Western European
WENRA RHWG
Nuclear Regulators Association

Report

Peer Review of the Implementation of the 2014 Safety Reference Levels in National Regulatory Frameworks

A RHWG report to WENRA

23 March 2018

Table of Content

Peer Review of the Implementation of the 2014 Safety Reference Level in National Regulatory Frameworks

00
Executive Summary

RHWG performed a formalised review to follow-up the implementation of some of the 2014 Reference Level (RLs) for existing reactors from 2014 in WENRA countries' national regulatory framework (i.e. legally binding requirement established in laws and regulations, publicly available licence conditions repeated in each and every NPP licence, publicly available regulatory guidance). This review focused on the 101 RLs which were revised or created (for example those in the new Issue T on natural hazards) to take into account the lessons from the TEPCO Fukushima-Daiichi accident.

Every WENRA country performed a self-assessment of the implementation, as of the end of October 2015, to conclude on the degree of implementation of each RL. The peer review was therefore based on a snapshot of implementation in the member countries at that time. In addition, members developed action plans for those RLs which were not implemented yet. In 2016, the self-assessments were peer-reviewed by RHWG members by desktop review and submission of written questions and answers, and by discussions in review groups and in the RHWG plenary.

The overall conclusion of the peer-review is that the implementation in national regulatory framework of the updated RLs is well advanced in most WENRA countries. However, for some RLs, further efforts need to be done to achieve harmonization. This is in particular the case for Issue F (Design Extension of Existing Reactors), which included changes to improve the concept of "Design Extension Conditions" (DEC), to better address the safety of the spent fuel pool and of multi-unit sites, as well as for the new Issue T (Natural Hazards).

Every WENRA country prepared an action plan for the implementation of the remaining RLs in the national regulatory framework. Progress on the implementation of the full set of RLs has been and will continue to be monitored through a report that RHWG submits to WENRA on an annual basis.

01
Introduction

On 14 September 2014 WENRA published the revised safety reference levels (RLs) for existing reactors which take into account lessons learned from the TEPCO Fukushima Dai-ichi accident.

WENRA members made a commitment to implement these updated RLs to improve and harmonise their national regulatory systems, with 2017 as a target date. Therefore, the Reactor Harmonisation Working Group (RHWG) of WENRA initiated a formal process to peer-review the implementation of these revised RLs in WENRA country national regulatory frameworks so that the national action plans already initiated to ensure full implementation may be amended if needed.

The purpose of this report is:

- To give details on the process that was followed by RHWG to peer-review the implementation of the updated RLs in national regulatory frameworks;
- To reflect the main challenges that RHWG encountered; and
- To present the outcome of the peer-review based on implementation at 31 October 2015;

02
Background

02.1 The WENRA Safety Reference Levels for existing reactors: 2000 -2008

With the view to increase harmonisation within WENRA countries, as a result of efforts initiated in 2000, WENRA published in 2006 a set of Reference Levels (RLs) for reactors in operation at that time in WENRA member countries. These RLs are of high level nature and do not go into legal and technical details. The RLs only cover nuclear power reactor safety and exclude nuclear security and, with a few exceptions, radiation safety.

The RLs concentrate on safety requirements that are placed by the regulatory regime upon the licensee. Safety areas and issues included were selected to cover important aspects of reactor safety where differences in substance between WENRA countries might be expected.

As a basis for the development of the RLs, the most recent publicly available edition of the IAEA safety requirements was used. This basis was complemented by the best practices of national regulations or regulatory guidance in WENRA countries.

The RLs were then updated twice: in 2007 (in particular issues E "Design Basis Envelope for Existing Reactors" and F "Design Extension of Existing Reactors") then in 2008 following the publication of IAEA GS-R-3[1] (in particular issue C "Management System"). In 2008, the full set consisted of 295 RLs.

02.2 Development of the 2014 version of the WENRA Safety Reference Levels

In March 2011, a major nuclear accident occurred at TEPCO Fukushima Dai-ichi nuclear power plant in Japan. In Europe, the so called "stress tests" were carried out, under the leadership of ENSREG[2], as comprehensive reassessment of the safety margins of European nuclear power plants. They included a peer-review process, performed in the first half of 2012, which resulted in recommendations and suggestions from ENSREG[3] and a request to WENRA to develop Reference Levels is certain areas.

In 2012, WENRA published a Statement[4] "WENRA Conclusions arising from the Consideration of the Lessons from the TEPCO Fukushima Dai-ichi Nuclear Accident" which highlights that "*WENRA's commitment is to proceed along the path of defining or revising existing Reference Levels as well as developing guidance documents for practical use by regulators*".

[1] IAEA GS-R-3 : The Management System for Facilities and Activities (2006)
[2] ENSREG : European Nuclear Safety Regulators Group
[3] ENSREG published a compilation of stress test peer review recommendations and suggestions (available on ENSREG website: http://www.ensreg.eu/NODE/513)
[4] Report available on WENRA website: http://www.wenra.org/archives/wenra-conclusions-arising-consideration-lessons-te/

As a result, RHWG was tasked to review and, where necessary, revise or develop new RLs to take into account lessons learned from the TEPCO Fukushima Dai-ichi accident (see RHWG report[5] "Updating WENRA Reference Levels for existing reactors in the light of TEPCO Fukushima Dai-ichi accident lessons learned – September 2014").

As a result of the RHWG review a new set of RL was developed, and after considering the stakeholder feedback on the draft RLs, finalized:

- The issues where there have been the most significant changes are:
  - Issue A (Safety Policy);
  - Issue C (Management System) RLs relevant to safety culture have been introduced;
  - Issue E (Design Basis Envelope for Existing Reactors);
  - Issue F (Design Extension of Existing Reactors) Design extension conditions have in particular been introduced for consistency with IAEA SSR-2/1 safety standard, as well as the need for independent and diverse heat removal means, one being effective for natural hazards exceeding the design basis;
  - Issue LM (Emergency Operating Procedures and Severe Accident Management Guidelines);
  - Issue N (Contents and Updating of Safety Analysis Report);
  - Issue O (Probabilistic Safety Analysis);
  - Issue P (Periodic Safety Review);
  - Issue R (On-site Emergency Preparedness);
- A new Issue (Issue T) dedicated to natural hazards, has been established. This new Issue has a strong interface with Issues E and F.

WENRA endorsed the revised set of RLs during the summer of 2014 and they were published on 14 September 2014. These 342 RLs represent, in addition to objectives for safety improvements to take account of the lessons learned from the TEPCO Fukushima Dai-ichi accident, good practices in WENRA countries.

02.3 Commitment to implement the updated Safety Reference Levels

On 27 October 2014, WENRA published a statement addressing the revised reference levels. With this statement WENRA members committed to implement the RLs into their respective national regulatory frameworks. It is stated that:

> *"The national regulators make a commitment to improve and harmonize their national regulatory systems, by implementing the new SRLs until 2017 as a target date."*

[5] Report available on WENRA website:
http://www.wenra.org/media/filer_public/2013/11/21/rhwg_report_on_updated_rls_for_existing_npp_-_november_2013.pdf

03
RHWG Review Process

03.1 General approach to perform the follow-up

During the RHWG meeting in January 2014, it was decided to prepare a plan to evaluate the implementation of the upcoming revised RLs. This plan was discussed and further elaborated at several RHWG meetings and finalised mid-2015. Two main actions were identified to follow-up on the implementation of the updated RLs:

- **Action item 1:** Follow-up on the implementation of the modified or newly created RLs in the national regulatory frameworks of WENRA countries;
- **Action item 2:** Follow-up on the implementation of a few modified or newly created RLs in the NPPs of WENRA countries.

This document reports on the follow-up of the implementation of the revised RLs in the national regulatory frameworks of WENRA countries (action item 1) only.

RHWG suggested and WENRA agreed to restrict the present review to the implementation of the RLs that were updated and developed after the accident at Fukushima Dai-ichi NPP. The implementation of the remaining RLs had been reviewed previously in 2010[6].

