Hospital waste treatment facilities

According to a survey by Central Pollution Control Board (CPCB) less than 20 per cent of the major hospitals in Delhi have installed incinerators for treating their medical waste.
Bio-medical wastes from hospitals, nursing homes and clinics include a variety of materials such as hypodermic needles, scalpel blades, surgical gloves, cotton, bandages, clothes, medicines, blood and body fluids, human tissues and organs, body parts, radioactive substances and chemicals. Some of these contain harmful organisms and disease causing agents. Improper incineration and disposal of wastes, particularly chlorinated compounds, can result in noxious emissions, including the dreaded dioxin.
Deadlines decided by Government for installing waste treatment facilities are as follows :
- Hospitals and nursing homes in towns with population of 30 lakh and above by Dec. 31, 99.
- Hospitals and nursing homes in towns with population of below 30 lakh _
_ with 500 beds and above by Dec. 31, 99
_ with 200 beds and above, but less than 500 beds by Dec. 31, 2000.
_ with 50 beds and above, but less than 200 beds by Dec. 31, 2001.
_ with less than 50 beds by Dec. 31, 2002
- All other institutions generating bio-medical waste not included above by Dec. 31, 2002. (Financial Express _ 29/8/99)

Project to dispose Hospital waste

The US Asia Environment Partnership (USAEP) between an Indian company and two US companies has suggested a project for treating and disposing the Chennai's hospital (biomedical) waste through a combination of mobile and stationary treatment systems. The project is proposed to provide biomedical waste treatment systems using a combination of hydroclave and incineration technologies.
There are two projects being proposed _ a mobile system and a stationary one. The expected project cost for both of them is around Rs. 10 crores. The cost for treatment of hospital waste is estimated to be around Rs. 15 per kg. This amounts to 0.1 per cent to one per cent of the revenue collected by hospitals per bed. Between 2 and 2.5 kg of waste is generated per bed. Of this 15 to 25 per cent is infectious waste. In the city 50 tonnes of hospital waste is generated every day. Both the mobile and the stationary systems will have a capacity to treat 5,000 kg per day. The work on the stationary project is expected to begin by October and the mobile one by December 99. In the stationary system, the infected biomedical waste will be treated through hydroclaving. This technology, does not leave behind any smoke or waste. The anatomical waste will be taken to an incinerator outside the city. The waste will be transported to the site either by the municipal corporation or the service provider. For the mobile system, a special 40 foot truck, capable of carrying 23 tonnes, to be provided by Calumet Coach, will cover five out of ten of the city's municipal corporation zones every day. The truck will be equipped to hydroclave the waste and dispose the residue at the selected landfill site. (Business Line _ 12/6/99)

Toxic metals in Sewage water farm

The Vice-Chancellor of Tamil Nadu Agricultural University, Coimbatore said in a two day International Workshop on "Environmental Impacts of Metals" held on 6-7 July 1999 at Coimbatore, Tamil Nadu that the soil and groundwater degradation due to land disposal of tannery sludge and effluent had warranted the Union Government to constitute the `Loss of Ecology Authority' to evaluate and compensate for the damage caused to agricultural lands. A study conducted by the University on the heavy metal budgeting of the Corporation sewage farm here revealed that there were higher contents of lead, nickel and chromium in the sewage water, as a result of which the napier grass and plant parts of the sugarcane crop raised in the nearby fields were found to contain very high levels of these heavy metals. (Business Line _ 7/7/99).

