SE - Sweden

RAPPORTEURS' REPORT - SWEDEN

ENSREG NATIONAL ACTION PLANS WORKSHOP

DRAFT Rev6, 22-04-2015

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 Sweden contains a compilation of conclusions and recommendations derived from the Compilation of Recommendations of ENSREG, key topics of the 2nd Extraordinary Meeting under the CNS, the state review of stress test results and findings of the Peer Review Country Report.
The country followed the structure proposed in the ENSREG Action Plan. National EU-Stresstest results were considered as well as ENSREG and CNS aspects.
The measures for Topics 1-3 are listed according to the national classification. There are no explicit references to the corresponding ENSREG recommendations and suggestions, Country Peer Review recommendations and aspects from CNS. Such references would have been helpful for assessing the content of the NAcP.

2015: No changes.

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

The overall structure of the Swedish NAcP follows the ENSREG guidance. The proposed outline was adopted with Parts I – IV as recommended by ENSREG. An introductory section provided general date about the sites and plants, including measures already taken due to the Fukushima accident.
It is notable that the central Swedish spent fuel storage facility CLAB was included in the national stress test.
In the presentation at the Workshop, it was shown that relevant measures for severe accident management had already been taken in the 80s. Further measures were taken after a new regulation entered into force in 2005.

2015:

The report has been updated by adding a new section (Part V) and updating the tables containing actions in Part IV. The structure is well-arranged; these changes and additions can be readily identified.

Most of the report has not been updated which should have been better explained in the NAcP, The explanation provided in the first paragraph of the Abstract is somewhat vague and it can be confusing for the reader that text from the original NAcP from 2012 has not been updated.

"Response/clarification on any issues identified in the rapporteur's report from the 2013 workshop" (see ENSREG Information Pack, section 3): In the rapporteur's report from 2013, it was stated that there are, in the 2012 NAcP, no explicit references to the corresponding ENSREG recommendations and suggestions. The revised NAcP still does not contain such references. Although the consideration of ENSREG recommendations was mostly clarified at the 2013 workshop, the inclusion of references to the ENSREG list in the revised NAcP would have been helpful, and would have increased readability and transparency.

"Relevant outcomes of studies and analyses identified in the NAcPs, and completed since the 2013 workshop" (see ENSREG Information Pack, section 3): In many cases, the Swedish NAcP mentions results of studies and analyses which have already been completed, and measures which are to be performed as a consequence, without providing information on the results and measures. However, information on results and measures was provided in the written answers.

In most cases, the deadlines for measures are not provided but it was clarified during the workshop and in the answers to questions that the authority will require licensees to present reactor specific implementation plans for these measures in 2016.

2.0 ASSESSMENT OF THE CONTENT OF NATIONAL ACTION PLAN

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

It is stated in the Swedish NAcP that most of the actions described in the NAcP are investigations for which the aim is to determine and consider which measures are fit for purpose, how they shall be implemented, and the time for implementation. All actions of the plan are prescribed to all plants; the measures which will result from the investigations are likely to be more plant-specific.

The Swedish NAcP is based on site-specific action plans which have been presented by the licensees but not yet been reviewed by SSM; definitive establishment and completion of the site-specific action plans will be the first step of implementation of the NAcP. The interplay between planning on national and site level is complicated and not fully explained in the NAcP, but was clarified in presentation and discussion at the WS.

SSM will in early 2013 issue a decree to the licensees, including parameters and parameter values to clarify the level of ambition of the measures in the NAcP, in order to establish a framework for a consistent and quality assured process to further improve reactor safety. The further process will be monitored (annual status report from licensees to authority) and followed up with new decrees by SSM to secure implementation of measures.[1]

The actions listed in the Swedish NAcP cover all of the ENSREG and Country Peer Review recommendations. In the absence of explicit references to these recommendations, it is difficult to establish the correspondence between actions and recommendations in each case. However, the consideration of the recommendations was clarified in the presentation and the discussion at the workshop. The only case where this could not be fully verified, ENSREG recommendation 3.3.16 (Severe Accident Studies), is of minor importance.

It should also be noted that the methods applied for investigations and analyses of natural hazards (Section 1.2 of NAcP) are not fully described.

2015:

No explicit information is provided in the NAcP concerning the decree which was to be issued in early 2013 by SSM, which has been mentioned in the 2013 Rapporteur's Report (see above).

[1] Due to a misunderstanding at the 2013 Workshop, the second and third paragraphs of this section do not fully reflect the basis of the Swedish NAcP. It should be noted that the NAcP is not based on site-specific action plans presented by the licensees. It was developed by SSM based on the licensees' stress test reports, peer review national report, ENSREG Compilation of Recommendations and Suggestions and the results of the 2nd Extraordinary CNS Meeting. All licensees were and are required to implement the NAcP. According to an SSM decision issued in 2013, licensees shall annually report to SSM on the reactor specific implementation of the NAcP.

