

A photograph of a modern building with a facade of vertical, metallic-looking slats. The building is multi-storied and has a geometric, angular design. The sky is clear blue. In the foreground, there are some trees and a paved area.

# ISOE European Symposium Uppsala, 26 - 28 June 2018

## Summary and outcomes

*C. Schieber*  
*ISOE-ETC*



Distinguished Oral Presentation

**UK Regulatory Approach to ALARA in Light Water Reactors at  
the Design Stage**

***Vaughan Rees (ONR, UK)***



## Distinguished Oral Presentation

### Status of Readiness for Lens Dose Limit Change

*Madelene Johansson (Ringhals NPP, Sweden),*

*Virva Nilsson (Forsmark NPP, Sweden)*



## Distinguished Oral Presentation

### **Organization to Fight against Workers Internal Alpha Contamination in Decommissioning Works at Saint-Laurent A**

*Jérôme Laurent (EDF DP2D, France),  
Benjamin Boussetta (EDF DIPDE, France),  
Gilles Ranchoux (EDF DP2D, France)*



**Distinguished Oral Presentation**

**Operational Experience of the first Dry Fuel Storage  
Campaign at Sizewell B NPP**

***Richard Parlone (Sizewell B NPP, UK)***



Distinguished Poster

**Simulation and Prediction of Dose Rates at Interim Storage  
for Spent Fuel at Dukovany NPP**

***Kristýna Gincelová (Faculty of Nuclear Science & Physical  
Engineering of Prague, Czech Republic),  
František Klímek (CEZ, Czech Republic)***



Distinguished Poster

**WasteApp – A Mobile Application for a Supervised Process  
for Radioactive Waste Management**

***Thierry Boisserie (EDF/UTO, France)***

# Participation

## 147 Participants 25 Countries

- *Armenia*
- *Austria*
- *Belgium*
- *Brazil*
- *Canada*
- *China*
- *Czech Republic*
- *Finland*
- *France*
- *Germany*
- *Hungary*
- *Italy*
- *Japan*
- *Republic of Korea*
- *Romania*
- *Russian Federation*
- *Slovenia*
- *South Africa*
- *Spain*
- *Sweden*
- *Switzerland*
- *The Netherlands*
- *United-Kingdom*
- *United Arab Emirates*
- *United States of America*



# **Presentations, Posters and Exhibition**

- **8 Themes**

- RP Program
- Source Term Management
- RP at decommissioning stage
- RP Regulations: guidelines and Implementation
- Accident Management
- RP Indicators
- Contamination Management
- Job Experiences

- **32 Oral Presentations, 14 Posters**

- Soon available on the ISOE-network website

- **9 Vendors**

# Summary and outcomes (1)

## Session 1. RP Programmes

- The 21<sup>st</sup> Century is providing **technologies that need to be explored, adapted and used to facilitate and improve RP performance** : use of remote monitoring, robotics, virtual reality, ... innovation has to be encouraged
  - Real-time routine radiation surveys, real-time gamma spectrometry
  - Use of drones for radiation surveys
  - Virtual reality for training, ...
- But, these are **tools at the service of RP programmes and will not replace Work and Human Management**. We still need:
  - Goals, Indicators, RP programmes,...
  - Empowerment of workforce, their implication in dedicated ALARA /working groups,
  - Education (increase self-protection actions) and training,...
- And last but not least: **the need to prove the efficiency of actions and potential cost saving**
  - Cost-benefit, using (or not) alpha values
  - A true challenge to identify and demonstrate the “positive side effects” (operating cost reduction, outage duration, improvement of work performance,..)

# Summary and outcomes (2)

## Session 2 & 3 - Source Term Management

⇒ **Cleaning** : demonstrations of new technologies at the service of “housekeeping for NPPs circuits”;

- High efficiency ultrasonic fuel cleaning,
- Vacuuming of Guide tubes, suppression pool, ...
- Removal of debris
- Chemical decontamination,
- Use of resins with Colloid Removal Capability
- ...

