials to be used, handling of receptacles etc.

PILOT PROJECTS FOR IMPROVED HEALTH CARE WASTE MANAGEMENT

Pilot Institutions

In cooperation with Gauteng Department of Health Leratong Hospital (Krugersdorp) and Itireleng Clinic (Soweto) have been selected as suitable pilot institutions following a comprehensive selection process that involved visits and assessment of numerous provincial clinics and hospitals as well as various private sector health care facilities and health related services.

Pilot Project Development Process

The development of options to be tested at the pilot institutions is a highly participatory process that is driven by Task Teams established by the Pilot Institution management and operational staff. The DACEL consultants act as advisors, secretariat and technical specialists for the Task Teams.

The aforesaid participatory process was chosen to ensure identification of the actual problems experienced at present, with a view to address the institutional, managerial, procedural as well as human and financial resource constraints that may exist. Furthermore, the pilot activities were preceded by a HCW Management Study Tour to Egypt, Denmark and the United Kingdom where the key stakeholders and representatives of the pilot institutions were introduced to various types of HCRW treatment plants and systems for containerising, collecting and managing HCRW. The Study Tour is documented in a comprehensive HCW Management Study Tour Report that documents the participants' observations and conclusions and contains pictures and descriptions of the visits. This and other project outputs can be downloaded from the DACEL web pages.

Through this process, affordable and sustainable options for improved HCW management were identified. Particular interventions have been selected for the pilot testing with a view to addressing the technical

and performance needs that are to be included in the next provincial tender for outsourcing of HCW management services, together with the i) Gauteng Provincial Strategy and Action Plans, ii) Gauteng HCW Management Guidelines, iii) Gauteng HCW Information System and iv) Capacity Building and Awareness Programme for improved HCW Management in Gauteng.

Figure 2 below shows a series of pictures of the situation at Leratong Hospital *before* the pilots started and *during* the pilot projects.

Figure 2: Pictures of Equipment and Situation before Pilot Project started and During Pilot Project at Leratong Hospital

Before Pilots Project	During Pilot Project	Before Pilots Project	During Pilot Project
 <p>Old sharps containers not fitting brackets</p>	 <p>New horizontal loading sharps container</p>	 <p>Red bags hanging loose on nursing trolleys</p>	 <p>Fixes containers and brackets for infectious waste</p>
Before Pilots Project	During Pilot Project	Before Pilots Project	During Pilot Project
 <p>Old refuse bins</p>	 <p>New wall mounted racks for general waste</p>	 <p>Old 140 litre cardboard box with 40 micron liner</p>	 <p>Reusable 100 litre plastic box with 40 micron liner</p>
Before Pilots Project	During Pilot Project	Before Pilots Project	During Pilot Project
 <p>Old 140 litre cardboard box sealed</p>	 <p>New 110 litre steel rack with 80 micron plastic bags</p>	 <p>Old makeshift trolleys for internal collection</p>	 <p>New cage trolley for reusable 100 litre and 50 litre plastic</p>

Before Pilots Project	During Pilot Project	Before Pilots Project	boxes During Pilot Project
 <p><i>Old makeshift trolleys for internal collection</i></p>	 <p><i>New 770 litre reusable wheelie bin full of 80 micron thick red sealed bags</i></p>	 <p><i>Manual loading of truck with boxes, sharps containers & anatomical waste containers</i></p>	 <p><i>Mechanical loading of filled cage trolleys/wheelie bins</i></p>
Before Pilots Project	During Pilot Project	During Pilot Project	
 <p><i>Manual feeding of central incinerator</i></p>	 <p><i>Mechanical lifting and feeding of central incinerator</i></p>	 <p><i>Washing and disinfection of 770 litre wheelie bin</i></p>	

DACEL has commissioned a comprehensive HCW Composition and Generation Study that has been conducted in conjunction with the pilot projects. The Study is providing detailed information, based on actual sorting of waste, on the segregation efficiency, waste composition and waste generation at Leratong Hospital for both HCRW and HCGW as well as information on the segregation efficiency and waste composition of HCRW generated by both private and public hospitals in Gauteng in general via sampling at a central treatment plant. The pictures below show the sorting process in progress.