RHWG established a formal review process with four main steps:

1. Preparation of national self-assessment reports and national implementation plans;
2. Peer-review of national assessments;
3. Update, if needed, of national implementation plans to account for the outcome of the peer-review;
4. Follow-up of the national implementation plans.

This report addresses steps 1 to 3. Step 4 is outside the scope of this report. Progress on implementation of the RLs will be monitored amongst others through members yearly reporting the status at WENRA spring meetings.

[6] WENRA/RHWG Report, Progress towards harmonisation of safety for existing reactors in WENRA countries, January 2011

03.2 Preparation of the national self-assessments and national implementation plans

Each country prepared a national self-assessment regarding the implementation of the modified or newly created RLs in their national regulatory frameworks. 101 RLs were under scrutiny.

The same criteria as the ones used earlier by WENRA were applied[7]. To qualify, a national requirement must be part of the legal regulatory system and be formally issued. It must be documented in an official, open document/publication. These requirements are of two types, both of which provide a basis for regulators to exercise their powers and duties, but at different levels:

- ***A legally binding requirement****, such as a law, ordinance or regulation that is mandated and enforced, if necessary with the use of legal sanctions. These requirements are issued by the parliament, government, or regulatory body as authorized; and*
- ***A general recommendation*** *(rule, condition, guideline, principle, standard, etc.) that the regulatory body issues formally with reference to a legally binding document, decision, permission, or other formal authorization. These are not legally binding and enforced like regulations; however, they are used for granting licences and regulating licensees' activities.*

These criteria from 2006 were again confirmed by WENRA in November 2014. WENRA also accepted that a licence condition stipulated in the construction or operating licence of each and every NPP licensee of a WENRA country and publicly available could also be credited for implementation.

For the self-assessment RHWG members had to categorize the status of the implementation in their national regulatory framework of each modified or newly created RLs. The following categories were to be applied:

- **Category A**: RLs considered to be fully implemented in national regulatory framework (no change of the national regulations or regulatory guidance is needed);
- **Category B**: A difference exists, but can be justified from a safety point of view (no change of the national regulations or regulatory guidance needed);
- **Category C**: RLs is considered as not being implemented[8] in the national regulatory framework (need to update national regulations or regulatory guidance).

RHWG members were expected to provide a short description on how a RL is implemented when category A was claimed. In case of category B, an explanation / justification was also

[7] "Harmonization of Reactor Safety in WENRA Countries", Report by WENRA Reactor Harmonization Working Group, January 2006

[8] A RL which is partially implemented in the national regulatory framework, should be of category C unless an appropriate justification supports a category B

expected. For RLs in category C, no explanation was expected but they were to be addressed in the national implementation plan (see section 03.4).

The national self-assessments for the peer review considered the status of implementation at the 31 October 2015.

As background information, RHWG members were also asked to provide a short overview of the national regulatory system in the beginning of their national self-assessment reports.

03.3 RHWG peer-review of national self-assessments

The peer-review of the national self-assessments consisted of three steps:

1. Desktop review of the national assessments and submission of written questions;
2. Written answers;
3. Discussion within RHWG to address written questions/answers and related open issues.

In total, **101 RLs[9] were reviewed** in this process. In order to accommodate the significant workload of the peer-review, RHWG decided to spread the review over its three meetings in 2016, by grouping the Issues in three batches. The RLs were grouped together based on the similarity of the topics (in particular Issues E and F). The following repartition was used:

Table 1. Repartition of the peer-review over the three RHWG meetings in 2016

RHWG Meeting	Issue	No. RLs	Sum RLs
January 2016	Issue A: Safety Policy	1	19
	Issue B: Operating Organization	1	
	Issue C: Management System	3	
	Issue D: Training and Authorization of NPP Staffs	1	
	Issue G: Safety Classification of SSCs	1	
	Issue N: Contents and Updating of SAR	4	
	Issue O: PSA	2	
	Issue P: PSR	5	
	Issue S: Protection against Internal Fires	1	
May 2016	Issue E: Design Basis Envelope	13	38
	Issue F: Design Extension	25	
October 2016	Issue LM: EOPs and SAMGs	13	44
	Issue R: On-site Emergency Preparedness	12	
	Issue T: Natural Hazards	19	

[9] The full set of the WENRA Safety Reference Levels for Existing Reactors published in 2014 comprises 342 RLs. 241 were already established in the 2008 version and 101 RLs were modified or created in the 2014 version.

The workload for the first meeting was deliberately reduced in order to get experience with the review process.

Taking into account the magnitude of the review (101 RLs times 18 countries), RHWG decided that the review would be performed in three country groups in parallel sessions during the regular RHWG meetings. The following three county groups were established:

Table 2. Country groups used for the peer-review

Country Group A	Country Group B	Country Group C
Romania	France	Bulgaria
Finland	Belgium	Czechia
Hungary	Slovenia	Germany
Slovakia	Spain	Sweden
Switzerland	The Netherlands	United Kingdom
Ukraine		

The desktop review of the different Issue batches was performed prior to the review meetings. Most countries submitted, prior to the meetings, written answers to the questions. This helped very much to have effective and efficient discussions in the country groups, focussing on open issues which have been identified during the desktop review.

WENRA Observer Countries represented in RHWG were free to choose a country group or move across country groups. WENRA Members with more than one representative in RHWG were invited to participate also in another country group. RHWG Chair could also participate in any Country Group discussion.

For every country group, a coordinator had the task to steer the discussion and document the final conclusion. Coordinators were:

- Group A: Slovakia;
- Group B. Germany;
- Group C: Austria.

RHWG agreed that every country group member shall, as a minimum, review the national self-assessments of the other countries in its country group. RHWG members and observers were invited to review, on voluntary basis, national assessments of countries from other country groups.

For each country, a one hour country group discussion for each Issue batch was organized but, in practice, more time was often needed. Plenary sessions were also organised to discuss issues that could not be resolved within a country groups or were of general interest. One purpose of the plenary discussions was also to harmonize the findings across the three country groups. The last plenary session took place during the RHWG 2017 January meeting.

03.4 Preparation of the national implementation plan

Together with the self-assessment, each country prepared a national implementation plan for those RLs that have not been implemented into the national regulatory framework and were therefore rated 'C', in line with the WENRA target date of 2017.

04
Outcome of the peer-review

04.1 Overall outcome of the peer-review

Following the formalised review process described above, every WENRA country performed a self-assessment of the implementation using three different categories to conclude on the degree of implementation of each RL. In addition, members developed action plans for those RLs which were not implemented yet. These action plans were updated after the peer-review process to take into account the outcome of the process.

The self-assessments were peer-reviewed by RHWG. To do so, desktop reviews and country group reviews were organized in 2016. Any open issues from the country group review were further discussed in RHWG plenary sessions.

Figure 1 shows the overall outcome of the peer-review process per country for the 101 RLs under scrutiny. The figure distinguishes between the numbers of RLs that have been implemented in national regulatory frameworks (category A or B) and those that have not been implemented (category C). The bars in the figure show the number of revised or new RLs claimed to have been implemented in each country's self-assessment and the position after the peer review. The number of RLs implemented for each country has often decreased as a result of the challenges during the peer review process, although generally not significantly.

The status of implementation is generally that at the beginning of the peer review process, i.e end of 2015 or the very beginning of 2016. Since then, several countries have been progressing with implementation plans. It should therefore be recognized that the number of RLs that have been implemented in some countries at the time of publication of this report may be significantly greater than indicated in Figure 1. Additional country specific information is given in Appendixes A and B.