⇒ **Prioritize actions** – search for efficiency in the implementation of decontamination actions

- Elaboration of decontamination programmes planning integrating source term indexes and maintenance work planning

⇒ **Control**: Shutdown procedures

- Comparison of international strategies (thanks to ISOE network)
- Use of Real time radionuclide monitoring of the RCS with CZT technology during transients and forced oxidation

# Summary and outcomes (3)

## Session 4. RP at Decommissioning Stage

- Towards the **organisation of an international sharing of experience** (ISOE - WGDECOM)
  - Benchmarking visits
  - Organisation of the collection of data for future comparison / database
- **Use of modelling for the design and planning of dismantling activities**
  - 3D modelling of RPV and Internal dismantling for Dose Optimisation of these activities in Italy
  - Modelling of plants using data on radionuclide concentrations in primary coolant, engineering drawings, ISOE database for doserates, dose and working time per activities => **expected individual and collective dose for dismantling German plants according to their initial design**

# Summary and outcomes (4)

## Session 5. RP Regulation: Guidelines and Implementation

- **Regulatory approach to demonstrate ALARP at the design stage**
  - **Essential role of benchmarking current leading operating plants** and integrate their **operational experience and lessons learned** in the new design (a role for ISOE ?)
  - A balance to be found between risk reduction and “sacrifice in time, trouble and money”: stop risk reduction when an increment would lead to a “gross disproportion” of sacrifice increment
- **The need for a systematic approach to review RP objectives, functions and rules** at the planning stage of design, modifications and dismantling, and a **regular assessment of compliance with this rules** during the operation and dismantling of the plant
  - Specific example of the complexity of maintaining the integrity of RCA barriers
- **Eye Lens Dose limit challenges**
  - Approaches **to identify risk activities** through surveys and measurements
  - Elaboration of RP procedures describing **when, where and how to monitor eye dose** and register it

# Summary and outcomes (5)

## Session 6. Accident Management

- **Development of RP procedures and training for emergency workers, together with new emergency center design**
  - Sharing common guidelines between plants
  - Elaboration of “emergency radiation work permits”
  - Training RP workers: a need for a new mindset, to see a bigger picture than in operation – train to be mobile for the beginning
- **Post-Accident situation - Lessons learned from the Fukushima accident**
  - Long term issues –addressed by the return of evacuees and including radiological, socio-economic and ethical dimensions
  - Emergency plans and exercises need to take into account all phases of the accident
  - Involvement of local populations and professionals in the decision-making and processes
  - Importance of designing with local communities mechanisms of governance aiming to restore decent and sustainable living conditions

# Summary and outcomes (6)

## Session 7. RP Indicators

- **Key elements of a RP Programme**

- **Dedicated structures** to pilot the RP Program according to the RP strategy
- **Performance indicators:** collective/ individual dose, events, contamination control, waste management, radioactive effluents control and environment radioactivity control,...
- **Who owns ALARA?** : all relevant stakeholders from **radiation workers** to ALARA coordinators, first line supervisors, plant managers

- **What can we learn for dose database analysis?**

- **Trends:** a tool to **alert** when weak signals of declining performances are progressively confirmed, or to **confirm the efficiency** of a RP Programme
- **Dose distribution:** Identify **priorities** for RP actions: plants, activities, work group with the higher doses
- **Benchmarking:** Identify leading plants, performances of designs,
- **Limits of the use:** these are only numbers – essential to further investigate with the ‘owners’ of the data



# Summary and outcomes (7)

## Session 8 & 9 . Contamination Management

- **Alpha risk management**
  - **Detection and prevention:** Overview of strategies at the international level for operating plants: same objectives, but different practices
  - **Setting specific organization** when the risk is confirmed – Dismantling activities
- **Internal dose management & assessment**
  - Specific case of Tritium in CANDU plants: emission control (reduce leaks, implementation of systems to dry atmosphere,..), prevention of intakes (monitoring workplaces, PPI,..), prevention of unexpected contamination (undressing procedures,...), monitoring system
  - Elaboration of monitoring strategy (specially following and assess dose from the WBC counting using intake models dose assessment)
- **R&D for the development of new measurement device**
  - $\beta$  Contamination using detector with discrimination capacity



# Summary and outcomes (8)

## Session 10. Job Experience

- **R&D to improve control of industrial radiography activities**
  - Sophisticated modelling of RB to plan activities and secure working areas
- **Baffle Bolt Replacement**
  - Indian point, Salem, Diablo Canyon, **Cook**
  - Impressive development of tools and technologies
  - “Old simple recipes” still work : time, distance, shieldings,... but also worker involvement,
- **Spent Fuel Storage Rack Replacement**
  - Role of modelling for planning activities
- **Dry fuel storage**
  - First Dry Fuel Storage Campaign at Sizewell B NPP
  - US Dry Cask Dose Comparisons

