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# NEWSLETTER

No.58

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October 2006

**THE JAPAN SOCIETY OF WASTE MANAGEMENT EXPERTS**

## Dear Waste Management Experts

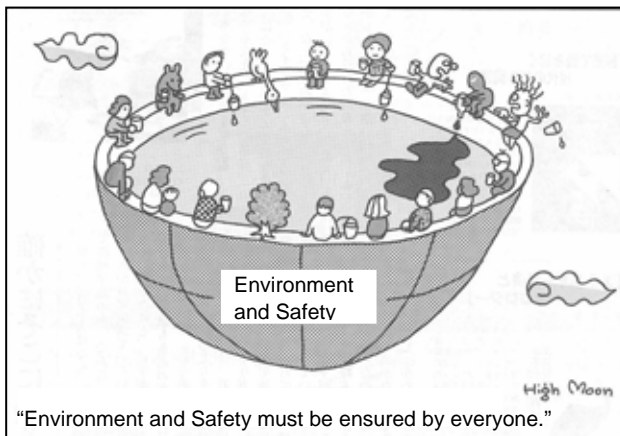
The autumnal rain front stays for a month over the Japanese islands. The ambient temperature is rapidly becoming lower expecting fine autumn days.

The Japanese Ministry of the Environment has released a white paper on a Sound Material Cycle Society, 2006. This annual report includes the latest data on waste management and the 3Rs in Japan. The English version will be released soon on the Ministry's web-site (<http://www.env.go.jp/en/wpaper/>). The abstract is reviewed in this Newsletter.

Samoa, an independent state in the pacific oceans, also faces SWM problems especially in landfill. A JICA expert who was dispatched to the country reports how to improve the landfill site using the Fukuoka-method.

We have resumed in this issue the incineration series focusing on Waste-to-Energy in Japan. Despite the world's highest incineration rate, there are still obstacles to fully-fledged waste heat utilization. Large scale utilization, including power generation, is limited to large cities. The power generation efficiency stays at a low level. The resumed article reviews this situation.

The annual research conference of JSWME is going to be held during November 20-22, 2006 in Kitakyushu City. The city, a steel empire at one time and aiming to



Comments by High Moon: "By an offender, we would fail to do it." Illustrated by Prof. Hiroshi Takatsuki (Taka-tsuki literally means "High Moon".)

be a role model now for the 3Rs, is located in the northernmost part of Kyushu and is close to the other Asian countries.

The 2nd Asia-Pacific Islands Expert Meeting on SWM will be held during November 22-24 in Kitakyushu City, consequently with the JSWME annual conference. Experts from over ten countries/regions will participate. The details are available in the JSWME HP.

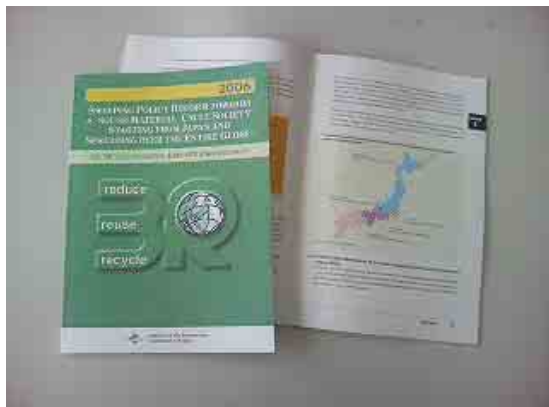
(Hideo Azuma)

## The Japanese Ministry of the Environment released an English report on "Sound Material-Cycle Society"

Today, Japan's waste management policy is expanding to include not only safe waste disposal but also the establishment of a sound material-cycle society. The Fundamental Law for Establishing a Sound Material-Cycle Society defines a sound material-cycle society as a society that can be realized by preventing products from becoming waste, suitably utilizing waste generated as resources whenever possible, and appropriately disposing of waste that cannot be used in any way, thereby controlling the consumption of natural resources and reducing the environmental load.