Table 3 shows the extent of implementation of each revised or new RL throughout the WENRA countries. The table is based on the result of the peer-review (excluding UK rating, see section 04.2). In this table, "100%" means that all countries have implemented the revised RLs. There is a great deal of variation in the number of countries that have implemented the RLs. Some RLs have been widely implemented (80%, i.e. in twelve countries), whereas others have only been very partially implemented (in two countries for example). Those with the lowest levels of implementation are typically in Issue F (Design Extension) and Issue T (Natural Hazards).

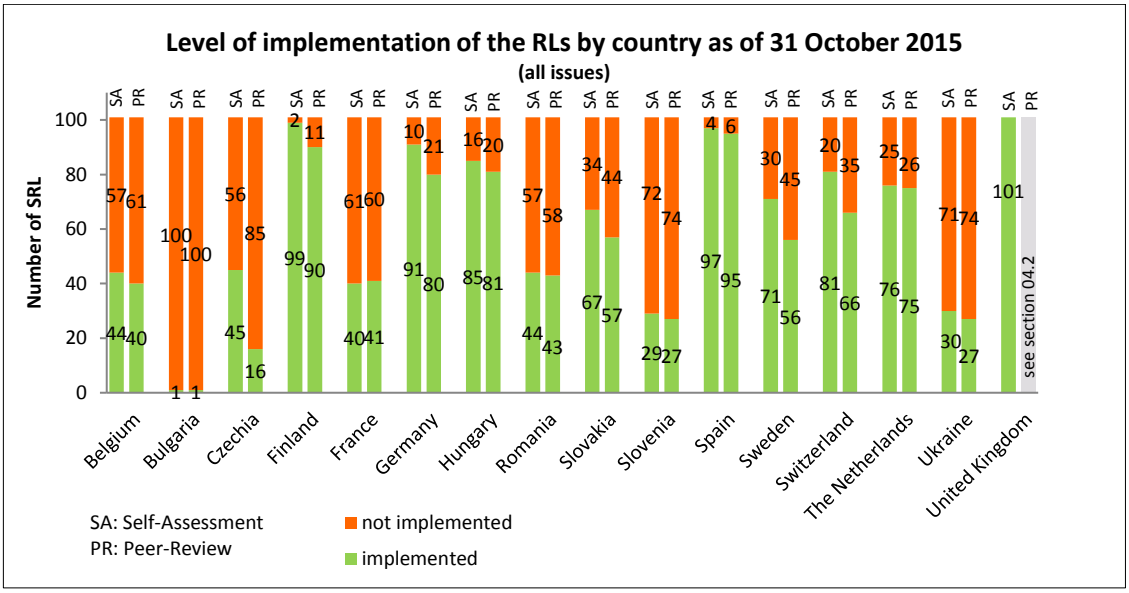

Figure 1. Level of implementation of the revised or new RLs by country as of 31 October 2015

Table 3. Implementation of each revised or new RL throughout the WENRA countries as of 31 October 2015

Implementation of each revised or new RL throughout the WENRA countries after the Peer-Review – Level of Harmonization (%), UK results excluded									
RL	%	RL	%	RL	%	RL	%	RL	%
A2.3	67	F2.1	53	F4.18	33	O1.1	40	T1.1	53
B2.2	67	F2.2	27	F5.1	73	O1.4	33	T2.1	73
C7.1	60	F2.3	53	G4.1	67	P1.3	67	T2.2	67
C7.2	67	F3.1	27	LM1.1	73	P1.4	80	T3.1	60
C7.3	53	F4.1	53	LM2.2	53	P1.5	60	T3.2	47
D3.1	80	F4.2	40	LM2.3	60	P2.2	73	T3.3	33
E1.1	87	F4.3	20	LM2.4	60	P3.2	67	T4.1	53
E3.1	67	F4.4	20	LM2.5	13	R1.1	53	T4.2	20
E4.2	80	F4.5	27	LM2.6	33	R2.1	87	T4.3	53
E5.1	73	F4.6	47	LM2.7	13	R2.2	53	T4.4	47
E6.1	67	F4.7	27	LM3.4	33	R2.3	40	T5.1	47
E8.3	67	F4.8	40	LM3.5	40	R3.2	53	T5.2	47
E8.7	60	F4.9	73	LM4.1	53	R3.6	33	T5.3	13
E9.5	47	F4.10	73	LM6.1	67	R3.7	47	T5.4	60
E9.8	73	F4.11	67	LM6.2	60	R4.3	67	T5.5	27
E9.9	67	F4.12	67	LM6.4	40	R4.4	33	T5.6	53
E10.1	47	F4.13	73	N1.1	87	R5.1	67	T6.1	27
E10.6	40	F4.14	40	N2.7	53	R5.3	73	T6.2	40
E11.1	67	F4.15	67	N2.14	53	R5.4	33	T6.3	20
F1.1	73	F4.16	67	N3.1	60	S2.3	73		
F1.2	47	F4.17	33						

WENRA countries prepared **action plans to implement the remaining RLs** into their national regulatory frameworks, taking into account the outcome of this peer review. Summaries of the individual action plans are given in Appendix B. RHWG prepares a report to WENRA for its spring meeting in each year that summarises the status of implementation of the full set of RLs. Progress on implementation has been and will continue to be monitored through that report.

04.2 Thematic discussions in RHWG plenary

RHWG discussed several topics in the plenary meetings to ensure a common understanding across the three Country Groups. In addition, the peer-review exercise revealed several challenges to interpret some Reference Levels. Challenges to implement certain reference levels have been identified and experiences were shared with all other participating countries. The peer-review exercise served as a valuable instrument to gather experiences during the implementation of the WENRA reference levels into national regulations. Questions raised and answered by the countries and the following discussions in the country groups / plenary identified areas of different understanding and expectations amongst the participating countries. Thus, the peer review process contributes to a better mutual understanding of the reference levels leading to a further harmonization of nuclear safety in Europe. In addition, RHWG recognises that for several RLs a further clarification during the next revision or an additional interpretation may be necessary. More details on some of these topics are provided in Appendix A.4.

RHWG discussed the implementation of the RLs in **UK regulatory framework** in general. UK adopted the unique approach of referencing the WENRA RLs directly in a Technical Assessment Guide (TAG 005) for ONR inspectors identifying them as relevant good practices (see Appendix B). RHWG acknowledged that SAPs (Safety Assessment Principles) and TAGs are adequate means to implement WENRA RLs into UK national regulatory framework. RHWG concluded that a peer-review RL per RL was not possible considering the self-assessment provided and that considering UK unique approach a classification into “A”, “B”, and “C” was not possible. RHWG accepted that the UK considers that RLs have been implemented as relevant good practice in its regulatory framework. Additional information is provided in Appendix B.

Finally RHWG discussed the value of a **follow-up of the implementation of the action plans** addressing those RLs that have not been implemented in national regulatory frameworks, possibly including an RHWG review of the progress. RHWG agreed that this should be considered when defining the future RHWG work plan, consistent with WENRA requests.

05
Conclusion

The overall conclusions of the peer-review are the following:

- Most of the national self-assessment ratings were confirmed by RHWG. For some of them, RHWG view was that the self-assessment rating was not enough substantiated. This led to additional explanations which allowed RHWG either to confirm the self-assessment rating or, for a few RLs, to agree on a different rating;
- Although the implementation in national regulatory framework of the updated RLs is well advanced in several WENRA countries, further efforts are still needed to achieve harmonization. This is in particular the case for RLs in Issue F (Design Extension of Existing Reactors), which included changes to improve the concept of "Design Extension Conditions" (DEC), to better address the safety of the spent fuel pool and of multi-unit sites, as well as for the RLs in the new Issue T (Natural Hazards).
- For some RLs RHWG identified further interpretation may be beneficial when they are revised.

The peer review took place during RHWG meetings in 2016. Many WENRA countries were implementing the RLs during the period of the peer review. The peer reviews were based on national self-assessments of the status of implementation at 31 October 2015 and hence do not typically take into account implementation during or after 2016. The status of implementation in the peer review is therefore a snapshot at that time.

