

2010_ISOE_Asian ALARA Symposium

Current Status of Radiological Protection in NPPs of Korea

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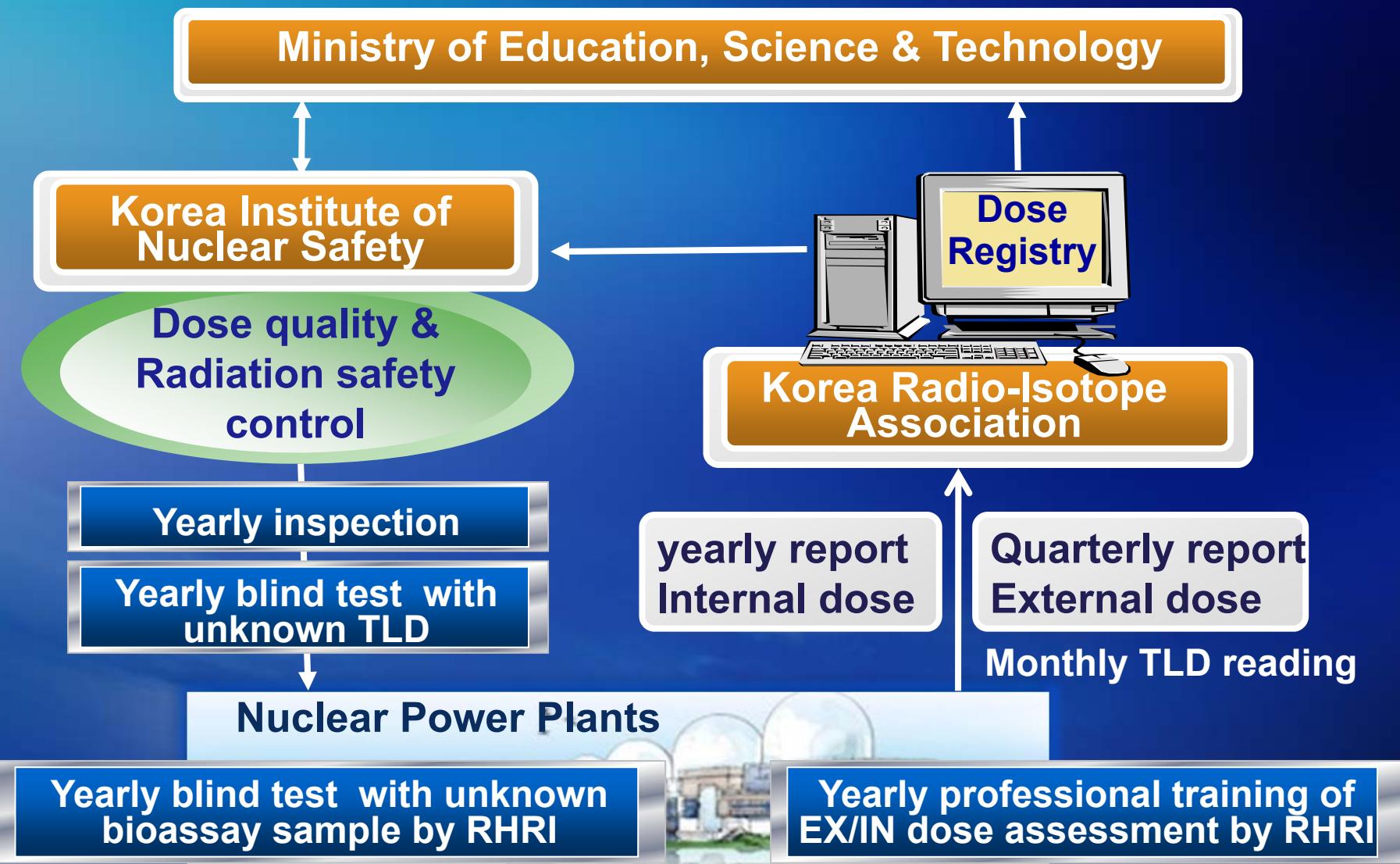
-  **National accreditation program of radiation dosimetry system**
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-  **NPP's ALARA program**
-  **Exposure trends of NPP workers**
-  **RHRI's activity for NPP's RP**

National accreditation program of radiation dosimetry system



KHNRP - Radiation Health Research Institute

National accreditation program of radiation dosimetry Sys



Every two reactors have a TLD reading facility and an internal dosimetry facility

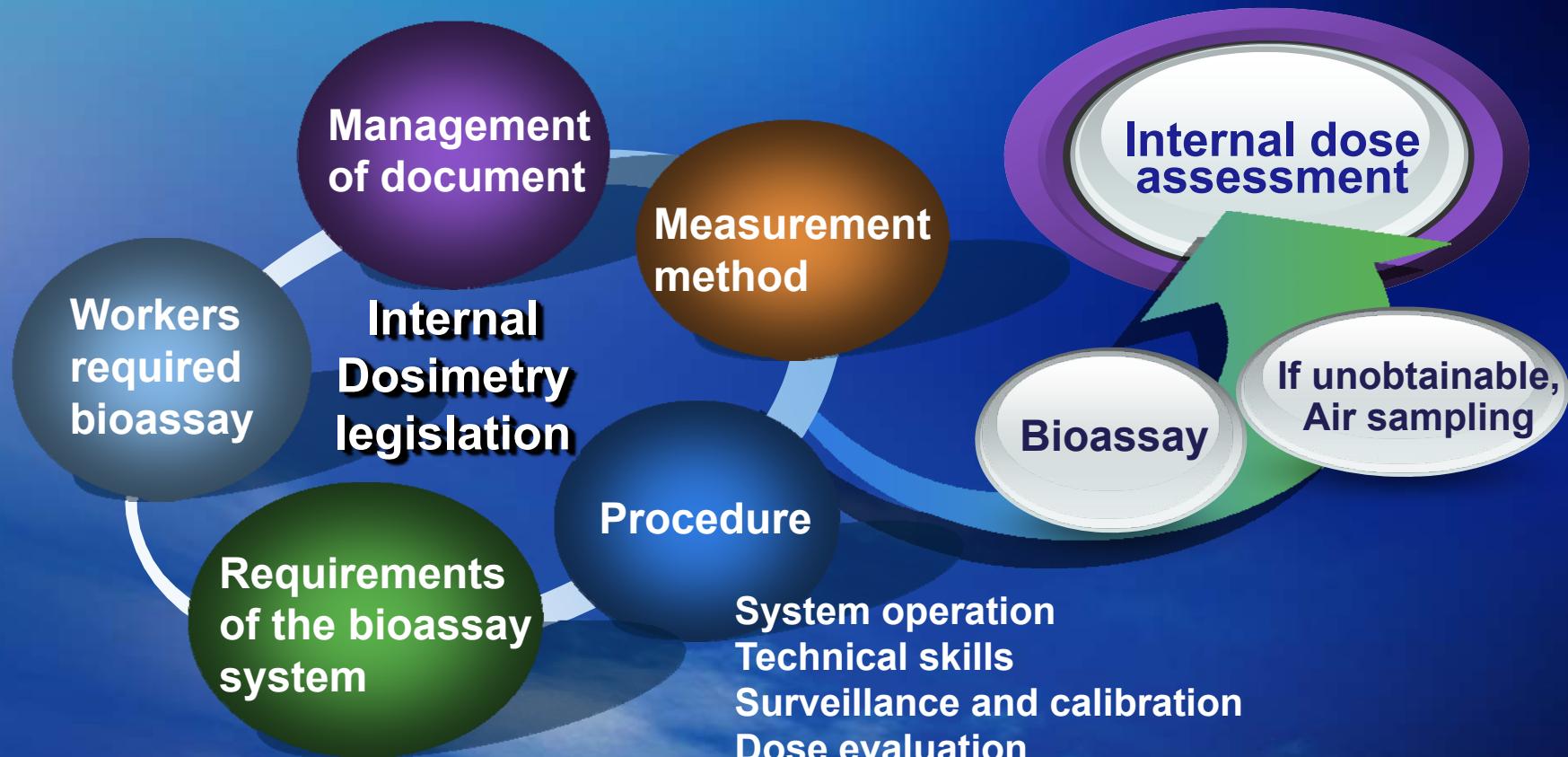


Legislation of dose quality control – External dosimetry





Legislation of dose quality control – Internal dosimetry



NPP's dosimetry system



KHNRP - Radiation Health Research Institute

Present state of nuclear power plants in Korea

Kori unit 1 started commercial operation in 1978

The first Korea Standard Nuclear Power Plant(Ulchin unit 3, OPR-1000) completed the construction in 1998