Strategies used in the United Kingdom to manage waste

A Scottish whisky distillery has installed a copper removal plant to recover copper from the dregs of the distillation process. Copper is recovered utilizing ion exchange columns, which are regenerated by adding sodium sulphate. The metal is released as copper sulphate solution, which is pumped through an electrolytic cell, containing stainless steel cathodes coated with platinized titanium, for 48 hours. After 4-5 regeneration cycles, about 4 kg/week of copper is recovered. Finishing Services Ltd. is also recovering copper from printed circuit boards. A PVC based membrane is applied here which removes surplus copper from the manufacturing process by allowing the passage of hydrogen and chloride ions while retaining copper, which is recovered as pure reusable flakes. Another tool used in the recovery and recycling of heavy metals is spent alkaline solutions and mineral acids used in manufacturing processes. The use of manofiltration membranes that retain low molecular solutes but allow the passage of salts is also growing. They also facilitate recovery of caustic compounds from cleaning processes used in dairy evaporators and similar applications. Ultra Sep has introduced the Alka-Save System, which consists of a series of tubular membranes capable of treating 60,000 ltr every 20 h at 70^0C with a recovery rate of 50,000 ltr for reuse. The capital investment on such a unit can be recovered within a period of about 1½ years.

Alchema has obtained exclusive rights to apply the MRS process for recycling and treating a variety of products such as fluorescent and mercury recovery lamps, batteries, carbon derivatives and even low level radioactive materials. Mercury Recycling Limited has installed a fluorescent tube recycling plant to separate the tube's components into metal, glass and mercury.

Waste Management services Ltd. recently installed the nation's first leachate plant using a disc tube reverse osmosis system. This unit currently treats 1,500 ltr/h of leachate and will be expanded shortly to treat 5,000 ltr/h. PVC is being reused as a foam core in cladding panels for buildings. It is also mixed with waste rubber products, such as shredded tyres, and used for both road surfaces and vehicle sound barriers.

In an endeavour to encourage recovery and recycling of potentially valuable industrial waste material, the government has published a list of incentives. These cover, by the extension of activities from licensing (subject to quantity and storage time limits) : waste paint, textiles, organic wastes, including paper and recovery of silver from photographic processing and nickel cadmium batteries.(VATIS UPDATE : Waste Technology, Sep -Oct 1999).

Recycling waste cellulose

Researchers at Rensselaer Polytechnic Institute, the United States, have developed a novel process to transform waste cellulose from paper mills into levulinic acid. Diphenolic acid, an ingredient used to produce polymers, is obtained using levulinic acid. By making use of the new process, diphenolic acid can now be manufactured at a very low cost.(Chemical Weekly, 27 July 1999)

Regional wood energy development programme

An extensive wood energy data base has been added to the website of the Regional Wood Energy Development Programme in Asia (RWEDP). The wood energy database contains data on various aspects related to wood energy for the 16 RWEDP member countries. The database is available at *http//www. rwedp.org/d database html.* (e-mail : rwedp@fao.org dt. 03-08-99 Mr Van der Plas, Thailand)

2.7 MW power generation plant at M/s Som Distilleries, Dist. Raisen, Madhya Pradesh

A power generation plant of 2.7 MW capacity based on Biogas being produced at M/s Som Distilleries, Dist. Raisen, Madhya Pradesh has been commissioned in June, 99 with financial support from MNES under its National Programme on `Energy Recovery from Urban Municipal & Industrial Wastes'. The power generation plant is utilising about 28000 m^3 per day of biogas being produced at the distillery with a single unit of 2.7 MW dual fuel engine using upto 5% diesel oil for pilot ignition. Before utilisation of biogas in the power plant, it is cleaned in a H_2S scrubbing plant

with an advanced biotechnological method based on biological oxidation of sulphide into elemental sulphur. The total cost of power generation project is about Rs. 9.84 crores. The successful operation of this plant has resulted in considerable improvement in the overall efficiency of the distillery due to regular power supply. M/s Som Distilleries expects to recover this cost within 5 years.(Cover photo).