Appendix A
Details of the RHWG Peer-Review

In the following the overall assessment results of the three review meetings are presented. Country specific results are given in the appendix B.

A.0 Desktop Review

Each WENRA country provided a self-assessment that was made available to all RHWG. Prior to each RHWG meeting, a desktop review was performed and resulted in written requests for clarification and written comments when the substantiation of the self-assessment rating was not fully convincing.

Over the 3 meetings, this resulted in numerous written questions. The following figure shows the number of pages of the self-assessment reports and the number of written questions and comments received.

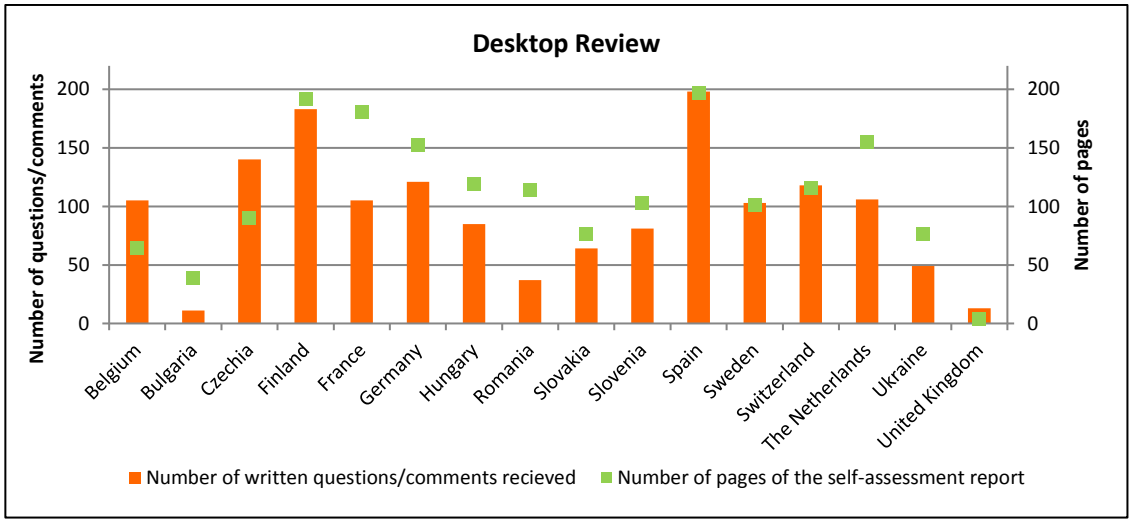

Figure 2. Number of pages of the self-assessment reports and number of written questions recieved

A.1 Review Meeting 1: Issues A, B, C, D, G, N, O, P, S

During the January 2016 RHWG meeting, the first batch consisting of 19 RLs was reviewed (Issues A, B, C, D, G, N, O, P, S). All countries submitted the self-assessments on the 19 RLs before this meeting. Most of the countries reviewed the self-assessments of their own country groups. Some also reviewed other country groups self-assessments. Most of the countries provided written answers prior to the group discussions. The following table shows in more detail which country reviewed which self-assessment.

Table 4. Details of the review of Issues A, B, C, D, G, N, O, P, S

Issues: A, B, C, D, G, N, O, P, S		Self-Assessment															
		Group A						Group B					Group C				
		Finland	Hungary	Romania	Slovakia	Switzerland	Ukraine	Belgium	France	Slovenia	Spain	The Netherlands	Bulgaria	Czechia	Germany	Sweden	United Kingdom
Review Group A	Finland																
	Hungary	x		x	x	x	x										
	Romania																
	Slovakia	x	x	x		x											
	Switzerland		x														
	Ukraine	x	x	x		x											
Review Group B	Belgium								x	x	x	x					
	France							x		x	x	x					x
	Slovenia							x	x		x	x					
	Spain							x	x	x							
	The Netherlands							x	x	x	x						
Review Group C	Bulgaria																
	Czechia																
	Germany	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
	Sweden												x	x	x		x
	United Kingdom												x	x	x	x	
	Austria	x	x			x				x			x	x	x	x	

Most of the self-assessment ratings (A, B or C) were confirmed by the review groups. For some RLs, the self-assessment rating was changed in agreement with the reviewed country.

The following figure summarises the conclusions of the national self-assessment (Issues A, B, C, D, G, N, O, P, S) of the countries using the three different categories. It also gives the RHWG peer-review conclusions, considering the decisions made in RHWG plenary sessions.

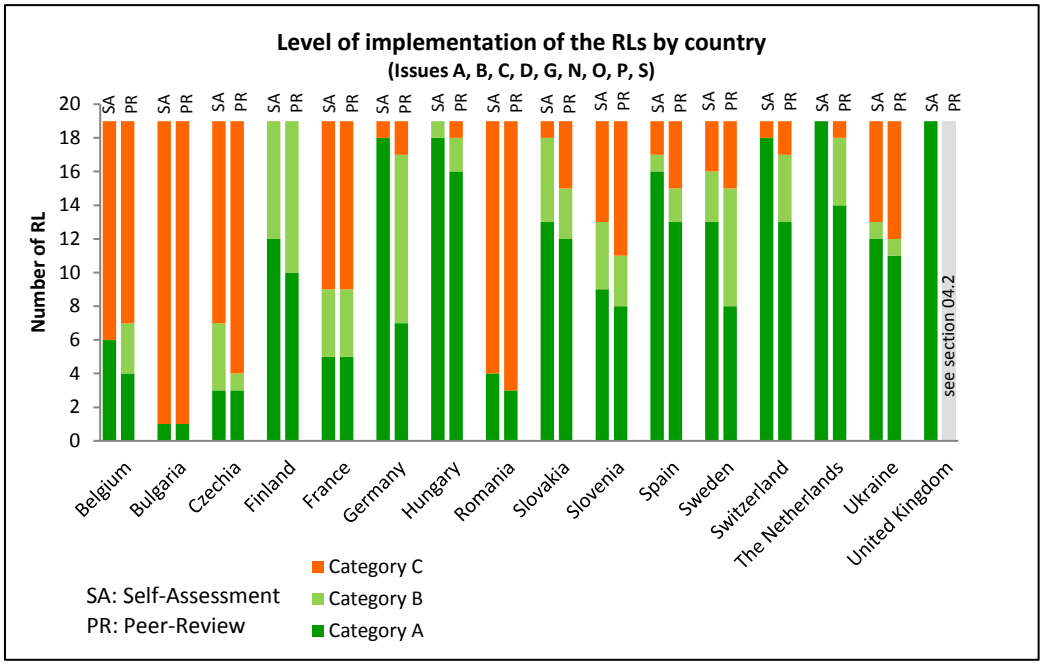

Figure 3. Level of implementation of the revised or new RLs by country (Issues A, B, C, D, G, N, O, P, S)

The following figure shows the overall review result of the participating members for the 19 RLs that were reviewed during the RHWG January 2016 meeting, considering the decisions made in RHWG plenary sessions. The UK peer-review results are not included (see section 04.2 and Appendix B). Deviations of the degree of harmonisation can be noticed. For example, further harmonization is desirable for the RLs O1.1 (scope of PSAs – including now SFPs and more external hazards) and O1.4 (need to justify the mission time).

