RAPPORTEURS' REPORT – FINLAND – 2015 Update
ENSREG NATIONAL ACTION PLANS WORKSHOP

1. ASSESSMENT OF THE STRUCTURE OF NATIONAL ACTION PLAN

1.1. Compliance of the national action plan with the ENSREG Action Plan:

Finland followed the structure proposed in the ENSREG National plan. National EU-Stress Test results were considered as well as ENSREG and CNS aspects. The findings from the country peer review mission were also addressed. An update of the National Stress test report is provided for each item. Finland considered all items of the ENSREG compilation of recommendations and suggestions but did not clearly refer to all of them as the text of most recommendations is summarized and gathered with others at the beginning of the different sub-sections. This approach was adopted to improve understandability and readability, especially for readers such as the general public. This approach however hinders the identification of the recommendations and the follow-up of the different actions implemented and launched. Therefore Finland provided and published a crossreference table relating the ENSREG compilation of recommendations and the Extraordinary CNS recommendations with the list of actions.
Some additional topics, such as evaluation of suitability of emergency preparedness personnel and plans for access control and radiation monitoring were also covered.

2015 Update: The 2014 update of the Finnish national action plan is an updated version of the 2012 report. Since neither the structure or the content has changed significantly, the information supplied is still found to be adequate.

1.2. Adequacy of the information supplied, taking into account the guidance provided by ENSREG.

The Finnish national action plan follows the ENSREG national action plan guidance closely.
The NAcP consists of an introduction, 6 sections describing topics 1 to 6, and a last section on implementation of activities.
This last section includes several tables listing the different actions or measures, their status and the associated schedule.

2015 Update: No change

2. ASSESSMENT OF THE CONTENT OF NATIONAL ACTION PLAN

2.1. How has the country addressed the recommendations of the ENSREG Action Plan?

For Topics 1 to 3, Finland has established a list of 47 measures split into 2 actions at the national level, 21 measures for the Loviisa site, 19 measures for the Olkiluoto NPP units in operation and 5 measures for the Olkiluoto EPR type reactor under construction. All these measures or actions adequately address the recommendations of the ENSREG action plan in a global way.

The peer review country report identifies only few recommendations.

Nevertheless, a recommendation was made with respect to the resistance of critical SSC to seismic activity. Further information was given during the workshop. The most important weaknesses are identified by the living full scope PSAs, including a seismic PSA, which over the past years has resulted in some modifications to SSC. Assessments indicate that the retrofitting of all components and structures in existing plants is not necessary, but the new seismic criteria are taken into account for major modifications at the existing units and for new units.

The peer review country report also pointed out the vulnerability of Olkiluoto units to total loss of AC power. To ensure cooling of the core when AC power is lost, an independent way of pumping water to the RPV is being planned. It will be based on the firefighting water system with additional booster pumps and a dedicated diesel generator. Also steam driven pumps are considered for the early phases of the accident.

During the discussions after the country presentation the question was raised if the pre-Fukushima studies that exclude containment damage after hydrogen leakage can still be considered sufficient or whether passive autocatalytic hydrogen recombiners should be installed at Olkiluoto 1 and 2. At the moment, Finland considers the studies still sufficient and there are no plans to install passive autocatalytic hydrogen recombiners in these units due to the inerted containment and already implemented measures to cope with severe accidents.

It was noted that Finland does not adopt the extended use of mobile means for accident management. Already existing fixed installed systems will be supplemented with some additional independent, diversified and protected fixed installed systems.

Loviisa NPPs severe accident management concept does not foresee a filtered containment venting system because of the special structure of the containment. Instead, an external containment spray system with a dedicated power source was installed for containment pressure management in case of a severe accident.

2015 Update: *Finland made clear during the presentation and in their report that the emphasis is on backfitting related to diverse means for decay heat removal function. The independency requirement states that accident management should be done by fixed means during the first 8 hours, after which there can be relied on mobile means. Hence the operator's strategy is relying less on mobile equipment.*

Reference to the particularities of the VVER cylindrical ice condenser steel shell containment design was included in the national report. During the presentation it was made clear that a risk for underpressure in the containment and containment collapse was judged more severe than the possible advantages of a filtered containment vent. The decision on the use of dedicated external spray system was made already in 1980's.

2.2. Schedule of the implementation of the NAcP

As mentioned in the Finnish National Action Plan, most planned actions and recommendations will be implemented by the end of 2014. Of these planned actions, some are already completed, a majority is planned in 2013 and the others for the year 2014.

There are several actions implying studies or technical improvements. Some of these technical improvements are still under evaluation. Actions resulting from these evaluations and the mentioned studies are expected to be implemented by 2018.

For one planned action, pertaining to the Olkiluoto 3 reactor under construction, the schedule for the evaluation phase is still under discussion.

2015 Update: Progress on implementation and update of the NAcP
The progress of the National Action plan is summarized in the last chapter of the NAcP. This chapter gives a good and timely progress of the implementation status. However, the text reveals some delays caused by more demanding analysis and design work.