The Fundamental Law for Establishing a Sound Material-Cycle Society requires the Japanese Government to annually submit to the Diet the reports on the state of generation, recycling and disposal of recyclable resources and on the policies that the government has implemented to establish a sound material-cycle society. The annual report, which is known as a "white paper", has been submitted since 2001. The annual report is also useful for all stakeholders as an updated data book on waste management and the 3Rs (Reduce, Reuse and Recycle) policy.

In 2006, the Japanese Ministry of the Environment released an English-version of the annual report (hereinafter "2006 Report") for the first time. The title of the 2006 Report is "Sweeping Policy Reform towards a Sound Material-Cycle Society: Starting from Japan and Spreading over the Entire Globe." It focuses mainly on lessons learned in Japan in the field of waste management in the past decade and on the establishment of an international sound material-cycle society.



“Sound Material-Cycle Society”  
by Ministry of Environment

The 2006 Report consists of three sections. The first section examines the period from the end of World War II till the 1990s, providing an overview of waste-related measures implemented during this period as well as the background behind the enactment of the Waste Management Law. The Waste Management Law, which was established in 1970, stated “conservation of the living environment” and clarified the industrial waste management responsibilities of businesses. This section also discusses the occurrence of illegal dumping and other forms of improper waste disposal and explains how waste management became a social problem. Improper waste disposal, including illegal dumping, caused water contamination, soil pollution, and other forms of environmental pollution, as well as unnecessary financial burdens for the rehabilitation of the original state of the soil that has been subjected to dumping. Japan has suffered from serious environmental pollution which was caused by illegal dumping. The most typical case is the illegal dumping on Teshima Island which amounted to 560 thousand m<sup>3</sup> during the 1980s. The cost for the recovery in Teshima Island is estimated 45 billion yen.

The second section explains the process through which major policy reforms of waste management and recycling measures have been implemented over the past decade. This explanation focuses on three policy measures: 1) industrial waste management based on the waste-generator’s responsibility, 2) recycling measures grounded in extended producer responsibility (EPR) and 3) municipal waste management promoted collaboratively and cooperatively by the national and local governments. The waste-generator’s responsibility refers to the idea that businesses that generate waste should bear responsibility for its treatment through appropriate recycling and final disposal. The foundation of this idea lies in the internationally-established “Polluter-Pays Principle (PPP).” With regard to the creation and enhancement of recycling measures, the concept of EPR is clearly stated in the Fundamental Law for Establishing a Sound Material-Cycle Society. Based

on the concept of EPR, Japan has established legal recycling systems for containers and packaging, household appliances, construction materials, food waste, and end-of-life vehicles that correspond to the particular qualities of each product. As for municipal waste, each stakeholder plays a role: the central government, which leads the management of the formation and reform of the legal system and other national systems, and local governments, which are familiar with actual conditions in their regional societies, the consumers and businesses promoting the 3Rs. In particular, collaboration and cooperation between central and local governments is important for creating a sound material-cycle society. In addition, this section describes the current status and future targets of waste management and recycling measures based on approaches implemented to date.

The 3rd section discusses the basic concept towards the formation of an international sound material-cycle society and Japan’s role in achieving this. Nowadays, waste management and recycling measures have come to take on international aspects. Therefore, it is necessary to establish a sound material-cycle society not only in Japan but also internationally. This section provides the basic concepts for establishment of an international sound material-cycle society. The basic concepts are 1) establishing a domestic sound material-cycle society, 2) enhancing and reinforcing activities to prevent illegal import and export of waste, and 3) facilitating import and export of recyclable resources. This section further provides a view on overviews of international development, including the 2005 Ministerial Conference on the 3R Initiative and the 2006 Senior Officials Meeting on the 3R Initiative, which were hosted by Japan.

The 2006 Report would be useful for federal and local government officials, business people, researchers and experts who are involved in waste management and recycling all over the world. The 2006 Report will be available soon on the web-site of the Japanese Ministry of the Environment (<http://www.env.go.jp/en>).

