RAPPORTEURS' REPORT

SLOVENIA

ENSREG NATIONAL ACTION PLANS WORKSHOP

1.0 ASSESSMENT OF THE STRUCTURE OF NATIONAL ACTION PLAN

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

The Updated National Action Plan of Slovenia contains a comprehensive compilation of conclusions and recommendations contained in the Compilation of Recommendations of ENSREG, key topics of the 2nd Extraordinary meeting under the CNS, the state review of stress test results and Peer Review Country Report, the actions for member states formulated in the IAEA action plan and the recommendations from the US-NRC and ASME.

Update 2015: No changes

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

The NAcP has followed the ENSREG guidance very closely. The National Action Plan is structured, in accordance with the structure suggested by ENSREG into four parts. Part I is devoted to the issues of external hazards (earthquakes, floods, extreme weather conditions), loss of safety systems and severe accident management. Part II deals with key topics of the Extraordinary CNS (national organization, emergency preparedness and international cooperation). Part III is devoted to Additional Topics and Activities (National Peer Review, Actions taken by SNSA and additional review by SNSA on important reports). The focus of the Action Plan - Part IV - contains the list of measures aimed at measures implementing the recommendations contained in parts I - III. The set of these measures is the sum of corrective actions identified.

Update 2015: The Revised NAcP closely follows the approach of the previous report, but including the new information gathered in Slovenia since April 2013. Specifically a new chapter 5 'Update of the NAcP' was added to Part IV, in which challenges from the first rapporteurs' report are addressed and changes and updates are reported on all actions.
Challenges and good practices identified during the implementation process of measures are not clearly mentioned in the NAcP but were clarified during the workshop.

2.0 ASSESSMENT OF THE CONTENT OF NATIONAL ACTION PLAN

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

Proposed measures are addressing all the recommendations of the ENSREG action plan and are specifically formulated for the Krško NPP and for SNSA, the Slovenian regulator. For all the proposed measures the timeframe for the implementation is indicated. It is mentioned in the NAcP that the SNSA efficiently monitors this process.

When reviewing the Slovenian NAcP it was noted that for a lot of ENSREG recommendations it was referred to the Safety Upgrade Program (SUP) of the Krško NPP, without mentioning which specific measure from the SUP deals with the ENSREG recommendation at hand. It therefore was not explicit if every ENSREG recommendation is covered by the SUP and what is the specific timeframe of implementation of the measure dealing with the ENSREG recommendation. However during the ENSREG workshop in Brussels the Slovenian representatives gave further details on the SUP and how each of the ENSREG recommendations is covered, as well as what is the expected timeframe. Additionally it became clear that the SNSA will closely monitor the fulfillment of the ENSREG recommendations in the SUP licensing process.

As explained by the Slovenian representatives several actions, mainly on the national level, were formulated as 'to be considered', since in the short time frame for the NAcP preparation not all recommendations could be given thorough review as to how much they are already incorporated in the Slovenian nuclear infrastructure, and which specific actions and dates for the implementation could be proposed.
SNSA plans to give all actions that are to be considered an in-depth review, whether and how the recommendations are or should be taken into account. The indicated timeframes for these actions are chosen without an in depth evaluation of the needed actions and are therefore are set for consideration, but SNSA expects that specific actions that would come up out of these reviews would be implemented in the same timeframe if possible.

An important issue in Slovenia, situated in a seismic active region, is the implementation of the ENSREG recommendation leading towards a resistance against earthquakes with a peak ground acceleration of 0.6g for the Krško NPP, which measure is part of the SUP.

Update 2015:
Additional seismic studies were done in recent years (2011 and 2013). From these analyses it was decided that no further immediate measures were necessary. Further investigations are planned for the next two years.

Amending of the nuclear safety regulations regarding design bases, and implementing the updated WENRA Reference Levels is in progress, with an existing draft under review by the regulator. The deadline for adoption is end 2015. It is commendable that Slovenia will implement the updated WENRA Reference Levels in such a short timeframe.
Furthermore Slovenia has put a lot of effort in the improvement of the emergency preparedness arrangements and the cooperation with Croatia on this issue is a commendable practice.
SNSA hosted an IRRS follow-up mission in September 2014 and invited both an OSART mission and an EPREV mission for 2017.

2.2. Schedule of the implementation of the NAcP

The implementation of improvement measures identified on European and National level in the aftermath of the accident in Fukushima Daiichi is clearly scheduled. A number of short-term measures is already realised. Part of these measures were based on the implementation of the B.5.b. requirements, which were issued by the US-NRC as a response to the 9/11 event. These requirements were also endorsed by the SNSA, which required their implementation in the Krško NPP. After the accident in Fukushima Daiichi the implementation is accelerated and adapted to the analysis of the event in Fukushima Daiichi. As a result of this analysis the following modifications were implemented and licensed in June 2011:

- the procurement of additional portable equipment (e.g. diesel generators, pumps and compressors) and
- implementation of several smaller modifications on the plant itself and in the emergency operating procedures (EOP) and severe accident management guidelines (SAMG) to enable the quick connection and use of this equipment.

