NEWSLETTER

NO. 3 November 1991

THE JAPAN SOCIETY OF WASTE MANAGEMENT EXPERTS

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Ministry of Health and Welfare Issues Guidelines for Prevention of Dioxin

1. Background

It was 1983 that dioxin was detected from the flying ash emitted from municipal solid waste (MSW) incinerators in Japan. Since then, Ministry of Health and Welfare has executed numerous researches on the generation mechanism and control of dioxin. Based upon the results of the researches, the Ministry entrusted a group of experts with a study on measures to be taken against dioxin, and finally issued "the Guidelines for the Prevention of Dioxin Generation from MSW Incinerators" in December 1990. The Ministry requested all the local governments to follow the Guidelines in managing and operating incinerators.

2. Major Prevention Measures Proposed

Aiming at the prevention of dioxin generation as much as possible, the Guidelines propose the following:

1) Prevention of Dioxin Generation through Perfect Combustion:
   Incineration furnaces should be designed and operated so as to make possible the control of combustion temperature and concentration of CO and O_2 gases for perfect combustion.
2) To take Measures for Lowering Temperature of Exhaust Gases Coming into Dust Collectors:
   Temperature of the entrance of dust collectors should be lowered because dioxin can be easily generated in the flying ash when the temperature of dust collectors are about 300°C.
3) Efficiency Improvement of Dioxin Collection:
   Either electric precipitators (EP) having the capability of efficiently capturing dusts, or bag-filters should be provided.

The Guidelines provide more detailed instructions according to types of furnaces (1. Continuous operation furnace (24 h/d), 2. Semi-continuous operation furnace (16 h/d) or mechanical batch type furnace (8-16 h/d), 3. Batch type furnace (8 h/d)), and depending further on whether furnaces are existing ones or ones to be constructed.

3. Effects to be Expected

In the case of newly-built furnaces of continuous operation type, dioxin can be reduced to 0.5 ng (= 0.5 x 10^{-9}g)/Nm^3 (in terms of equivalent 2,3,7,8-TCDD) if the Guideline was fully observed. Substantial reduction of dioxin is also expected even in case of the existing furnaces or other types of furnaces. It is expected that the complete compliance with the Guidelines will lead to a 90 % reduction of the total dioxin discharged from MSW incinerators in Japan.

Environment Agency of Japan Issues Soil Environmental Quality Standards

Environment Agency of Japan, in August 1991, issued the soil environmental quality standards as shown below for the prevention of soil pollution caused due to toxic substances such as heavy metals. These standards were determined in view of maintaining soil capacity for 1) purifying, and providing clean water and 2) producing crops. In case that soil conditions do not meet the standards, it is required to take measures necessary for meeting the standards.

Newly Established
Soil Environmental Quality Standards

SUBSTANCES	TARGET LEVELS OF SOIL QUALITY EXAMINED THROUGH LEACHING TEST	REMARKS
Cd	≤ 0.01 ppm	For agricultural land: less than 1 ppm in rice
Cu	Not Applied	For agricultural land: less than 125 ppm of concentration in the soil by 0.1 N-HCl extraction method
As	≤ 0.05 ppm	For agricultural land: Less than 15 ppm of concentration in the soil by 1 N-HCl extraction method
Pb	≤ 0.1 ppm	
Cr (VI)	≤ 0.05 ppm	
T-Hg	≤ 0.0005 ppm	
Alkyl-Hg	Not to be Detected	
CN	-Ditto-	
Org-P	-Ditto-	
PCB	-Ditto-	

Note: The above standards are not applicable to the following places:

1) Places where natural toxic substances exist such as the neighborhood of mineral veins
2) Places designated for storage of toxic materials such as waste disposal sites

Japanese Municipalities on the Move (2)
Osaka's Experience in Waste Incineration

1. Early Stage

Osaka City with the population of 2.6 million, has a long history of waste incineration. The first 13 incinerators were constructed in 1903. They were of natural draft type and their capacity was 1 ton/unit. In 1918, a forced draft type incinerator was constructed and the rate of incineration reached 50% of the total waste generation (350 ton/day). In 1930s, the amount of the waste was over 1,000 ton/day and the rate of the incineration increased to 70% owing to the improvement of the facilities.

2. Introduction of the Continuous Type Incinerators

Incineration systems in Osaka were completely destroyed during the World War II. Osaka City continued rehabilitation of the facilities and started the construction of new incineration facilities. A mechanized batch incinerator with capacity of 200 ton/day was constructed in 1959. In 1963, a continuous type incinerator with 3 units of 150 ton/day was constructed and this was the first full-scale continuous type incinerator in Japan. In 1965, with the new technology introduced from Switzerland, an incinerator(200 ton/day x 2 units) equipped with facilities such as boilers and power generators was completed.