Figure 3: Pictures from HCW Composition and Generation Study Commissioned by DACEL

Sampling of HCGW and HCRW generated at Leratong Hospital took place July and August 2002 before the implementation of the pilot activities. The sampling at Leratong Hospital was repeated 26 May – 9 June 2003 to monitor the impact of the interventions on segregation efficiency, waste generation and composition. The sampling of HCRW from both public and private hospitals at a central treatment plant in Gauteng took place in August and September 2002

Table 4: Result of 14 day sampling of HCRW from Public Hospitals and Clinics in Gauteng at Central Incinerator

Public Health Facilities in Gauteng	Incorrectly Disposed		Correctly Disposed			Total
	HCGW	Other HCW	Infectious	Pathological	Sharps	
Health Care Risk Waste Only	kg/Day	kg/Day	kg/Day	kg/Day	Kg/Day	kg/Day
General Infectious Waste	2556.9	2026.62	3684.94	.	.	8268.46
Sharps Containers	3.98	72.34	.	.	54.66	130.98
Anatomical W Containers	.	.	.	97.19	.	228.17
Total	2560.88	2098.96	3684.94	97.19	54.66	8627.61
Percent	29.68%	24.33%	42.71%	1.13%	0.63%	100.00%

Table 5: Result of 14 day sampling of HCRW from Private Hospitals and Clinics in Gauteng at Central Incinerator

Private Health Facilities in Gauteng	Incorrectly Disposed		Correctly Disposed			Total
	HCGW	Other HCW	Infectious	Pathological	Sharps	
Health Care Risk Waste Only	kg/Day	kg/Day	kg/Day	kg/Day	kg/Day	kg/Day
General Infectious Waste	1705.37	576.8	4226.07	.	.	6508.24
Sharps Containers	13.07	395.2	.	.	325.9	734.17
Specican Containers	13.89	22.12	.	13.94	.	784.12
Total	1732.33	994.12	4226.07	13.94	325.9	8026.53
Percent	21.58%	12.39%	52.65%	0.17%	4.06%	100.00%

Table 6: Result of 14 day sampling of HCRW and HCGW at Leratong Hospital before the Pilot Project Interventions.

Pre-intervention Study at Leratong Hospital		Incorrectly Disposed		Correctly Disposed		Total	
		HCGW	HCRW	HCGW	HCRW	HCGW	HCRW
Container Type	Size	Mass/Day	Mass/Day	Mass/Day	Mass/Day	Mass/Day	Mass/Day
HCRW							
General Infectious Waste	140L	76.36	1.85	0	224.62	76.36	226.47
Sharps Containers	10L	0.01	2.79	0	17.04	0.01	19.83
Laboratory		0	0	0	13.8	0	13.8
Blood bank		0	0	0	6.87	0	6.87
Sub-total		76.37	4.64	0	262.33	76.37	266.97
Percentage		22.20%	1.40%	0%	76.40%	22.20%	77.80%
General Waste (HCGW)							
General Waste Containers	Black bags	0	8.08	173.17	0	173.17	8.08
Food Waste		0	0	182.45	0	182.45	0
Recyclables	Paper	0	0	72.21	0	72.21	0
Sub-total		0	8.08	427.83	0	427.83	8.08
Percentage		0%	1.90%	98.10%	0%	98.10%	1.90%
GRAND TOTAL		76.37	12.72	427.83	262.33	504.20	275.05
Percentage		9.80%	1.60%	54.90%	33.70%	64.70%	35.30%
Grand total per patient per day (kg/p/d)		0.15	0.025	0.842	0.516	0.993	0.541

The tables 4-6 above show that: i) there is a considerable amount of general waste in the HCRW, which is causing excessive cost of waste disposal, ii) there was considerable amounts of HCRW in the General Waste being disposed to landfills from Leratong Hospital before the interventions. Also, it was found that 5% of all cardboard boxes with HCRW did actually contain infected sharps such as syringes with needles etc. Full details can be found at

The data from the post-intervention has not been processed yet but qualitatively it is evident that: i) there has been a significant reduction in the mis-segregation, ii) amounts of HCGW has increased and amounts of HCRW has decreased, iii) the number of misplaced sharps has been significantly reduced. It therefore appears that with the interventions that, among others, consisted of improved containers and placement of containers, capacity building and training and improved monitoring it is possible to significantly improve the mis-segregation and reduce the mass of HCRW requiring costly containerisation and treatment. The findings of the last composition study will be published on the above mentioned web-site once the data processing has been completed.

