TOPICS Fukushima July 20, 2018 No.80

How Should Wastes Produced at the Fukushima Daiichi Nuclear Power Station be Managed?

International conference held to help understand the properties of waste

Seven years ago, a major accident occurred at the Fukushima Daiichi Nuclear Power Station (1F), and as a result various types of radioactive waste have been produced in large amounts inside the power station. To properly manage these wastes, it is essential to understand the types and amounts of radionuclides contained in the wastes, and their physical/chemical properties. By taking into account waste properties, it will be possible to effectively carry out research and development on waste management technology for storage, treatment, and disposal.

From June 19 to 20, the Fukushima Research Conference on Development of Analytical Techniques in Waste Management (FRCWM2018) was held in the "Manabi no Mori (Forest of Learning)" of the Tomioka Town Art & Media Center in Fukushima Prefecture. Researchers with an interest in this research field gathered in the conference from both inside and outside Japan. At the conference, there were reports on the latest findings and an exchange of views, focusing mainly on development of technology for waste analysis.

As a forum for discussion of near-term issues, the Fukushima Research Conference (FRC) has been held by the Collaborative Laboratories for Advanced Decommissioning Science (CLADS), an organization conducting research and development for decommissioning of the 1F. The FRCWM2018 was the first FRC in this fiscal year, and there were about 100 participants including researchers from the UK, Russia, China, and Vietnam.

How are wastes at 1F currently being managed?

Professor Shuichi Hasegawa of the University of Tokyo, Head of the Program Committee, opened the conference by explaining its purpose. There were three focal points for the discussion at this conference: 1) characteristics of accident wastes at nuclear power facilities including cases overseas, 2) the current state of research relating to analysis of wastes at the 1F, and 3) the upgrading of analysis technology.

Regarding the current state of waste management at the 1F, Mr. Norifumi Sahashi of Tokyo Electric Power Company gave a detailed explanation about the topics such as secondary wastes produced due to treatment of rubble and contaminated water, based on the most recent data. This is important information that serves as a starting point for examining waste management technology.

Mr. Yoshikazu Koma of the Japan Atomic Energy Agency (JAEA) reported analysis data obtained thus far regarding contaminated water and waste. The analysis has been carried out with an eye toward use in safety assessment when wastes are disposed of in

the future. Therefore, the attention of the analysis is paid not only to radionuclides that can be measured non-destructively such as ^{137}Cs, but also "hard-to-measure nuclides" requiring chemical separation or other treatments. Examples of contamination characteristics were presented together with the data on retained water underground buildings, slurry produced with multi-nuclide removal equipment, and rubble such as soil and concrete.

Mr. Koma further reported the development situation regarding methods of estimating the amount of radioactivity contained in waste, including wastes which cannot be analyzed due to the difficulty of collecting samples, and wastes which will be produced in the future.

Hierarchical management of waste at Sellafield

Ms. Susan Brown from the UK reported on ascertaining the properties of wastes at Sellafield, UK. There are more than 200 nuclear power facilities at Sellafield. Still untreated radioactive wastes are stored in large amounts, and they cover a wide range including almost all types. She reported that, if a hierarchy for intelligent waste management is put in place based on data for understanding the properties of each type, this will yield the best safety and cost effectiveness in site restoration.

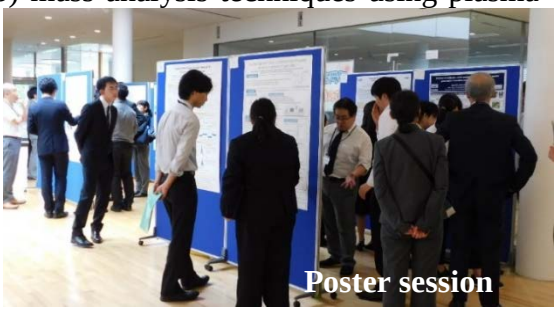
Mr. Aleksei Konoplev from Russia gave a talk on comparing the radionuclides released into the environment from the Chernobyl Nuclear Power Plant and the Fukushima Daiichi Nuclear Power Station. He talked about the results for the examination of radioactive cesium released into the environment in the two accidents, based on a conceptual model of bonding of radioactive cesium in the environment with fine particles such as soil and sediments as well as chemical changes in the soil-water system. He reported that the migration of cesium in the environment will proceed more quickly at the 1F accident than that at Chernobyl due to the differences in climate and topography.


Mr. Aleksei Konoplev

Aiming for more advanced analysis of waste

Regarding the upgrading of analytical technology, there were presentations and an exchange of views on topics such as, 1) adsorption of radionuclides to zeolites and its solidification, 2) technology on elemental analysis using new emission spectral analysis methods, 3) nuclide separation techniques using thermochemical reactions, 4) radiation measurements using laser spectroscopy, and 5) mass analysis techniques using plasma for long half-life radionuclides that have been difficult to be analyzed by radiation measurement.

At the poster session, young researchers from both inside and outside Japan gave 19 presentations, and the awards were given for outstanding poster presentations—one first prize, and three excellence awards.


Poster session

TOPICS Fukushima　No.80

Fukushima Administrative Department

Sector of Fukushima Research and Development

Japan Atomic Energy Agency (JAEA)

Address: 8F Taira Central Building, 7-1 Aza-Omachi, Taira, Iwaki-shi, Fukushima 970-8026, Japan

Phone:　+81-246-35-7650　　Fax:　+81-246-24-4031

Website: https://fukushima.jaea.go.jp/english/