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JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA)

MEDICAL WASTE COLLECTION,
DAMPING, TREATMENT & RECYCLING
IN SAUDI ARABIA

A SECTOR PROFILE

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PREPARED BY:

THE ECONOMIC BUREAU
RIYADH, SAUDI ARABIA

APRIL 1999





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Section 1

GENERAL DESCRIPTION

Section 1
GENERAL DESCRIPTION

INTRODUCTION

Medical or hospital waste includes all of the following categories:

- Waste that can be treated like household garbage, and to the extent that this is possible, should be re-cycled (e.g., paper, glass, textiles, kitchen waste).
- Waste that may present a risk of infection only in a medical environment, but that apart from this aspect need not be handled as hazardous waste (e.g., plaster casts, disposable clothing, bandages, disposable syringes, drip bags).
- Waste that represents a hazard in the medical environment and elsewhere and, therefore, in both cases requires special handling (e.g., waste that is tainted with hazardous pathogens, parts of bodies, waste from organs).
- Other waste occurring in the medical field (e.g., disinfectants, photochemicals, waste containing mercury, pharmacological waste, laboratory chemicals).

The expression 'waste from the medical environment' also includes residues from medical, veterinary, testing and research facilities.

Today, infectious waste is very precisely defined, that is to say waste that is tainted with pathogenic. Unlike non-infectious waste which may be disposed of depending on the country and on the waste re-utilisation principles applied,

infectious waste, due to its hazardous nature, should be dealt with separately and undergo controlled disposal.

MEDICAL WASTE MANAGEMENT

Until recently, medical waste generated in the Kingdom, toxic or otherwise, was collected by contractors retained by the various municipalities and disposed of at designated municipal landfills. These landfills, however, were not built at proper sites or according to modern environmental engineering designs to accommodate such wastes. No attempt, aside from segregation and primary treatment by some hospitals, was made to separate the toxic from the less or non-toxic medical waste, and no special treatment was undertaken. Resulting problems include leaks, odors, and as-yet unmeasured contamination of underlying aquifers.

Today, there are only forty medical hospitals in the Kingdom that have the capability of treating medical waste using microwave technology. Two of these are located in Riyadh and the remaining in Jeddah. Eighty five percent of the remaining medical institutions in the Kingdom dispose of their waste in municipal containers, the content of which are subsequently compressed and transferred to landfills without treatment. The other 15% tend¹ to burn their medical waste in traditional incinerators operated during the night. The reasons behind this phenomenon are relatively lax regulations and/ or enforcement, and until recently, non-existence of specialized plants for the treatment of medical waste.

It is unclear if transport of medical waste from the hospital to the place of disposal takes place separately from the remaining waste in order to avoid any mixing up. It is also unclear if special vehicles that allow cooling of the cargo space are used. This is specially important in warm countries such as Saudi Arabia since, otherwise, optimum temperatures for the spreading of pathogens may be reached. Additionally, there are no statistics as to the frequency of medical waste collection and, therefore, no information is available in the public domain as to the

circumstances surrounding the interim storage of waste, in cooled rooms or otherwise.

Also in disposing of infectious waste by sterilisation the germs are killed, but there is practically no reduction in volume. If the waste does not undergo immediate incineration in a waste incineration plant, there is a risk that it decomposes at room temperature. Disposal after sterilisation also requires further supervision as it is not possible to dispose of waste in a garbage dump after sterilisation, since although the pathogenic agents have been killed, it may still contain amputated limbs. Little information is available as to whether such concerns are properly addressed by domestic health institutions.

The Saudi Environmental Projects Company (SEPCO), the first company in Saudi Arabia to operate a modern treatment facility, has been operating for 6 months only and does not have the capacity today to handle the totality of the waste generated by the health sector. In addition, many of these medical institutions are located in remote areas and are therefore not easily accessible.

The Ministry of Municipalities and Rural Affairs (MOMARA) has on a number of occasions requested the **Ministry of Health (MOH)** to instruct hospitals not to dispose of medical waste in municipal containers but in special containers.