After the European Stresstest some additional mobile equipment and connection points are already installed by the end of 2011.
In 2012 there was the realization of the third 6.3 kV safety related diesel generator and the upgrading of the flood protection dikes upstream the river, which resulted from the first PSR.
Part of the Safety Upgrade Program of the Krško NPP was already envisaged in the Slovenian legislation before the Fukushima Daiichi accident as a prerequisite for lifetime extension.
After the accident in Fukushima Daiichi the SNSA ordered the plant to implement this program (evaluation and implementation of severe accident measures) in advance. The program, which includes the installation of Passive Autocatalytic Recombiners, filtered containment venting system, establishment of the Emergency Control Room and relocation of the technical support centre (i.e. emergency control centre) into a bunkered and severe accident protected building, alternative UHS, additional pumps for injecting into steam generators, the reactor coolant system, spent fuel pool, reactor cavity, reactor coolant pump

seals with dedicated reservoirs, all designed for the Design Extended Conditions, is now ready (approved by SNSA in 2012) and will be implemented before 2016.
The other, national level, measures have a time schedule between 2013 and 2018, a number of which is subject to further analyses (see 2.1).

Update 2015: The SUP deadline was changed from 2016 till the end of 2018. This change was approved by SNSA. The reasons for this delay were mainly the magnitude of the project, the complexity of design documentation, long delivery times of main components, inclusion of the Krško NPP into the Public Procurement in Water Management, Energy, Transport and Postal Services Area Act, and failure of the bidding of the Bunker Building 2 (BB2) project.
In 2014 the licensee notified the SNSA that an important part of the SUP project (phase 3) will not be realised by the end of 2018 because it was not clear if the owners of the Krško NPP are willing to provide the necessary budget for this final part of the SUP project. A financial viability study had to be done first. The results of the study showed that the Krško NPP will be profitable even with implementation of the SUP's 3rd phase. So the owners of the plant decided to continue with its exploitation including the investment to SUP Phase 3. The SNSA is now awaiting the NPP's application for the SUP 3rd phase final deadline. Phase one of the SUP (Filtered containment venting system and Passive autocatalytic recombiners) was finished in 2013, while the second phase of the SUP, which consists of improvements such as Additional flood protection of the nuclear island, Reconstruction of the operation support centre, Establishment of new technical support centre, Installation of pressurizer PORV bypass, Installation of spent fuel pool alternative cooling, Installation of emergency control room, and Installation of additional independent instrumentation, will be implemented between 2015 and 2018.

Most of the actions included in the "to consider" category have been moved to the implementation phase. For the additional studies identified (action 5 form the NAcP), SNSA is still considering on the remaining three topics (radiological protection equipment for severe accident response, analysis and identification of situations that would prevent performance of work for radiological reasons, and the question of stress on staff behaviour) whether additional studies will be required.
It is important to note, that the Krško NPP has started developing additional PSA models (for low power and shutdown states, as well as for the spent fuel pool).

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

The NAcP informs on how the Krško NPP and SNSA intend to improve the safety of the NPP in the aftermath of the Fukushima Daiichi accident according to the national assessments, the recommendations and suggestions of the European stress tests and the conclusions of the CNS process. The implementation schedules are clearly provided.

The English version was made public on the website of SNSA. The national action plan will be updated half yearly.

Update 2015: There was an update on the actions in the national action plan in December 2013 published on the SNSA website. In December 2014 a complete updated version of the national action plan was published. The NAcP and its up-dates were published in English on the SNSA website.

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

After the accident in Fukushima Daiichi, Slovenia started immediately with the analysis of possible safety improvement of the Krško NPP facility. Measures already planned before (installation of mobile equipment) were accelerated. Shortly after the accident in Fukushima Daiichi and as a result of the stress test process a number of extra measures were identified and are already implemented. Also the Safety Upgrade Program envisaged in the Slovenian legislation to address severe accidents and to enhance the severe accident management of the plant was accelerated after the accident. In addition to addressing the mitigation of severe accident, the SUP also represents another layer in the prevention of the core damage and damage of the spent fuel pool. Thus the SUP, which will be implemented until 2016, will further enhance in a well structured way, the overall safety of the facility. SNSA will be able to follow the implementation very closely.
A strong point of the Slovenian NAcP is the incorporation of the IAEA action plan, the US-NRC recommendations and the ASME report after the Fukushima Daiichi accident.
Another commendable practice is the use of a full scope plant specific simulator for validation and training of SAMGs, which are implemented for all plant states.
The Krško SAMGs have also been independently validated with an IAEA RAMP (Review of Accident Management Program) mission in 2001, yet the Slovenian NAcP foresees another independent validation when the implementation of the SUP is complete.