(Hiroaki Takiguchi)

**Japan’s ODA on Solid Waste Management:  
Samoa’s Tafaigata Landfill Rehabilitation Project**

The Tafaigata landfill in Upolu, Samoa, has been transformed from a messy, smelly dump to a clean and fresh semi-aerobic landfill structure using the Fukuoka method, now the standard method of landfill in Japan. The transformation process was funded by the Japan International Corporation Agency (JICA), at a cost of



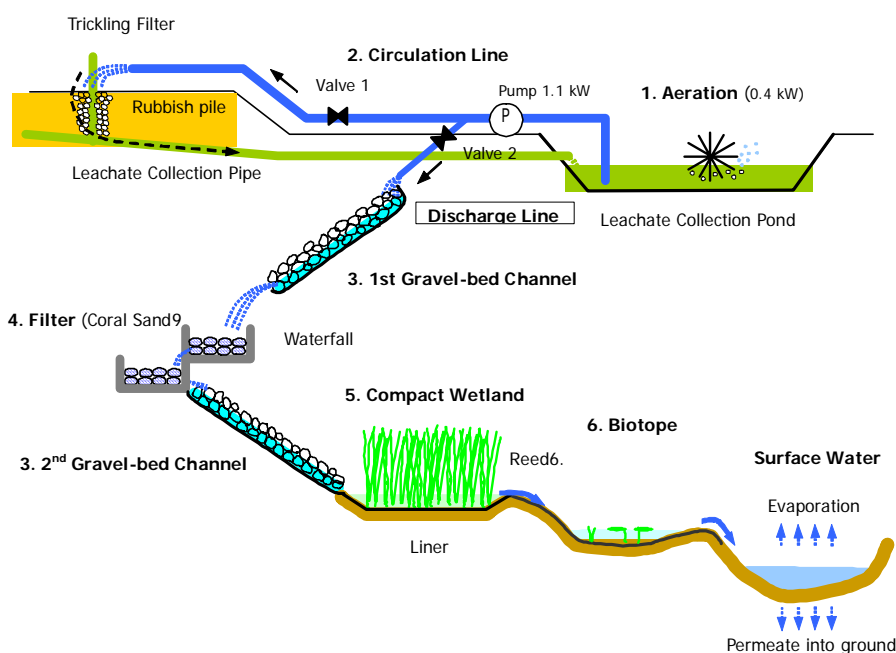
Aerial shoot of leachate treatment facilities

only US\$400,000 (consultant supervisor not included).

Transformation took place in two phases. The first one was setting up waste cell bunds, consolidating the soil "floor", installing the air ventilation / leachate collection pipes, a leachate collection pond, and all-weather access roads. The second phase included setting up the leachate treatment facilities. When completed in December 2005, the project was handed over from JICA to the Samoan Government's Ministry of Natural Resources, Environment and Meteorology (MNREM).

### The Leachate Treatment System

The leachate, the liquid produced by the breakdown of waste, is very high in nutrients which can cause damaging algal growth in streams and lagoons. This in turn can consume all the available oxygen in the water so that fish and other biota suffocate. However immediate removal of leachate using the Fukuoka method makes leachate cleaner than the conventional method, moreover we need to treat the leachate further in order to discharge it to the peripheral environment.



The system comprised of a circulation line and discharge line. The circulation line, which is comprised of a circulation column with a trickling filter and aerator, is the main line throughout the year. The discharge line is to be operated especially in the rainy season. Before discharging, treated water needs to be treated further so as not to affect the environment. This line mainly uses natural cleansing methods and effects such as Gravel-bed Channels, and Compact Wet Land.