Up till now, the Saudi government has had a fragmented approach to the collection, removal and disposal of certain types of waste, mainly those which are visible and have a direct impact on human activities. However, in many cases the disposal of such waste itself entails new problems, concerning its management, methods, locations and types of treatment. In the case of medical waste segregation, transportation and treatment, Saudi Arabia is just beginning to witness the burgeoning of the industry, be it from the legislative point of view or the appearance of private waste management businesses on the market scene.

¹Ministry of Municipalities and Rural Affairs (MOMRA) Annual Report of 1998

Section 2

RESPONSIBLE AGENCIES

Section 2

RESPONSIBLE AGENCIES

Although growing awareness of environmental problems has led the Saudi government to draft environmental regulations and impose controls on pollution sources, there is still no comprehensive framework to restrict pollution levels or provide for corrections. A number of quasi-governmental agencies, however, have adopted international standards to manage pollution levels within their jurisdiction. The government, however, is expected to introduce a national environmental program in the future.

For now, Saudi Arabia's environmental protection sector is overseen and regulated by the **Environmental Protection Coordination Commission (EPCC)** and the **Meteorology and Environmental Protection Administration (MEPA)**, both established in 1981. The **Ministerial Committee on the Environment (MCP)** was established in 1989. These agencies coordinate, regulate and monitor all aspects of the environment and pollution levels.

METEOROLOGY AND ENVIRONMENTAL PROTECTION ADMINISTRATION (MEPA)

In 1981, the government established the **Meteorology and Environmental Protection Administration (MEPA)** and designated it as the central government agency for the environment (in addition to its functions in the field of meteorological services). In particular, the following functions were assigned to **MEPA**:

- conduct environmental surveys to define problems and recommend environmental standards and measures;

- recommend protection regulations and measures dealing with environmental problems;
- recommend practical measures necessary to deal with emergency situations affecting the environment;
- assess existing environmental pollution levels and future variations;
- keep abreast of developments in the field of environmental protection on the regional and international levels; and
- establish environmental standards and specifications for pollution control and environmental protection, in a definite and stable form to be considered by the appropriate authorities when issuing permits for industrial and agricultural projects which may have an environmental impact.

In response to the increasing interest in environmental concerns at the national level, the **Ministerial Committee on the Environment (MCE)** was formed in 1989 to act as the highest institutional authority responsible for setting environmental strategies and policies at national level, in addition to determining the Kingdom's international and national viewpoints in this field. **MEPA** was assigned to undertake the tasks of the General Secretariat of the **MCE** and still plays its role in the daily operations of environmental management and in coordinating such matters at the national level. It also reviews all new environmental projects referred to it by the Ministry of Industry and Electricity, submitted by Saudi companies that wish to set up industrial projects. **MEPA** currently has two American environmental experts as advisors. **MEPA** also provides meteorological services for marine and air navigation activities, oil drilling platforms, agriculture, and the general public. The government, however, is considering to split responsibility for meteorology and environmental protection between two agencies.

While only limited regulations currently cover waste disposal in the country, **MEPA** has issued standards and regulations that are expected to lead eventually to a national waste disposal code. It has prepared a hazardous waste law, but there are still no hazardous waste disposal sites - and no enforcement of the law. **MEPA** has also been involved in establishing standards related to the use of lead-free fuel (which may become available in the year 2000), control of dust in cement factories and quarries, oil spill control, and air quality monitoring.

MEPA has officially approved landfill disposal areas such as the Abpaiq site run by **Environmental Services Company (ESC)**.

OTHER AGENCIES

Other government agencies involved in environmental protection include the **Ministry of Health (MOH)**, the **Ministry of Agriculture and Water (MOAW)**, the **Royal Commission for Jubail and Yanbu**, the **Ministry of Municipal and Rural Affairs (MOMRA)**, the **Arriyadh Development Authority (ADA)**, and the **King Abdul Aziz City for Science and Technology (KACST)**.

