

CSNI Research on Safety of Water-Cooled Reactors

Andrew White

Nuclear Safety Division, NEA

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Outline

- Overview of the CSNI
- Examples of CSNI Output – activities addressing Fukushima lessons-learned
- Conclusions

Committee on the Safety of Nuclear Installations

- **Role:** to be a vehicle for research collaboration and communication among national organisations focused on maintaining and advancing scientific and technical knowledge for the safety of nuclear installations
- **Focus:** to provide technical support to member countries by means of information exchange, analyses, and cooperative research on various technical issues
- **Membership:** Senior nuclear regulators and TSOs from 27 countries (Non-governmental organizations such as utilities also participate).

CSNI Methods of Work

- Objective: Address potential safety issues common to many or all of the OECD/NEA member countries
 - Work tends to focus on operating reactors, but can also support new reactors
- Working Groups established for broad technical areas with ongoing work programmes
- Task Groups address short-term activities (~3 years)
- Cooperative research projects share resources on experimental or database activities of common interest

CSNI Outputs

- CSNI products are generally one of the following:
 - Technical or collective opinion papers
 - Technical reports, including state-of-the-art reports (gaps in research are identified and certain countries step forward to lead relevant joint projects)
 - Workshop or seminar proceedings
 - Currently 40 activities are underway in 7 working groups

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 (WGHOFF)

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

CSNI post Fukushima Activities

- Following Fukushima, a number of high priority tasks were identified and undertaken:
 - *Technical Status Report on Filtered Containment Venting (WGAMA - Analysis and Management of Accidents):*
 - Summary of current practise and technical basis for venting
 - *Status Report on Hydrogen Risk Management and Related Computer Codes (WGAMA):*
 - Summary of technology for mitigating hydrogen and modelling hydrogen behaviour
 - *Workshop on Natural External Events including Earthquake (WGRISK – Risk Assessment):*
 - Current experience with using PSA for external events
 - *Workshop on the Robustness of Electrical Systems of NPPs in Light of the Fukushima Daiichi Accident (Task Group):*
 - Best practises for ensuring reliable electrical supply

CSNI post Fukushima Activities

- **(cont.)**
 - *Status Report on Spent Fuel Pool under Loss of Cooling Accident Conditions* (WGAMA and WGFS – Fuel Safety)
 - Current knowledge base of fuel pool response to threats
 - *Metallic Component Margins under High Seismic Loads* (WGIAGE – Integrity and Ageing of Components and Structures)
 - Assessment of margins for cooling systems in an earthquake
 - *Human Performance and Intervention under Extreme Conditions* (WGHOFF – Human and Organisational Factors)
 - Best practises for supporting effective response to severe accidents
 - *International benchmarking project of fast-running software tools for the estimation of fission product releases during accidents at NPPs* (WGAMA)
 - Experience with applying tools to other reactor types

CSNI post Fukushima Activities

- Senior Expert Group on Safety Research Opportunities Post-Fukushima:
 - Recommend information that should be obtained from Fukushima during the decommissioning/dismantlement process in order to further the knowledge base among members about severe accident progression.
- Working Group on External Events:
 - Fukushima, along with current PRAs, showed that a large part of the risk to a nuclear plant is from natural external events.
 - CSNI had few activities to look at how natural external events are handled among the various member countries, where major uncertainties remained, and what cooperation work could be done to address these uncertainties.
 - Initial focus is on severe weather events with high winds and a risk of flooding

Conclusions

- The CSNI has a broad programme of work addressing knowledge gaps and safety research requirements of common interest
- Primary focus is operating reactors, with improvements and safety assessment tools being applicable also to new reactors
- The resulting knowledge base can underpin design of improved reactors, and subsequent regulatory review of an improvement