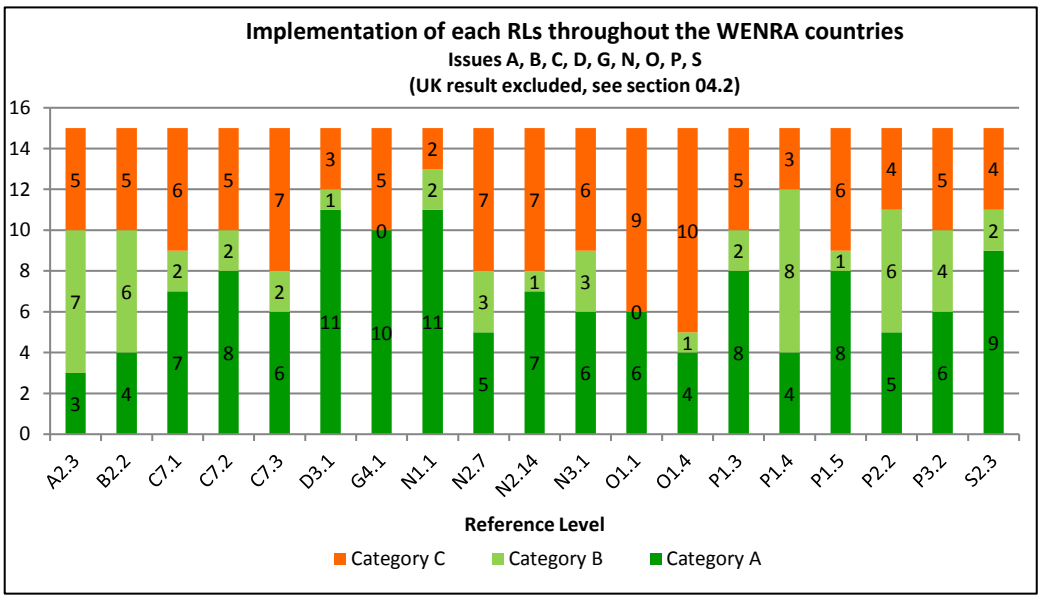

Figure 4. Implementation of each revised or new RL (Issues A, B, C, D, G, N, O, P, S) throughout the WENRA countries

A.2 Review Meeting 2: Issues E and F

During the May 2016 RHWG meeting, the second set consisting of 38 RLs was reviewed (Issues E and F). All countries submitted the self-assessments on the implementation of the 38 RLs before the meeting. Most of the countries reviewed the self-assessment of their own country groups. Some also reviewed other country group self-assessments. All countries provided written answers prior to the group discussions. The following table shows in more detail which country reviewed which self-assessments.

Table 5. Details of the review of Issues E and F

Issues: E, F			Self-Assessment														
			Group A						Group B					Group C			
			Finland	Hungary	Romania	Slovakia	Switzerland	Ukraine	Belgium	France	Slovenia	Spain	The Netherlands	Bulgaria	Czechia	Germany	Sweden	United Kingdom
Review	Group A	Finland		x	x	x	x	x										
		Hungary	x		x	x	x	x										
		Romania																
		Slovakia	x	x	x		x	x										
		Switzerland																
		Ukraine																
	Group B	Belgium								x	x	x	x					
		France							x		x	x	x			x		x
		Slovenia							x	x		x	x					
		Spain							x	x	x		x			x		
		The Netherlands							x	x	x	x						
	Group C	Bulgaria													x		x	
		Czechia																
		Germany	x	x	x	x	x	x	x	x	x	x	x	x	x		x	
		Sweden												x	x	x		
		United Kingdom												x	x	x	x	
		Austria	x	x		x	x				x			x	x	x	x	x

Most of the self-assessment ratings (A, B or C) were confirmed by the review groups. For some RLs, the self-assessment rating was changed in agreement with the reviewed country.

The following figure summarises the conclusions of the national self-assessment (Issues E and F) of the countries using the three different categories. It also gives the RHWG peer-review conclusions, considering the decisions made in RHWG plenary sessions.

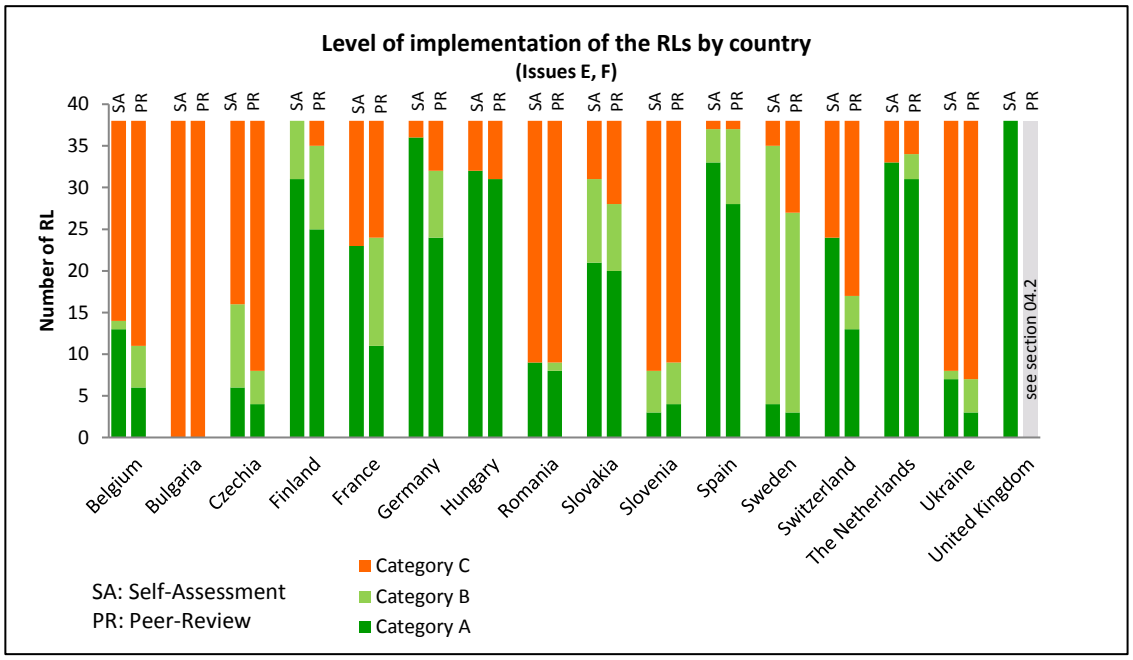

Figure 5. Level of implementation of the revised or new RLs by country (Issues E and F)

The following figure shows the overall review results of the participating members for the 38 RLs of Issues E and F that were reviewed, considering the decisions made in RHWG plenary sessions. The UK peer-review results are not included (see section 04.2 and Appendix B). Deviations of the degree of harmonisation can be noticed. In particular, a need of further harmonisation can be noticed for the RLs F2.2, F3.1, F4.3, F4.4, F4.5 and F4.7. Those RLs in particular deal with the selection process for DEC A (F2.2), the DEC analysis (F3.1), the use of mobile equipment (F4.3), common services of equipment and personnel of multi-unit sites (F4.4), the autonomy of the site (F4.5) in design extension conditions, as well as with ensuring the heat removal function (F4.7).

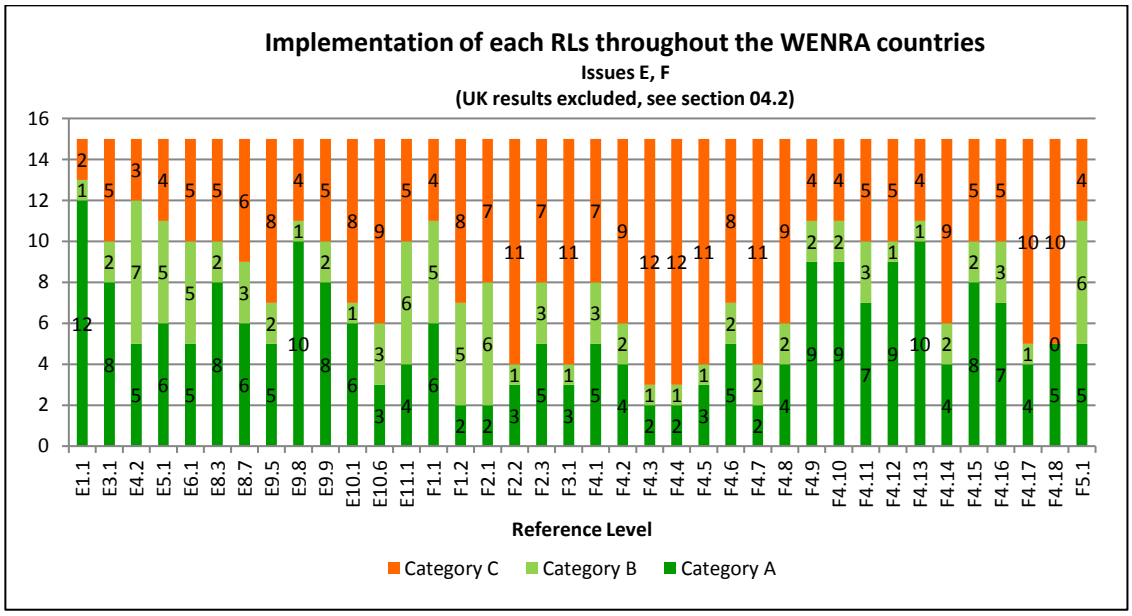

Figure 6. Implementation of each revised or new RL (Issues E and F) throughout the WENRA countries