In terms of medical waste management, the agency most directly involved is the **Ministry of Health**. In terms of minimizing and controlling pollution, the **Royal Commission** and **Saudi Aramco** (the national oil company) are the most effective agencies.

THE MINISTRY OF HEALTH (MOH)

The **MOH** issued directives requiring medical institutions in the private and public sectors to adopt a comprehensive system for the disposal of medical waste along scientific methods considered safe vis-à-vis health and the environment. While some guidelines were given, they are not considered comprehensive and detailed, and they tend to refer to guidelines put forward by international organizations such as the **World Health Organization (WHO)**..

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ROYAL COMMISSION FOR JUBAIL AND YANBU

Early in the planning and design stages of the industrial cities of Jubail and Yanbu, the Royal Commission outlined requirements for maintaining a cleaner environment in these cities. It performs environmental impact assessments to predict the effects of rapid industrialization. It also (among other things):

- develops regulations to keep industrial effluent discharges and emissions into the air at internationally acceptable levels;
- uses environmental design criteria at Jubail and Yanbu that are consistent with the New Source Performance Standards of the U.S. Environmental Protection Agency;
- plans for the reclamation and treatment of industrial wastewater and sewage;
- encourages industries to monitor stack gases with automated process controls (to reduce total plant emissions);
- requires new industries relocating to the two cities to perform remedial engineering and construction to ensure that environmental safety and pollution control equipment are included in the plant design; and
- requires continuous field inspection of facilities to ensure compliance with regulations.

In addition, the Royal Commission has implemented a comprehensive program for monitoring ambient air quality, industry effluent, and ground water in the cities; the program includes monitoring stations, water sampling, landfill management, and noise monitoring.

THE MINISTRY OF MUNICIPAL & RURAL AFFAIRS (MOMRA)

Municipalities have the primary responsibility for collecting and disposing urban waste in Saudi Arabia. The Ministry has recently adopted a comprehensive environmental plan giving priority for waste recycling and targeting a 25% recycling rate for 1998.

ARRIYADH DEVELOPMENT AUTHORITY (ADA)

The ADA was originally created as an independent agency to plan the development of Riyadh. Now it focuses on preserving the Riyadh area's ecosystem and is developing environmental standards for the city, which could be adopted for the entire country. It was the ADA that presented the government's position at a major international environmental conference held in Riyadh in September 1997.

MAJOR ACHIEVEMENTS

Major achievements at the national level in this field during the last few years can be summarized as follows:

- The development of environmental management institutions and a national framework for managing the environment, culminating in the formation of the Ministerial Committee on the Environment and its general secretariat in 1410.
- The Kingdom's effective participation in many international and regional fora on environmental issues, in particular the United Nations Conference on Environment and Development (the "Earth Summit") held in Rio de Janeiro, Brazil 1992.
- The distinguished effort in combating and controlling the largest ever oil spill in the Gulf after the Kuwait liberation war, and in protecting strategic utilities and facilities.

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- The establishment of the Saudi Environmental Awareness project in cooperation with MEPA and the private sector through the Economic Offset Program; under this scheme -- a pioneer of its type in cooperation between the government and the private sector -- the private sector provided management and finance, while MEPA provided the necessary scientific and technical support.
- The development and upgrading of meteorological services to both civilian and non-civilian sectors.
- The conservation and expansion of the Kingdom's vegetation resources, through the activities of the Ministry of Agriculture and Water, including the plantation of more than 10,000 hectares of range and pasture lands, the replantation of 80 hectares of forests, and the distribution of 500,000 seeds; in addition, the Ministry surveyed and classified 200,000 hectares of land and continued the maintenance and development of irrigation and drainage networks.
- The preservation and protection of wildlife by the **National Commission for Wildlife Conservation and Development (NCWCD)**, including the establishment of ten wildlife reserves for rare and endangered species and three research centers.
- The implementation of several projects for the reduction of ground water levels by the **High Commission for the Development of Riyadh**; these projects covered around 40 percent of the affected areas in the city of Riyadh.
- The attention to environmental affairs by a number of agencies and organizations in the industrial sector, and, in particular, to the application of measures pertaining to industrial safety; such agencies and organizations include the Minister of Petroleum and Mineral Resources, the Ministry of Industry and Electricity, Saudi ARAMCO, the Royal Commission for Jubail and Yanbu, and SABIC.

