PROGRESS AND THE CURRENT STATUS OF PCB WASTE TREATMENT IN JAPAN

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Abstract

In response to domestic and international concerns for environmental pollution by PCBs (polychlorinated biphenyl) that are highly toxic and chemically stable, the government of Japan in cooperation with prefectures and other stakeholders has carried out several measures to manage PCB waste in an appropriate and systematical manner. In 2001, the government established the Law Concerning Special Measures against PCB Waste. The law stipulates that PCB waste shall be disposed of no later than the target fiscal year 2016 and requires PCB waste holders to store, collect, transport and dispose of their waste in an appropriate and systematical manner. In addition, the government and prefectures have cooperatively arranged the treatment scheme of PCB waste by utilizing Japan Environmental Safety Cooperation (JESCO), in which PCB decomposition plants are operating in five major cities. Furthermore, the Ministry of the Environment has conducted verification tests for the incineration of low-contaminated PCB waste (some transformers including PCB-contaminated dielectric oil) at existing industrial waste treatment facilities since 2006 and confirmed the waste was decomposed safely without hazardously affecting the surrounding areas. The government of Japan continues working together with prefectures and other stakeholders to complete disposal of PCB waste until the assigned year.

History of the PCB Waste Problem in Japan

PCBs (Polychlorinated Biphenyls) are chemical substances that possess excellent insulation properties, a poor conductor of electricity as well as flame resistance. It had been widely used for electrical equipments such as transformers and capacitors. In 1966, PCBs were first detected in fish and seabirds in many parts in the world, and since then it had become obvious that PCB exposure was expanding across the globe. In Japan, the Kanemi Oil Poisoning Incident, the large-scale food poisoning caused by PCB contamination of rice oil, occurred in 1968. Then, PCBs had been detected in various animals, breast milk and others, and environmental contamination by PCBs became a social problem.

Under these circumstances, production of PCBs discontinued in 1972 and the production and import has been prohibited since 1974. However, arrangement of PCB waste treatment system had not progressed, so high-volume transformers and capacitors remained in a long-term storage. That led to the situation where environmental pollution would be more serious if these equipments were mislaid.

The toxic nature of PCBs is not only harmful to human health and the environment, but also cause global

environmental pollution to future generations by widely expanding through air and mobile species. Internationally, the Stockholm Convention on Persistent Organic Pollutants was agreed in May 2001, and Japan ratified the Convention after the parliamentary approval in August 2002. This Convention stipulates that governments have until 2025 to phase out the use of PCBs and dispose of PCBs in an environmentally sound manner no later than 2028. In Japan, the Law Concerning Special Measures against PCB Waste was enacted in 2001 to promote secure and appropriate treatment of PCB waste.

The General Outline of Law Concerning Special Measures against PCB Waste

The law defines necessary regulations about storage and disposal of the waste as well as establishment of the comprehensive treatment scheme. The outline is as follows:

(1) Treatment plan by the government and Prefectures

- The Environment Minister is to establish a basic plan for comprehensive and planned promotion of secure and appropriate treatment of PCB waste.
- Prefectures are to make PCB waste treatment plan in line with the national basic plan.

(2) Obligations of PCB waste holders

- PCB waste holders are responsible to dispose of their PCB waste properly and report the status of storage and disposal to prefectural governors at the end of each fiscal year.
- PCB waste holders are responsible to dispose of or consign someone to dispose of all PCB waste until July 2016, which was determined by the Cabinet Order with consideration of establishment of the treatment scheme.
- The Environment Minister or prefectural governors can order PCB waste holders to dispose of their PCB waste or take other necessary measures if the waste holders fail to dispose of the PCB waste within the set period.
- The Environment Minister or prefectural governors are able to impose punishments against PCB waste holders who fail to notify the storage or to dispose of the PCB waste within the set period.

(3) Establishment of the treatment scheme

- The Government is to promote disposal facilities of PCB waste and take necessary measures to secure the appropriate treatment.

Establishment of PCB Treatment Scheme by Inter-regional Treatment Facilities

The government and prefectures have cooperatively arranged the treatment scheme of PCB waste by utilizing Japan Environmental Safety Cooperation (JESCO). As for the treatment of PCB contaminated high-voltage transformers and capacitors, JESCO has developed five inter-regional treatment facilities. The treatment facilities have operated in the City of Kitakyushu since December 2004, in the city of Toyota and

Tokyo since September and November in 2005 respectively, and in the City of Osaka since October 2006. The fifth project in Hokkaido is scheduled to start its operation from October 2007. As for the treatment of PCB-contaminated small electrical appliance, wasted clothes and sludge, the second-term Kitakyushu project is now under way. Overall, the government, prefectures and JESCO are in tandem to implement PCB waste treatment on schedule at five PCB decomposition plants nationwide.

