Topics Fukushima 30 November 2012 No. 4

Topics Fukushima introduces JAEA's activities related to Fukushima.

Project entrusted by the Ministry of the Environment –Creating reports of testing of 22 decontamination technologies

JAEA compiled the FY2012 Project Report on Decontamination Technology Evaluation on October 23.

To discover technologies that can be utilized for decontamination work and verify their effects, economic feasibility, safety, and other factors, the Ministry of the Environment launched the "FY2011 Decontamination Technology Demonstrations Project" to publicly solicit decontamination technologies that would be verified in demonstration tests and adopted 22 candidates. JAEA was commissioned by the Ministry of the Environment to provide technical assistance related to these demonstrations, and the results of this demonstration project were summarized in the Project Report, with details provided in the following link below:

http://www.jaea.go.jp/fukushima/techdemo/h23/h23_techdemo_report.html

This demonstration project added new findings to the knowledge obtained in the technology demonstration project JAEA had conducted under entrustment from the Cabinet Office from October 2011 to March 2012. The main details of this information are as follows:

Surface of road

The importance of suction balance was confirmed for increasing the decontamination effects on surfaces of roads and others. Higher pressure and lower volume of water as well as strong suction power are the key for increasing decontamination effect, regardless of whether high pressure water or ultra-high pressure water was used. It was confirmed that the effect of high pressure water decontamination becomes uniform by collecting used water at the same time.

Soil

The same level of decontamination for soil as the technical demonstration project commissioned by the Cabinet Office was observed, by using scrubbing cleaning to collect fine material such as clay. Regarding cleaning of soil, development of standards, instead of technologies, such as for reusing is required.

Fig. 1 Soil decontamination demonstration plant

Pond bottom soil

The depth distribution of contamination of pond bottom soil was identified, and the soil at 5 to 15 cm below the pond bed turned out to be contaminated. However, as deep soil is not contaminated, decontamination will be possible by removing the top layer of bottom soil.

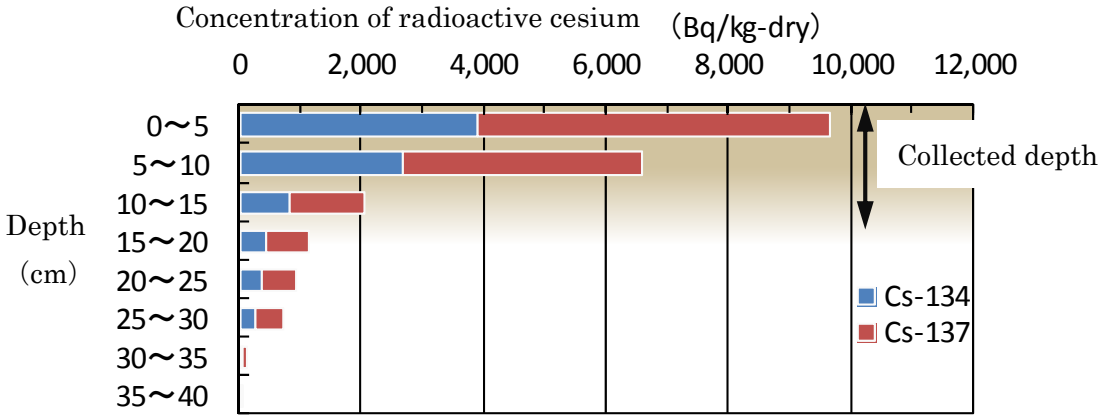

Fig. 2 State of contamination by depth of mud at pond, lake and river beds

Organic materials

It turned out that radioactive cesium remains in the carbides when organic materials are carbonized, and radioactive cesium does not transfer to bio-ethanol when organic materials are processed for bio-ethanol production. While plant operating costs are greater if radioactive materials need to be treated, if income is expected by business such as power generation, depreciation may be calculated over approximately 15 years. To maximize the cost-effectiveness, systems need to be developed around mountainous regions to minimize costs required for collection and transportation of unused wooden materials including forestry offcuts that are left after logging for construction materials. As elution of radioactive cesium from bottom ash was 30% when burning biomass, while elution from bottom ash

generated from the incineration of general waste is reported to be 5.6%, extra care must be taken with elution from bottom ash, in addition to fly ash, when using biomass. This indicated that measures must be taken for radioactive materials in the bottom ash when designing plants.

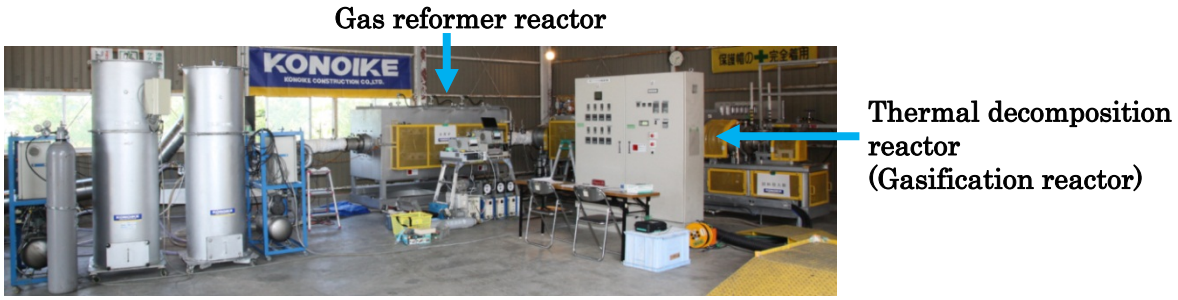

Fig. 3 Demonstration test device for reducing the quantities of organic materials through biogas electric power generation

Tree bark

While radiation level of tree bark can be lowered enough to allow distribution in the market by cleaning and other means of decontamination, with the lack of demand for such materials, development of technologies for thermal decomposition and burning aiming for reduction in the amount and stabilization will be necessary. While technology to reduce incineration ash is almost completed, still R&D on technologies, such as for the addition of zeolite and other absorbents as aggregate, needs to be continued to prevent radioactive cesium elution, as cesium is eluted from fly ash even if it is solidified.

Rubble

Regarding rubble, it was confirmed that dry processing and wet blasting can achieve effect comparable to the effect observed in the technical demonstration project by the Cabinet Office. Although the cost for dry processing could be lowered by using liquid nitrogen, still cost-effectiveness is relatively low compared to the decontamination effect, which is the challenge to the operation on a commercial basis.