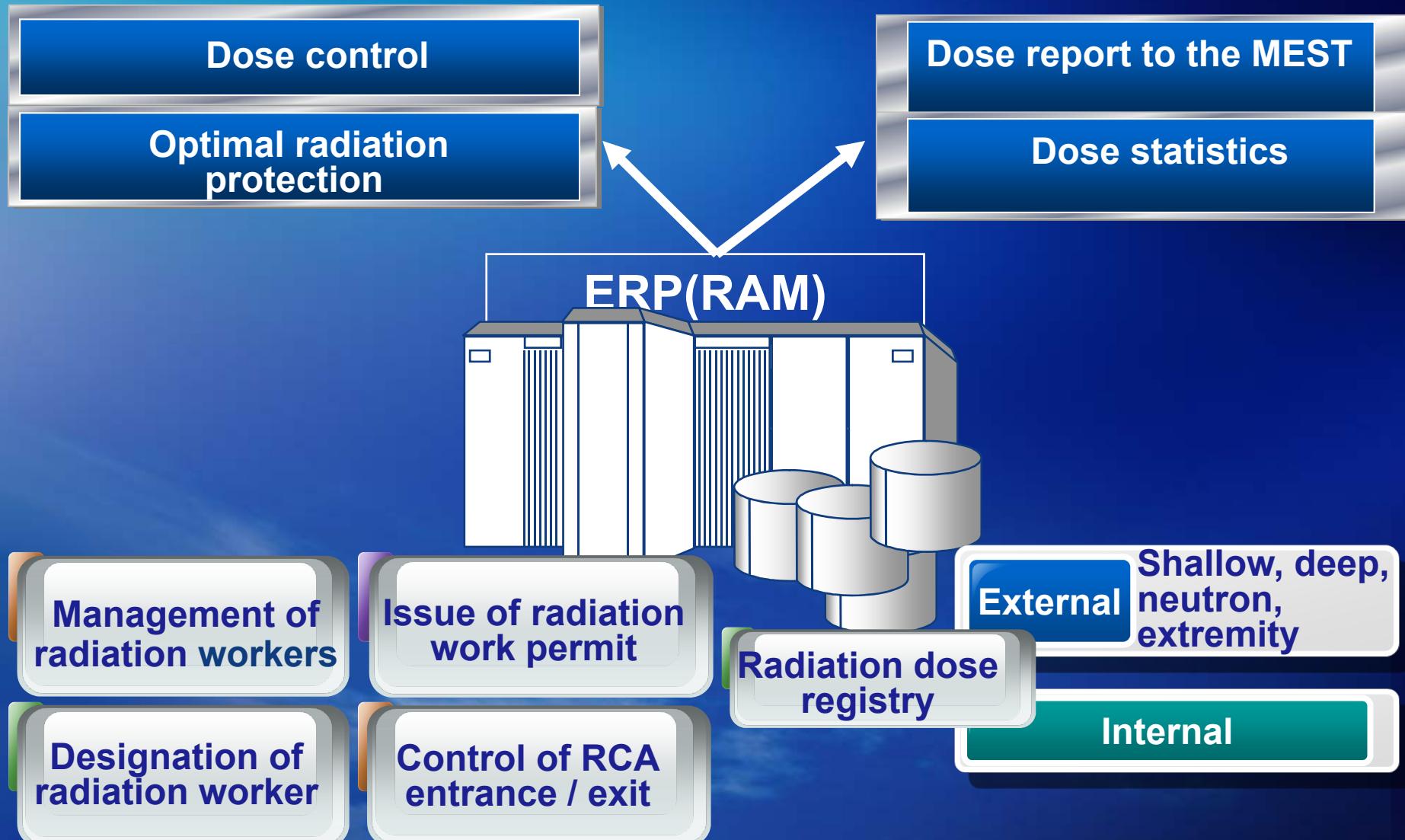
The first concrete casting for 1.4 million kW-level(APR-1400) Shin-Kori uint 3 in 2008



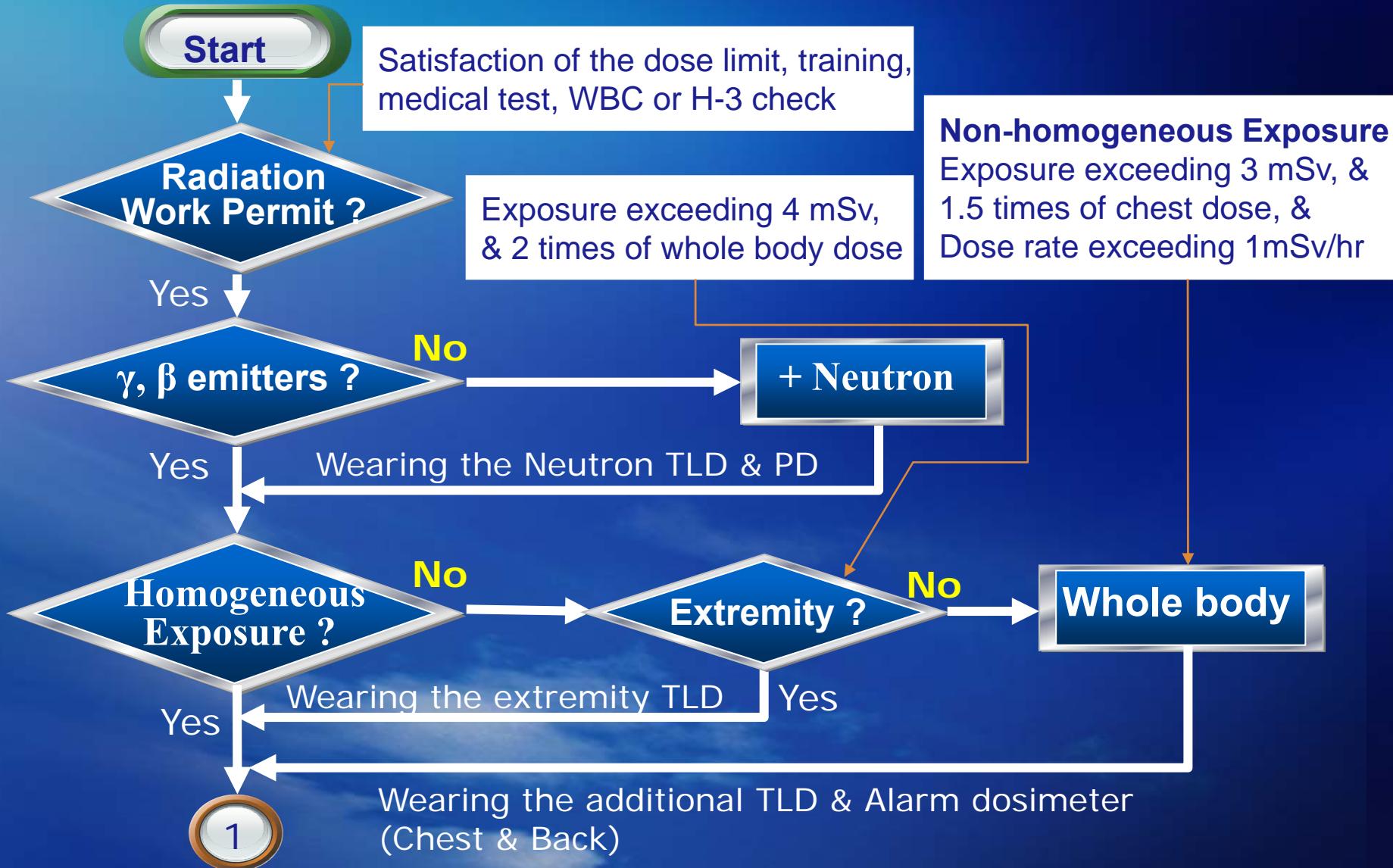
20 units in operation
(16-PWR, 4-PHWR)