As noted earlier, there is still much to be done in the area of medical waste collection, treatment and/ or disposal.

Section 3

PRIVATE COMPANIES INVOLVED

Section 3
PRIVATE COMPANIES INVOLVED

Few private companies are involved in the management and treatment of medical waste in the Kingdom. The most important ones are:

SAUDI ENVIRONMENTAL PROJECTS COMPANY

The **Saudi Environmental Projects Company (SEPCO)** is the only company in Saudi Arabia certified by the **Meteorology and Environmental Protection Administration (MEPA)** to transfer, manage, and treat medical waste along scientific and technical grounds. The company owns and operates the Jeddah Medical Wastes Treatment Complex which was completed in August 1998. Experimental operations of the center, which started in December 1998 are over. The facility has a daily treatment capacity of 25 tons of medical waste and is the only one in the Kingdom so far. The treatment plant, which uses microwave technology and is produced by the U.S. firm Sanitec, was sold to **SEPCO** by Al-Seif Development Company. The latter declared at the time that it was negotiating the sale of 10 similar units valued at a total of USD 10 million to Gulf and other Arab organizations.

SEPCO recently concluded several agreements for disposal of medical wastes with a number of hospitals and medical centers in Jeddah,, such as the King Fahd Hospital (the first government hospital to assign **SEPCO** for this job.), King Fahd Armed Forces Hospital, Al-Huda Military Hospital, and Al-Salama Hospital. Agreements for management and treatment of medical waste have also been signed with a number of private hospitals in Jeddah, including Bagedou & Dr. Erfan Hospital, Dr. Taha Bakhsh Hospital, Al-Ansar Hospital and Dr. Al-Shifa Hospital, in addition to a number of hospitals and clinics in Taif. **SEPCO** has also concluded contracts with a large number of clinics and laboratories in Jeddah and Taif. The company is said to have secured around 70% of the contracts for the treatment of medical waste from hospitals and medical centers in the Western Region.

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The value of the five-year contract with Dr. Taha Bakhsh Hospital is SR 1.5 million/ annum. The contract calls for the hospital to halt the use of the existing incinerator and replacing it with more hygienic and environmental friendly equipment. The contract also provides for the training of the Hospital personnel on waste management.

The company intends to establish in the coming few months a center for treatment of medical wastes in Riyadh similar to the one it has set up in Jeddah. The new center will be established on a 30.000 sq.m. area and will use microwave technology thereby eliminating gas emissions normally associated with traditional incinerators. The center will have three microwave ovens; two stationary units and one mobile unit with a daily capacity of 20 tons and at a cost of about USD 1 million per unit.

Other private companies in the Kingdom are involved mostly in the transportation, as opposed to the treatment, of medical waste. Furthermore, their activities are not restricted to medical waste as such but would normally extend to other waste categories casually characterized as solid, domestic, industrial, hazardous, chemical, liquid or a combination thereof. Examples of such companies include:

AL-FAHHAD ZEGWAARD COMPANY

P.O. Box 4537

Dammam 31412, Saudi Arabia

Tel: 966-3-842-0244/842-1294, Fax: 966-3-842-1248

Contact: Frank Van Kooten, General Manager

Activity: General environmental consulting and management of medical wastes.

IMAD COMPANY

P.O. Box 677

Al-Khobar 31952, Saudi Arabia

Tel: 966-3-864-7562/894-2169, Fax: 966-3-864-3887

Contact: Azhar Farooqi, Commercial Manager

Activity: Management of used oil and medical waste.

