

The Status of Radiation Protection and its Prospect in KHNP

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- I. Introduction
- II. Dose Reduction Plan
- III. Reliability of Radiation Data
- IV. Current R&D Topics for RP
- V. Future Prospect

- **Nuclear Power Plant in Korea**
 - 24 in operation (21,716MW)
 - 4 in construction (commercial oper. : 2016 ShinKori 3&4, 2018 ShinHanul 1&2)
 - 4 in construction (commercial oper. : after 2021~)
 - * 22.5% of nation's total power
- **The voice of stakeholders are increasing**
- **KHNP continues to make every effort for radiation safety including to reduce radiation dose**

II.

Dose Reduction Plan

	Phase-1 Plan ('91~'00)	Phase-2 Plan ('01~'10)	Phase-3 Plan ('07~'16)
Main Reduction Methods	<ul style="list-style-type: none"> -Removal of RTD bypass lines -Application of new ECT equipment -Adoption of new nozzle dams -Improvement of RCS pump shafts 	<ul style="list-style-type: none"> -Installation of T³ removal facilities -Adoption of chemical decontamination -Initiation of ALARA workshops 	<ul style="list-style-type: none"> -Steam generator replacement -Zinc injection -Ultrasonic fuel rod cleaning -Simplification of Rx heads
Goal / Result of Final yr (man·Sv)	1.2 / 0.95	0.78 / 0.60	0.43 / 0.53(2013)

■ One of the important thing in RP management is to secure the reliability of radiation survey data

- Before 2010, calibration of portable radiation instrument were done at each plant
- CRI centralized it on the basis of KOLAS*/ILAC**
- Over 8,500 items are calibrated annually in CRI

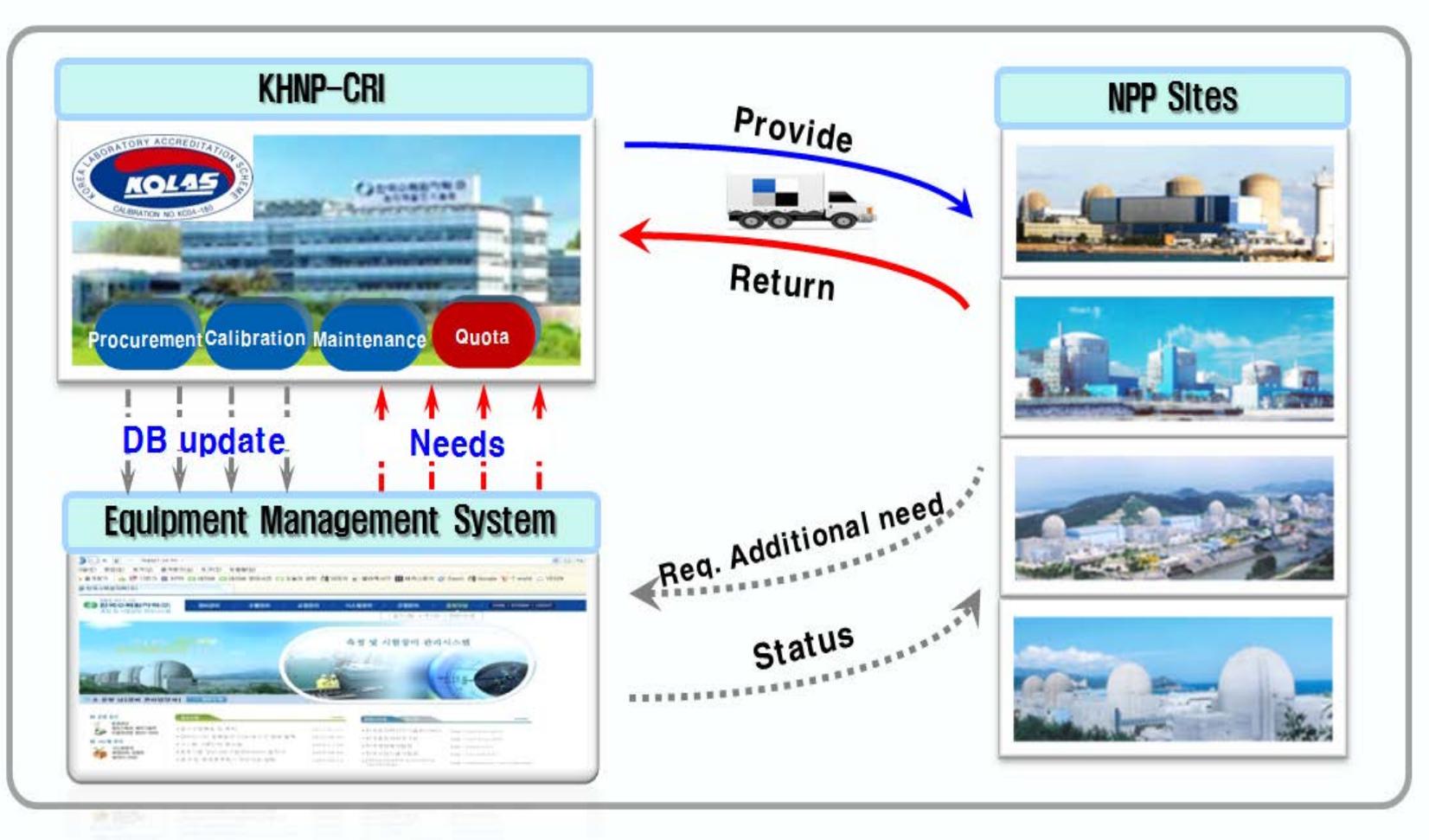
*Korea Laboratory Accreditation Scheme **International Laboratory Accreditation Cooperation