However, during the presentation it was clarified that according to a decision issued in 2013, licensees shall annually report on the reactor specific implementation of the NAcP to SSM.
Also, clear information is provided in Part V regarding the new decisions on independent core cooling. The importance of the annual licensee reports is again emphasized.
Regarding the methods for investigations and analyses of natural hazards, some information is provided in the 2014 NAcP (section 9.1.3).
Regarding the references to ENSREG recommendations, see 1.2.

It has been clarified at the Workshop that the re-assessment of the seismicity levels which (according to the Stress Test Peer Review Country Report for Sweden) was planned for 2014 is being addressed by a sensitivity study that quantifies the influence of palaeo-seismological data on the site specific hazard.

2.2. Schedule of the implementation of the NAcP

The measures listed in the NAcP are scheduled in three categories: Completion by the end of 2013, by the end of 2014 and by the end of 2015. It has to be noted that this mostly concerns investigations, as pointed out above.
Implementation of the necessary technical and administrative measures, as a consequence of the investigations, will follow afterwards (until 2020 at the latest). In the NAcP, it is stated that SSM considers it as highly likely that the majority of necessary technical and administrative measures will be implemented before 2020 to make sure that implementation takes place as soon as reasonably possible. However, no definite deadlines or milestones are defined between 2015 and 2020.

2015:
It is commendable that the activities in the NAcP have been completed according to the planned schedule, or are proceeding according to plan.

For many actions in table 8.2 of the 2014 NAcP, measures are mentioned which have resulted from analyses and investigations which have been performed. However, the measures are often not described; and only the general deadline for 2020 is provided for the implementation of these measures resulting from these analyses, as well as for other measures which will result from analyses and investigations which are still on-going. At the workshop, it was also clarified that SSM is planning to issue a new decision, requiring all licensees to present, in spring 2016 after all investigations defined in the NAcP have been completed, detailed and plant specific plans for the implementation of measures identified through the investigations (complying with the general deadline of 2020). SSM further explained that a risk informed approach is expected to be applied for the site specific implementation plans (i.e. implementation of the measures most important considering potential risk and consequences should be prioritized).

For the Independent Core Cooling system, deadlines for implementation have been decided (NAcP Part V, section 9.3):

- *Submission of an implementation plan for a transitional solution by 30 June 2015,*
- *implementation of the new requirement for this transitional solution by 31 December, 2017,*
- *submission of an implementation plan with reactor specific solutions for the full solution by 31 December, 2015 and*
- *implementation of the full solution in 2020.*

SSM issued a decision on the conditions for this work by 15 December 2014. (In the NAcP, section 9.4, this point is not entirely clear since it is stated that "SSM will impose a requirement" for the full solution; however, this was clarified at the workshop.)
It is also stated in the NAcP that a licensee may apply for changes in the conditions in case shut-down of a reactor is planned during the next few years after 2020.

SSM have clarified at the Workshop that all actions in the NAcP are monitored by the regulator and the level of regulatory supervision is again based on a graded (risk informed) approach. Independent Core Cooling is considered to have high priority.

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

The NAcP contains comprehensive information on the actions planned post-Fukushima, as well as background information on the European context of the activities and on the Swedish nuclear power plants.
The process to plan the activities in Sweden, for example the interplay between planning on the national and the site level, could be better described. Also, the lack of direct referencing between actions and ENSREG and Country Peer Review Recommendations renders it difficult to get an overview for the review of the implementation of these recommendations.
The NAcP is accessible both on the regulator's and the ENSREG website. Its implementation will be closely monitored by SSM, and the implementation process is to be transparent for all stakeholders. The annual status reports will be published.

2015:
It is commendable that only published documents are listed as references in the NAcP.
The interplay between national and site level is briefly described in the 2014 NAcP (section 9.1.5), in particular regarding the independent core cooling actions.

Regarding reference to the ENSREG recommendations, see 1.2.

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

Specific safety goals in terms of timespans for keeping a safe plant state (e.g. in case of total loss of AC power) have been set in Sweden, which can be regarded as a good practice. It is also commendable that the implementation of severe accident management measures has begun in the 1980s.

A return frequency of 10^{-5}/year is used for plant reviews and backfitting for all natural hazards.

The time schedule presented in the NAcP focusses on investigations, and does not provide detailed information on the schedule for the resulting technical and administrative measures. Establishing appropriate, comprehensive and consistent schedules for these measures constitutes a challenge and will need comprehensive planning, also taking into account that the pre-Fukushima modernization program is still on-going. The final deadline provided for all related activities (2020) is later than most other countries. However, the implementation of the majority of the measures is expected before this year, but the definite deadlines cannot be provided before the investigations are completed.