FEASIBILITY OF SELECTED HCW MANAGEMENT SCENARIOS FOR GAUTENG

Selected Scenarios

Figure 7 below shows the four scenarios investigated in the Feasibility Study. The four scenarios include the current situations (Status Quo) and Scenario 1, which is similar to Status Quo but with improved treatment and reduced manual handling, whereas Scenario 2 and 3 include more elaborate changes to the containerisation and internal transport of HCRW by using different sizes of wheelie bins instead of the cardboard box system that is presently in use.

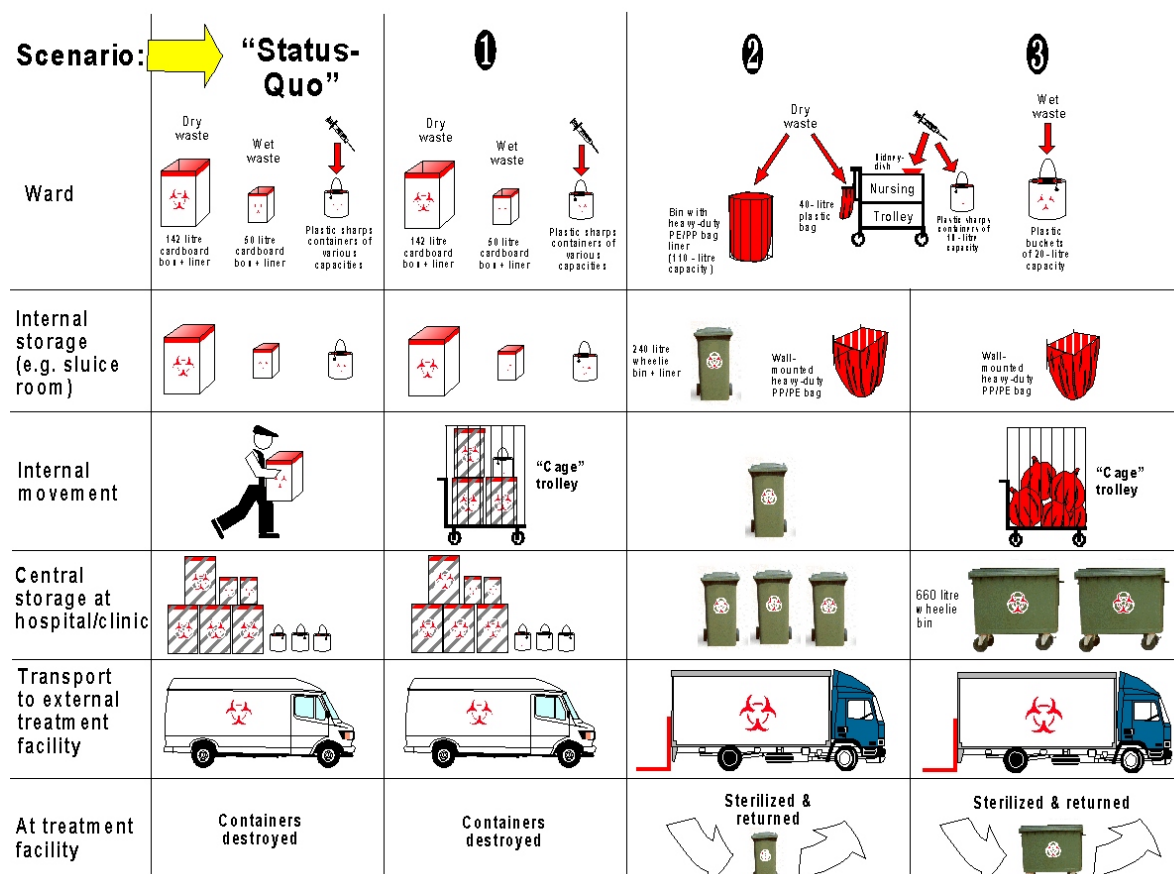


Figure 7: Selected Scenarios for Management of HCRW in Gauteng assessed in the Feasibility Study

For Scenarios 1, 2 and 3 calculations have been made for various treatment options including incineration, microwave and autoclave technologies assumed to comply with the Gauteng Minimum Requirements in terms of emission to air and the level of microbial inactivation achieved.

Findings of the Feasibility Study in Brief

The environmental and financial assessment of the selected HCRW management scenarios show that regionalised treatment systems are financially most advantageous and that containerisation systems other than the current cardboard boxes are environmentally and safety-wise more advantageous and financially neutral or advantageous depending on the details in the management system configuration.

A summary of the outcome of the Financial Assessment of the Scenarios is presented in Table 7 below.

