

Radiological Effect on Workers and Residents during Post-accident Recovery Phase Studied by JNES

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Large amount of radioactive nuclides were discharged to the environment as a consequence of Fukushima Daiichi accident in 2011, and large scale of off-site area was contaminated mainly by Cesium-134 and 137. Immediately after the accident, the Government of Japan had designated the restricted area within a 20-kilometer radius from the Fukushima Daiichi NPS and issued an evacuation order to residents in the area. The area was restructured in 2012, the evacuation order had been lifted step by step, and now only “Difficult to return zone” is remaining as of January 2020.

After the evacuation, many kinds of countermeasures on environmental remediation had been taken in the area. The most major countermeasure was decontamination of land, house, road etc. In addition to that, remediation of infrastructure (e.g., Joban Expressway, National Highway, Prefecture road, railroad, combustible waste treatment facility, and sewage water treatment facility), firefighting with wild fire, carrying out of hazardous material from the area had been taken.

Under this circumstances, it was necessary to assess exposure dose of workers on remediation activity and operation of the infrastructure, user of the infrastructure, e.g., exposure dose of driver who would drive through the area, and firefighter^[1-3]. It was also required to evaluate contamination of cars which had passed through the area, and that of hazardous materials e.g., petrol from gas station and chemical materials at chemical factory, to be carried out from the area because those activities potentially cause the secondary dispersion of radioactive materials^[4]. Furthermore, there were large amount of disaster waste such as broken house, furniture and appliances generated by tsunami which is potentially contaminated by radioactive nuclides, in the Fukushima Prefecture. Although the waste should be managed in accordance with its level of radioactivity, there was only ambient dose rate available. For efficient decision making, it was required to develop the *in-situ* determination methodology of the radioactive concentration using ambient dose rate^[5].

Japan Nuclear Energy Safety Organization (JNES), which was former TSO of the Nuclear Regulation Authority (JNES was dissolved and integrated into NRA in 2013), had been tackled those challenges based on the letter of request from Support Team for Residents Affected by Nuclear Incidents, Nuclear Emergency Response Headquarters, Cabinet Office. In the presentation, overall picture of JNES' study on radiological effect on the outside of Fukushima Daiichi will be presented and some example will be elaborated.

Keywords: *remediation of infrastructure, radiological effect, dose assessment*

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