

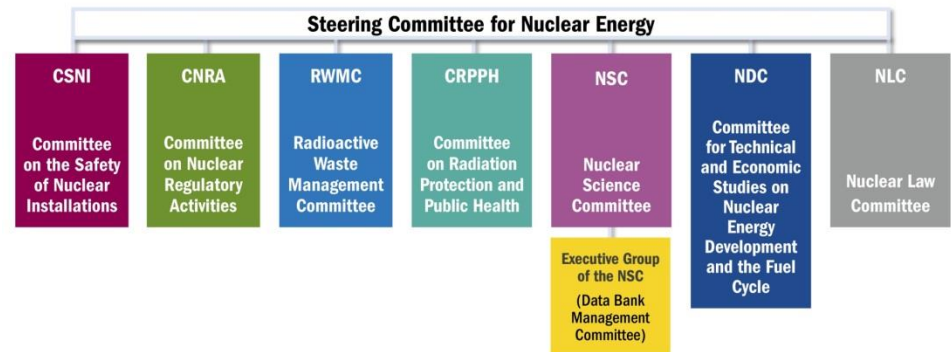
NEA/CSNI Working Group on Human and Organisational Factors, WGHOF

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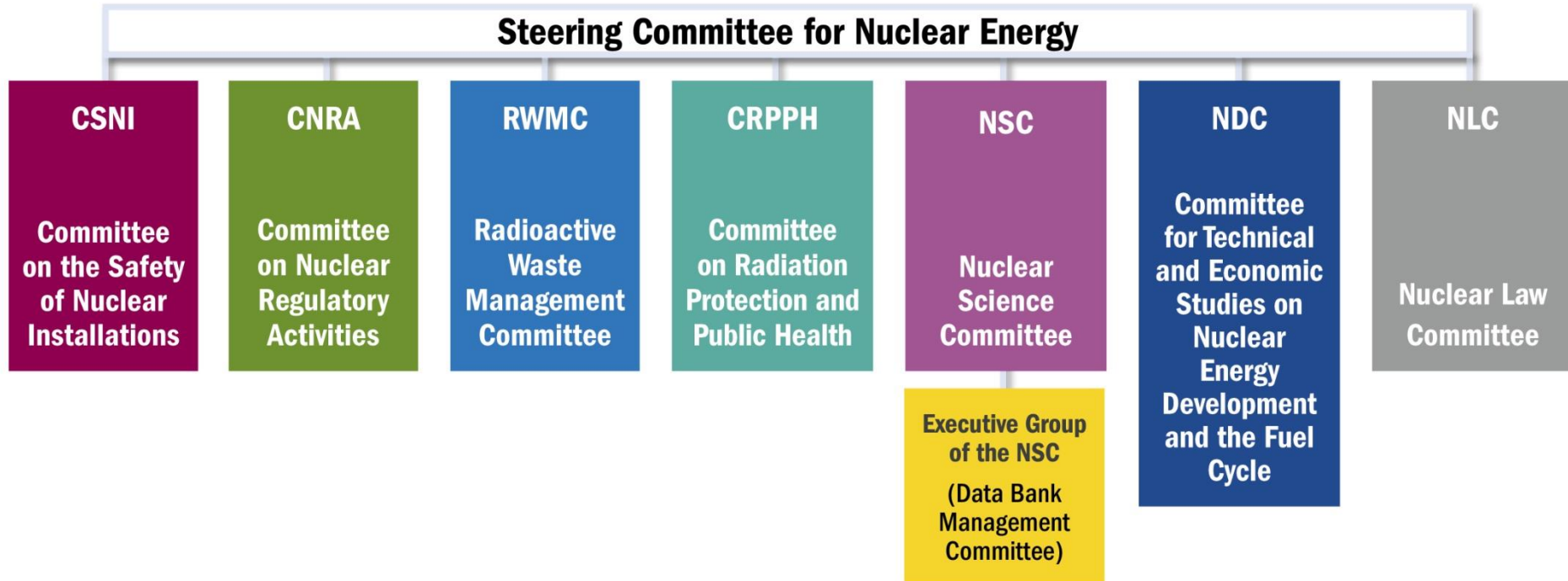
**International Conference on Human and Organizational Aspects of
Assuring Nuclear Safety
25 February, 2016**