A.3 Review Meeting 3: Issues LM, R, T

During the September 2016 RHWG meeting, the third set consisting of 44 RLs of the issues LM, R and T was reviewed. All countries submitted the self-assessments on the implementation of the 44 RLs before the meeting. Most of the countries reviewed the self-assessments of their own country groups. Some also reviewed other country group self-assessments. All countries provided written answers prior to the group discussions.

The following table shows in more detail which country reviewed which self-assessments.

Table 6. Details of the review of Issues LM, R, and T

Issues: LM, R, T			Self-Assessment														
			Group A						Group B					Group C			
			Finland	Hungary	Romania	Slovakia	Switzerland	Ukraine	Belgium	France	Slovenia	Spain	The Netherlands	Bulgaria	Czechia	Germany	Sweden	United Kingdom
Review	Group A	Finland		x	x	x	x	x										
		Hungary	x		x	x	x	x										
		Romania																
		Slovakia	x	x	x		x	x										
		Switzerland	x	x		x		x										
		Ukraine	x	x		x												
	Group B	Belgium								x	x	x	x					
		France	x						x		x	x	x					x
		Slovenia							x	x		x	x					
		Spain							x	x	x		x			x		
		The Netherlands							x	x	x	x						
	Group C	Bulgaria													x	x	x	
		Czechia																
		Germany	x	x	x	x	x	x	x	x	x	x	x	x	x		x	
		Sweden												x	x	x		
		United Kingdom												x	x	x	x	
		Austria	x	x		x	x			x	x	x		x	x	x	x	x

The following figure summarises the conclusions of the national self-assessments (Issues LM, R, and T) of the countries using the three different categories. It also gives the RHWG peer-review conclusions, considering the decisions made in RHWG plenary sessions.

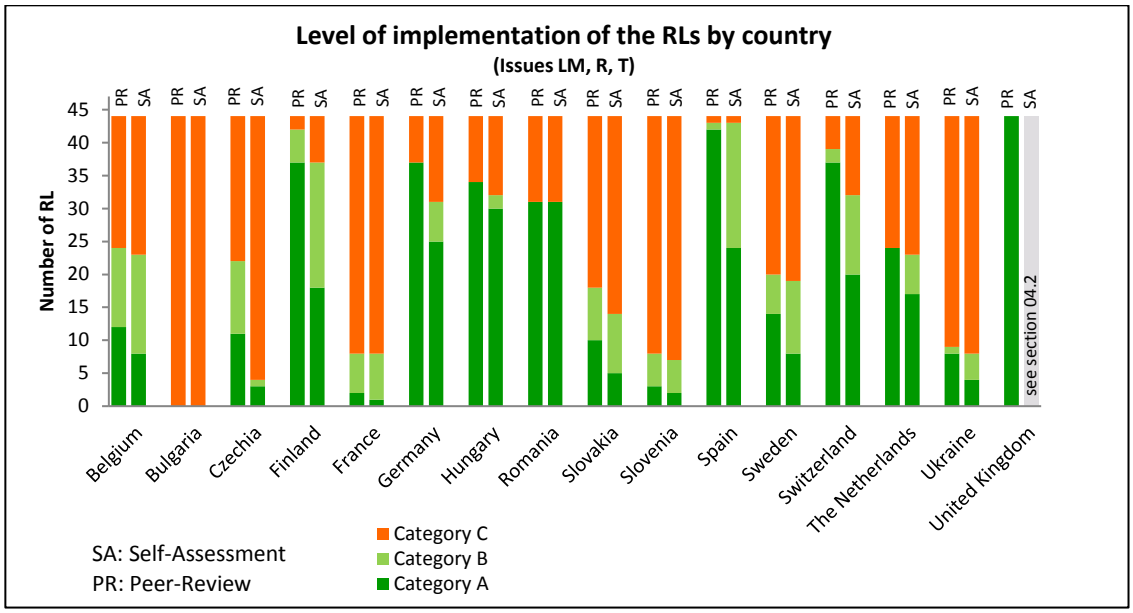

Figure 7. Level of implementation of the revised or new RLs by country (Issues E and F)

The following figure shows the overall review results of the participating members for the 44 RLs of Issues LM, R, and T that were reviewed, considering the decisions made in RHWG plenary sessions. The UK peer-review results are not included (see section 04.2 and Appendix B). A need of further harmonisation can be noticed in particular for the RLs LM2.5, LM2.7, T4.2, T5.3, T5.5, T6.1, and T6.3. Those RLs in particular deal with the procedures for accident conditions that simultaneously affect the reactor and spent fuel storages and for multiple nuclear installations (LM2.5, LM2.7), with the protection concept against natural hazards (T5.3) including monitoring and alert processes (T5.5), and with considerations for events more severe than the design basis events in the DEC analysis (T6.1, T6.3).

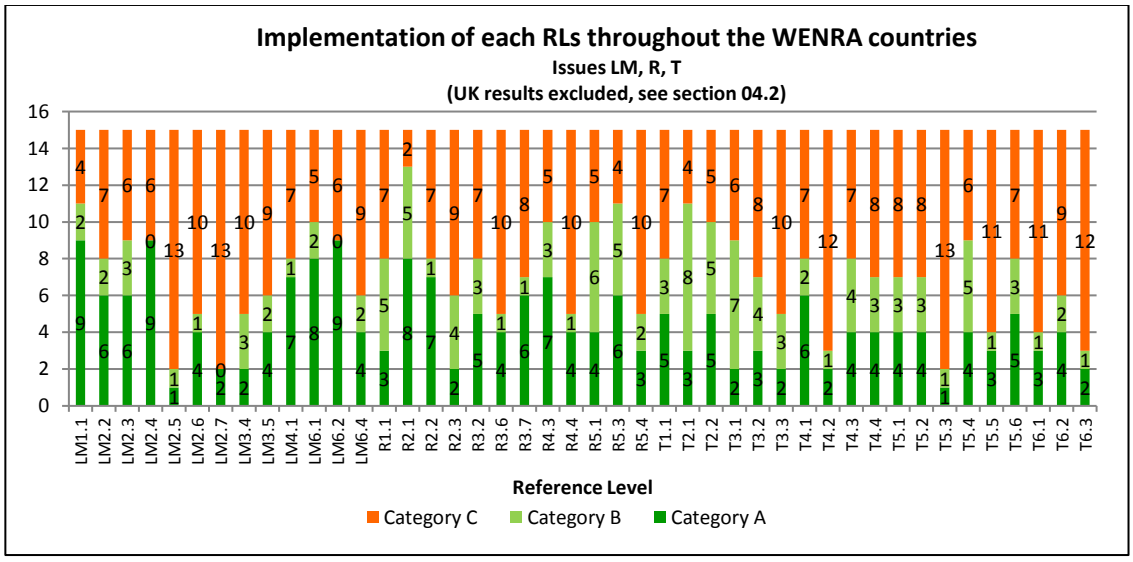

Figure 8. Implementation of each revised or new RL (Issues LM, R, T) throughout the WENRA countries

A.4 Thematic discussions in RHWG plenary

The following topics are reflecting experiences gained during the implementation of RL in national regulations, the self-assessment and the discussion during the country groups / plenary sessions:

- Implementation of the term "timely" (RLs A2.3, B2.2 and P1.4);
- Requesting deterministic and probabilistic methods and engineering judgement at the same time (RLs E4.2, E6.1 and F2.1);
- Meaning of "adequately qualified equipment" (RL LM3.4);
- Status of the mission times in PSA as required in RL O1.4;
- Justification of the scope of PSR (RL P2.2);
- Expectations of the assessment of the cumulative effects of all PSR findings (RL P3.2);
- Common understand of the requested extension of emergency plans (RL R3.2);
- Need to require specific margins rather than a general request of margins;
- Implementation of the screening process in RL T3.1.