Well distribution in Landfill gas extraction

The Land-fill Gas (LFG) recovery facility at Can Mata in Spain consists of 19 biogas extraction wells regularly spaced out over the entire platform. There are also two aspiration pumps of 600 m^3/h each, and a flare of 1,00 m^3/h capacity. Some 400 _ 450 m^3/h of biogas was burnt, with an average methane content of around 60%.
To make LFG recovery as efficient as possible, the distribution of the network of extraction well must be carefully designed. A uniform distribution of wells is not recommendable in landfills where there are noticeable variations in depth and where the age and the composition of the waste is homogenous (variations in waste thickness). The differentiation of sectors by waste thickness is the criteria that will provide the most efficient gas recovery.
In the case of the Can Mata landfill, a distribution of the same number of wells (nineteen) making the same economic investment, following the thickness related criteria would result in a 62.6% recovery rate (total biogas recovered over total biogas generated) as opposed to the 50.3% rate currently achieved with the existing well distribution. (Waste Management, April 99).

The Green label system in The Netherlands

In the green label system, each unit (kWh) of electricity from renewable sources obtains a label. This label is discrete from the electrical energy, so that a renewable energy plant actually produces two products; electricity and green labels. The producer sells the electricity to the local utility which is forced, by law, to accept all electricity against a standard remittance fee. For convenience, each 10,000 kWh obtains one green label _ a certificate stating that 10,000 kWh of electricity from a renewable source was applied to the national grid in a particular month. The label is advertised in an open market. Private persons, enterprises and utilities can sell and buy green labels. In particular, utilities which have failed to meet their quota for renewable energy may buy labels to make up their shortfall.(CADDET Renewable Energy Newsletter, March 99).

Three dimensional combustion modeling in MSW Incinerator

The advantages of minimization, stabilization, sanitization of waste, and energy recovery have made incineration treatment to be a reliable, economical, and effective means to deal with large amounts of municipal and industrial solid wastes. However, incineration treatment also suffers from considerable and often acrimonious public debate regarding toxic organic emissions and secondary pollution of the environment. A three dimensional flow modeling of turbulent burning gases in MSW has been presented using Finite Element method. Under the assumptions of infinitely fast devolatalization of solid waste and nonuniformly distributed gaseous methane along the gate, burning flow structures are obtained by solving the governing differential equations of mean and turbulent quantities of velocity, temperature, and species concentrations using a k-E turbulence model. The combustion process was considered as a two step stoichiometric reaction mechanism when underfire preheated air entered and mixed with methane gas. A mixing controlled eddy-dissipation model was adopted to predict the reaction rates of gaseous species.(Journal of Environmental Engineering/February 1999).

Extractive Membrane Bioreactor for treatment of Pharmaceutical Industry process Wastewater

The Extractive Membrane Bioreactor (EMB) is an alternative, relatively new technology for dealing with a wide range of Volatile Organic Compounds (VOCs) (and other non-volatile hydrophobic organics) present in harsh inorganic compositions which combines extraction and biodegradation in a single system. This technology was invented at Imperial College, London, UK and it is now being commercialized by a spin-off company (Membrane Extra-ction Technology Ltd.) following successful pilot trials treating chemical industry wastewaters. The process is designed to remove toxic, poorly water-soluble organic compounds from waste streams using dense phase membranes. The membranes separate the waste stream and the biological medium where specialized micro organisms are kept under optimum conditions. Only the organic solvents to be destroyed cross the membrane into the biological side where they are converted by micro-organisms into harmless compounds. This is possible since inorganic species (acids, bases, charged ions or catalyst molecules) are not able to cross the membrane. (Environmental Progress, Vol.18, No.1, Spring 99).

Web Sites on `Waste-to-Energy' on the Internet

Breakthrough in making plastic degradable :
http://www.degradable.net/

Symphony Environmental Company, the United Kingdom, has achieved a major breakthrough in producing degradable polyethylene. Thuffy plastic bags developed by the company can be made to degrade within 60 days to six years, depending on the requirement. A notable feature of this technology is the controllability of the degradation process. While a refuse sack or carrier bag can be manufactured to last for two years, a bread bag or food wrap can be made to last not longer than a few months.
E-mail : contact@degradable.net
BTA Anaerobic Digestion Technology :
http://www.bionet.net/mat
Anaerobic digestion technology using BTA Process is being utilised for number of application for treatment of various industrial wastes. The details of process technology and numerous references for the project set up can be viewed under this Web Site.