The next steps for revision of the 2004 SPSA, which will probably be done after all ongoing additional investigations are complete, constitutes a challenge specific to Slovenia due to the seismic characteristics of the Krško site.

A challenge for Slovenia represents the enhancement of off-site emergency preparedness and its harmonization with Croatia.

Update 2015:
The update of the Slovenian NAcP includes an additional commendable aspect:

- The SNSA has prepared draft new regulations, which also include the 2014 updates of the WENRA Reference Levels. These regulations are planned to be adopted until the end of 2015.

How Slovenia dealt with the above mentioned challenges is well addressed in the updated NAcP.
However, in the workshop of 2015 there were some new challenges identified:

- Completion of Phases 2 and 3 of the SUP will add in a large extent to the safety of the Krško NPP. The challenge remains implementing theses phases in a timely manner.
- Improving the nuclear safety infrastructure in the present economic crisis situation.

2.5 Technical basis related to main changes and relevant outcomes of studies and analyses

The most important change in the NAcP is the delay of part of the SUP implementation. This change is mainly due to non-technical reasons (financing of the project, problems in the bidding process, long deliver times of some main components and complexity of the project). On the other hand, due to this delay the owner of the Krško NPP can take advantage of experiences and technical developments in other nuclear countries and implement the best technical solutions, bringing the Krško NPP to a safety level which could be compared with generation III reactors. However SNSA still has to approve the intended implementation measures and the solutions chosen.

The NAcP from Slovenia is mainly focussed on hardware measures and improvements in regulations, emergency preparedness and processes within the SNSA, and to a lesser extent on studies. Since 2013 only one study was initiated but has not been completed yet. SNSA is considering on the remaining three topics whether additional studies will be required

3.0 PEER-REVIEW CONCLUSIONS

Slovenia has taken into account all the necessary issues, identified according to the National assessments, the recommendations and suggestions of the European stress tests and the conclusions of the CNS process, in its NAcP and updated this plan. The progress on the identified actions was good, however, an important part of the hardware measures still has to be implemented.

Slovenia has made very good progress with the implementation of measures after the Fukushima Daiichi accident. Immediately after the accident the implementation of measures, which were already planned before (installation of mobile equipment in the framework of NRC's B.5.b requirements) were accelerated. The measures were an important upgrade to the safety of the Krško NPP. The Krško NPP reviewed and updated the SAMGs in relation to this new equipment and in relation to the accident in Fukushima Daiichi.

Additional substantial improvements are included in the Krško Safety Upgrade Program (SUP). The Phase one of the SUP (Filtered containment venting system

and Passive autocatalytic re-combiners) was finished in 2013. The second phase of the SUP (e.g., Additional flood protection of the nuclear island, Establishment of new technical support centre, Installation of pressurizer PORV bypass, Installation of spent fuel pool alternative cooling, Installation of emergency control room) is delayed and will be implemented from 2015 till 2018. In 2014 the licensee notified the SNSA that a part of the SUP project (phase 3) will not be realised by the end of 2018. A financial viability study had to be done first. The SNSA is now awaiting the NPP's application for the SUP 3rd phase final deadline, which will most probably be in 2021. The change in this schedule is mainly due to non-technical reasons. The benefit of this delay is that the owner of the Krško NPP can take advantage of experiences and technical developments in other nuclear countries and implement the best technical solutions.

Most of the other actions from the NAcP are well in progress. However, there is no real progress in the improvement of the nuclear safety infrastructure in the present economic crisis situation.

The NAcP from Slovenia is mainly focussed on hardware measures and improvements in regulations, emergency preparedness and processes within the SNSA, and to a lesser extent on studies.

The use of a full scope simulator for severe accidents for the validation and training of SAMGs is a commendable practice in Slovenia.

It is also commendable that Slovenia has implemented the updated (2014) WENRA Reference Levels in a draft of new regulations. The updated regulations should be adopted by the end of 2015.

Furthermore Slovenia has put a lot of effort in the improvement of the emergency preparedness arrangements and the cooperation with Croatia on this issue is a commendable practice.

Slovenia still has the following challenges:

- Implementation of phase 2 and phase 3 of the SUP until 2018 and 2021 respectively
- Improving the nuclear safety infrastructure in the present economical and political crisis situation.