DAMATH COMPANY LTD.

P.O. Box 8454

Dammam 31482, Saudi Arabia

Tel: 966-3-834-4503, Fax: 966-3-833-9639

Contact: Saad H. Al-Dossary, Business Development Manager

Activity: Management of used oil and medical waste.

KAID AL-INJAZ INTERNATIONAL

P.O. Box 30509

Al-Khobar 31952, Saudi Arabia

Tel: 966/3/894-8684

Fax: 966/ 3/ 898-1965

Contact: Kamal A. Al-Juhani, General Manager

Activity: Medical waste and hazardous material destruction and disposal.

In late 1998, Kayed Al-Injaz Company commissioned King Fahd University of Petroleum and Minerals Research Center to study of the environmental effects for five sites in each of Riyadh, Jeddah, Dammam, Qassim and Abha for the set up of facilities for disposal of dangerous medical wastes.

SADACA ENVIRONMENTAL GROUP

P.O. Box 16513

Jeddah 21474, Saudi Arabia

Tel: 966/2/683-0711

Fax: 966/2/683-1940

Contact: Mohammed I. Alawi, Manager

Activity: Sadaca Group is a pioneer in waste recycling in Saudi Arabia. The company obtained a long-term contract from the government for solid waste recycling. Sadaca is said to be currently engaged in medical and hazardous waste treatment and recycling,

A number of firms are also seeking to enter the market, of which we mention:

ABDULLAH ABDULMOHSEN AL-KHODARI SONS CO.

P.O. Box 3589

Al-Khobar 31952, Saudi Arabia

Tel: 966/3/895-2840

Fax: 966/3/898-6856

Contact: Fawwaz Al-Khodari, President

Ahmad Kanawati, Director Planning and Resources

Overview: Abdullah Al-Khodari Sons company has been established for more than 40 years and is listed among the top 100 business firms in Saudi Arabia. The company specializes in construction and maintenance of civil, electrical, mechanical and environmental engineering, as well as manufacturing, oil/gas support industries, agencies and distributorship, travel and tourism, and technical training. Management now is looking into entering into the business of recycling, treatment, minimization and disposal of solid waste, hazardous waste and medical waste, and full waste management.

REDLAND INDUSTRIAL SERVICES (RISAL)

P.O. Box 718

Dammam 31421, Saudi Arabia

Tel: 966/3/834-3343

Fax: 966/3/834-2937

Contact: Wayne D. Giles, General Manager

Overview: Redland Industrial Services (RISAL) is a multi-disciplined industrial services company. It is interested in entering new markets notably the handling, transportation and pre-processing of industrial, hazardous and medical wastes.

OTACO ENVIRONMENTAL

P.O. Box 1886

Al-Khobar 31952. Saudi Arabia

Tel: 966/3/894-7311/894-7307

Fax: 966/3/898-5368

Contact: Dr. Mohammed Ghanayem, General Manager

Overview: Otaco Environmental provides consulting services to private and government agencies. Otaco operates a licensed biological treatment facility for hydrocarbon waste. Otaco has completed numerous asbestos abatement, site clean-up, soil and waste sampling projects. Today, the company is looking into entering the following markets: Hazardous waste treatment, PCB recovery and treatment, air emission evaluation, medical waste handling, and biological treatment of hydrocarbon wastes.

NATIONAL ENVIRONMENTAL PRESERVATION CO. (BEEA'H)

P.O. Box 10628

Jubail Industrial City 31961, Saudi Arabia

Tel: 966/3/358-8008

Fax: 966/3/358-8584

Contact: Saad I. Al-Inaizi, General Manager

Overview: Beea'h is a hazardous waste management company which operates the Kingdom's first hazardous waste incinerator. Beea'h is a multi-discipline organization offering the following services to both the private and public sectors in the Kingdom and nearby Gulf States: environmental engineering services, environmental monitoring services, analytical testing services, risk and hazard assessment services. Beea'h is considering entering the following markets: medical waste treatment, asbestos removal and extraction, stack testing and emission monitoring.

