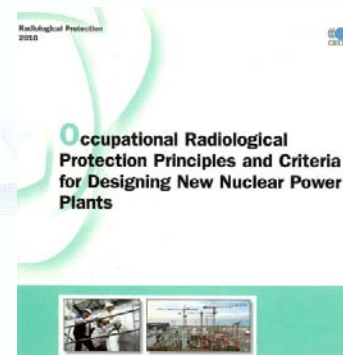


# Occupational radiation protection principles and criteria for designing new nuclear power plants

*introduction of the publication*

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# 2011 ISOE North American ALARA Symposium and EPRI Radiation Protection Conference

- Presentation by Richard Doty, in collaboration with Willie Harris and David Miller, members of the Expert Group on Occupational Exposure, January 2011

# Why it is important to address ORP at the design stage?

consider **full life-cycle at the design stage**



Available feedback from maintenance and dismantling



Organize **training and knowledge management through extended life-cycle** (2-3 generations of workers)

Importance of networking to enable **information collection and exchange** on ORP during design and over the full life-cycle

integration of ORP into the design may **save time, money and exposure** during subsequent operation

## New paradigm: From “a posteriori” to “a priori”

- ORP for future generations of workers (design for 60 or more years)
- Integration of ORP in the design and conception phases
- Identification and optimization of cost - benefit
- Precaution for reduced exposures over the full NPP life cycle (operation, maintenance, transport, decommissioning)
- Risk - balanced optimization, considering
  - other health hazards for workers
  - exposure of worker vs. public, environmental, regulatory needs
- Awareness of the positive as well as negative aspects of ORP

Based on experience of experts and feedback from existing facilities

## Intended audience and aims

### Audience

1. Executive management of nuclear power plants
2. Designers
3. Manufacturers
4. Contractors
5. Authorities responsible for regulating occupational radiation exposure
6. ALARA Committees

### Aims

1. Assist in assessment of ORP aspects of design and license applications
2. Provide for a technical framework for making judgements on ORP at the design stage
3. Provide examples of actual tools (e.g. ALARA committees)
4. Provide guidance on using ALARA checklists

## What is in the report?

### Major issues addressed in individual chapters

**Occupational radiation protection principles at the design stage of nuclear power plants**



Lessons learned, knowledge management, education and training



Integrating occupational radiation protection criteria during the design phase



Evaluation and integration of occupational radiation protection cost in design process

## Structure of the publication

1. Executive summary page 9
2. Introduction and scope 15
3. 4 chapters on different aspects of ORP,  
including 14 sub-chapters 21
4. Conclusions 61
5. Five appendices 65

Foreword, List of acronyms, Figures, References  
108 pages

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Free download: <http://www.nea.fr/rp/reports/2010/nea6407-occupational-rp.pdf> .

# Chapter Titles

- ORP principles at the design stage
- Lessons learned, knowledge management, education, and training
- Integrating ORP criteria during design
- Evaluation and integration of ORP cost into design



# Titles of Appendices

- ALARA design check-list
- ALARA engineering design principles
- Application of ALARA to facility system design
- Applications for licenses – design aspects re ORP
- Optimisation of ORP in the design of the EPR

## Major conclusions

### Issues to be addressed at the design phase

1. Basic ORP principles – **justification, optimisation and dose limitation** - are to be maintained through the expected full life-cycle, addressing also international and national guidance and regulations.
2. **Optimisation** should consider not only **potential health risks** from ionising radiation, but also **other potential risks to the workers' health** in order to **allocate resources** in a well balanced way so that the best worker protection is achieved.

## Major conclusions, cont'd.

3. Organisation of **training and knowledge management** is to ensure the availability of highly qualified personnel and adequate **design-basis documentation** over the full lifetime of the facility, from design to decommissioning.
4. Active **networking in support of information, experience and data exchange and assessment** is needed to maintain sustainable **implementation of good practice**, and ensure an effective traceability and use of lessons learned.

## Major conclusions; cont.

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- 5. Integration of ORP principles and criteria into all components and future operations is needed to save time, money and exposure over the lifetime of the facility.**

## Issues not to be forgotten at the design stage

### Cooperation

Multi-disciplinary and multi-organisational co-operation on ORP decisions at the **design stage** is important.

### Cost

Evaluation of **investment and maintenance costs** related to ORP will be important at the **design stage**

### Experience

Recognising the importance of building on **existing experience, knowledge management structures, processes and procedures** (*related to ORP*) must be **designed** into future plants.

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## Examples of CRPPH Activities of Working parties and Expert groups:

- Nuclear Emergency Matters (WPNEM)
- Occupational exposure (**EGOE** and ISOE)
- Best Available Techniques (EGBAT)
- Qualified Human Resources (EGQHR)
- Radiological Protection of the Environment (EGRPE)
- Implications of ICRP Recommendations (EGIR)
- Evolution of the System of RP (Asian conferences and Science & Values workshops)
- Exclusion of Reactors in Decommissioning from the Paris Convention
- Consumer Products Containing Radioactive Substances

# CRPPH Expert Group on Occupational Exposure

***Scope : Policy and strategic areas of occupational radiation protection with a focus on the nuclear power sector***

***Subjects being addressed:***

***ORP principles and criteria for designing new NPPs (2007-2010); published in 2010***

***Implementation of ICRP recommendations - focus on dose constraints; foreseen to be completed in 2011***

***Radiological protection policy and operational issues***



# Occupational Radiological Protection Principles and Criteria for Designing New Nuclear Power Plants



# Thank you for your attention