History of the Environmental Radioactivity Survey in Korea

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1. Introduction

Space, including Earth, is filled with radiation. In any place, under any circumstances, the amount of radiation is extremely low, but it cannot be completely eliminated. Human beings are in a radiation environment because radiation exists in the entire environment that human beings are in contact with. I would like to describe the history of the environmental radioactivity survey in Korea.

2. Environmental Radioactivity Survey

2.1 Propose

The main propose of the environmental radioactivity survey are protecting the public health and preserving of environment from any radiological accident.

2.2 History

Environmental radioactivity survey was mainly aimed at assessing the impact of radioactive fallout caused by ground nuclear experiments in the 1950s and 1960s.

In the 1970s and 1980s, the survey was carried out to check whether nuclear facilities such as nuclear power plants had an environmental impact.

And in the 1990s there was a Russian dumping of radioactive material in the East Sea. Also, in the 2000s, it was necessary to monitor the radiation terrorism with the 9.11 terror. The targets of environmental radioactivity survey have been changed according to the times, such as the monitoring and detection of radioactivity leakage due to the nuclear activities of neighboring countries such as North Korea's underground nuclear tests.

In particular, the Fukushima nuclear power plants accident in Japan in March 2011 was an opportunity for the public to experience the importance of environmental radiation monitoring.

2.3 Monitoring system

Environmental radiation monitoring system in Korea can be divided into the monitoring of the environmental radiation of the whole country and the environmental radiation monitoring around the nuclear facilities.

The Korean Institute of Nuclear Safety (KINS) has been conducting the environmental radioactivity monitoring for the entire country under the leadership of the government.

The main purpose of environmental radiation monitoring in the vicinity of nuclear facilities is to investigate the current concentrations and the long-term accumulation trends of radionuclides released from the nuclear facilities.

The environmental radioactivity monitoring was independently conducted by regulation body and its monitoring results are implemented to evaluate the environmental radioactivity monitoring results of licensees.

The normal environmental radiation/radioactivity level monitoring and emergency purpose environmental radiation/radioactivity monitoring on varying kinds of environmental samples, collected by the KINS (central radioactivity monitoring station) and the 15 regional radioactivity monitoring stations, are conducted based on the Article 105 (Monitoring of Nationwide Radiation Environment) of the Nuclear Safety Act.

Gross beta and gamma radioactivity concentration in the airborne dust, fallout, precipitation and tap water were periodically carried out at 15 Regional Radioactivity Monitoring Stations. Gamma-ray emitting radionuclides in airborne dust, fallout and precipitation collected at the Central Radioactivity Monitoring Station were also periodically analyzed.

The radiation monitoring station monitors the fluctuation of the environmental radiation level in real time. At this time, Integrated Environmental

Radiation Monitoring Network (IERNet) monitors ambient gamma dose rates by real-timely for a total of 170 sites, including 15 regional radioactivity monitoring stations and 155 radiation monitoring posts.

The monitoring data of the ambient gamma dose rate measured in these areas are collected and managed by the KINS in real time. The monitoring results are published to the public through the internet web page (http://iernet.kins.re.kr). The KINS also developed a real-time environment radioactivity information app (eRAD@NOW) using a mobile app to provide information to the public on anytime, anywhere.

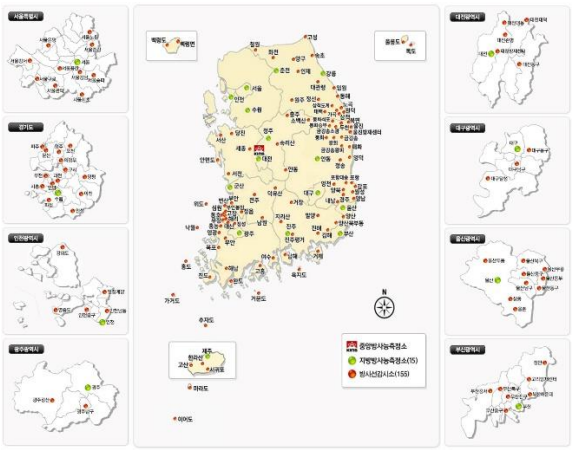

Fig. 1. Locations of radiation monitoring posts.

On the other hand, the marine environmental radioactivity survey around the Korean peninsula began with the announcement of the white paper on the Russian government's radioactive waste disposal at the East Sea in 1993, and KINS started to monitor the radioactivity of the seawaters around Korean peninsula in 1995.

The concentrations of ^{137}Cs, ^{3}H, ^{90}Sr, and $^{239+240}Pu$, and $^{240}Pu/^{239}Pu$ isotopic ratio were analyzed and assessed in the seawater samples, marine organism samples, and sediment samples, which were collected by help of the National Fisheries Research and Development Institute.

In order to monitor environmental radioactivity for the surface seawater, the seawater samples have been collected biannually at the fixed 21 stations off coast of Korea since 1994. The concentration of radionuclides and isotopic ratio between radionuclides in surface seawater were assessed using surveyed data cumulated from 1994.

The seawater in the specific layer and sediments were collected, respectively, at 6 stations and 16 stations once a year in order to obtain the concentrations and isotopic ratio of artificial radionuclides. The environmental radioactivity in marine organisms (fish, shellfish and seaweed) were determined biannually.

In Korea, the operator of facility shall conduct the survey of radiological environment and the evaluation of the impact of radiation on environment and file a report thereon to the Nuclear Safety and Security Commission (NSSC) in pursuance of Article 104 (1) of the Nuclear Safety Act.

Independently, when the NSSC deems it necessary to confirm the results of the survey and the evaluation of the operator of facility, he may conduct radiological environmental monitoring programs pursuant to the Article 104 (2) of the same act.

The KINS carries out the above radiological environmental monitoring around facilities every year in terms of implementation of the Article 104 (2) authorized by the NSCC in accordance with the Article 111(Delegation of Authority) of the same act.

3. Conclusion

As a part of environmental monitoring activities, the results of the environmental radioactivity analysis conducted by each institution are published in the form of reports on the internet site. And the government plans to database all the environmental radiation data of Korea and will provide it to the general public.

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