24 % of power facility &
36 % of electricity use

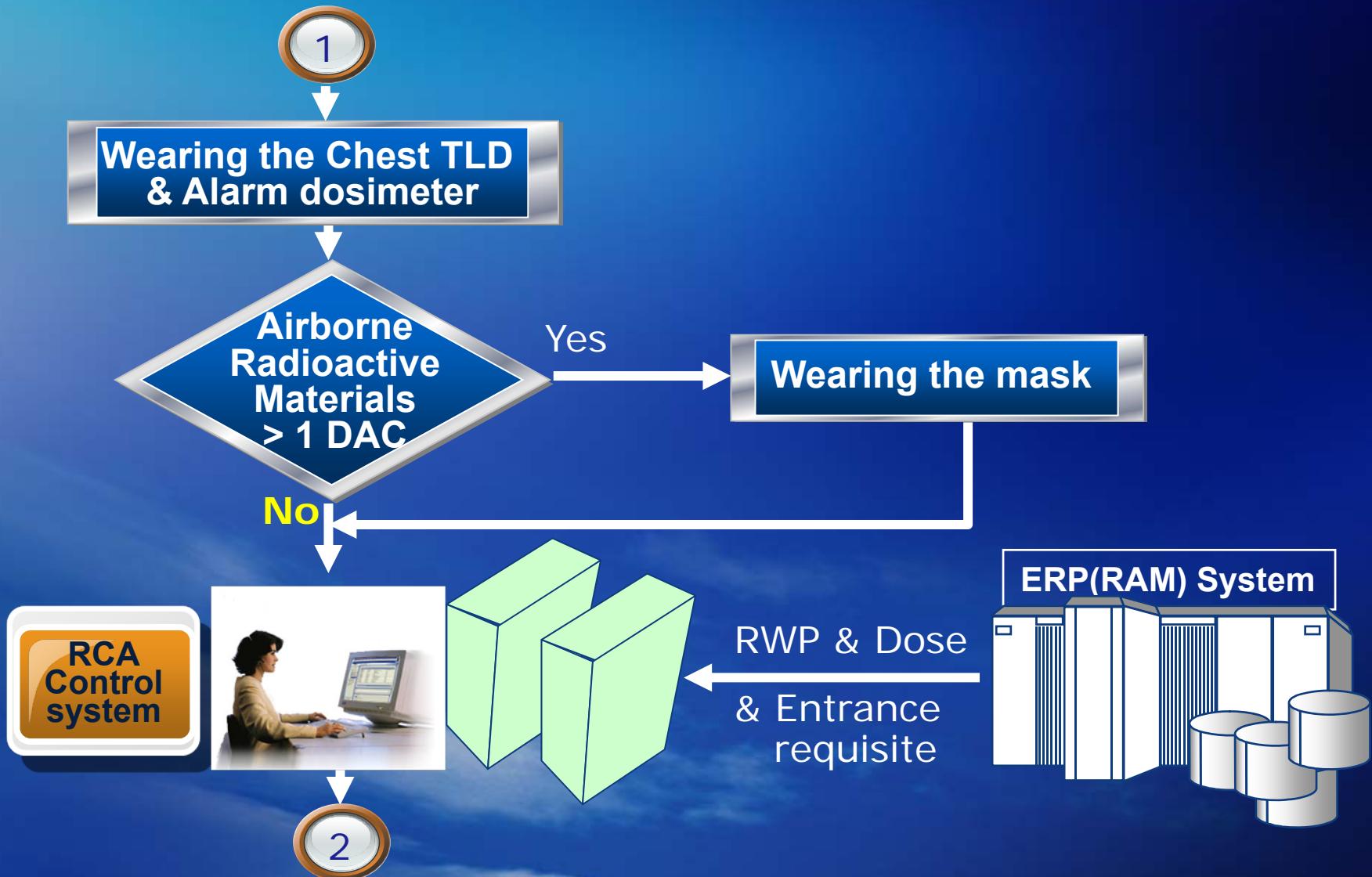
NPP's dose registry system



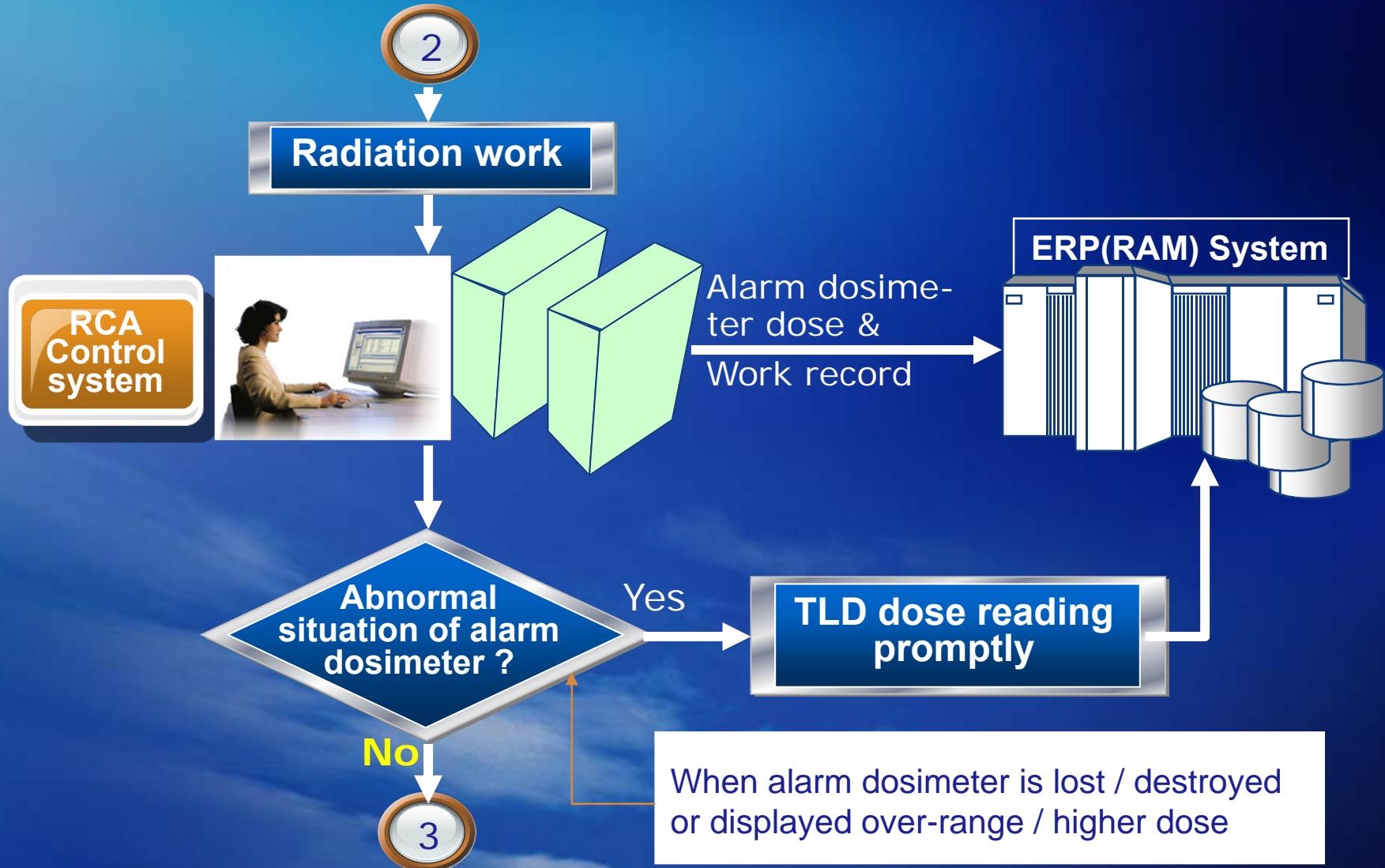
NPP's radiation exposure control



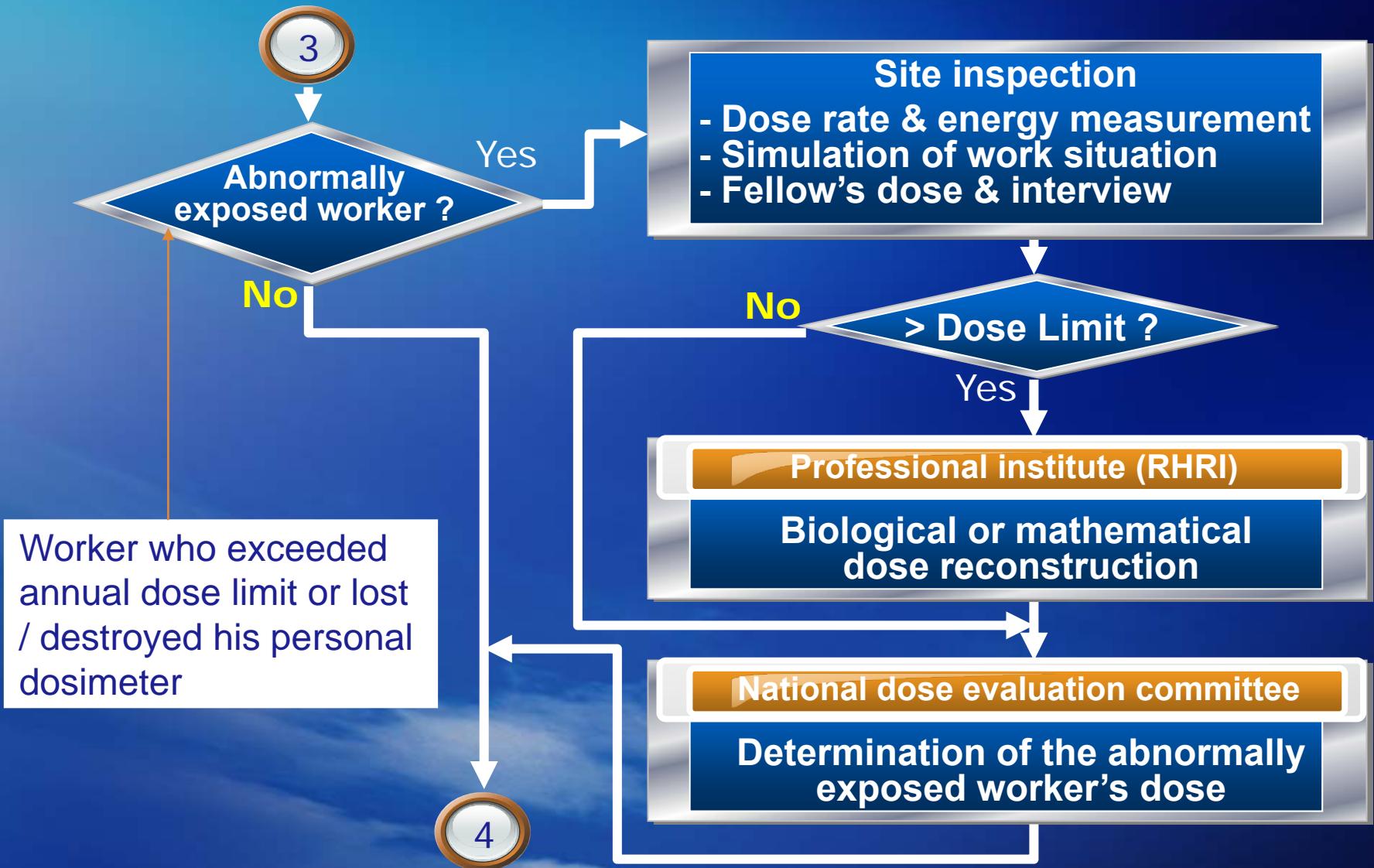
● NPP's radiation exposure control



NPP's radiation exposure control

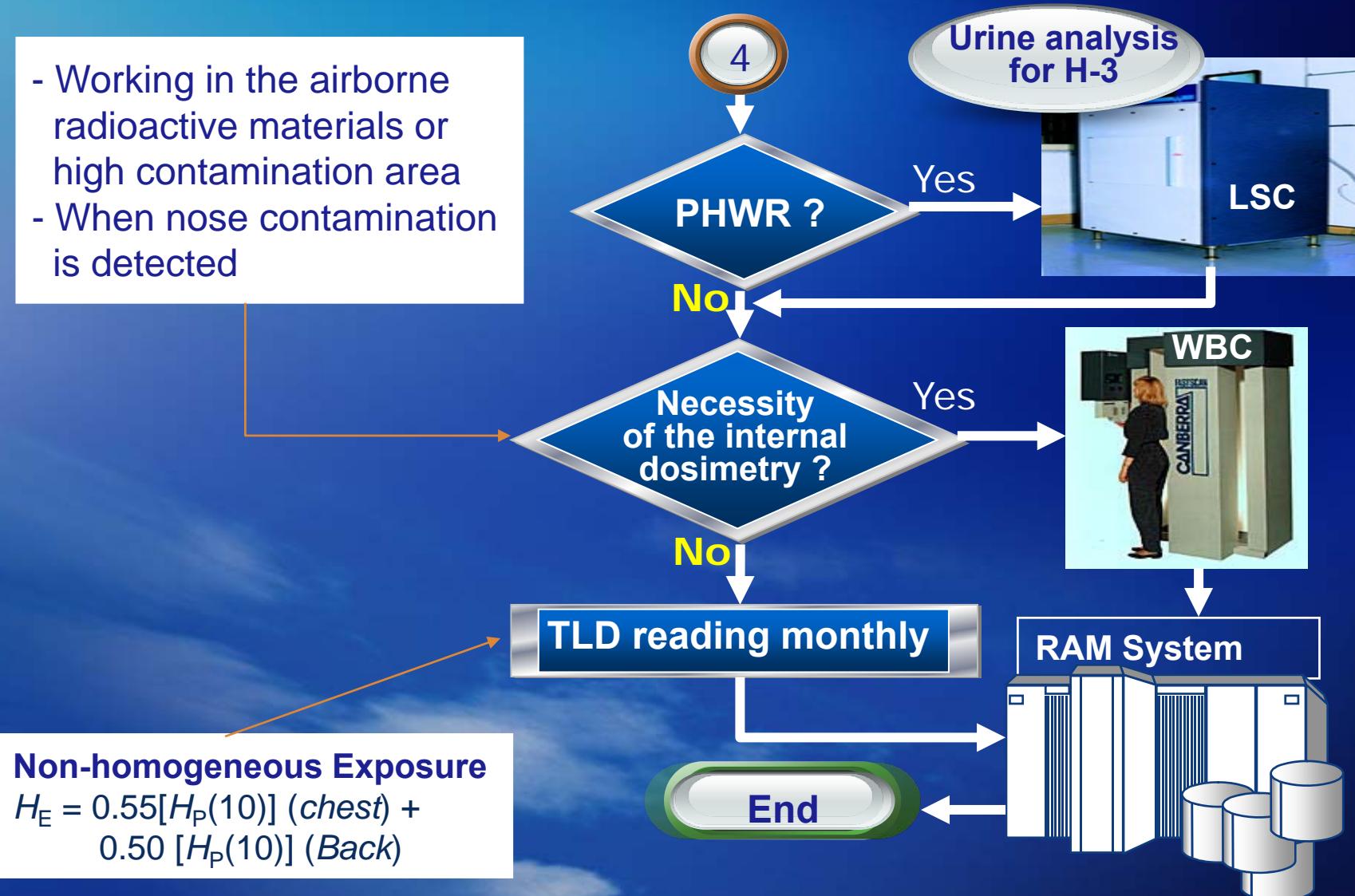


NPP's radiation exposure control



● NPP's radiation exposure control

- Working in the airborne radioactive materials or high contamination area
- When nose contamination is detected