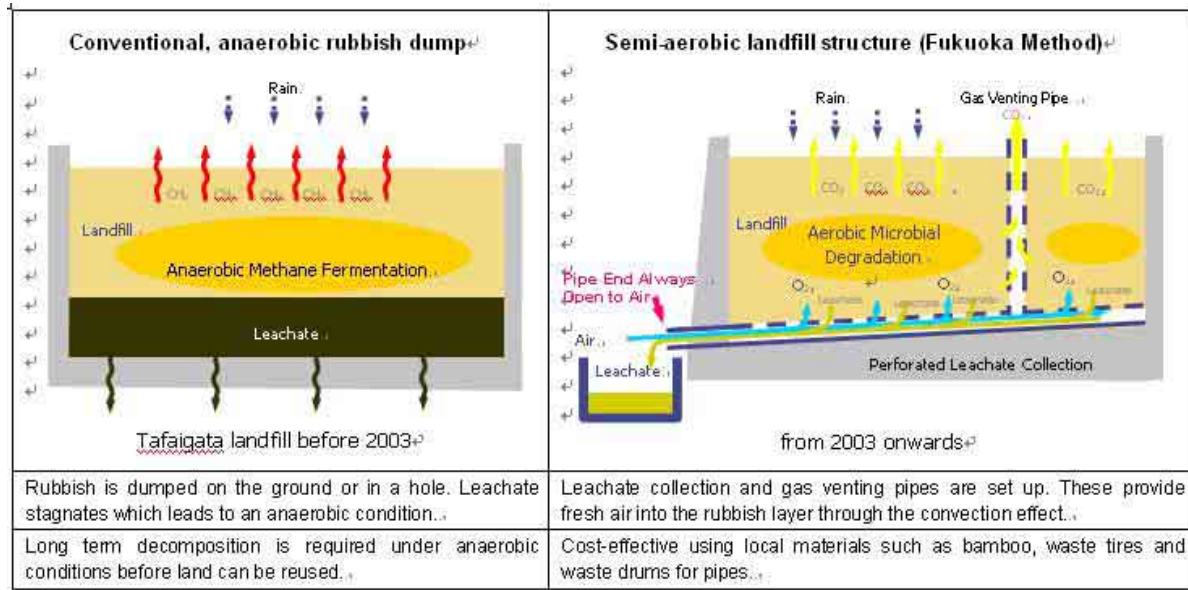
The Tafaigata Leachate Treatment Facility is very much concerned with being sustainable. It uses local materials such as coral tips for filters, porous lava rocks for catalyst beds, and aquatic vegetations for absorption of Nitrogen and Phosphorus. This cheap and eco-friendly system also requires little energy for operation and only minimum maintenance.

It comprises of six discrete steps:

1. Aeration – mechanical stirring provides more oxygen into the leachate collection pond, so micro-organisms can decompose the organic matter better.
2. Circulation treatment – a leachate treatment system through a trickling filter back down to the leachate collection pipe. Trickling filters are an aerobic treatment system that exploits micro-organisms growing on the rocks exposed to air: these aerobic bacteria metabolise organic matter from waste water.
3. Gravel-bed Channel – another natural cleansing method. It continues the process of the trickling filters but uses aquatic organisms such as algae that are attached to the surface of gravel. When water flows over and through the gravel, these aquatic organisms decompose and absorb the polluting nutrients.
4. Filtration - Local materials such as coral sand and coconut husk activated carbon are used to adjust the acidity (pH) and remove heavy metals and organic compounds from the leachate.
5. Compact Wetland – This is another natural cleansing method using aquatic vegetation, such as reeds. These plants remove the nutrients phosphorous and nitrogen to prevent any undesirable excessive plant growth downstream. The outflow is now clean enough to be released into

## How does Tafaigata differ from a 'normal' landfill?

*A comparison of a conventional, anaerobic rubbish dump and a semi-aerobic landfill structure*



the natural environment.

6. Biotope – a mini-natural ecosystem, which is an indicator of treated water quality. If the plants and animals in the biotope are healthy, then the harmless water is ready to be released into streams, over land or to the sea.

