



European Nuclear Safety Regulators Group

ENSREG Conference 2015

**Outcomes of the 2nd Workshop on National Action Plans
Follow-up of European Stress Tests**

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Background

- NAcPs describe the actions, identified following the Fukushima Dai-ichi accident, that were taken, planned or implemented and their schedule to improve the safety of nuclear power plants (NPPs).
- Conclusions from the **1st NAcP workshop** (April 2013):

The workshop concluded that a follow-up peer review with appropriate mandate and Terms of Reference.... Such a follow-up peer review could be conducted in 2015 or later when the results of important studies and assessments are available. This review should make use of other coordinated reviewing processes where appropriate. [...]

- The goal of the workshop was to present the NAcPs and to have them reviewed by their peers via a common discussion as stated in the ENSREG Action Plan. The workshop based on the **NAcPs updated by the end of 2014**.
- **WENRA Reference Levels** should play a role. WENRA approved the updated SLRs in 2014 thus most countries have not incorporated them in their respective NAcPs yet
- **ToR** (A group from AT, ES, DE, FR, DK, UK volunteered to produce) endorsed by ENSREG (October 2014).

Pre-Workshop activities

- **Update in the NAcPs** – not later than 31 December 2014.
 - Modifications in the NAcP should be clearly identified.
 - Basic guidance for the content of the NAcP was developed (not template)
- Selection of **officers** – December 2014:
 - **Chair**.
 - 2 **Vice-Chairs** (Kai Weidenbrück, Killian Smith) and 6 **Session Chairs** (Killian Smith, Kai Wiedenbrück, Kirsi Alm-Lytz, Bojan Tomic, Fernando Franco, Poul E. Nystrup).
 - 12 **Rapporteurs** responsible for monitoring the NAcP presentations and collating the outputs (2 rapporteurs jointly covered 3 NAcPs).
 - No rapporteur was assigned to monitor his/her country.
- Platform and support for the Q&As phase EC: **Comments and questions** on the revised NAcPs by 28 February 2015.
 - From January 8 till February 28 (window for questions)
 - Received 1013 questions, 836 from peers plus 177 from the public (average 53 Q / country)
 - Countries received from 7 to 100 questions/comments.
- **Answers** in written submitted by 14 countries. All the countries are requested to include implicitly their answers in their respective national presentations.

Workshop process

- The workshop identified the progress on the **implementation of the NAcPs**.
- **Main changes** in the NAcP from 2013 workshop, including:
 - Additional measures
 - Measures removed
 - Changes in the schedule
- **Technical basis** for the main changes identified. The WENRA SRLs recently approved (in 2014) are implemented in a few cases and are under implementation in all the MS
- **Challenges and good practices** during the implementation process.
- Relevant outcomes of **studies and analyses** identified in the NAcPs, and completed since the 2013 Workshop.

2nd NAcP Workshop

- The discussion took place in a very open and constructive atmosphere. Transparency on the implementation of lessons learned from the Fukushima Dai-ichi accident was also considered.
- The workshop identified a real commitment of all MS with the NAcP. The NAcP implementation is under the oversight of the national regulatory bodies.
- Commendable practices and challenges during the implementation process were identified.
- Main changes in the NAcP from 2013 workshop, include:
 - additional measures
 - changes in the schedule
- 110 experts from 20 European Union member states, Switzerland and the Ukraine, the European Commission, as well as observers from four additional countries (Armenia, Norway, Taiwan and USA) participated.

Technical Session

- Presentation by the **USNRC** on the experience and requirements after Fukushima:
 - Similar processes to the Stress Tests took place in the U.S.A., led by the USNRC and the joint NRC/US industry Fukushima steering committee.
- **Periodic Safety Review (PSR)** (Approaches presented by CSN, STUK, ASN, ONR)
 - Same standards (WENRA Safety References Levels and IAEA-standards) were used as a basis.
 - In some countries the initiative remains in the licensee (who is obliged to proactively find ways to improve safety in their plants and apply for permission to execute these improvements) whereas in other cases is the regulator who has the responsibility to promote improvements of the safety of nuclear installations.
 - It was clearly stated that the process contribute to continuous improvement of nuclear safety.
- **WENRA's Safety Reference Levels (SRLs)**
 - Description of the development and revision process of SRLs for existing reactors, taking into account the experiences after the Fukushima accident.

Findings: Commendable practices (1/2)

- Relying more on fixed equipment instead of mobile equipment in particular during the initial phase of the accident.
- Protecting additional fixed safety equipment against external hazards (bunkered systems). In some cases, safety functions are required to be available in case of external events with frequencies well below $10^{-4}/\text{yr}$.
- Increase the autonomy/capacity of bunkered systems beyond the design basis.
- Building an alternative emergency management building on-site (capable to withstand extreme events).
- Centralized emergency support centre have been installed in several countries for rapid intervention.
- Provisions for the management of large volume of contaminated water.

Findings: Commendable practices (2/2)

- Mitigation of the consequences of loss of control of large areas of the facility caused by fires or explosions.
- Transboundary working groups and cooperation for off-site emergency response.
- Implementation of measures needed for in-vessel retention for molten corium, for smaller reactors.
- Emergency exercises dealing with multi-unit accident scenarios
- Use of full-scope simulators for severe accident.
- The general implementation and continued review of SAMG, including the adequate training process.
- Extension of the stress test review on nuclear installations other than NPPs

Findings: Challenges (1/2)

- In some countries complex safety related actions are delayed from the initial schedule (FCV, PAR's, emergency management building, hardened safety core, etc.), but the delay is not very significant and rely on the license process by the regulatory authority.
- Detailed schedules for specific measures resulting from analyses and studies are yet to be compiled for some countries.
- Some countries reported difficulties with the implementation of actions due to financial constraints, which would require a regulatory position.
- Availability of dedicated instrumentation and control required for accident management qualified to remain operable under severe accident conditions and extreme hazards.
- Hydrogen management outside the containment.

Findings: Challenges (2/2)

- Integration of concurrent safety related improvements, such as the implementation of the NAcPs, updated WENRA Safety Reference Levels and the findings from the Periodic Safety Reviews.
- Containment integrity in severe accident conditions and heat removal from the containment with independent qualified systems and selection of the strategy for the molten corium retention.
- Accident conditions starting from reactor shutdown with no containment integrity.
- Reviewing extreme natural hazards (in particular seismic) and relevant plant provisions according to ENSREG recommendations.

Material produced

- Updated National Action Plans (NAcP):
Reports and presentations.
- Summary report.
- President statement.
- Rapporteurs' reports.
- Questions and answers.

Outcomes from the NAcP Workshop

- This Workshop demonstrated that improvements are being implemented in the European nuclear power plants:
 - Relevant outcomes of studies and analyses identified in the 2012 NAcPs have been mostly completed.
 - Significant number of measures is already implemented.
- The NAcP Workshop 2015 recognized again the importance of the Stress Tests peer review recommendations and the Periodic Safety Review process as a powerful tool for the continuous improvement of nuclear power plants.
- The Workshop provided transparency on safety improvement measures, their scope and schedule.
- The Workshop identified that Follow-up on the implementation of the pending actions is necessary. This follow-up could take advantage of other reporting requirements.



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Thank you for your attention!