NPPs' ALARA Program



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Laws regarding ALARA

Korea atomic energy law

1995 :
Adoption of the “ALARA” concept

Release quantities of radioactive material to the environment
and occupational radiation doses are maintained ALARA

↓
Enforcement Ordinance

1999 :
Requirement to implement “ALARA”¹⁾

↓
MEST notice

2000 :
Requirement to implement “ALARA”²⁾

Equipment improvements for ALARA in existing NPP

- ✓ KHN has performed a substantial amount of equipment improvements in order to meet the dose limitations



PSAR

preliminary safety analysis report

ALARA Design of Korea standard nuclear power plant

- ✓ KSNPs are being constructed with an enhanced design based on the experiences of the existing plants.



**Year of 2008, average individual dose → 1.1 mSv/yr
KSNP → 0.5 mSv/yr**

KHN's ALARA program

ALARA Procedure in operating NPP

Any Works

Expected dose
Under 10 man-mSv

Expected Dose
10 ~ 70 man-mSv

Expected Dose
70 ~ 200 man-mSv

Expected Dose
Over 200 man-mSv

Use general RWP

- Use RWP
- Evaluate expected dose

Work group should make
- Expected Dose sheet and ALARA check list

ALARA Subcommittee(Committee)
Review & approve

Feedback

Review after works and
If actual dose exceeds 25% of expected dose

ALARA subcommittee (Committee) Review, discuss
& apply : dose reduction method to repeated works

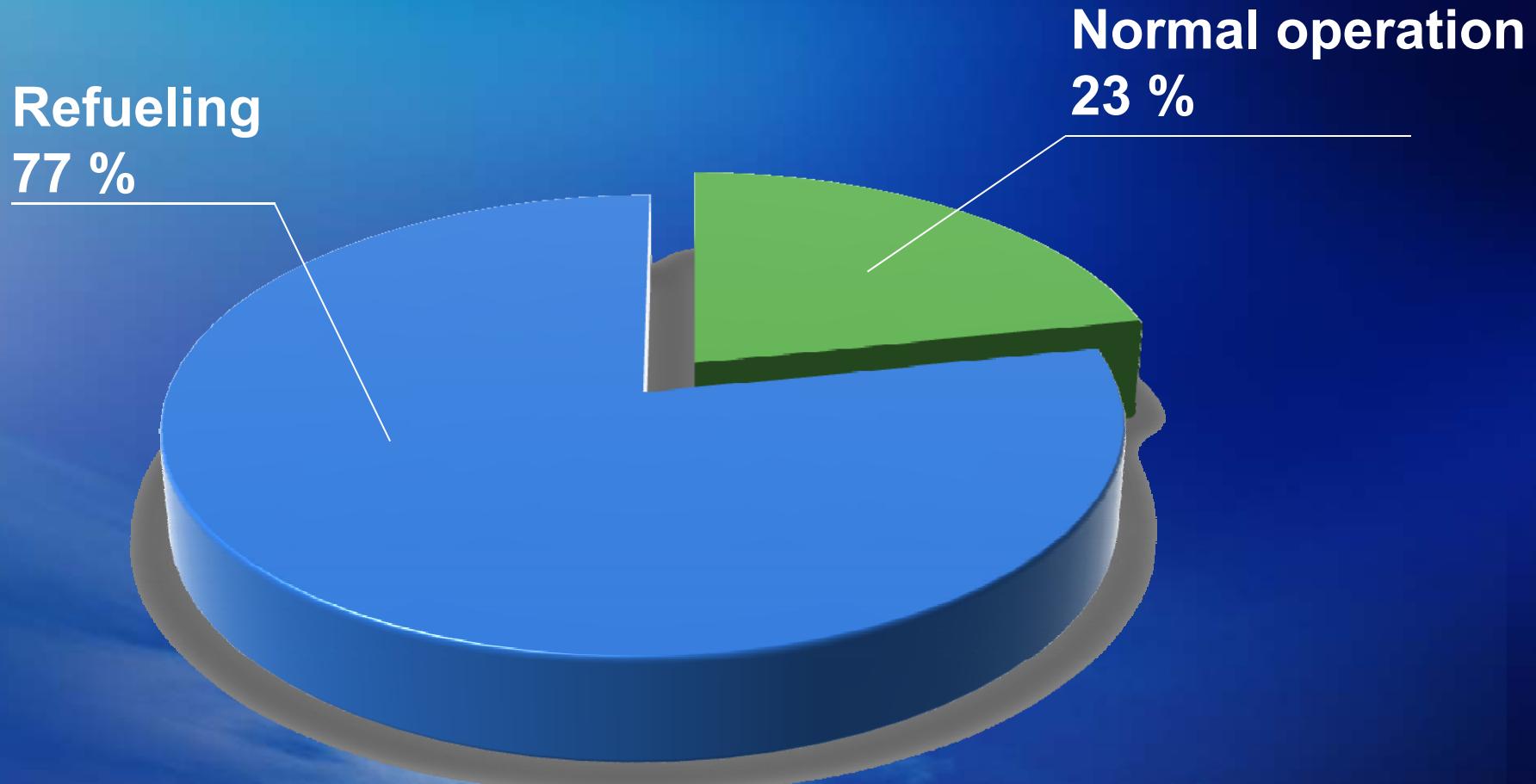
Exposure trends of NPP workers



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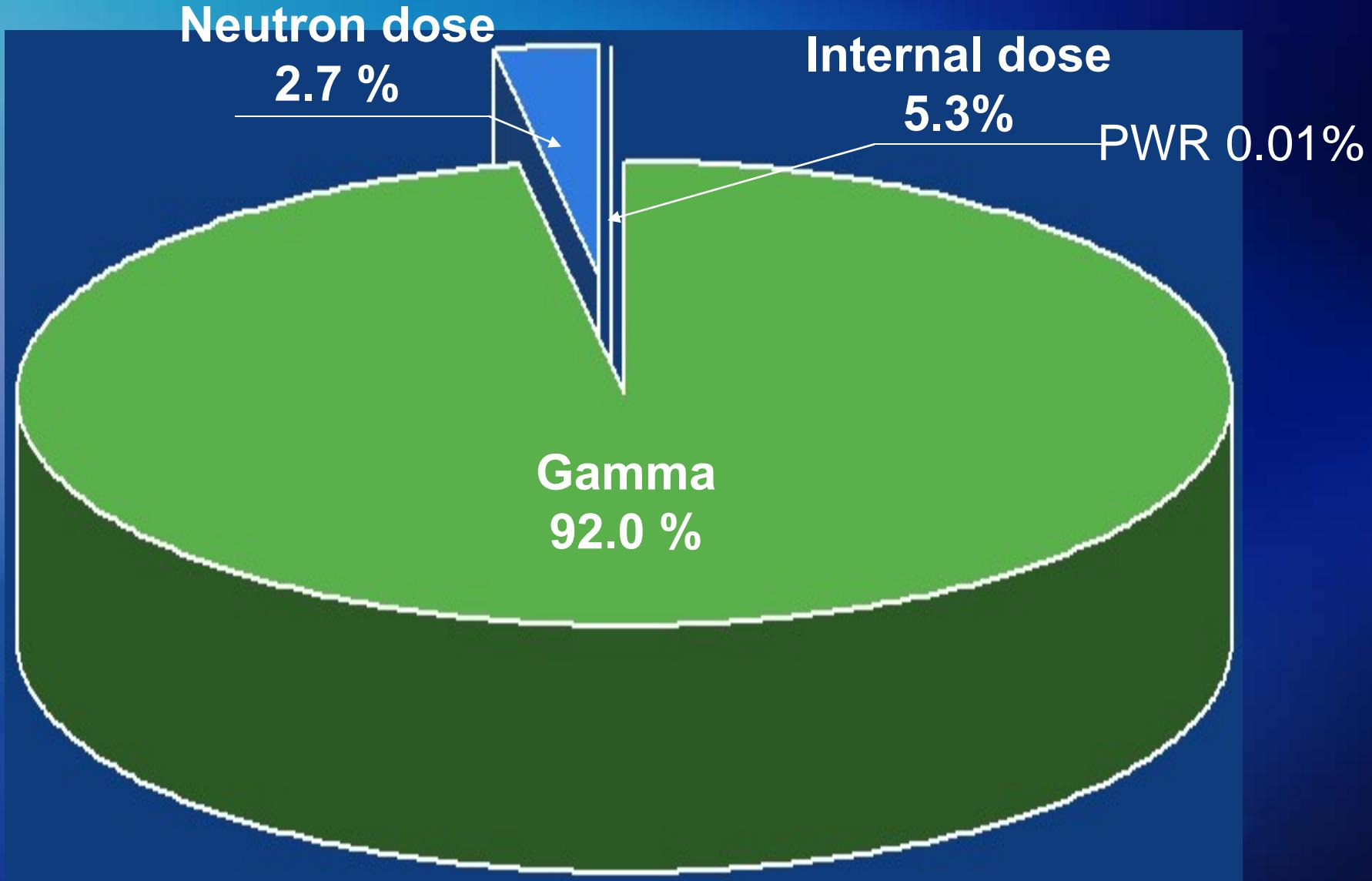


Dose distribution by operation state (1990 ~ 2007)