The life of the incineration facilities is said to be 20-25 years. Osaka City has experienced remodelling the old facilities, introduction of the latest pollution prevention facilities, maximization of the power generation as well as augmentation of the incinerating capacity.

3. Realization of 100% Incineration of Combustible Waste

Osaka City has currently 10 incinerators as shown in the table below. The total incineration capacity is about 6,000 ton/day. With the completion of the incinerator in Taisho in 1980, Osaka finally realized a 100 % incineration of combustible waste. Thereafter, Suminoe and Tsurumi have been reconstructed in 1988 and 1990 respectively. Osaka City has plans for continuing reconstruction of incinerators.

Incinerators Currently Operating in Osaka City

LOCATION	COMMENCEMENT OF OPERATION (YEAR)	CAPACITY	USE OF GENERATED HEAT OR STEAM
1. Nishiyodo	1965	400 t/d (200 t/d x 2 units)	Power Generation 4,900 kwh
2. Yao	1966	600 t/d (150 t/d x 4 units)	
3. Morinomiya	1969	900 t/d (300 t/d x 3 units)	Steam supply for neighborhood facilities
4. Hirano	1971	600 t/d 200 t/d x 3 units)	
5. Higashiyodo	1974	600 t/d (200 t/d x 3 units)	
6. Minato	1977	600 t/d (300 t/d x 2 units)	Power Generation 2,750 kwh
7. Minamiminato	1978	600 t/d (300 t/d x 2 units)	Power Generation 2,650 kwh
8. Taisho	1980	600 t/d (300 t/d x 2 units)	Power Generation 2,800 kwh
9. Suminoe	1988	600 t/d (300 t/d x 2 units)	Power Generation *1 11,000 kwh Hot water supply to a nearby swimming pool & sports facilities
10. Tsurumi	1990	600 t/d (300 t/d x 2 units)	Power Generation *2

*1 Generated power is partly used to operate a nearby sewage treatment plant.
*2 Generated power is partly transmitted to park facilities. Surplus power is sold to an electric company.

Introduction of Governmental/Semi-governmental Organizations Related to Waste Management in Japan (1)

THE INSTITUTE OF PUBLIC HEALTH

This column will, in series, introduce Japanese governmental/semi-governmental organizations related to solid waste management. As the first time of the series, we introduce the Institute of Public Health.

The Institute of Public Health was established in March 1938 under the administration of the Ministry of Health and Welfare for the purpose of training public health personnel and conducting research works concerning public health. Since then, the Institute acts as a post graduate school of public health.

The Institute offers the following courses:

1) Courses leading to the Diploma in Public Health
2) Courses leading to the Master of Public Health
3) Courses leading to the Doctor of Public Health
4) Special courses for continuing education in Public Health

In addition to these courses, International Courses were launched as an international cooperation program of the Institute, which are organized to promote development of public health personnel in the world in cooperation with JICA and Ministry of Foreign Affairs, etc.

The Institute consists of 16 departments, a library and an executive section. The Department of Sanitary Engineering is responsible for education and research in the engineering fields including night soil treatment and solid waste management.

Current research activities of Solid Waste Management Section in the Department of Sanitary Engineering include the following; 1) reduction of toxic substances discharged from municipal waste incinerators, 2) study on greenhouse gasses emitted from solid waste disposal facilities, 3) monitoring system of pollutants discharged from solid waste disposal sites, 4) biological treatment system of liquid waste by using filter membrane.

In 1986, the Institute was designated as WHO Collaborating Centers for Solid Waste Management, for Community Water Supply and Sanitation, and for Air Pollution.

Any inquiries should be directed to:

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6-1, Shiroganedai 4 Chome, Minato-ku, Tokyo 108, Japan
Phone: 03-3441-7111
Fax: 03-3446-4314
(* Dr. Masaru Tanaka is also the head of the WHO Collaborating Center for Solid Waste Management.)

230 Attended JICA's SWM Training Course During the Past 23 Years

Every year, from mid-May to mid-July, around 10 SWM (Solid Waste Management) specialists from developing countries visit Japan to attend the 2-months SWM and nightsoil treatment training course organized by JICA (Japan International Cooperation Agency), the sole governmental agency for the technical cooperation of Japan. The course has received 230 participants so far since its inception. This year's course was the 23rd one. All the trip and accommodation costs as well as the basic allowances are covered by JICA.

This year's participants were from Bolivia, Brazil, Indonesia, Korea, Malaysia, Oman, Paraguay, Philippines, Singapore, and Thailand. According to them, the most impressive thing in Japanese SWM was the cleanliness of all the SWM-related facilities they visited such as transfer stations, incineration plants and sanitary landfills. This is perhaps the result of efforts made by all the SWM-related people in Japan to overcome the NIMBY syndrome.