# As a conclusion...

## From Malmö, 1998 to Uppsala, 2018...

- **RP issues are still the same**
  - **In 1998:**
    - *Dose Reduction & Management During Plant Operation and Major Maintenance Tasks*
    - *Decontamination Experiences & Chemistry Improvements*
    - *Topical Session on Dosimetry*
- **But Major progress in Occupational RP**
  - A search for continuous improvement: RP professionals are never satisfied, always challenging even the best results
  - Work Management Improvements: ALARA programmes, Engagement of stakeholders, Training, Planning, ..
  - Increasing place of modelling and simulations
  - Important role of research and development, as well as use of new technologies
  - Integration of lessons learned from international experience
- **Within this framework, ISOE has proven to be an efficient system combining data collection and network of professionals sharing the same goals and values towards an optimal radiation protection of workers and public**

## ISOE Information

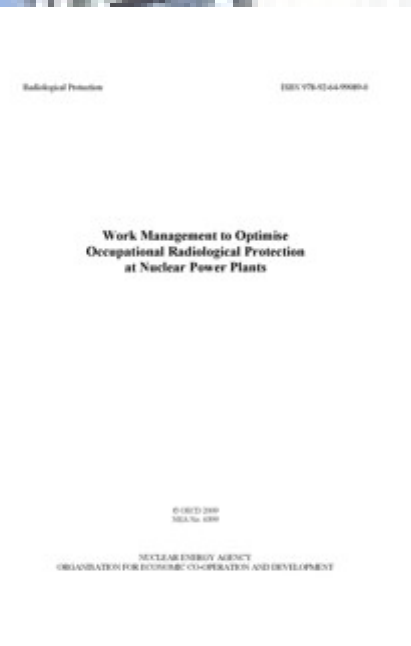
- **Working Group to revise the ISOE Publication**

### **Work Management to Optimise Occupational Radiological Protection at Nuclear Power Plants - 2009 Issue**

We still need participants from NPPs to bring field experience !

If you are interested, please send an e-mail to the ISOE Secretariat:

[isoe.secretariat@oecd-nea.org](mailto:isoe.secretariat@oecd-nea.org)





**Next ISOE symposium**

**INTERNATIONAL ISOE SYMPOSIUM**

**Kyoto, Japan**

**24 – 26 October 2018**

**Organised by the Asian Technical Center**

# 2018 ISOE International ALARA Symposium

Kyoto, Japan,  
October 24-26, 2018



ISOE Asian Technical Center  
Nuclear Safety Research Association





Day 1 and 2 (Oct 24<sup>th</sup> and 25<sup>th</sup>)

## Part 1 Conference

Venue: TKP Kyoto-Shijokarasuma Conference Center

### Topics Interested:

RP at the Decommissioning Stage

RP at Plant Life Extension Activities

RP at Education and Training

...and other topics related to RP.



Day 3 (Oct 26<sup>th</sup>)

## Part 2 Technical tour

Venue: FUGEN Decommissioning Engineering Center, Japan Atomic Energy Agency, Tsuruga

“FUGEN” Advanced Thermal Reactor

A prototype ATR & only one  
ATR in Japan

Moderator: Heavy Water

Coolant: Boiling Light Water

Commercial operation: Mar. 1979 – Mar. 2003

Start of the decommissioning program: Feb. 2008



Photo: JAEA

At the site, in parallel with dismantling of a part of the facility, JAEA performs R&D of dismantling methods. They intend to apply their achievements not just to FUGEN but also to further dismantling works of other LWRs.

## Due Dates

Registration: August 31<sup>st</sup> 2018

Abstract: September 28<sup>th</sup> 2018

Presentation Material: October 5<sup>th</sup> 2018

ISOE Website

<http://www.isoe-network.net/activities/upcoming-symposia/273-2018-isoe-international-symposium.html>

ATC Website

<http://www.nsra.or.jp/isoe/english/index.html>

Registration fee: No registration fee is charged







**All information on:**

**[WWW.ISOE-NETWORK.NET](http://WWW.ISOE-NETWORK.NET)**

***Do not hesitate to ask for your password  
to access the ISOE members areas***

## **WARM THANKS**

- **Programme Committee Members**
- **Speakers and Authors of Posters**
- **Exhibitors**
- **Sponsors:**
  - **Vattenfall / Forsmarks Kraftgrupp**
  - **SSM**
- **Organisation staff:**
  - **CEPN: Lucie D'Ascenzo, Laure-Anne Beltrami**
  - **Forsmark NPP: Staffan Hennigor & colleagues**
  - **SSM: Petra Hansson**
  - **UKK Team**
- **All Participants**



A photograph of a modern building with a facade made of vertical, metallic-looking panels. The building is set against a clear blue sky. A semi-transparent white rectangular box is overlaid on the right side of the image, containing the text.

**We are looking forward already to seeing you**

**at the next International ISOE Symposium**

**to be held in June 2020 in France**