Table 8: Summary of Findings of the Financial Assessment of Total Costs of the Selected HCW Management Scenarios for Gauteng

		Scenario 1			Scenario 2			Scenario 3			Status Quo
ALL GAUTENG HEALTH CARE FACILITIES		Autoclave	Incinerator	Microwave	Autoclave	Incinerator	Microwave	Autoclave	Incinerator	Microwave	Estimated total monthly notional cost
Number of treatment facilities	1	R 4.0	R 4.1	R 5.0	R 3.8	R 3.9	R 4.8	R 3.8	R 3.8	R 4.8	R 4.9
	3	R 4.3	R 4.4	R 4.8	R 4.1	R 4.2	R 4.6	R 4.1	R 4.2	R 4.5	
	10	R 5.7	R 5.8	R 5.8	R 5.2	R 5.3	R 5.4	R 5.3	R 5.4	R 5.4	
	20	R 7.2	R 7.6	R 7.3	R 6.7	R 7.0	R 6.7	R 6.7	R 7.0	R 6.8	

In general, the environmental analyses show that a considerable environmental improvement can be achieved by moving away from today's sub-standard on-site and off-site incinerators towards incinerators

or non-burn treatment technologies that comply with the Gauteng Minimum Requirements. The environmental analysis has not resulted in a clear recommendation for or against any particular type of HCRW treatment technology provided that the minimum requirements of the Gauteng HCW Management Policy are adhered to. However, incinerators and non-burn treatment technologies result in very different types of emission that are not easily comparable, but result in different degrees of local versus global impacts as well as different degrees of atmospheric versus soil and water impacts.

In terms of safety and socio-economic impacts the analyses have not been finalised yet.

In brief the following conclusions are made:

1. It appears possible to introduce new health care risk waste (HCRW) service concepts that while complying to improved performance standards, cf. the Policy, will have the same budgetary impact as the current sub-standard HCRW services
2. Regionalisation is clearly preferable compared to onsite solutions
3. 2-4 regionalised treatment plants appear to result in the lowest overall costs due to economics of scale
4. Use of reusable wheelie bins is equal to or slightly more cost efficient than use of disposable cardboard boxes, even when including the increased costs of transportation and disinfection of reusable containers
5. Cost of transportation increased when using reusable containers, but the increase does not exceed the savings due to elimination of disposable cardboard boxes
6. The estimated cost of the existing HCRW collection and treatment services in Gauteng appears high compared to the estimated cost of improved efficient treatment system
7. Implementation of the environmental performance requirements stated in the Gauteng Policy will significantly reduce the environmental impact of HCRW management in Gauteng
8. The existing incinerators in Gauteng are emitting significant amounts of pollutants compared to internationally available state-of-the-art incinerators.
9. Incineration has compared to non-burn technologies the most adverse impact in terms of release of acid gases and dioxins/furans, whereas non-burn technologies has the most adverse impact on the emission of green house gases leading to global warming.

CONCLUSIONS

This paper presents an on-going development process that will ultimately lead to improved HCRW management in Gauteng. Hence, even though a number of important outputs have been generated at the time of writing this paper, the majority of the project outputs are still to be produced over the remaining project period. Hence, there are still outputs being generated.

It has become apparent from the Gauteng Initiative that HCW Management, has in the past and is presently, managed in a questionable and often environmentally unsustainable manner in Gauteng and there is a serious backlog in terms of awareness. The capacity to manage HCW in an environmental sound, yet occupational healthy and safe manner is lacking when compared to the current practises in the developed world. In particular there is a need for clear allocation of responsibilities in terms of the management of HCW and for setting sustainable standards for health and environmental impacts. There is further a need to provide the tools required, including guidelines, to the health care sector and the service industry, in order to provide an acceptable and sustainable HCW management system.

The outcome of the Composition and Generation Study demonstrate that there is a considerable scope for improving the segregation of HCRW and that this can be achieved by introduction of better management and monitoring routines as well as capacity building and improved equipment that is placed more conveniently. Also, it is demonstrated that by improving the segregation and avoiding general waste being disposed as HCRW significant reduction in the expenses for HCRW collection and treatment can be achieved.

ACKNOWLEDGEMENTS

DACEL wishes to thank DEAT who have facilitated the funding and technical support from the Danish International Development Assistance (DANIDA), the project partners at the Gauteng Department of Health and other government department. Furthermore, DACEL acknowledges the keen interest and support shown by the health care waste sector and would like to thank the consulting engineering

company RAMBØLL of Denmark and the South African sub-consultants for the technical assistance provided.

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