As for the recycling industry, it is a relatively new phenomenon in Saudi Arabia. There are no known private companies engaged specifically in medical waste recycling. However, a number of companies are involved in the recycling of paper which is a part of medical waste that can be likened to domestic waste.

For example, the **Saudi Company for Paper Manufacturing** started the production of paper tissues from scrap paper, in Dammam, in 1991. The first paper-to-paper recycling plant, the **Arab Company for Paper Manufacturing (WARAK)**, started production in Dammam in 1996. **WARAK** recycles some 70,000 tons of test liner and floating papers which are used for manufacturing cartons. The combined annual feed requirement of both companies is 120,000 tons. Estimations of the percentage of waste paper recycled in the Kingdom range from 6 to 17 percent depending on the source and methodologies/ assumptions used. This figure is low compared ² to that observed in the United States (40%) and Japan (55%). A number of government/ public institutions (e.g., King Faisal Specialist Hospital, King Fahd National Guard Hospital) have signed agreements

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with one or both of the above two firms whereby the paper recycling business collect scrap paper from the said institutions for recycling. In some cases, the recycling firms tend to pay around SR 140/ ton.

Another waste recycling plant is under construction in Jeddah and will process some 250,000 tons/ year of food, paper and wood. The same company is planning to establish separation plants in other Saudi cities, including Makkah and Yanbu in the western part of the country.

Some establishments also collect and compact aluminum, tin cans, scrap metal, cartons and plastics, and export them to India, Syria, Turkey and other countries for recycling.

There are also some small recycling factories for plastic, cartons and metals. There are 6 plastic recycling plants in Saudi Arabia ³ with a combined annual production capacity of 19.7 tons.

² United States Department of Commerce, ISS, US National Trade Data Bank.

³ Industrial Directory of Ministry of Industry & Electricity of 1997.

Section 4

PRIORITY OF GOVERNMENT FOR PRIVATIZATION

Section 4

PRIORITY OF GOVERNMENT FOR PRIVATIZATION

The Sixth Economic Development Plan's stance on private sector role in protecting the environment calls for the active participation of private sector establishments in the various development activities. Although the Plan does not single out medical waste, it does mention solid waste at large. In particular, the plan encourages the following:

- Continued contribution to the management and financing of environmental awareness activities in cooperation with the concerned government agencies who stand ready to provide necessary scientific and technical support. The establishment of non-profit organizations in the environment protection field is specifically encouraged.
- Establishment of *green* industries, that is industries producing environment-friendly products for which there exists a proven demand internationally.
- Provision of environment consulting services targeting both the private and public sectors, as well as the preparation of environmental impact assessments pertaining to a multitude of government and private-sector projects.
- Investment in environment preservation businesses, for example industrial projects for treating and recycling solid waste and waste water, plants for the manufacturing of environment-friendly equipment required by industry, as well as the development of national parks and recreational facilities and resorts organized along environmental principles.

The plan also encourages citizens and private establishment to follow existing environmental protection regulations and guidelines with respect to the rational use of water resources, limiting waste generation, and increasing operational efficiency.

The plan does not call for specific government incentives, monetary or otherwise, to be offered to private sector establishment wishing to engage in *green* activities. It does state however that sectorial agencies whose activities have an impact on the environment will “[...] encourage the private sector to participate in environmental protection and pollution control activities, and encourage investment in environmentally oriented activities and industries, such as waste treatment and recycling plants, and to encourage the use of environmentally sound technologies.”

Indirect government motivation include:

- Developing a set of environmental standards and criteria that will be reviewed and updated periodically.
- Conceiving and implementing a national system for environmental impact assessment, whereas government and public projects will be required to undergo an environmental impact assessment and a resulting report filed with the concerned government agencies for review and approval or lack thereof.

