

Regulatory Response to Lessons from International Operating Experience: Examples from Finland

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Principle of continuous safety enhancement

- The principle of continuous safety enhancement was adopted in Finland already in the 1970's when the nuclear power plant operation was started.
- This principle is today included in the Government Degree on the Safety of NPPs:
 - the licensees are required to gather operating experience and to analyze it with the aim to enhance safety




International Operating Experience provides insights for enhancing nuclear safety

- International reporting on Operating Experience is a well established practice and provides a lot of useful information for those who want to learn from it
- As part of its regulatory oversight and enforcement policy, STUK requires that the licensees utilize the reported foreign operating experience for
 - improving staff competences and management of operations,
 - modernizing and back-fitting of operating plants, and
 - addressing the lessons learned in improved design of new facilities
- STUK also uses foreign operating experience for planning its inspection programs and safety assessment

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International OEF process at STUK (1)


- STUK is the national co-ordinator of IRS reports
 - STUK has requested a direct access to the IAEA/NEA's web-based IRS system to more than 100 experts representing different organizations in Finland
- STUK also gathers information directly from its cooperation with other regulators
- STUK's own IOEF processes are described in STUK's Quality Manual

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International OEF process at STUK (2)


- STUK has a dedicated group that works on international OEF (full-time co-ordinator and ten participating experts)
- The group is tasked to
 - make screening of
 - IRS-reports disseminated through the IAEA
 - other information or reports received directly from other sources
 - assign the received foreign information to categories with respect to actions to be taken
 - maintain a database on the received information
 - make within the limits of its competence or propose other staff to make a detailed review and assessment of experience found of special interest and suggest actions if needed
 - oversee the utilization of international OE by licensees
 - prepare the IRS-reports on events at NPP's in Finland

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Examples on Utilisation of IOE

- Foreign events that have recently resulted in plant modifications at Finnish NPP's:
 - ECC recirculation filter blockage (Barsebäck 1992)
 - Disturbance in electrical power system (Forsmark 2006)
- Examples on modifications or actions based on US NRC Generic Communications in 2009:
 - ECCS Gas Accumulation (NRC Information Notices 2008, 2006)
 - Biodiesel in Fuel Oil of Safety Related Engines (NRC Information Notices 2009, 2006)
- Other examples on STUK's review on utilization of US NRC Generic Communications to Finnish NPPs

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Gas in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (1/2)

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- **NRC Generic Letter 2008-01; IRS 7950, IN 2006-21, IRS 7815**
 - numerous generic communications dealing with gas accumulation or similar issues
 - safety concerns related to inadequate gas control: air-binding, potential damage to pumps, inadequate discharge pressure, and water hammer
 - identified root causes of gas accumulation: bad design, improper filling and venting after maintenance, ineffective gas controls during operation, ineffective application of Tech Specs, problems with keep-full systems
- **Actions required in Finland**
 - licensees were asked to submit information to demonstrate that the subject systems are in compliance with licensing and design bases and applicable regulatory requirements, and that suitable design, operational, and testing measures are in place for maintaining this compliance.



Gas in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (2/2)

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- Loviisa NPP:**
- vortex-phenomena were evaluated in emergency core cooling pump suction lines in case of low water level in water storage tank.
 - vortex-plates were introduced in the emergency core cooling water storage tank in 2009 annual maintenance outage.



Gas in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (2/2)

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- Oikiluoto NPP:**
- concern had been addressed already in 2001 (before receiving NRC letter) by testing whether nitrogen could jeopardize emergency cooling pumps in case of steam line break in the upper containment and consequent blow down into the condensate pool (blow down pipes are nitrogen filled).
 - no actual problems were identified