■ Inter-comparison for right dose assessment

- External dose : by NSSC's Nuclear Act Article 80
- Internal dose : by ANSI N 13.30

* 13 NPPs participated to this program

III. Reliability of Radiation Data

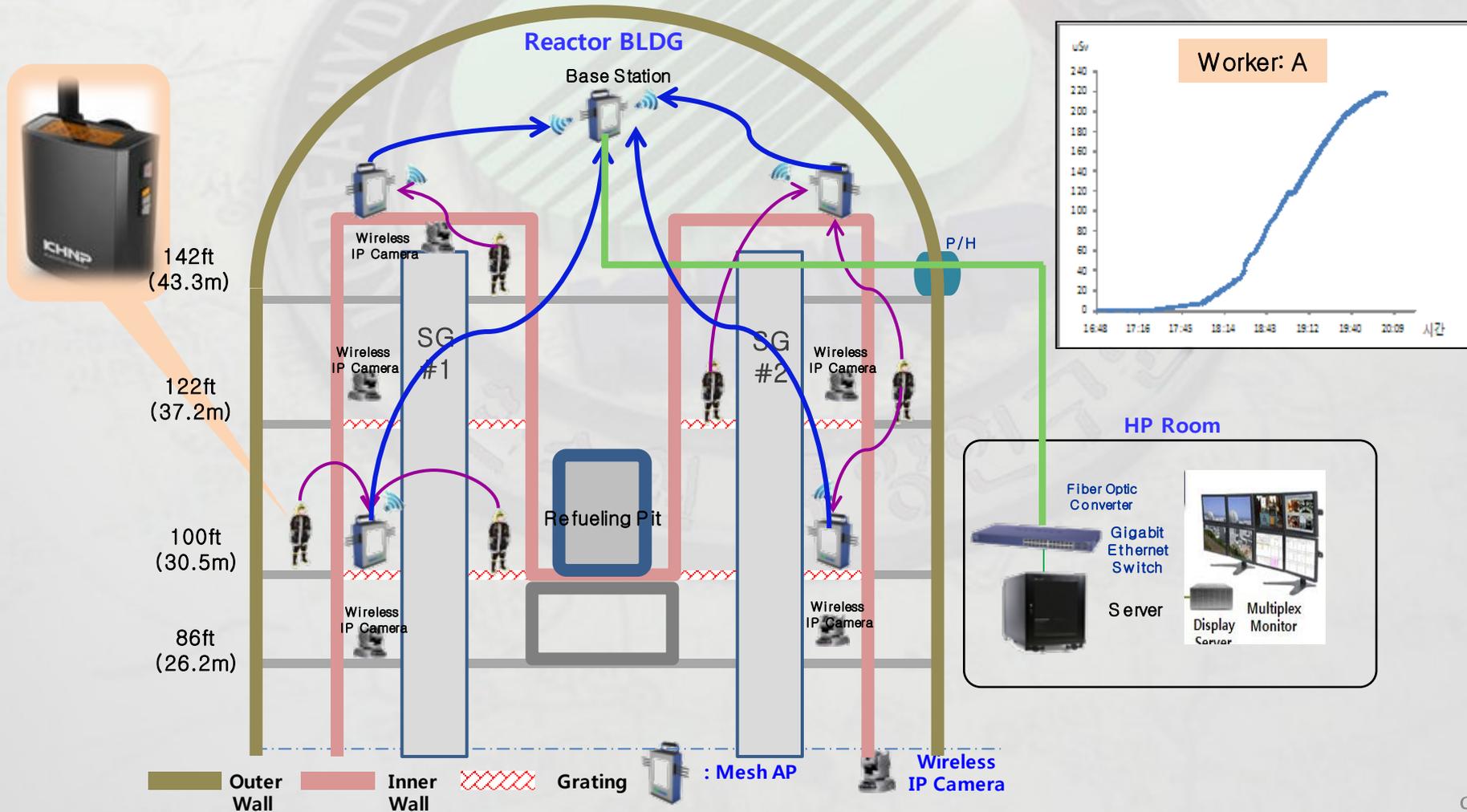


- Development of an ALARA type radiation monitoring system ('11.4~'13.8)
- Research on countermeasures to reduce the radiation dose for long-term operated nuclear power plant ('12.3~'14.2)
- Development of auto calibration and data management system for radiation measurement ('13.4~'15.3)
- Development of clearance monitor system for radwaste ('13.9~'16.6)