The peer-review exercise revealed that the implementation of **the term "timely"** (e.g. "*timely implementation*" (RL A2.3), "*timely manner*" (RL B2.2 and P1.4)) is challenging for a number of countries. Some countries stated that, from a legal point of view, use in regulations of unspecific term "timely" may be challenging and that such expectation is often implicit as no deadline is stated in regulations. RHWG acknowledged that notion of "timely" is usually ensured through regulatory (enforcement) practices. RHWG also pointed out that WENRA has established an Ad-Hoc Group developing guidance on "Timely Implementation of Reasonably Practicable Safety Improvements to Existing Nuclear Power Plants" in view of the Article 8a of the EU Nuclear Safety Directive.

The RHWG plenary addressed the implementation of RLs E4.2, E6.1 and F2.1 which all mention the **use of deterministic and probabilistic methods, as well as engineering judgement**. Some countries asked for clarification whether regulations or regulatory guidance should explicitly require the use of all methods or only some of them. RHWG's view was that regulations or regulatory guidance should not exclude any of the methods to allow the licensee to justify its conclusions and the regulator to challenge this assessment.

A comment to the plenary was made that the meaning of **"adequately" qualified equipment** in RL LM3.4 was unclear since it might be difficult to qualify equipment for severe accidents with the same measures as the ones used for qualification to design basis accident conditions. RHWG recalled that the intention of the revision of this specific RL was to strengthen the requirement by requiring to "*rely primarily on adequately qualified equipment*" with the goal to have confidence, supported by relevant evidences, that the equipment will work in the expected conditions where the safety case foresees the use of the equipment.

RHWG discussed, with respect to the implementation of RL O1.4, whether **the justification of mission times in PSA** is covered by applying realistic models. Several countries stated that, in their self-assessments, they rated the implementation of the RL as not achieved since the

justification of the mission times is not covered. RHWG concludes that, in these cases, harmonization was not achieved since there is no consensus that realistic modelling covers justification of mission times. All countries were asked to check their self-assessments in this respect to ensure that the rating is consistent among countries.

RHWG discussed if the licensee should be required to give a **justification of the scope of the PSR** (RL P2.2) if the regulator already prescribes the scope. RHWG looked at the specific case in more detail and concluded that since IAEA safety guides were followed, such a justification was not needed in this specific case.

Regarding the implementation of the global assessment of PSR findings (RL P3.2) RHWG discussed whether a summary of the PSR consisting of a compilation of intermediate conclusions provided by the licensee is sufficient to fulfil the requirement of **an assessment of the cumulative effects of all PSR findings** or if the scope should go beyond this. RHWG agreed that, in the specific case, the RL was fulfilled.

With regard to **emergency plans**, the review groups discussed the interpretation of the last sentence of RL R3.2 (*"The plan shall be capable of extension, should more severe events occur."*). RHWG's view was that the emergency management shall be set up in such a way that it is flexible enough to cope with originally unconsidered scenarios.

Some members reported that **margins** (see e.g. T5.3) are addressed in high level regulations rather than specifically for different topics. These regulations require that in general there have to be sufficient margins. RHWG's view was that, as long as margins are explicitly required on a general basis, it may not be needed to require them again on specific matters.

The review groups reported that the **screening process for natural hazards** (T3.1) and the justification of the compiled list of natural hazards is often mixed and implicitly covered in regulations and guidance. RHWG's view was that the expectation set by the RLs is to obtain a justified list of hazards, which is complete and site relevant, allowing the licensee to avoid detailed investigations for hazards which can be screened out on a justified basis

Appendix B
Summary of National Status Towards Harmonisation

–

Belgium

The Federal Agency for Nuclear Control (the FANC) of Belgium, supported by the national TSO Bel V, performed the self-assessment and submitted the full self-assessment report the 29 October 2015. Following the discussion during the RHWG meetings, Belgium submitted revisions of the self-assessment report the 11 March 2016, 17 June 2016 and 12 January 2017.

In total Belgium received 105 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

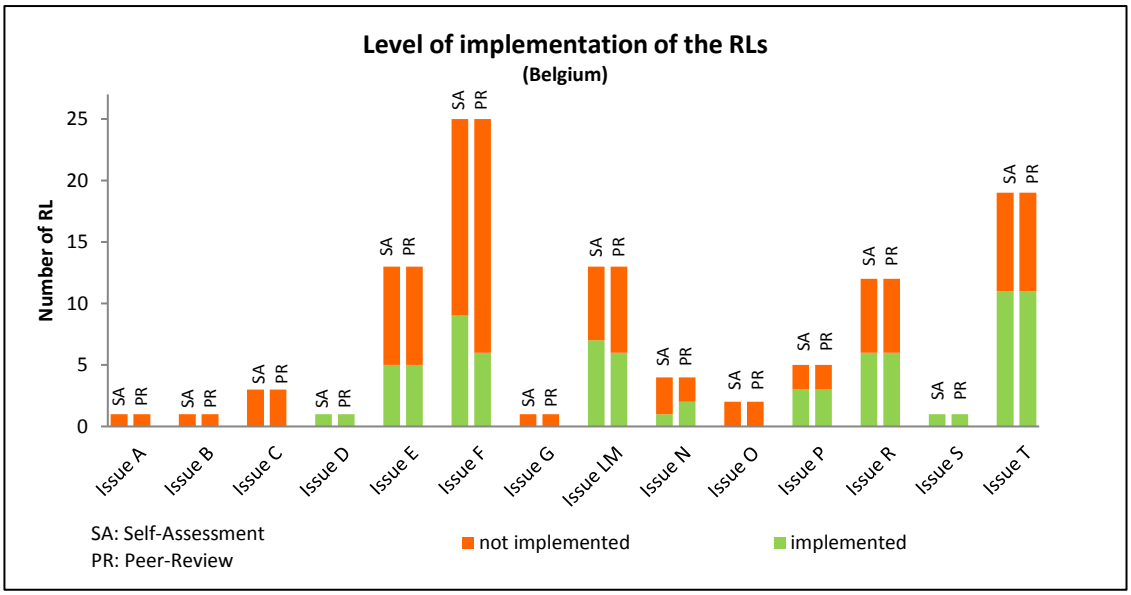

Figure 9. Level of implementation of the revised or new RLs by issue for Belgium

The original reference levels WENRA (2008) were implemented into the Belgian regulation by the Royal Decree of 30 November 2011 on the safety requirements for nuclear installations.

A new regulatory project has been started early 2015 at the FANC to modify this Royal Decree to include the new and revised RLs (in Category C) of September 2014. The following timeline is foreseen:

- Drafting the initial proposal: first part of 2017
- Stakeholder (incl. Licensee) consultation: 2017
- Official advisory bodies consultation: and 2017
- Submission to the Government and Enactment by the King followed by the publication in the Belgian official journal: end of the process

In parallel, a benchmarking on the practical implementation at the nuclear facilities has been started.

The modification will also incorporate the new safety objectives from the European directive on nuclear safety (2014/87/Euratom).