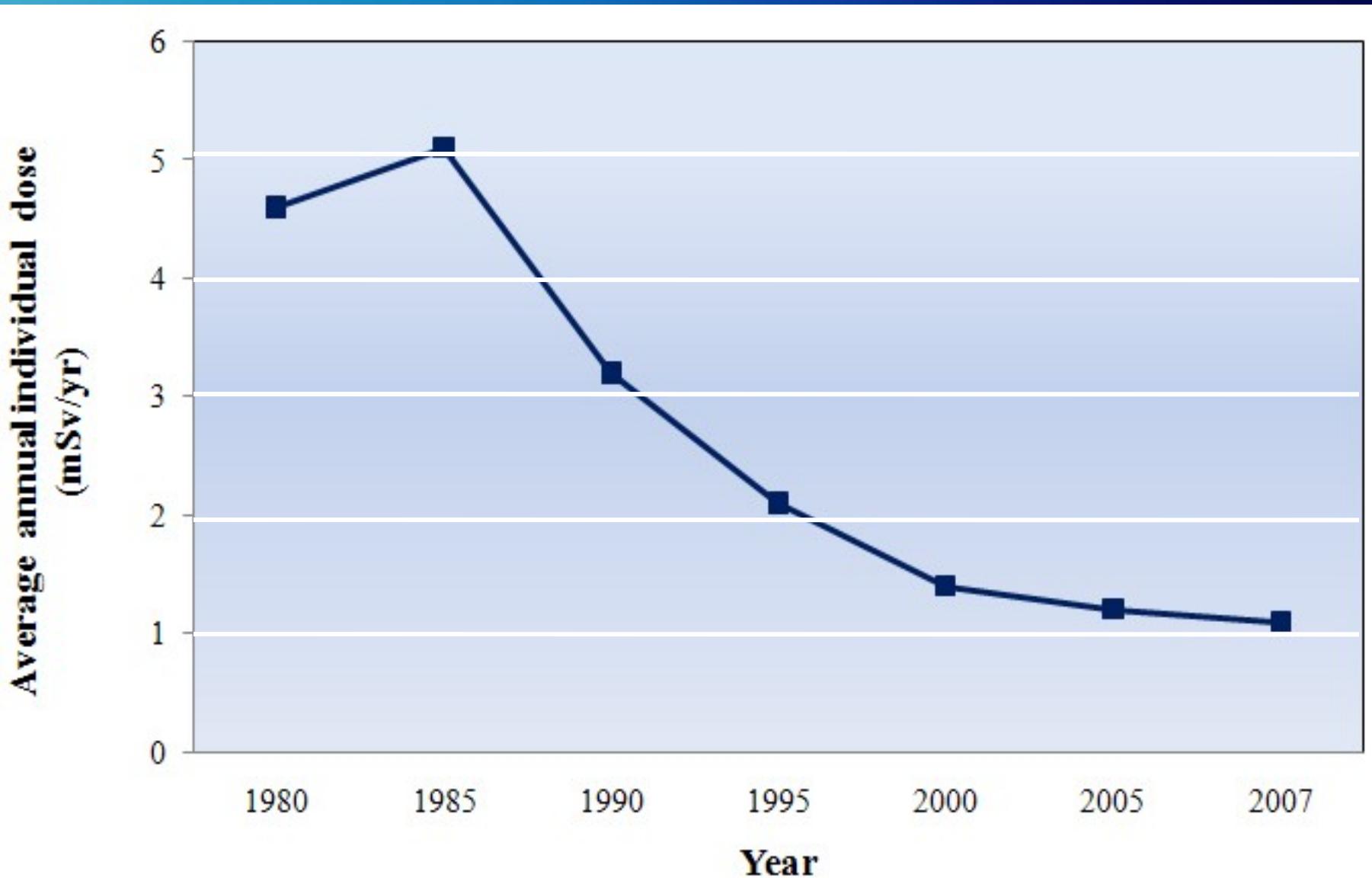




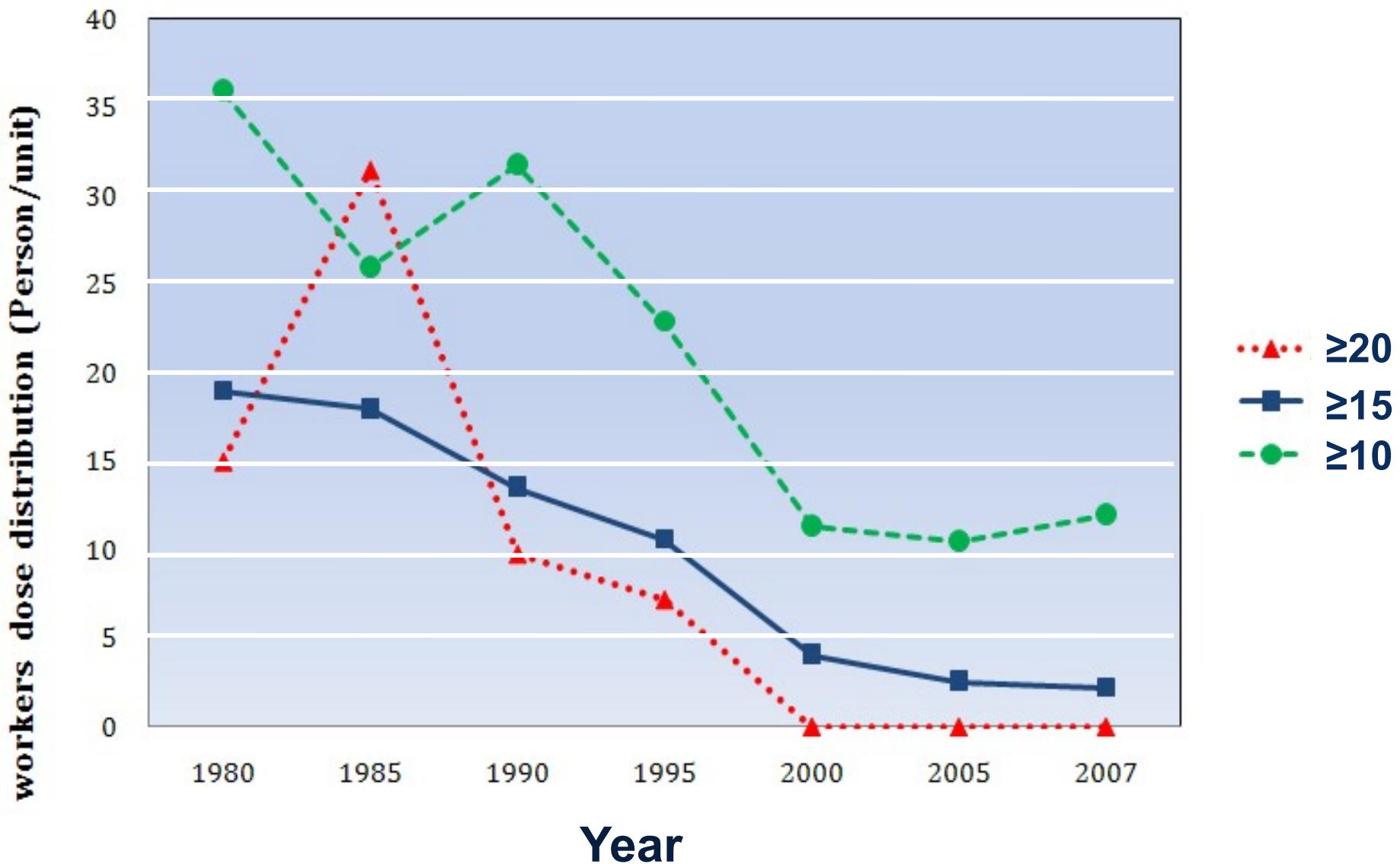
Dose distribution by exposure type (1990 ~ 2007)



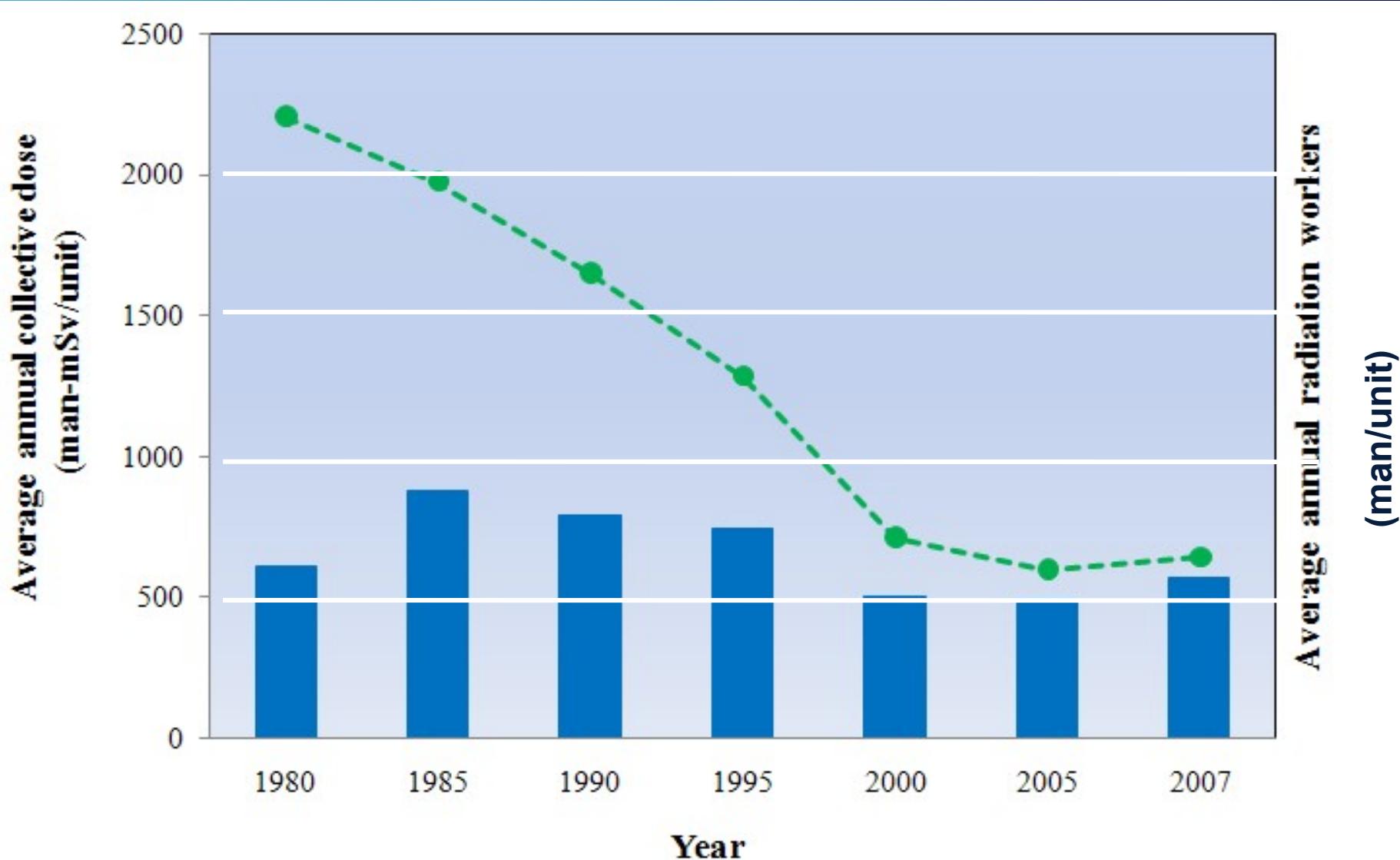
● Annual individual dose trend of NPP workers

