Incorporation of International Standards for Radioactive Waste into Domestic Safety Regulations

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[Current status of radioactive waste disposal]

Currently in Japan, there are 50-plus nuclear power plants and about 5,000 radioisotope and radiation facilities in operation. They all generate radioactive waste, and the issue of its disposal cannot be avoided. Under the Nuclear Reactor Regulation Law, waste disposal operations primarily by nuclear power plants are carried out in the form of near-surface disposal. Currently, under the Law Concerning the Prevention of Radiation Hazard, plans are underway to dispose of radioactive waste from radioisotope, radiation and accelerator facilities, which will be undertaken by the JAEA. In addition, plans for sub-surface disposal and the deep geological disposal of high-level radioactive waste are being developed under the Nuclear Reactor Regulation Law. In Japan, radiological protection standards to ensure radiation safety were discussed between 1975 and 1985. Recommendations were issued by the ICRP in 1977, 1990 and 2007, and systematized.

This paper describes how the standards evolved. It also describes dose criteria compatible with other areas of radiation use from the perspective of the current radiological protection standards and discusses the appropriate direction to take.

[Radiological protection standards for radioactive waste disposal]

Japan's only radiation dose criteria for radioactive waste disposal are provided in the December 1987 report of the Basic Committee of the Radiation Council "Regulation-Exempt Doses from Near-Surface Disposal of Radioactive Solid Waste." These state that the effective dose of the public from potential exposure after the end of the proposed period of radiological control should be limited to 10 μSv/year. As mentioned above, the ICRP issued recommendations in 1990 and 2007, whereupon radiological protection standards for radioactive waste disposal were developed (see the references). All the three sets of radiological protection standards for radioactive waste disposal recommend a dose limit of 1 mSv/year for the public. With the development of different techniques to ensure compliance with this limit, we are moving away from the early approach based on ALARA alone toward one ensuring compliance with the dose limit based on a target dose constraint of 0.3 mSv/year. This follows the ICRP's policy of emphasizing the optimization of protection, one of the three principles of justification, optimization of radiological protection and dose limitation, which should be applied to medical, radioisotope, accelerator and other facilities.

[Discussion of the radiological protection standards and the direction to take]

As the approach to radiological protection evolved, recommendations in related areas were made following the primary recommendations in 1977, 1990 and 2007. Adequate consideration was given to the continuity of the limitation principle, which forms the basis of the standards, and related standards were developed by the IAEA. Consideration should be given to ensuring the international compatibility of the radiological protection standards and incorporating the latest knowledge. The Radiation Council started a review of the 1977 report and decided to

eliminate the regulation-exempt dose of 10 μSv/year and change it to an international criterion of 300 μSv/year (normalization). In addition, the Council decided to apply the criterion to all types of radioactive waste and set an upper limit of 20 mSv to prevent human intrusion into geological repositories. These are in compliance with the Safety Requirements on the Disposal of Radioactive Waste (DS354) in the standards system for radioactive waste (WASSC), part of the IAEA's safety standards. These are also all consistent with the ICRP's 2007 Recommendations (Publ. 103), and a site release criterion of 300 μSv is specified in IAEA WS-G5.1 based on a similar philosophy.

Based on the Radiation Council's decision (revision), there will be discussion of how to incorporate the ICRP's Recommendations into domestic laws, the Reactor Regulation Law, and the Radiation Hazard Prevention Law. The above-mentioned ICRP's radiological protection standards for radioactive waste adopted this stance in the 2007 Recommendations (ICRP Publ. 103). The Radiation Council is discussing the incorporation of the ICRP's 2007 Recommendations into law and is very likely to recommend that this dose constraint be incorporated. It is inconceivable to apply special radiological protection standards to radioactive waste disposal alone.

References

ICRP Publ. 46 (1985) "Radiation Protection Principles for the Disposal of Solid Radioactive Waste"

ICRP Publ. 77 (1997) "Radiological Protection Policy for the Disposal of Radioactive Waste"

ICRP Publ. 81 (1998) "Radiation Protection Recommendations as Applied to the Disposal of Long-Lived Solid Radioactive Waste"