- A study on the simple and easy radiation supplementary units for effective communications with public ('14.7~'14.10)

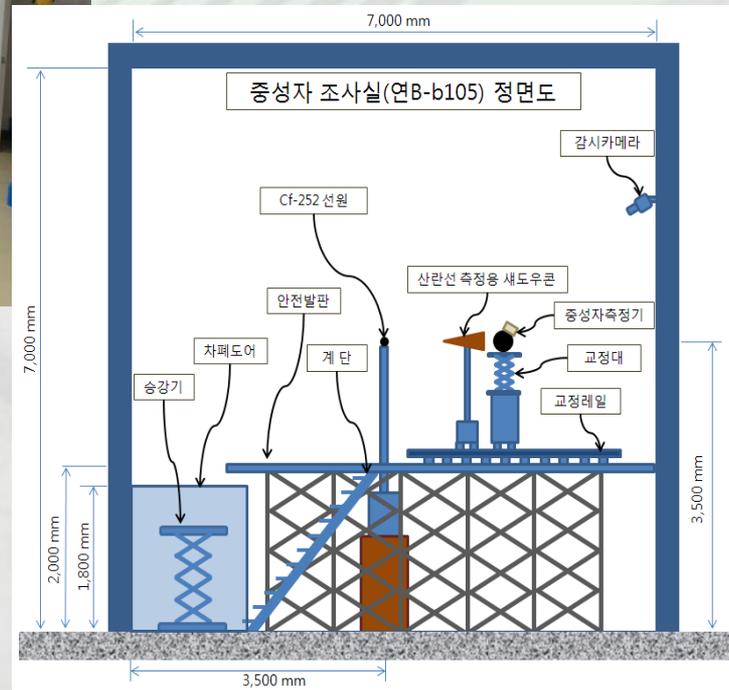
- Construction of standard radiation field and process improvement for tests of personal dosimeters('15.3~'18.2)
- Evaluation of expected annual tritium activity from Hanul units 3 & 4 ('15.3~'15.12)
- Reliability test of steam generator leak monitoring system for standard Korean nuclear plant ('15.7~'15.11)
- Feasibility study on the development of the shape-related radioactivity evaluation technology ('15.9~'16.5)
- Development of calibration technology of portable tritium monitor (*TBD*)

