

The Status of Radiation Protection Management and its Prospect in KHNP

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Abstract

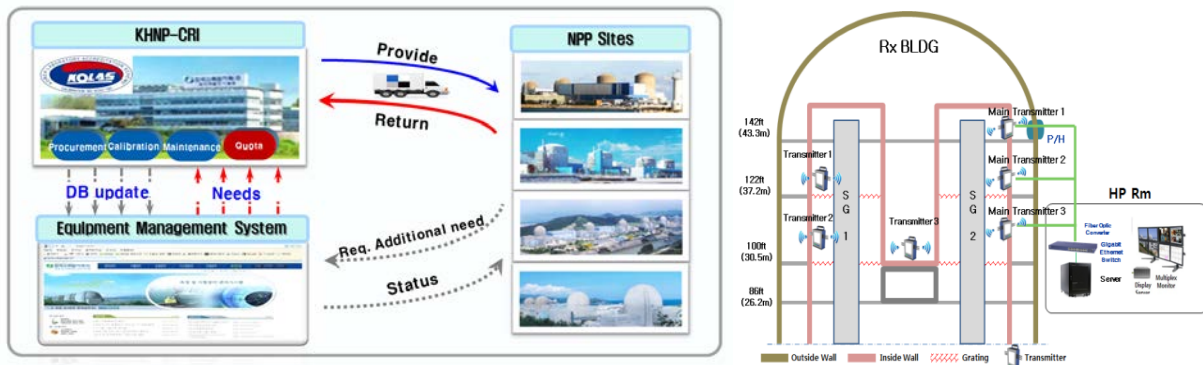
Owing to launching of Shin-Wolsung #2 on July 24, 2015, KHNP now has 24 nuclear power plants in operation with a total power generation capacity of 21,716 MW, accounting for about 22.5% of the nation's total power. On the other hand, the voice of stakeholders also increased in proportion to nuclear power and with the Fukushima accident. Under this circumstance, KHNP continues to make every effort to increase nuclear safety including to reduce radiation dose and unplanned radiation exposure. The purpose of this paper is to introduce current status and future prospect of radiation protection in KHNP.

1. KHNP's Dose Reduction Plans

KHNP has maintained a phased dose reduction plan every ten years. The phase-1 dose reduction plan started in 1991 and was applied to 9 plants. The phase-2 plan started in 2001 for 16 plants, but it ended in 2006 because the reduction goal was achieved early. The phase-3 plan started in 2007 and will be in effect until 2016. Statistical analysis shows that the overall dose reduction will be about 30% as a result of the plans. The effective methods of dose reduction include steam generator replacement, installation of tritium removal facilities, and zinc injection. KHNP is now preparing a new dose reduction plan based on the results of several assessment and R&D projects.

2. Securing the Reliability of Radiation Data

Figure 1 shows the concept of centralized management of portable radiation instrument which includes its procurement, maintenance and calibration accredited by KOLAS and ILAC. Formerly, these all were done by individual plant itself, which often raises a problem of calibration or securing reliability of survey data. The amount of calibration is 8,500 in 2014. On the basis of this ability, CRI performs inter-comparison of external and internal radiation dose assessment every year. This year, a total of 13 nuclear power plants participated in the assessment and the analysis was carried out from April to August 2015. The measured results are compared to each other using the criteria of NSSC's Nuclear Act Article 80(performance criteria for dosimeter reading) and ANSI N13.30 (performance criteria for radiobioassay)



[Fig.1] Centralized Calibration of Portable Instruments [Fig.2] Schematic diagram of RPDMS

3. R&D Topics of Radiation Protection

There are several on-going researches related to radiation protection in KHNP. Topics are shown in below Table. Figure 2 shows one of the research output, denoted 'Real-time Personal Dose Monitoring System (RPDMS)'. This system has been applied to Hanbit unit-3 and Hanul unit-4.

[Table] R&D Topics of Radiation Protection

No	Topic	Period	Remarks
1	Development of an ALARA type radiation monitoring system	11.4~13.8	
2	Research on countermeasures to reduce the radiation dose for long-term operated nuclear power plant	12.3~14.2	
3	Development of auto calibration and data management system for radiation measurement	13.4~15.3	
4	Development of clearance monitor system for radwaste	13.9~16.6	
5	A study on the simple and easy radiation units for effective communications with public	14.7~14.10	
6	Construction of standard radiation field and process improvement for tests of personal dosimeters	15.3~18.2	Beta/X-ray
7	Evaluation of expected annual tritium activity from Hanul units 3 & 4	15.3~15.12	
8	Reliability test of steam generator leak monitoring system for standard Korean nuclear plant	15.7~15.11	
9	Feasibility study on the development of the shape-related radioactivity evaluation technology	15.9~16.5	
10	Development of calibration technology of portable tritium monitor	TBD	

4. Future Prospect

Concurrent radiation issues are; claiming of resident's thyroid cancer in Kori and resident's tritium bioassay in Wolsung. Future prospect related to radiation protection at KHNP are summarized by; 1) Preparation of radiation protection for decommissioning 2) Paradigm shift of ALARA culture and micro-Sivert (including tritium reduction) 3) Application of up-to-date ITs to radiation protection management 4) Maintaining the measurement/calibration authority of plants.