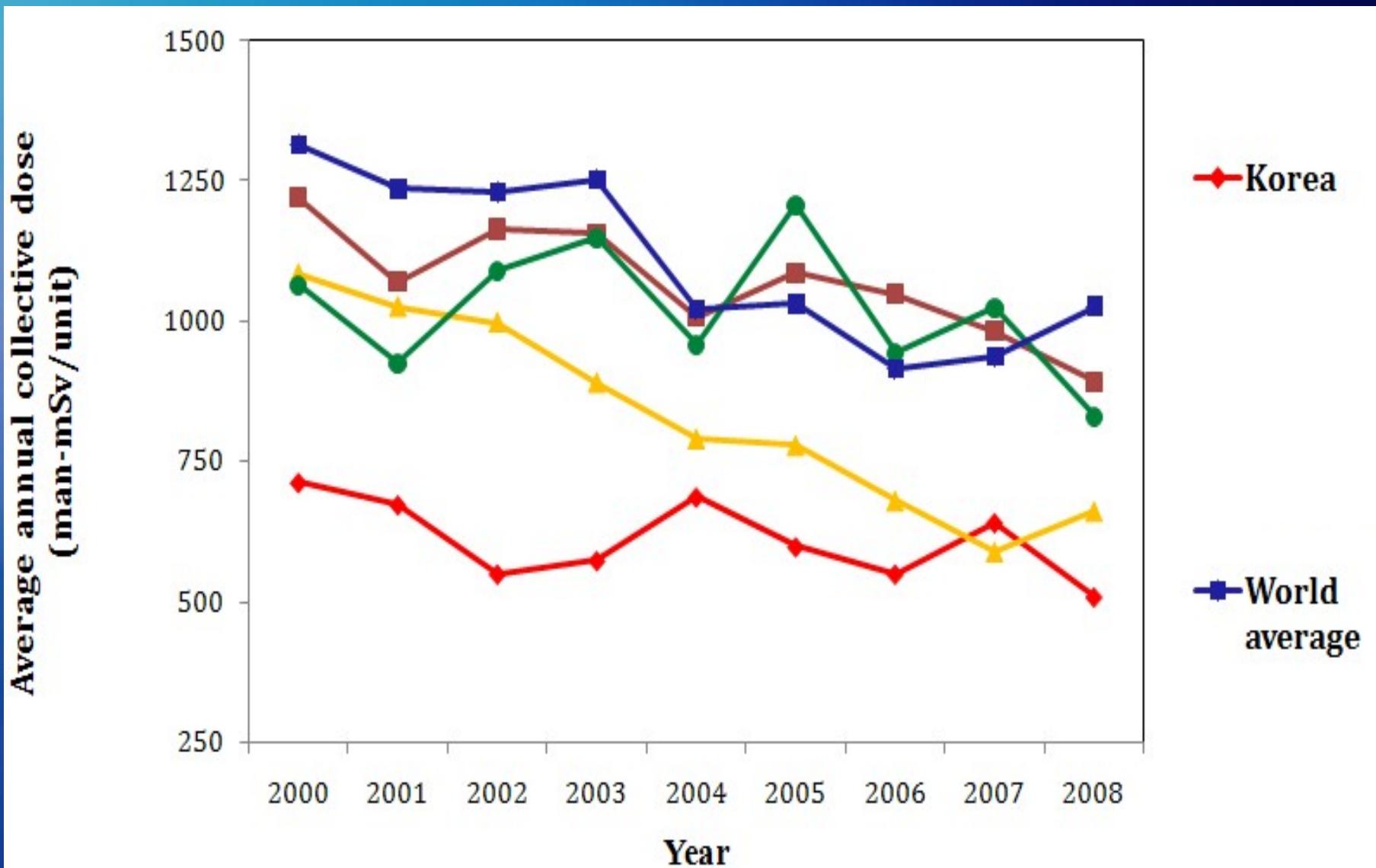


Radiation dose distribution of NPP workers



● Annual collective dose trend of NPP workers





RHRI's Activity for NPP's RP



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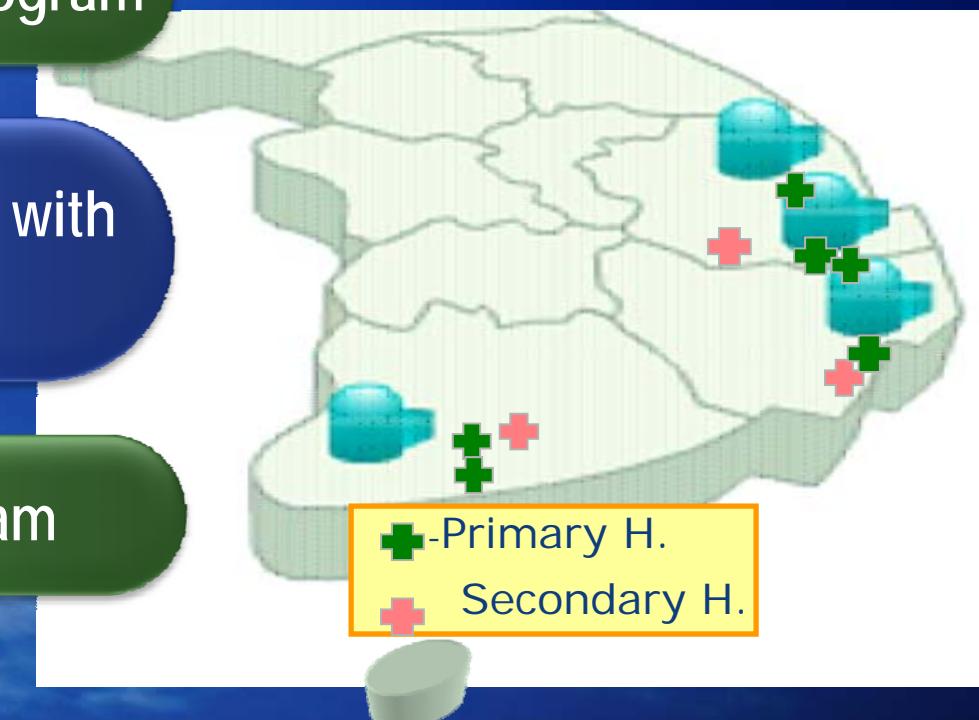
● Radiation emergency medical preparedness for NPP