Most actions will be implemented by 2018, however some actions in the action plan don't have a deadline. Those actions are part of a forum, where the deadline will also be defined in cooperation with the stakeholders of that forum on national level.

The schedule for the remaining actions for Olkiluoto unit 3 is still under evaluation, pending its operating licence application.

2.3. Transparency of the NAcP and of the process of the implementation of the tasks identified within it

The NAcP informs comprehensively and well understandably how the NPPs in Finland shall be improved in the aftermath of Fukushima according to the national assessments, the recommendations and suggestions of the European Stress Tests and the CNS recommendations.

The Finnish NAcP is published on the STUK website, together with other information and reports on post-Fukushima actions (including the Stress Tests).

2015 Update: The Finnish report still remains comprehensive and understandable for a member of the public with a high degree of transparency. However, the small changes in the schedule are not explained or highlighted. This might mask delays for the members of the public as a comparison of both the 2012 report and 2014 update are necessary.

2.4. Commendable aspects (good practices, experiences, interesting approaches) and challenges

Finland has adopted an approach of continuous improvement, utilizing the feedback of full scope PSAs which include extreme weather conditions. Severe accident managements systems are required to be safety classified, qualified, independent and single failure tolerant.

At Loviisa nuclear power plant, air cooled cooling units powered by an air-cooled diesel generator will be installed to ensure long term decay heat removal in case of loss of sea water cooling. The spent fuel pools will also be fitted with these air cooled cooling units.

During the discussions after the presentation, Finland pointed out that the lessons learnt from the Fukushima accident are not the only safety concerns and that the prioritization of possible safety improvements is important in all countries.

2015 Update: Good practices and challenges identified during implementation so far.

Commendable Practices

The Finnish regulator has published new guides to improve the safety for new power plants. This is quite relevant as Finland is considering new builds. To overcome the challenge to incorporate the outcome of those guides to the operating power plants, Finland will rely on the mechanism of continuous improvement.

Additionally, under International Cooperation, the 2014 publication of the Nordic Flagbook is mentioned. This is a good practice for international emergency preparedness, which was already anticipated before the Fuskushima incident. In the context of emergency preparedness Finland also conducted recently a multi-unit accident exercise on one of its sites.

Finland is also actively conducting national research to improve the safety of the current operating fleet by addressing the present safety issues.

Challenges

To the rapporteurs assessment, and as mentioned during the presentation. An additional challenge is posed by the updating of the flooding analysis at Loviisa, which demands more effort than originally foreseen.

2.5. Technical basis for Main changes and relevant outcomes of studies and analyses

From the assessment of the updated report, there seems to be no changes in the Finnish national action plan. There have been no measures added, removed or modified. As there are no changes, no technical basis is provided since 2013.

2.6. **2015 Update:** Relevant outcomes of studies and analyses identified in the NAcPs, and completed since the 2013 workshop.

Quite an amount of studies were identified in the National Action plan of 2013. Studies were however not limited to the nuclear power plants, but also included studies at the national level for the off-site emergency management. A study led e.g. to the identification that mobile power generators should be available for the off-site crisis center.

The site-specific study on the water inventory has been finished. It was clarified that, though not explicitly mentioned in the text, no additional measures had to be taken.

3. PEER-REVIEW CONCLUSIONS

The Finnish NAcP gives comprehensive and understandable information on the safety improvements of the Finnish nuclear power plants after the Fukushima accident, taking into account the national stress tests, the recommendations and suggestions of ENSREG and the CNS summary report.

Finland followed the structure proposed in the ENSREG National plan.

The Finnish NAcP is published on the STUK website, together with other information and reports on post-Fukushima actions (including the Stress Tests).

Most planned actions and recommendations have already been implemented before 2014. There are still a few actions that, some coming from finished studies, that will be implemented by the end of 2018. However some particular actions have no specific deadline due to the specific stakeholders involved on national level.

Finland has adopted an approach of continuous improvement, utilizing the feedback of full scope Probabilistic Safety Assessments, including extreme weather conditions. Severe accident managements systems are required to be safety classified, qualified, independent and single failure tolerant.

Seismic safety assessments indicate that the retrofitting of all components and structures in existing plants to new seismic criteria is not necessary, but these criteria are taken into account for major modifications at the existing units and for new units. Also some modifications related to seismic resistance have been carried out based on the PSA results.

Finland is implementing several measures to improve core cooling. At Loviisa nuclear power plant, air cooled cooling units powered by an air-cooled diesel generator have been installed and long term decay heat removal in case of loss of sea water can be ensured. At Olkiluoto an independent way of pumping water based on the firefighting water system with additional booster pumps will be set up. Also steam driven pumps will be implemented for the early phases of the accident. Finland thus puts emphasis on backfitting of fixed installed systems, since requirements demand 8 hours of accident management without mobile equipment.

Finland also tries to handle the currently identified issues with updated and evolving regulations, together with an appropriate national research program. Furthermore in the context of emergency preparedness, Finland cooperates internationally and recently organized a multi-unit exercise accident.

Finland remarked that the lessons from Fukushima are not the only safety concern and that the prioritization of possible safety improvements is important in the sense of the desirable continuous improvement process.