They were also impressed by the active participation and cooperation of citizens in source separation and recycling. To understand the background of active response of citizens, the participants visited an elementary school in the suburbs of Tokyo and observed there a SWM education class. In Japan, all the fourth grade school children receive around 10 classes related with SWM based on the guidelines of the Ministry of Education. The participants unanimously concluded that the major target of SWM education should be children because they are more receptive than adults.

Johkaso system, a Japanese technology for on-site nightsoil and grey water treatment, has also attracted the attention of many participants as one of the prospective solutions to the water pollution problems caused by poor management of night soil in their countries. Johkaso system may be advantageous for developing countries because its investment and recurrent cost is far less than that of the conventional sewerage system. Some participants are willing to try the system in their own countries.

Information on this course is available at the JICA's overseas offices and/or Japanese diplomatic offices.

Introduction of Recent JICA Publication

Technical Handbook Series Vol. 1
Improvement of Solid Waste Management in Developing Countries, Author: Dr. Kunitoshi SAKURAI
available, free of charge, from
Institute for International Cooperation, Japan International Cooperation Agency (JICA) 10-5, Honmuracho, Ichigaya, Shinjuku-ku, Tokyo 162, Japan

A Letter from Reader

JSWME has received many letters from the audience of NEWSLETTER. The following is one of the letters received:

Republica de Colombia
MINISTERIO DE SALUDE (Ministry of Health)
Calle 16 Numero 7-39 Bogota, D.E.

January 30, 1991

Dear Dr. Tanaka:

I would like to take this opportunity to express my appreciation and give you my thanks for "Newsletter" No. 1, and I wish to receive it in the future, because this is a good opportunity to know something more about "Solid Waste Management" in your country. I have special interest in "Medical Waste Disposal", so I want to know if it is possible to get that report.

I want to tell you that I am working in the same position in the Ministry of Health. I had the opportunity to make an exposition about my Action Plan, and in this month we are preparing a new plan for our next three years in the field of the final disposal, recycling and community participation.

Sincerely yours,

Hernando Rodriguez Herrera
Solid Waste Section
Environmental Sanitation Direction

Journal of Japan Society of Waste Management Experts Vol. 2 No. 2 (April 1991) & Vol. 2 No.3 (July 1991)

These two volumes contain the following technical papers. (written in Japanese with English abstract)

Vol. 2 No. 2

Design Philosophy on Leachate Treatment Facilities at a Sea-Based Solid Waste Disposal Site in Osaka

by Kazuhiro Takamizawa, Osamu Yamamoto, Isao Fukunaga, Zensuke Inoue and Atsuhiro Honda

Hazardous Materials in Shredder Wastes and Their Appropriate Treatment System

by Shin-ichi Sakai, Masako Ogawa and Hiroshi Takatsuki

Vol. 2 No. 3

An Economic Evaluation of Recycling Schemes

by Kazuhiro Ueta

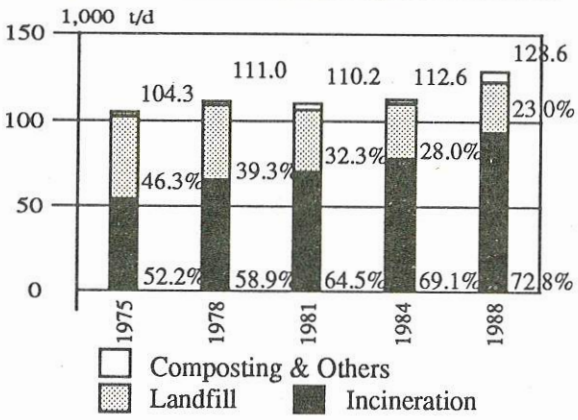
Recovery of Mercury for MSW Incineration by Closed System and Its Practical Application

by Tadao Fujimoto, Mitsuyuki Nishihara, Katsuya Kawamoto and Masakatsu Hiraoka

A Brief Note on Solid Waste Disposal in Japan (3) Methods of Disposal

As shown in the figure below, waste disposal by means of incineration has steadily increased in Japan. In 1988, a 73 % of Japanese municipal waste was incinerated, while a 23 % was disposed of by means of sanitary landfill, and the remaining 4 % by other means. Incineration is very important to Japan with small land as it is effective in terms of waste volume reduction, stabilization of waste, and making waste harmless. On the other hand, waste disposal by landfill has been decreasing due to increasing difficulty of securing landfill sites and the existence of secondary pollution risks involved. Composting is negligibly small as it is economically unfeasible.

Changes in Methods of Waste Disposal 1975-1988



Note: In 1989, there were 1870 incinerators including those under construction. The breakdown is shown below: Continuous operation type 397 plants (21.2 %), Semi continuous type 246 (13.2 %), Mechanical batch type 959 (51.3 %), Batch type 268 (14.3 %)

Correction in the NEWSLETTER No. 2

Waste components expressed in percentage in this column of the NEWSLETTER No. 2 should be read as "on DRY base". (It was wrongly indicated as "on wet base".)

NEWSLETTER NO. 3

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