WHO/REMPAN Liaison Institute

24hr Emergency Response Program

Maintenance of REMP system with
NPP appointed hospitals

Education/ Training Program



* REMP : Radiation Emergency Medical Preparedness

● Accidental dose evaluation system

Decision-making for the treatment of patient caused by radiation exposure

Biological Assessment

CA, FISH, MN, PCC

Clinical Evaluation

Clinic symptoms

Radiation Dose
Assessment

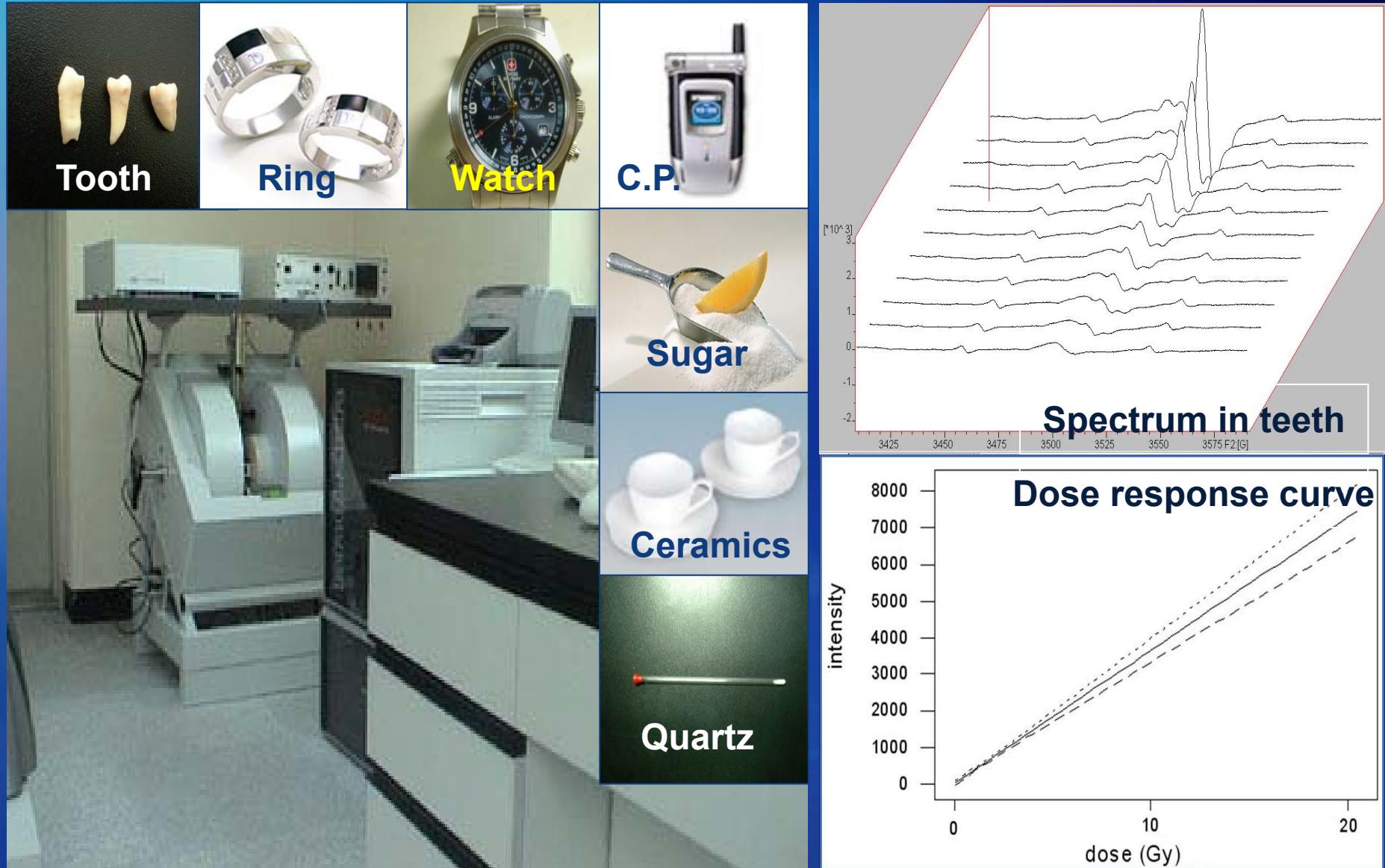
Physical Assessment

ESR, WBC, LSC
Body Activation Analysis

Mathematical Assessment

MCNP, VOXEL

Electron Spin Resonance System

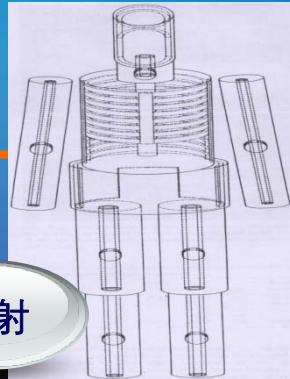


Body Activation Analysis System

NPP



照射



血液分析



AAS



HPGe

Neutron spectrum
: Excel 開發



KBADA

Dose assessment
S/W:Visual Basic 開發

Water Slab Phantom : 製作

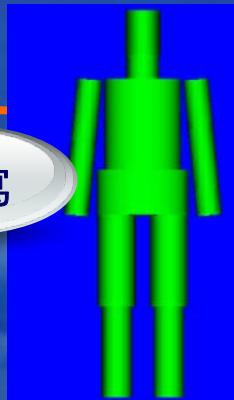


Modified
BOMAB : 製作

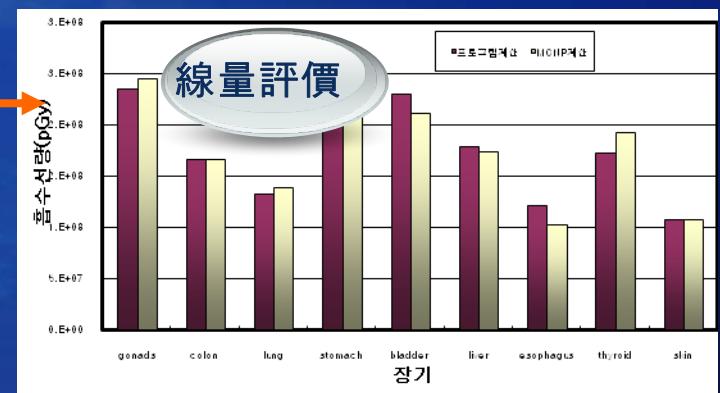


MCNP-X

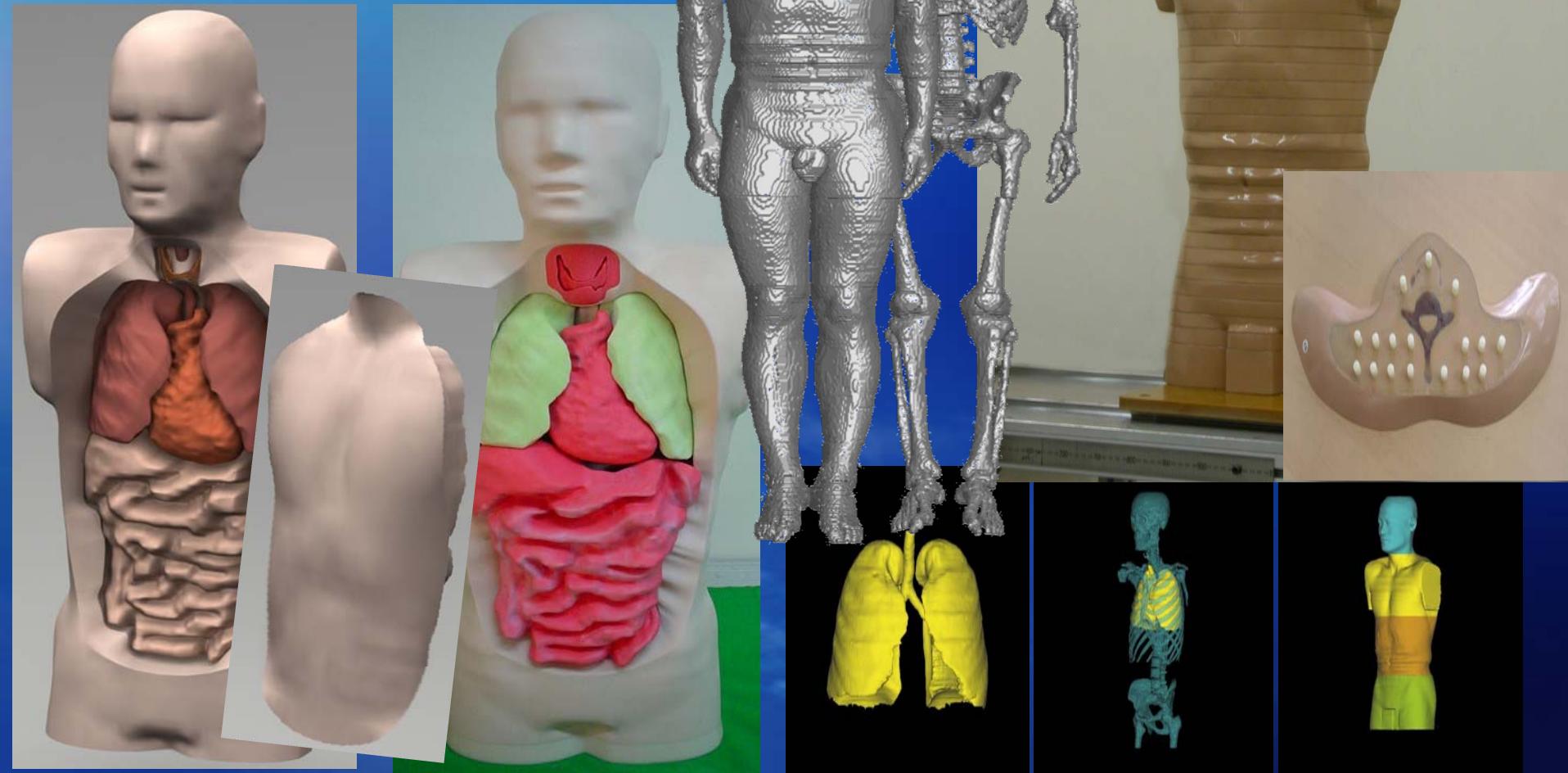
模寫



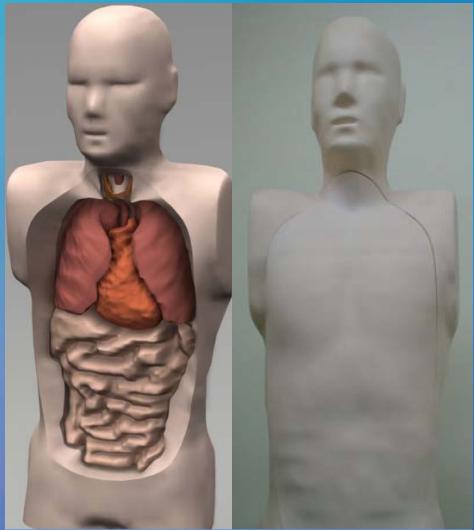
線量評價



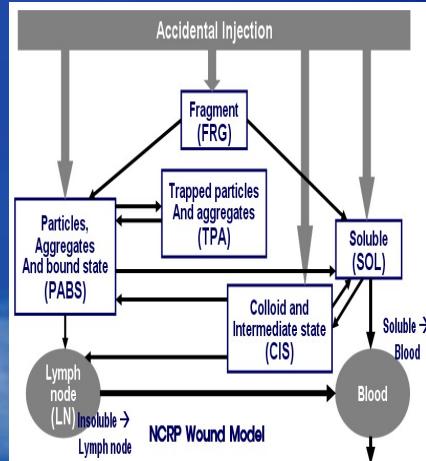
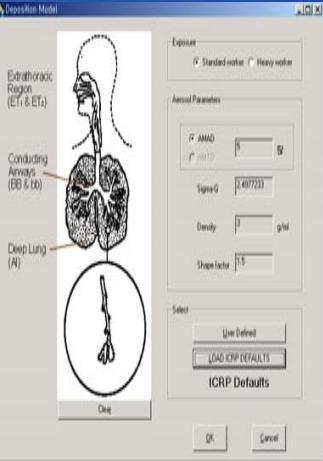
• Development of Korean Phantom



