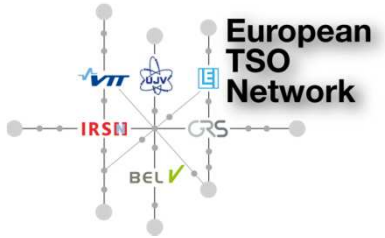

Contributions of Technical Safety Organizations (TSOs) to Enhancing Nuclear Safety After the Fukushima Daiichi NPP Accident

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E. Uspuras, M. Korec, G. Gromov

European TSO Network (ETSON)

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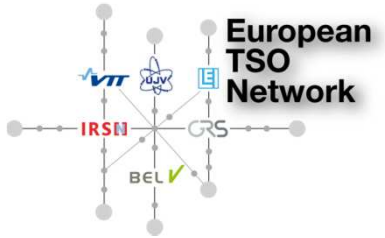


ETSON

- founded in 2006
- members 2011: IRSN (FRA), GRS (GER), Bel V (BEL), ÚJV (CZE), VTT (FIN), VUJE (SVK), LEI (LIT), SSTC (UKR) and JNES (JPN) as associated members

ETSON – Objectives

- provide a forum for exchange of analyses and in R&D in the field of nuclear safety
- develop and implement a common nuclear safety research programme
- foster the convergence of technical nuclear safety practices within the EU and beyond

Work of ETSON members related to the Fukushima nuclear accident

- **operated national nuclear crisis centres**
- gave advice to national regulators and governments
- take part in the definition and conduction of national NPP stress tests
- **contributed to the definition of the EU stress test (initiated by EC, WENRA)**

Accident prevention (1)

Revisiting the general approach to safety

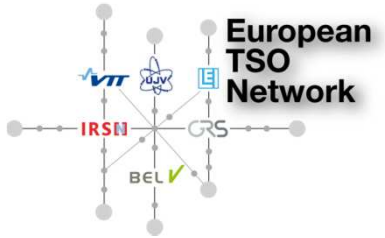
1. Identification of hazards that challenge the defence in depth concept
   - harmonized approach for considering the results of the national and international stress test reviews of natural and manmade hazards
   - analysis of operating experience events initiated by such hazards

   → ETSON supports the Clearinghouse initiative of the European Commission

2. Vulnerability analysis of the defence in depth concept
   - identification of cliff-edge-effects
   - consideration of all plant states and of the spent fuel storage pool
   - reveal effectiveness of accident management measures under adverse conditions
   - consideration of human and organizational factors (e.g. decision making in crisis management)

3. Improve the robustness of the defence in depth concept

Accident prevention (2)

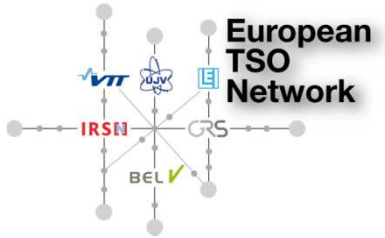


Research for safety improvement

- Nuclear safety research constitutes an important base for safety improvement and accident prevention.
- ETSON brings together the knowledge / results of national and international research programmes, where issues related to Fukushima are addressed.
- ETSON defines a common post Fukushima research programme in coordination with OECD/NEA/CSNI:

1. **Development of improved methods for the systematic identification of vulnerabilities of NPPs**
2. **Improved modeling of fuel degradation in the spent fuel storage pool**
3. **Study of fuel cladding damaging induced by seawater cooling**
4. **Critical review of the state of the art in severe accident modeling**

Accident prevention (3)



Strengthening international safety standards and safety culture

- TSOs enhance efforts to strengthen international safety standards and to objectively assess their implementation using state of the art methods
- TSOs ready to contribute to European peer review of national stress tests
- IAEA / TSO initiative for a global TSO Forum: promote lessons learned from the Fukushima accident worldwide
- Training and tutoring strengthens implementation of international safety standards:
  European Nuclear Safety Training and Tutoring Institute (ENSTTI), also offered to participants from nuclear newcomer states and developing countries.

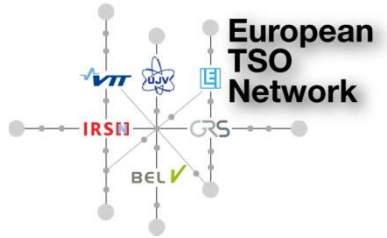
Emergency preparedness and crisis management

International cooperation and support in crisis situation

- Mutual assistance in crisis management, e.g. by
  - evaluating the course of accident, incl. assessment of radioactive source term
  - predicting the radiological consequences
  - intervention teams with special measuring equipment

- **ETSON proposes international network of crisis centres**
  - commonly accessible data libraries on safety relevant plant features and analysis tools
  - Standards for information exchange: sufficient information to predict the plant status and radiological consequences
  - national crisis management exercises could be opened to international participation
  - common strategy for the communication with the public and the media

Assessment and mitigation of health and environmental consequences



Post-Fukushima mitigation and remediation programmes are required

- to shelter and dismantle the reactor
- to protect population from further harms
- to characterize the radioactive contaminations of terrestrial and marine environment over long periods of time

Programmes should be based on international technical support and scientific cooperation:

- in dosimetry, enforcement of environmental monitoring systems, epidemiology, radioecology, etc…
- making use of existing research platforms and networks: e.g. MELODI (research platform on low dose effects), STAR (network of excellence in radioecology)

ETSON supports the early as possible implementation of related operational and scientific programmes

Conclusion

- **Nuclear safety has to be rule and science based**
- **ETSON is committed to**
  - **contribute to safety enhancement across the world and to**
  - **play an active role in nuclear safety road map fixed at this ministerial conference**