Both of these steps will encourage the establishment of environmental consulting firms as well as waste treatment and recycling businesses.

The Sixth Development Plan does mention the provision of interest-free long term loans for the construction and operation of hospitals, clinics, and pertinent support services by the private sector. It can be argued that medical waste management and treatment services do constitute bona fide support services.

Section 5

DEGREE OF CURRENT ACTIVITY AND RELATIVE GROWTH

Section 5

DEGREE OF CURRENT ACTIVITY AND RELATIVE GROWTH

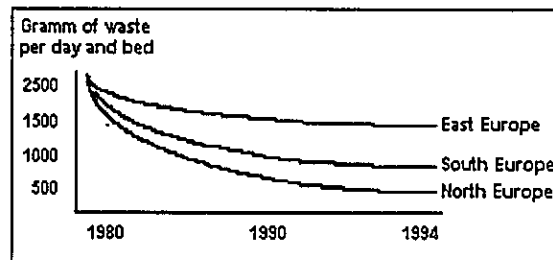
The General Director of Preventive Medicine at the Ministry of Health, Dr. Mohamed Al-Zahrani, indicates that the aggregate quantity of hazardous medical waste generated daily in the Kingdom is estimated at 107.25 tons and that 63 percent of medical institutions tend to segregate extremely contagious waste and transfer them in leak-proof bags and containers. It is estimated that hazardous medical waste constitutes about 15% of all hospital waste whereas the remaining tend to be comparable to household waste. Given the preceding, the composition and quantity of hospital-generated waste in the Kingdom can be described as under:

	Weight in tons	Percentage Distribution
Hazardous Medical Waste	107.25	15%
Domestic-Like Waste	607.75	85%
Total Hospital Waste	715.00	100%

The corresponding annual figure for total hospital waste is approximately 260,000 tons. This quantity may be excessive; in the United States a recent study revealed that 6,000 hospitals generate about 4 billion pounds (2 million tons) of waste per year, for an average of 333 tons per hospital per year. Given that Saudi Arabia has just over 303 hospitals, the corresponding figure in the Kingdom is in the vicinity of 860 tons per hospital per year, which is 2.6 times the U.S. average.

The quantity of waste that is classified as infectious is country-specific and depends to a great extent on the concept of waste existing in a hospital and on the consequent implementation of its separation into groups. In general, the amount of infectious waste per day per bed varies between 50 and 2500g. It is estimated that medical waste generated by a patient in Saudi Arabia averages about 6 kg per day. Given that hazardous medical waste in Saudi Arabia constitutes some 15% of all

generated medical waste, then the amount of infectious waste per day per bed in Saudi Arabia is 900 grams ⁴ which is in line with North European averages but lower than East and South European averages.



The Jeddah-based **Saudi Environmental Projects Company (SEPCO)** -the only company in Saudi Arabia certified by the **Meteorology and Environmental Protection Administration (MEPA)** to transfer, manage, and treat medical waste along scientific and technical grounds- has a daily treatment capacity of 25 tons of hazardous medical waste. This constitutes about 23% of the Kingdom's daily generation of hazardous hospital waste. The planned Riyadh-complex will have a treatment capacity of 60 tons/ day, alleviating a substantial part of the treatment shortage and covering some 79% of hospital demand at maximum nominal capacity utilization.

⁴ United States Department of Commerce, ISS, US National Trade Data Bank.

Section 6

REGULATIONS AND ADMINISTRATIVE SYSTEM

Section 6

REGULATIONS AND ADMINISTRATIVE SYSTEM

Presently, there are limited regulations governing the disposal of waste in Saudi Arabia. The **Meteorology and Environmental Protection Administration (MEPA)** has issued standards and regulations which will eventually lead to a national waste disposal code.