(Takeo Tashiro)

### **Waste to Energy in Japan (1)** *- Thermal Recycling at the Waste Incinerator -s*

More than 70% of the municipal waste incinerators in Japan utilize residual heat. Popular usage is for heating and hot-water supply in the incinerator plants and heat supply to outside facilities such as adjacent indoor pools. Heat supply is the most efficient manner of thermal recycling, but power generation is also efficient without facilities available nearby to supply heat.

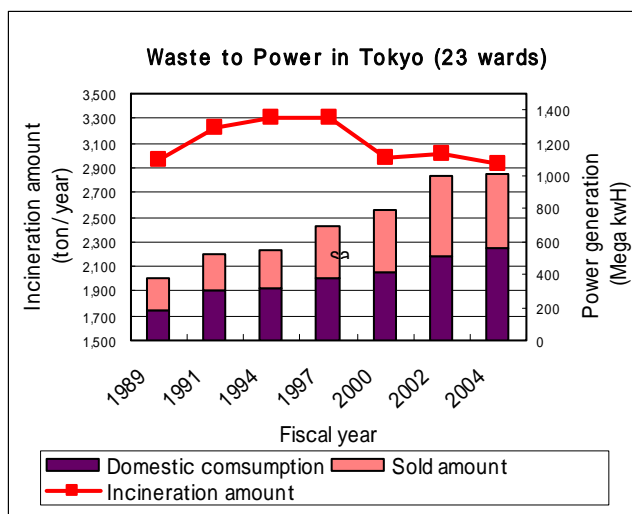
Waste-to-energy has become common in large cities. It is estimated that about half of the waste incinerated all over the country is used for power generation. However, the incinerators generating power are those whose scale is large and only 271 (or 20%) out of 1,396. The majority of the incinerators in Japan are small in scale in small municipalities which cannot bear high facility cost and O&M cost and have difficulties securing necessary engineers. The policy of the national government to respond to such a situation is to encourage a group of municipalities to develop upgraded incinerators for common use.

In the waste-to-energy plant, thermal energy in

incineration emission gas is recovered by the steam boiler, and the steam turbines generate power. The total power generation capacity has been increasing since the first waste-to-energy plant was installed in Osaka City in 1965, and it went to 1.68 million kW in 2005. Taking the example of the Tokyo Metropolitan Area (23 wards with a population of 8.5 million), all the 18 incineration plants generate energy. The total output of power generation amounts to 239 thousand kW (in addition, 50 – 60 GJ of heat are provided for the local heating system). The figure below is the trend of power generation in the area, showing that about half of the power generated is sold. The rate of waste incinerated to waste generated is over 85%, and the rate of power sold is planned to increase to 75% by incinerating separately collected plastic waste, which is currently crushed and landfilled.

The power generation efficiency of waste-to-energy plants is generally as low as 10%. To improve it, it is necessary to raise steam temperature at the inlet of the turbine and to lower steam pressure at the outlet. Steam temperature at the inlet, however, had been controlled under 300°C in the waste-to-energy plants in order to prevent the corrosion of the superheaters by high temperature, resulting in low power generation efficiency

not more than 15%. Due to the use of less corrosive material and the improvement of incinerators and incineration control as a result of strenuous research and development for higher generation efficiency in the 1990s, steam temperature can be about 400°C and the generation efficiency of some of the new plants has achieved 20%. Further effort is being made at present to raise the steam temperature to 500°C to develop high efficiency waste-to-energy plants with a generation efficiency rate of 30%. It is to be noted, however, that it is difficult to decrease outlet steam pressure because a large volume of cooling water is not available in the urban area and only air cooling is applicable.



In addition to the improvement of steam conditions as mentioned above, approaches to raise power generation efficiency may include an increase in waste calorific value and the improvement of heat efficiency of the incinerators. These in turn necessitate the improvement of incineration control of the incinerators including stokers by employing, for instance, exhaust gas recycling technology.

