

**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 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 2<sup>nd</sup> 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.

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

The NAcP has followed the ENSREG guidance 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 organizations, 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 implementing the recommendations contained in parts I - III. The set of these measures is the sum of corrective actions identified.

**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 peer review 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 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.

## 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 were 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 Periodic Safety Review.

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).

### 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.

### 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 Seismic Probabilistic Safety Assessment, 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.

### 3.0 PEER-REVIEW CONCLUSIONS

The **Slovenian** NAcP informs comprehensively and in a transparent way how the safety of the Krško NPP is and will be improved 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 NAcP has been prepared by the Slovenian Nuclear Safety Administration (SNSA). The NAcP has followed the ENSREG guidance closely. The NAcP is structured in accordance with the structure suggested by ENSREG.

The English version of the NAcP is accessible on the website of SNSA.

During the ENSREG workshop in Brussels the Slovenian representatives gave further details on the Safety Upgrade Program of the Krško NPP and how each of the ENSREG recommendations is covered, as well as the expected time frame.

The identified measures will be implemented according to a three phase time schedule. The immediate actions after the Fukushima Daiichi accident were completed in 2012. Most of the measures which are part of the Safety Upgrade Program will be implemented in medium term till 2016. They comprise a wide range of technical measures, improvements or implementation of procedures and operational regulations, which are very well structured in a comprehensive program. The rest of the measures are scheduled until 2018, a number of them is at first subject to further analyses, on which basis further decisions will be made.

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

Slovenia acted proactively after the Fukushima Daiichi accident and realized quite a lot of measures in the last two years. The incorporation of the IAEA action plan, the US-NRC recommendations and other (scientific) evaluation reports is as well a commendable practice.