The NEA: A Forum for Co-operation for the Most Advanced Countries in the World

- Founded in 1958
- 31 member countries
- 7 standing technical committees
- 75 working parties and expert groups
- 21 international joint projects



NEA Committees



Committee on the Safety of Nuclear Installations (CSNI)

CSNI Programme Review Group (PRG)

Working Group on Risk Assessment (WGRISK)

Working Group on Analysis and Management of Accidents (WGAMA)

Working Group on Integrity and Ageing of Components and Structures (WGIAGE)

- Subgroup on the Integrity of Metal Components and Structures
- Subgroup on the Ageing of Concrete Structures
- Subgroup on the Seismic Behaviour of Components and Structures

Working Group on Human and Organizational Factors (WGHOE)

Working Group on Fuel Safety (WGFS)

Working Group on Fuel Cycle Safety (WGFCSS)

Working Group on External Events (WGEV)

Senior Expert Group on Safety Research Opportunities Post-Fukushima (SAREF)

Task Group on Robustness of Electrical Systems of NPPs in Light of the Fukushima Daiichi Accident (ROBELSYS)

OECD/NEA joint projects in the nuclear safety area:

- ATLAS Project
- BIP-2 Project
- BSAF Project
- Cabri Water Loop Project
- CADAK Project
- CODAP Project
- FIRE Project
- Halden Reactor Project
- HEAF Project
- HYMERES Project
- ICDE Project
- LOFC Project
- PKL-3 Project
- PRISME-2 Project
- SCIP-2 Project
- STEM Project
- THAI-2 Project

WGHOFF Mission

The principal mission of WGHOFF is to improve the understanding and treatment of human and organisational factors within the nuclear industry in order to support the continued safety performance of nuclear installations and improve the effectiveness of regulatory practices in member countries.

WGHOF

- human and organizational factors experts from regulatory bodies, technical support organisations, research institutions, industry, and international organisations (IAEA, EC)
- a forum for exchange of information and operating experience, and for identifying HOF issues, methodologies and practices
- surveys, workshops and proceedings, technical opinion papers and state-of-the-art reports have been produced in the past by WGHOF on various topics.

Topics over the years

- Plant maintenance
- Plant modifications
- New plant technology
- Oversight
 - Management of Change
 - Safety Management
 - Oversight of Safety Culture
 - Organisational Suitability
 - Leadership and Management for Safety

Recent Work

Integrated System Validation (ISV)

- Workshop, February 2015
- nearly 30 experts from 11 different countries
- representatives from regulators, reactor design organizations, and research organisations
- Share experiences and views through white papers submitted prior to the workshop
- 3 days of discussions focused on achieving reasonable confidence in the Human Factors Engineering (HFE) validation of integrated nuclear power plant control room systems

Integrated System Validation (ISV)

- Considering both design modifications and new builds
- Experts explored opportunities for improving confidence in design validations from early in the design process through design implementation.
- The results suggest that a multi-phase approach is a promising pathway toward enhancing confidence in the validation of main control room designs and modifications.
- A report on the outcomes from the workshop should be available in 2016.

Fukushima Daiichi follow-up

- WGHOF closely engaged in ensuring lessons learned from the accident at Fukushima Daiichi are properly addressed
- Group reviewed the influences of national characteristics on safety culture (one of the concerns expressed in Japan's DIET report).
 - Concluded that while national characteristics are an important consideration for organisations in ensuring an effective safety culture, no changes are required to the currently accepted safety culture framework.

- WGHOF contributed to an effort led by the NEA's Committee on Nuclear Regulatory Activities (CNRA) to develop a guidance document on best practices for ensuring an effective safety culture for regulatory bodies.