2015:

It appears that establishing appropriate, comprehensive and consistent schedules for implementation of measures identified during the analyses phase remains a challenge. SSM is well aware of this challenge since it was stated at the workshop that the authority is planning to issue a new decision, requiring all licensees to present, in spring 2016 after all investigations have been completed, detailed and plant specific plans for the implementation of measures identified through the investigations, applying a risk-informed approach. Furthermore, it was clarified during the workshop that the licensees have already implemented some measures and planning is ongoing for the remaining measures. This has been discussed with the authority but not yet presented in detail.

At the Workshop, it was also explained by SSM that no difficulties are expected in complying with the general final deadline (2020) although the detailed plans are not yet available, since sufficient information is already available for the activities to be planned to assess their duration.

It is commendable that, due to the high importance attached to the introduction of a new independent core cooling system, an intermediate step has been introduced and the introduction of a transitional solution is now planned by the end of 2017.

SSM explained at the Workshop that the Independent Core Cooling function is required to be available in case of external events of a frequency of 10^{-6}/yr. It is commendable that Sweden

has decided to issue a requirement for this low frequency although it will be a challenge to demonstrate the fulfillment of this requirement.

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

There is one significant change in the schedule – one new milestone has been added: A transitional solution for the Independent Core Cooling function has to be in place by the end of 2017 (see 2.2 and 2.4). In this way, core cooling capabilities will already be improved well before the full solution for the Independent Core Cooling function is implemented (by 2020).

Little information is included in the NAcP concerning the outcomes of studies and analyses. However, information regarding the outcome of studies and analysis was provided in the written answers and at the Workshop, for example regarding external flooding, an alternative function for SFP cooling, hydrogen management, filtered venting.

3.0 PEER-REVIEW CONCLUSIONS

The activities in the NAcP have been completed according to the planned schedule, or are proceeding according to plan. All issues which were identified post-Fukushima are being pursued. Relevant information is mostly well presented in the updated NAcP.
A number of important tasks still have to be pursued; a large part of the activities so far concerned analyses and studies, on the basis of which measures will be planned, to be implemented until 2020 at the latest.

The original NAcP followed the structure proposed in the ENSREG Action Plan. It contained comprehensive information on the actions planned in the aftermath of Fukushima, as well as background information on the European context of the activities and on the Swedish nuclear power plants.

The 2012 NAcP mainly presented investigations for which the aim is to determine and consider which measures shall be implemented, and the time for their implementation. The final deadline provided for all related activities (2020) was later than most other countries; however, during the 2015 workshop some countries presented delays which result in a comparable (or later) final deadline. It was also noted during the 2013 workshop that the implementation of the majority of the measures is expected before this year. It is notable that the central spent fuel storage facility CLAB has been included in the stress test.
Specific safety goals in terms of timespans for keeping a safe plant state (e.g. in case of total loss of AC power) have been set in Sweden, which can be regarded as a good practice.
It is also commendable that the implementation of severe accident management measures has begun in the 1980s and that Sweden applies continues improvements and is implementing extensive modernization programs.
The implementation of an additional Independent Core Cooling function was already planned in the 2012 NAcP. At the Workshop 2013, it was found that it should be considered with high priority and can be regarded as a challenge.

Accordingly, the introduction of the Independent Core Cooling function has high priority today and is progressing according to schedule. Originally, it was planned to introduce this measure in just one step, implementing the full solution by 2020. It is commendable that an intermediate step has been introduced now, in the 2015 NAcP – a transitional solution, which does not have fully to meet the expectations for the Independent Core Cooling function, is to be introduced by the end of 2017.
An implementation plan for the transitional solution is to be submitted by mid-2015, and for the full solution by end of 2015. For reactors to be shut down soon after 2020, licensees may apply for a change of conditions.

For the implementation of the Independent Core Cooling function, the licensees will have to demonstrate that the requirement for the function to be available at hazard frequencies of 10^{-6}/yr is fulfilled. It is commendable that Sweden has decided to issue a requirement for this low frequency although it will be a challenge to demonstrate the fulfillment of this requirement.

In many cases, the updated Swedish NAcP mentions results of studies and analyses which have already been completed, and measures which are to be performed as a consequence, without providing information on the results and measures. However, explanations were given in the written answers to submitted questions, and at the Workshop.

The general final deadline of 2020 for all measures resulting from studies and investigations will soon be supplemented by a more detailed schedule: It was stated at the Workshop that the authority is planning to issue a new decision, requiring all licensees to present, in spring 2016 after all investigations have been completed, detailed and plant specific plans for the implementation of measures identified through the investigations, applying a risk-informed approach. Additionally it was clarified during the workshop that the licensees have already implemented some measures and planning is ongoing for the remaining measures. This has been discussed with the authority but not yet presented in detail.
Thus, it appears that establishing appropriate, comprehensive and consistent schedules remains a challenge. SSM is well aware of this challenge.