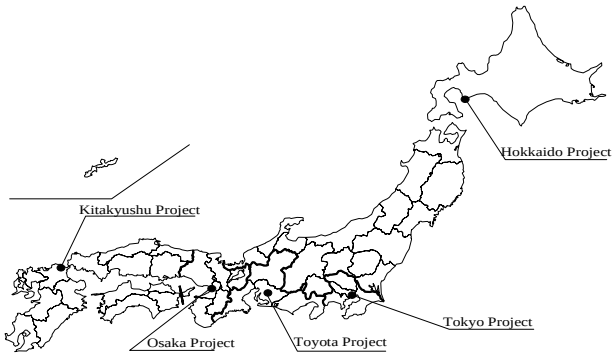

Figure: Location of JESCO's Inter-regional Treatment Facilities

Storage of PCB Waste

It is necessary for PCB waste holders to check the status of storage so as not to cause environmental contamination like leaking and to implement all measures necessary to improve the storage circumstance. Also, PCB waste should be appropriately stored not to be missing or treat inappropriately as non-PCB waste.

The Waste Management Law designates PCB waste as specially controlled industrial waste, which requires establishing a chief control manager who should have specific academic knowledge and working experiences of waste treatment.

PCB waste holders should comply with the following rule:

- The storage place should be separated from other wastes.
  - It is recommended to store PCB waste in a warehouse or a cabinet place which can be locked and prevents strangers to enter in.
- A signboard marking place for storage must be set up at the entrance.
  - The signboard should be more than 60cm×60cm in length and width, and indicates the place of storage of PCB waste, type of the PCB waste, the manager's name and contact address.
- Storage sites should be maintained to prevent a spill, leaking, bad odor and seeping underground.
  - PCB waste should be stored with leak-proof container like drum.
  - In case of leaking, it is recommended to lay a tray (oil pan) under a storage container.
  - A container that might cause leakage should be double-covered.
- The storage place should be separated from any place of high temperature such as boiler room.

Maintain Safety in the Transportation of PCB Waste

To secure safe and efficient transportation of PCB waste, the government revised related cabinet orders and compiled a guideline for collection and transportation of PCB waste.

Under the revised rule, PCB waste transporters must put the waste into a special container for the transportation that follows structural criteria. It is also required for transporters to equip emergency measure facilities like absorbents and communication facility including GPS. Furthermore, transporters should have enough knowledge and experiences to transport PCB waste appropriately.

The transportation guideline specifically defines technical methods required by the Waste Management Law as transportation criteria. PCB waste should be treated in safe and certain way following with this guideline.

Response to Low-contaminated PCB Waste

In July 2002, it became clear that some transformers included PCB-contaminated dielectric oil (low-contaminated PCB waste). The Ministry of the Environment (MOE) and the Ministry of Economy, Trade and Industry set up a committee for low-contaminated PCB waste and conducted a study on the reason and basic policy for the treatment of low-contaminated PCB wastes.

In the report announced in May 2005, the committee concluded that stakeholders related to the lifecycle of dielectric oil would partially related to the inclusion of low-density PCB and spread of low-contaminated PCB waste: For example, Dielectric oil manufacturers did not take thorough measures to prevent the oil products from PCB contamination, and electric equipment makers operated the facility using both new and reused oil.

The average level of concentration of low-contaminated PCB waste is around several dozen ppm, which is a concentration level of one to several ten thousands of PCB contaminated transformers. Because the level is extremely low, technically-feasible and cost-efficient treatment methods should be considered. Since 2006, MOE in cooperation with prefectural governments and waste treatment facilities have been promoting verification tests for the incineration of low-contaminated PCB waste at existing industrial waste treatment facilities that has capacity of incinerating waste at high temperature. It was confirmed that PCBs and dioxin emission level in gas and water from the incinerator were substantially less than the related regulations, which means the waste was decomposed safely without hazardously affecting the surrounding areas. MOE is planning to conduct another verification tests with supports from prefectural governments and waste treatment facilities.

Conclusion

In Japan, PCB waste holders are requested to store, collect, transport and dispose of their waste in an appropriate and systematical manner. With substantial supports from prefectures and other stakeholders, the government is also making coherent efforts to complete PCB waste disposal no later than the target fiscal year 2016, set by the Law Concerning Special Measures against PCB Waste.