The **Ministry of Health (MOH)** has issued directives requiring medical institutions in the private and public sectors to adopt a comprehensive system for the disposal of medical waste along scientific methods considered safe vis-à-vis health and the environment. These directives also require medical institutions to seek the assistance of businesses specialized in the segregation and transportation of medical waste. They also give instructions pertaining to the use of colored bags recommended by the **World Health Organization (WHO)**, special plastic containers, medical waste trolleys, as well as to the preliminary treatment of hazardous medical waste prior to storing them in designated areas away from food storage and preparation units. Furthermore, **MOH** requires medical institution to make available treatment units matching certain environmental specifications and licensed by **MEPA**.

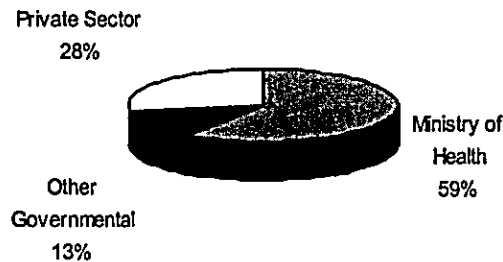
According to the **Ministry of Health**, non-compliance with the above instruction entails the imposition of punitive measures against offenders.

APPENDIX

APPENDIX A
HOSPITALS IN THE KINGDOM

The number of hospitals operating in the Kingdom increased by an annual compound rate of 2 percent over the 1992-1997 period to reach a total of 303 institutions as of end of 1997. **Ministry of Health (MOH)** facilities accounted for 59 percent of all hospitals (or 180 hospitals) followed by private sector hospitals at 28 percent (84 hospitals) and other governmental hospitals at 13 percent. (39 hospitals).

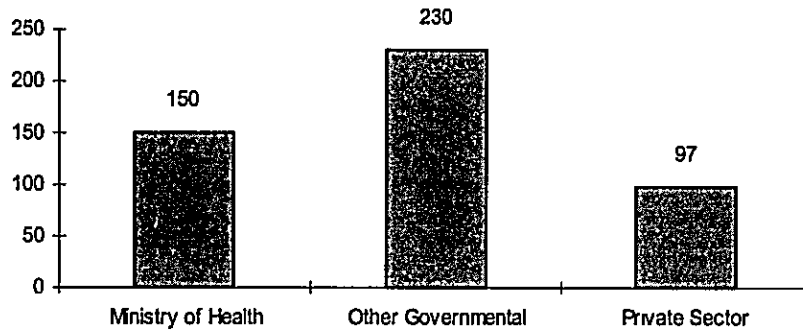
Sectorial Distribution of Hospitals



Bed-wise, **MOH** hospitals still come first with 61% of sector capacity. Other governmental hospitals occupy the second rank with 20% of setor capacity by virtue of their relatively larger size. The rest being the share of the private sector.

Other governmental hospitals have the largest average number of beds/ hospital (230 in 1997), being one and a half times larger than average **MOH** hospital bedding capacity. Private sector hospitals tend to have the lowest average number of beds (97 in 1997).

Average Number of Beds per Hospital, 1997



Source: 1997 Annual report. MOH.

The highest growth in the number of institutions and beds has been in the Other Governmental sector which witnessed a 4% annual compounded growth rate over the 1992-1997 period. The private sector came in second with a 3 percent growth. Tables A-1 and A-2 below illustrate the progression in the number of hospitals and beds over the 1992-1997 window.

Table A-1: Hospital by Sectors

Sector	1992	1993	1994	1995	1996	1997
Ministry of Health	170	174	173	175	176	180
Other Governmental	32	32	34	36	39	39
Private Sector	72	75	72	74	75	84
Total	274	281	279	285	290	303

Table A-2: Beds by Sectors

Sector	1992	1993	1994	1995	1996	1997
Ministry of Health	26,878	26,974	26,878	26,737	26,955	27,058
Other Governmental	7,285	7,338	8,357	8,563	8,794	8,970
Private Sector	6,988	7,477	6,592	6,616	6,876	8,185
Total	41,151	41,789	41,827	41,916	42,625	44,213

Source: 1996/ 1997 Annual Health Reports. MOH.