Study on internal dosimetry



Technical support about
Internal dosimetry for
NPPs in Korea

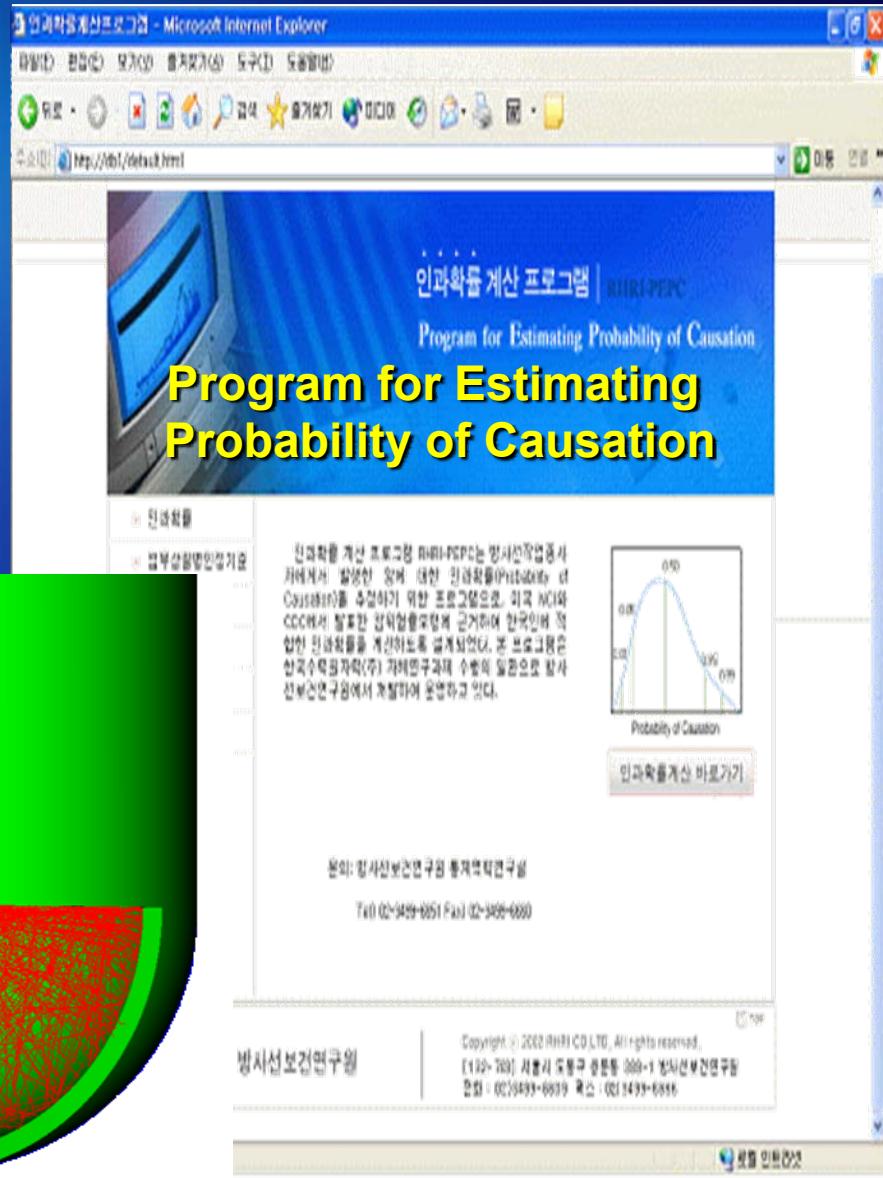
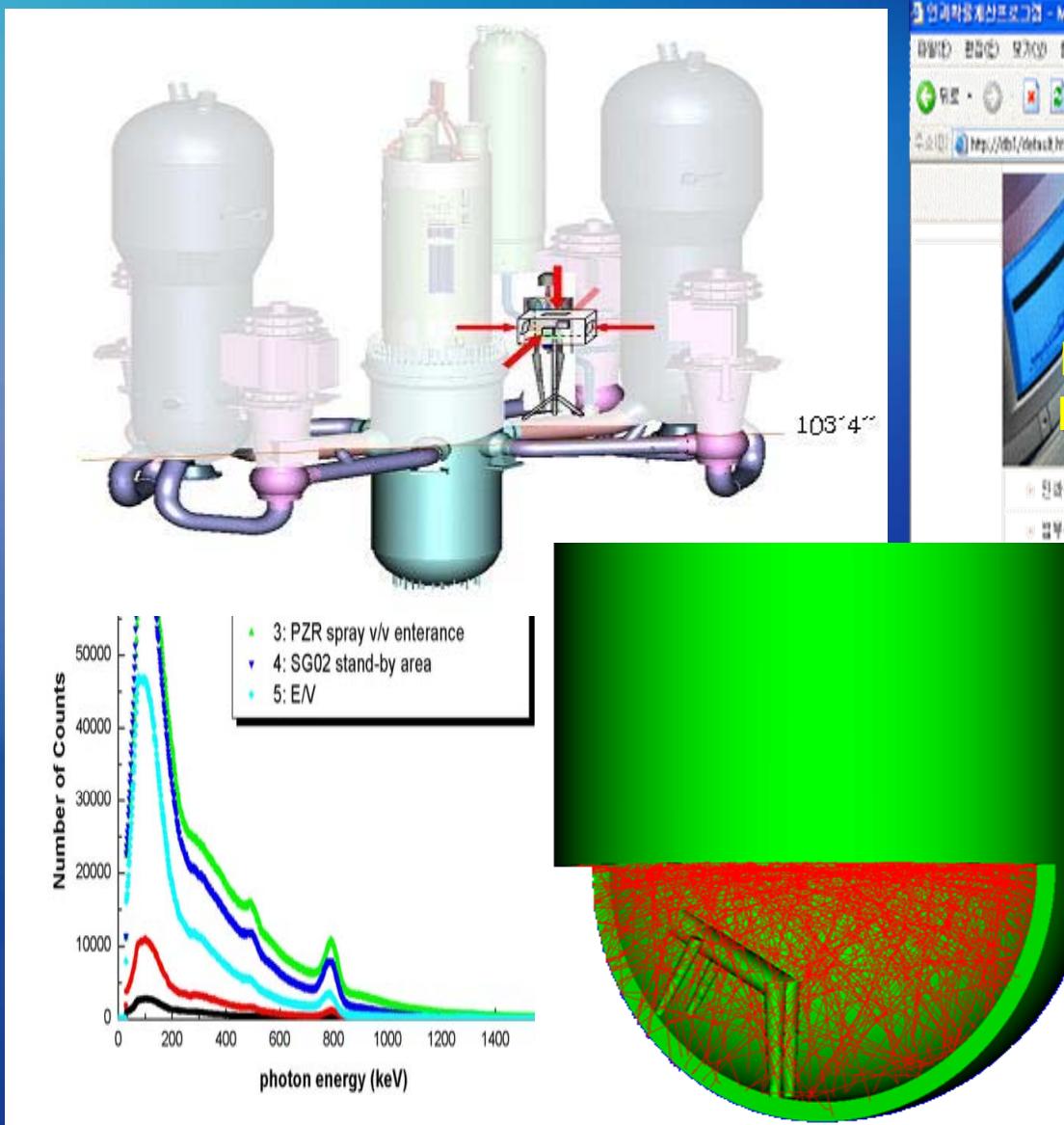


IDEAS Guideline

Wound model

Training of
Guide S/W 開發
NPP members

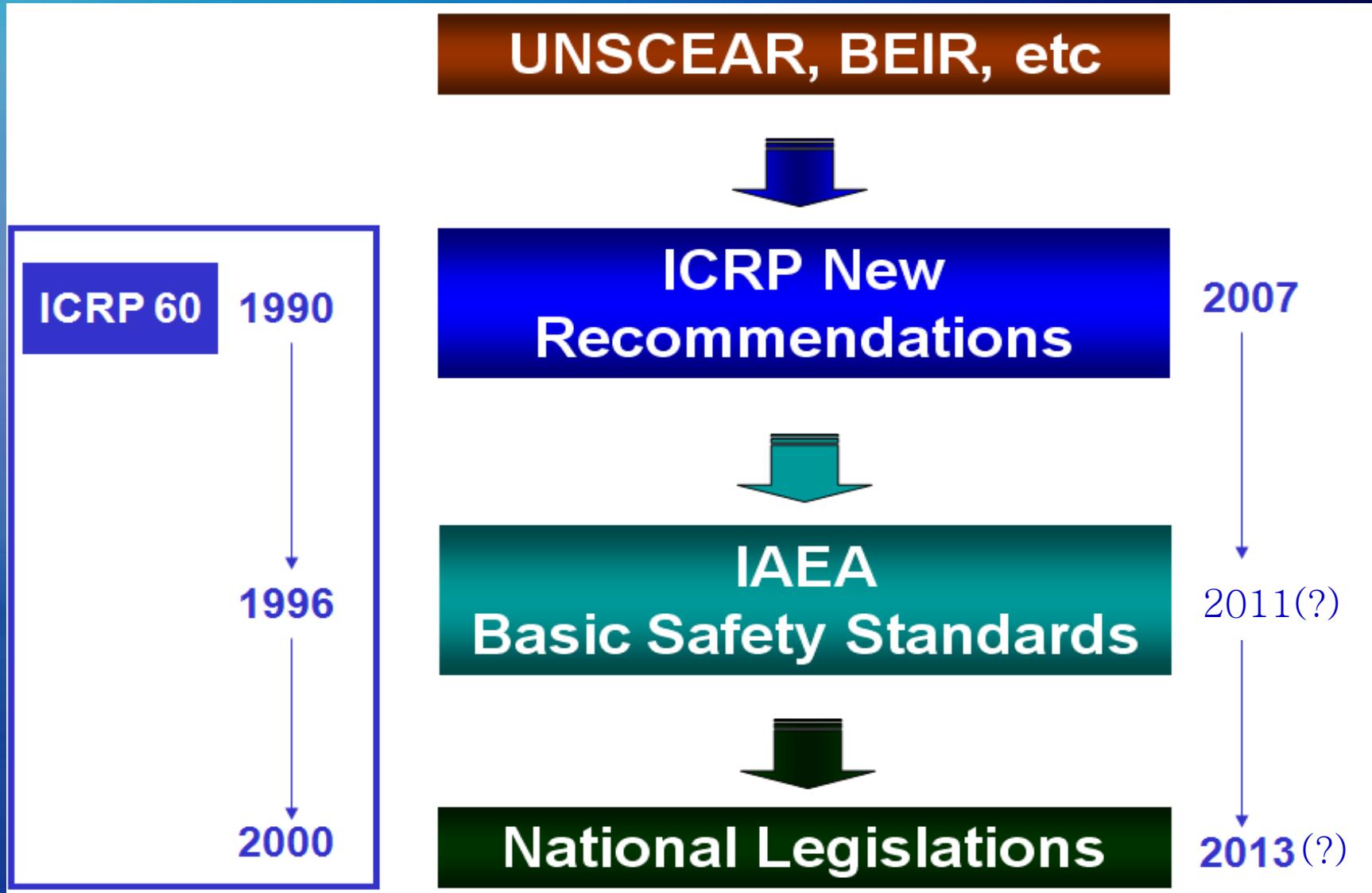
● Radiation dose reconstruction, PC calculation & epidemiologic investigation



● Low dose radiation research



Application study of ICRP new recommendation





Thank You !



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