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College of Technology Students Learn Techniques for Radiation Measurement

Thirteen students from eight colleges of technology receive practical training at the Sasakino Analytical Laboratories of the JAEA

On August 28, thirteen students from eight colleges of technology throughout Japan gathered at the JAEA's Sasakino Analytical Laboratories in Fukushima Prefecture, and received practical training on radiation measurement. What did they learn?

Study

Since 2011, the Institute of National Colleges of Technology, Japan has been carrying out six projects to develop nuclear human resources for students at 33 colleges of technology (also known as "Kosen"). The project carried out at the Fukushima National College of Technology, "Practical Training on Nuclear Power and Radiation", was focused on the training in the field of restoration from the nuclear disaster and nuclear safety.

Thirteen highly-motivated students from eight colleges of technology throughout Japan participated in the training provided by the Japan Atomic Energy Agency (JAEA). They experienced various types of basic practical training relating to nuclear power at the newly established Sasakino Analytical Laboratories.

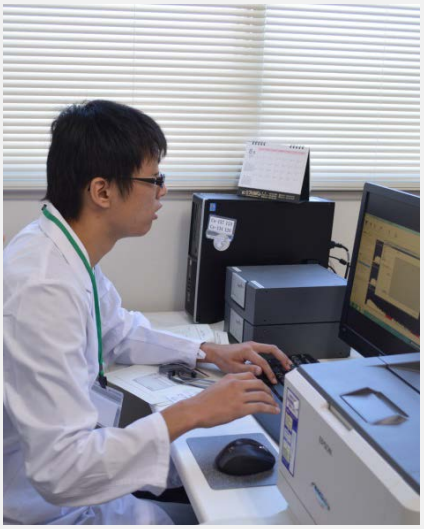
Radiation measurement of various items

On the day of the training, the students were divided into two groups. One group measured the radioactivity of soil and drinking water using a HP-Ge detector. The soil was sampled beforehand on the grounds of the laboratory, and the drinking water was the laboratory's tap water. It took some time for these measurements to finish, and thus while the students were waiting, they used a survey meter to measure the air dose rates in the room, and the dose rates of familiar materials. The materials provided for this included: gas mantles, dried kelp, marble, and chemical fertilizer. Gas mantles are used as the lighting element in lanterns for camping and other applications. Each student took a material in hand, and measured it with a GM survey meter. With some of the materials, the measured values surged upward, and the students learned that radiation is emitted by natural radioactive materials from a variety of items.

When measurements of soil and tap water were finished, the results were output. The students eagerly peered at the results and the gamma ray spectra on the PC screen of the equipment.

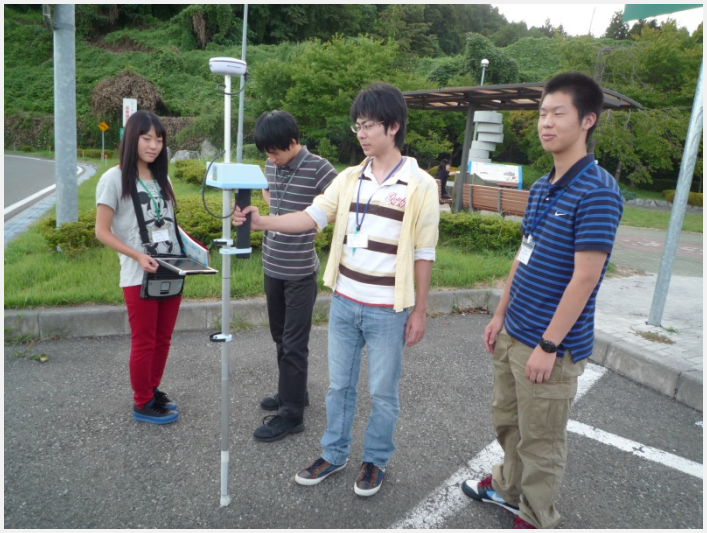
The readings of the survey meter declined when an iron plate was placed between the material and the measurement device, or when the meter was moved away from the material. Nobuyuki Kinouchi, who was acting as an instructor, explained the reason for these phenomena, and the importance of calibrating measuring devices to ensure accurate measurement.

Measurement of radioactivity within the body



The other group carried out measurements of internal exposure. This was a first experience for all of the group members. They stood, one at a time, at the specified position in a whole body counter, as another student performed measurement operation while watching the PC screen and following the instructions of the instructor. The measurement time was only 2 minutes per person. An explanation was provided on how to read the recording paper on which the measurement results were output, and each student calculated the total exposure dose expected he/she would receive over the next 50 years based on the measurement results. This total dose is called the committed effective dose. For the students this is just an unfamiliar word, and therefore the instructor, Yasuhiro Uezu, provided an easy-to-understand explanation of the term's meaning, and the fact that there are various radioactive materials in the body.

Measuring radiation outdoors



When measurement training in the Sasakino Analytical Laboratories was finished, the group underwent further training in the parking area on the way to Iwaki. They used the system called a γ-plotter (gamma plotter) developed by the JAEA to produce maps that show radiation dose rates measured at different two heights (5cm and 1m). The instructors Keiichi Kawase and Shingo Tomita explained how to use the γ-plotter, and then students measured the radiation dose rates while walking around the parking area. Soil with vegetation or turf exhibited a slightly higher dose than the parking lot paved with asphalt. Also, the interlocking blocks under the rainwater drain pipe exhibited a higher dose than other locations. Such facts can be understood visually by using the γ-plotter. In addition, the students found that values differ, even at the same location, depending on the type of measuring device, and learned how to use measuring devices and points to consider regarding measurement.

This training at the Sasakino Analytical Laboratories was conducted on the second day of the three day training course of the project. On the first day, the students were lectured at Fukushima National College of Technology on topics such as treatment and disposal of radioactive wastes and material characteristics necessary for nuclear power generation. They also engaged in exercises such as evaluation of strength characteristics using micro-scale test specimens. On the third day, the students made a presentation summarizing the results of two days of practical training. There were a question-and-answer session and time for comments, and each student received a certificate of completion.

There were feedbacks from the students such as that it was a good experience to measure the internal exposure, that it was a valuable opportunity to operate measurement equipment that they usually could not, that they were able to see state-of-the-art technologies such as a monitoring car, and that they deepened their understanding of nuclear power and radiation.

Apparently many students who participated in this training have interest in the energy field or desire to go into the field of energy or nuclear energy. All of the instructors share the desire to contribute to the restoration of Fukushima from the disaster by, in addition to conducting research and development for the environmental restoration, actively promoting collaboration and cooperation for human resources development and responding to the expectation of students.