IV. Current R&D Topics for RP (3)

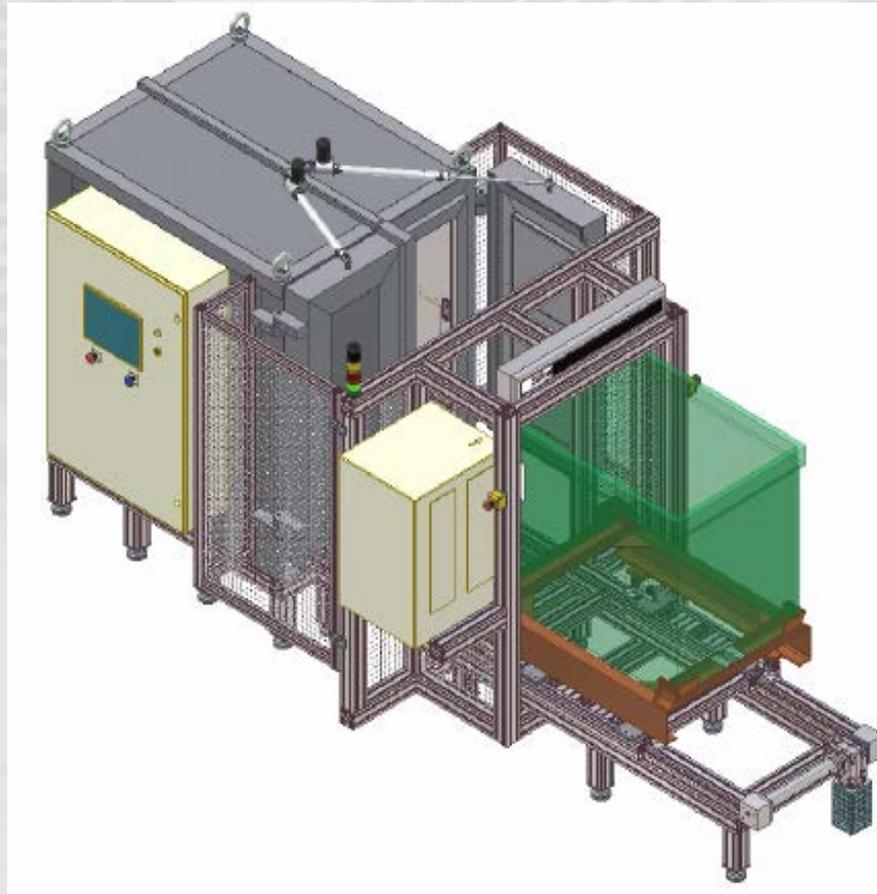
■ Schematic diagram of RPDMS



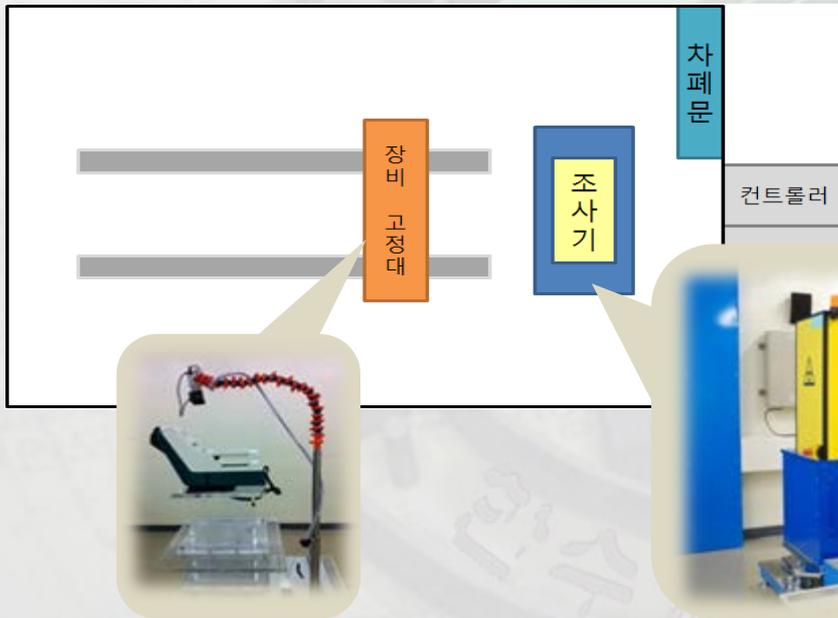
■ CRI's Gamma(Cs-137), Neutron(Cf-252) Irradiator