(Kouji Arita)

### International Symposium Information

Japan-Korea Symposium (during the JSWME annual conference)

Date & Place: November 21, 2006, Kitakyusyu, Japan

Venue: Kitakyusyu International Conference Center

The 2<sup>nd</sup> Asia-Pacific Islands Experts Meeting on SWM

Date & Place: November 20-22, Kitakyusyu, Japan

Venue: Ditto

The 4<sup>th</sup> Asian-Pacific Landfill Symposium

(APLAS Shanghai 2006)

Date: November 2-4, 2006/10/02

Venue: Shanghai Exhibition Center

### Journal of the Japan Society of Waste Management Experts, Vol. 17, No.4 (July 2006)

Recent issues of the Journal of JSWME contain the following articles. The articles are written in Japanese with the abstract in English.

#### Paper

#### *The Elution of mercury from Weathered Granite with Leachate from Solid Waste Landfill*

Daisuke Tsuchida, Koji Takahashi, Mineki Toba, Yoichi Kurokawa, Makoto Nagase and Akira Utsunomiya

#### *Results of Continuous Monitoring of Bisphenol A and 4-Nonylphenol Concentrations in Leachate from Final Disposal Landfills*

Hiromi Sakamoto, Hitorhi Fukui, Michimasa Takahashi, Kunihiko Saitoh and Hidehiro Kaneko

#### *Dissolution Behaviour of Slag in Cement-equilibrated Aqueous Solutions*

Toshikatsu Maeda, Tsunetaka Banba, Tsuyoshi Mizuno, Shogo Terakado, Isamu Kitagawa and Masami Numata

#### *Reduction of Dioxin emissions by Retrofitting a Municipal solid Waste Incinerator*

Hajime Tejima, Shigehiro Shibakawa, Yasuyuki Fujita, Akihiro Matsumoto, Nobuo Takeda, Masaki Takaoka and Shin-ichi Sakai

#### Note

#### *Activation energy for the De-Hydrochlorination Reaction on Poly (Vinyl Chloride) by Microwave Irradiation*

Saburo Moriwaki, Motoi Machida, Hideki Tatsumoto, Masumi Kuga and Toshio Ogura

#### *Development of Novel Process for Removing Cadmium from Scallops Organ Waste Using Apple Juice Residue*

Katsutoshi Inoue, Kedar Nath Ghimire, Kai Huang, Keisuke Ohto, Hiroyuki Harada, Hidetaka Kawakita and Minoru Morita

**Waste Management Research**  
**Vol. 17, No.4 (July 2006)**

Preface

*Leaning Wisdom from Failures and Wastes*

Akiko Kida

Special Issues: Reassessment of the Containers and Packaging Recycling Law

*Reassessment of the Containers and Packaging Recycling Law*

Yasuhiro Fujii

*The Evaluation of the Container and Packaging Recycling Law and Future Tasks*

Tadashi Otsuka

*Issues Concerning the Revision of the Containers and Packaging Recycling Law and Extended Producer Responsibility*

Hajime Yamakawa and Kazuhiro Ueta

*Amendment of the Containers and Packaging Recycling Law: The Municipality Viewpoint*

Hajime Shoji

*Food Industry View on the Revised Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging: Process and Evaluation*

Masahiro Takahama

*A Citizen's Assessment of Issues surrounding Revision*

Masako Hattori

Review

*Current Status and Future Perspective on Environmental Safety Management for Secondary Products: Focusing on Evaluation Methods and Acceptable Criteria for Secondary Construction Products*

Masahiro Osako and Hirofumi Sakanakura

Commentary

*Gas Turbine Combustor Development for Gasified Fuels and High-efficiency Waste Combustion Power Plant for Refuse Derived Fuel and so on*

Takeharu Hasegawa

Current Members of JSWME as of September 30, 2006  
(The figures in parenthesis indicate the difference from June 30, 2006)

Regular Members	3,304	(20)
Students	314	(-6)
Non-Japanese Member	100	(0)
Public Institutions	110	(0)
Supporting Members	164	(-2)
Individuals of NPOs	4	(0)
Total	3,996	(12)

**NEWSLETTER NO.58, October, 2006**

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