Fukushima Daiichi follow-up

- A particular concern highlighted by Fukushima Daiichi was the challenge of implementing mitigation strategies in the aftermath of an extreme event.

Human Performance under Extreme Conditions

- Workshop conducted February 2014 in Brugg Switzerland, ENSI
- 34 delegates from 14 countries
- Backgrounds in human sciences, engineering, operations, military
- Presentations:
 - lessons learned from the Fukushima Daiichi accident
 - science and research
 - good practices from nuclear and non-nuclear domains

Workshop Objectives

- Share experience and develop knowledge about human and organizational performance under extreme conditions
- Identify specific currently applied HOF design principles in the nuclear industry and compare them with available knowledge (e.g. from academic knowledge and experience in non-nuclear field)
- Provide a basis for improvements and necessary research for taking into account HOF issues in the design and use of measures

Theme: Resilience

- Human Capabilities
 - Stress and cognition
 - Training and exercises
 - Selection
- Organisation
 - General organisational aspects for managing the unexpected
 - Leadership and management
 - Cultural aspects
- Infrastructure
 - Strategies for emergency preparedness, methodology and tools
 - Supporting severe accident management – infrastructure, capabilities and research needs
 - Challenges of procedure design and instruction of procedure-based practices

Reliability vs. Resilience

Current safety paradigm:

- Exhaustive deterministic and/or probabilistic identification of all potential situations
- Pre-determination of all the expected responses
- Safety considered as conformity with this “designed-to-be-safe” world
- A perfect world where nothing goes wrong
- Risk is seen to be generated by deviations and variations
- Usual response to the unexpected is more pre-determination and more authority to the control processes

Reliability vs. Resilience

- Intrinsic ability of a system to maintain its structural identity, its (main) features, and at least partially its performance, in the presence of disturbances, including large, unusual, or unexpected ones, going beyond those for which the system had been designed for, or those to which it is adapted
- System's ability to succeed under variable conditions
 - Adaptive capacity, that enables appropriate responses to the unexpected
 - Balance between specialisation and flexibility

- The resulting suggestions for good practices and areas requiring further research in the areas of human capabilities, organisation and infrastructure have been documented in workshop proceedings released in 2015

Current areas of interest

Lessons learned from exercises conducted in response to Fukushima

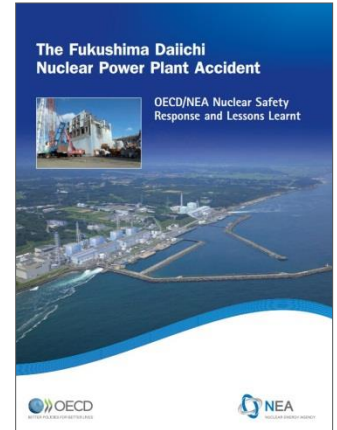
- Licensees beginning to conduct validations of manual mitigation actions, training, drills and exercises to test and demonstrate the effectiveness of their capabilities to mitigate severe accidents.
- This task involves identifying and developing a means (e.g., surveys) to gather and share lessons learned from the implementation of these exercises throughout the international nuclear community
- The objective of this task:
 - to facilitate/accelerate industry learning of best practices and identify areas requiring additional research and development.

Assessment of resilient organisations

- Organisational resilience is required to ensure safety in normal conditions (design basis) and when facing the unexpected (beyond design basis).
- The objective of this task:
 - to explore the link to safety culture, safety management systems and other concepts already in use,
 - identify the gaps to resilience (set of skills, practices required), and
 - then to evolve these concepts as a basis for a true systemic approach to safety for coping with the unexpected

Human Performance

- Human performance plays a key role in 60 – 80% of events in high reliability industries.
- Research and experience show the use of event free tools to prevent human errors does not produce the lasting changes.
 - a more holistic view of human performance strengthens the factors which promote desirable human performance
- The objective of this task:
 - to identify the individual, technological and organizational factors which may affect human performance
 - describe current approaches to the implementation of human performance programs
 - identify best practices in regulatory oversight.



All NEA publications and institutional documentation available at
www.oecd-nea.org