▣ CRI's Radwaste Clearance Monitor System



■ CRI's OCR Calibration System



교정 데이터

조사기	검출기	교정거리 (mm)	기준신량률	시차값										편위
				1	2	3	4	5	6	7	8	9	10	
75.5 TBq	고준위	1 035.3	5 Sv/h	4.42	4.49	4.42	4.46	4.50	4.47	4.40	4.42	4.09	4.40	4.74
		1 109.9	500 mSv/h	5.14	5.11	5.12	5.11	5.12	5.12	5.12	5.10	5.09	5.16	
183 GBq	중준위	3 476.0	50 mSv/h	4.21	4.23	4.21	4.21	4.19	4.19	4.14	4.12	4.14	4.12	4.16
		1 788.9	5 mSv/h	4.09	4.02	4.04	4.02	4.11	4.09	4.04	4.16	4.11	4.16	
11.1 GBq	BKG	1 486.4	500 μSv/h	4.99	4.92	4.94	4.96	4.99	4.91	4.93	4.92	4.94	4.92	4.94
		4 645.7	50 μSv/h	4.09	4.02	4.04	4.02	4.11	4.09	4.04	4.16	4.11	4.16	
BKG	측정전	1 035.3	측정후	1.09	1.93	1.92	1.97	1.99	1.84	1.86	1.72	1.99	1.84	
		4 645.7	측정후	1.10	0.17	0.22	0.23	0.19	0.20	0.21	0.22	0.19	0.19	

Before



패턴DB

인식 프로그램 화면

인식 결과

After

IV.

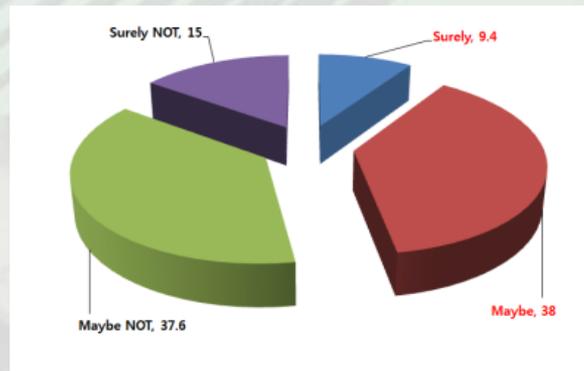
Current R&D Topics for RP (7)

▣ A public opinion census for radiation unit

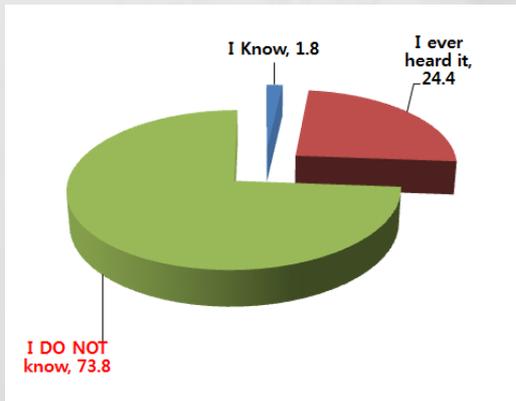
- Recent Survey of Public Opinion
"Radiation Unit — mSv, Bq"

Population	500 Men and women over the age of 19
Sampling Error	Based on the random sampling, Confidence interval of 95% standard maximum allowable sampling error are $\pm 4.4\%$ point
Survey method	Computer Aided Telephone Interview (CATI)
Survey period	Oct. 22 ~ Oct. 23, 2014
Institution	Hankook Research Co., Ltd.

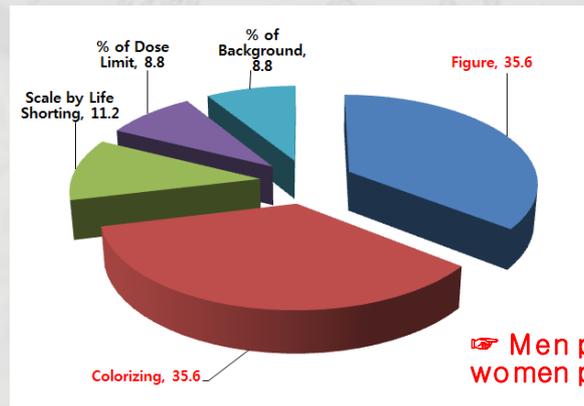
- Do you think the radioactivity is infected with person's respiratory or skin contact? (%)



- Do you know the radiation unit 'Becquerel(Bq)'? (%)



- Which do you prefer as easier radiation auxiliary unit, if it is changed?



Men prefer 'Figure', women prefer 'Colorizing'

- **Concurrent radiation issues;**
 - Claiming of resident's thyroid cancer in Kori
 - Tritium bioassay of resident in Wolsung

- **Future prospects**
 - Preparation of radiation protection for decommissioning
 - Paradigm shift of ALARA culture and micro-Sivert (including tritium reduction)
 - Application of up-to-date ITs to radiation protection management
 - Maintaining the measurement/calibration authority of plants