Belgium proposed the following action plan for fully implementing the remaining 61 RLs into the national regulation:

Table 7. Action plan of Belgium to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
All "C"	Modification of the Royal Decree of 30 November 2011 on the safety requirements for nuclear installations. The revised Royal Decree will transpose the new and (significantly) revised WENRA reference levels.	2017/2018

Bulgaria

The Bulgarian Nuclear Regulatory Agency (BNRA) performed the self-assessment and submitted the full self-assessment report the 30 October 2015.

In total Bulgaria received 11 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

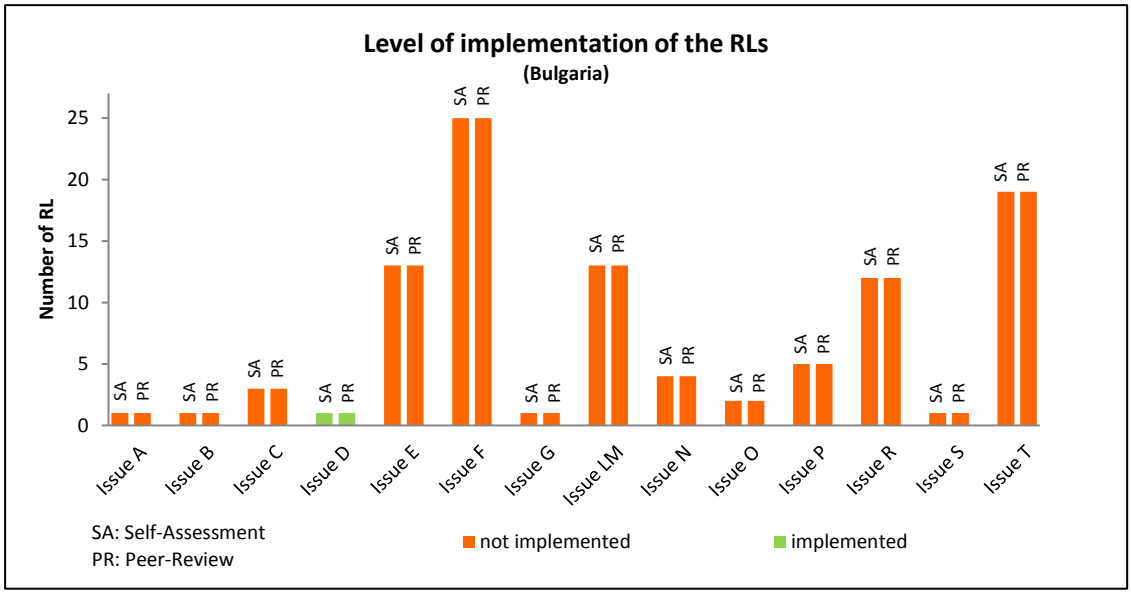

Figure 10. Level of implementation of the revised or new RLs by issue for Bulgaria

A process of implementation of the revised Reference levels (RLs) in the national regulations has been initiated at the Bulgarian Nuclear Regulatory Agency in 2014, after their publication by WENRA. Almost all RLs, except RLs of Issue R, have been taken into consideration in the new draft of the Regulation on Ensuring the Safety of Nuclear Power Plants. The revised RLs of Issue R have been taken into account in the new draft of the Regulation for Emergency Planning and Emergency Preparedness in Case of Nuclear and Radiation Accident.

The new Regulation on Ensuring the Safety of Nuclear Power Plant was enforced in October 2016, in parallel with the completion of the peer review process.

Bulgaria proposed the following action plan for fully implementing the remaining 100 RLs into the national regulation:

Table 8. Action plan of Bulgaria to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
A2.3, B2.2, C7.1, C7.2, C7.3, E1.1, E3.1, E4.2, E5.1, E6.1, E8.3, E8.7, E9.5, E9.8, E9.9, E10.1, E10.6, E11.1, F1.1, F1.2, F2.1, F2.2, F2.3, F3.1, F4.1, F4.2, F4.3, F4.4, F4.5, F4.6, F4.7, F4.8, F4.9, F4.10, F4.11, F4.12, F4.13, F4.14, F4.15, F4.16, F4.17, F4.18, F5.1, G4.1, LM1.1, LM2.2, LM2.3, LM2.4, LM2.5, LM2.6, LM2.7, LM3.4, LM3.5, LM4.1, LM6.1, LM6.2, LM6.4, N1.1, N2.7, N2.14, N3.1, O1.1, O1.4 P1.3, P1.4, P1.5, P2.2, P3.2, S2.3, T1.1, T2.1, T2.2, T3.1, T3.2, T3.3, T4.1, T4.2, T4.3, T4.4, T5.1, T5.2, T5.3, T5.4, T5.5, T5.6, T6.1,T6.2, T6.3	The RLs will be implemented in the new Regulation on Ensuring the Safety of Nuclear Power Plant	2017
R1.1, R2.1, R2.2, R2.3, R3.2, R3.6, R3.7, R4.3, R4.4, R5.1, R5.3, R5.4	The RLs will be implemented in the new Regulation for Emergency Planning and Emergency Preparedness in Case of Nuclear and Radiation Accident.	2017

Czech Republic

The State Office for Nuclear Safety (SUJB) of Czech Republic performed the self-assessment and submitted the full self-assessment report the 13 December 2015.

In total Czech Republic received 140 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

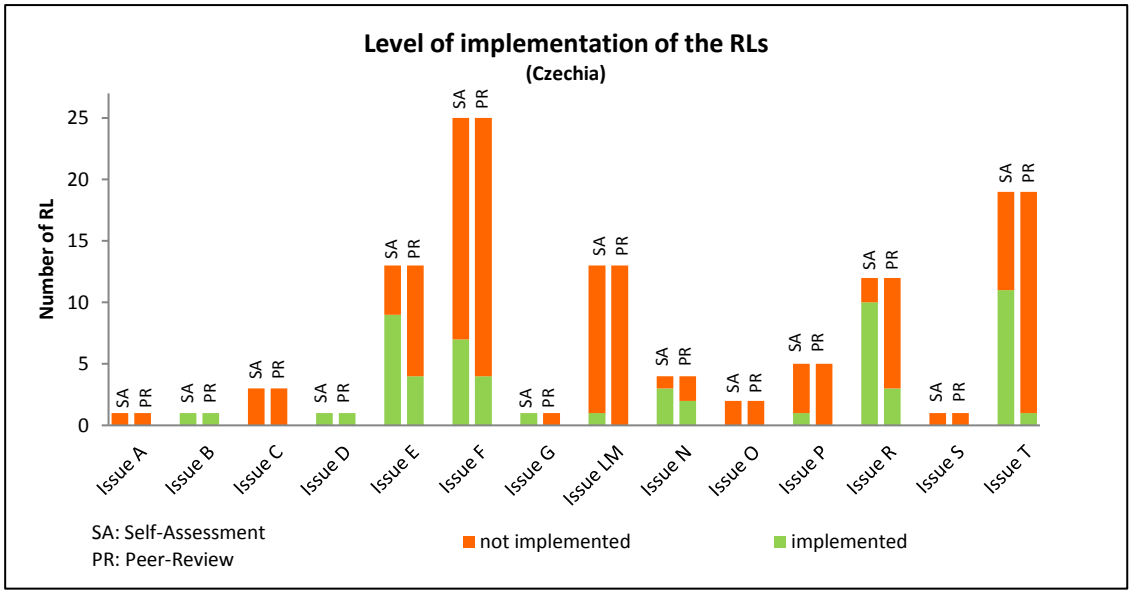

Figure 11. Level of implementation of the revised or new RLs by issue for Czech Republic

Czech Republic proposed the following action plan for fully implementing the remaining 85 RLs into the national regulation:

Table 9. Action plan of Czech Republic to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
A2.3, C7.1, C7.2, C7.3, E1.1, E4.2, E5.1, E6.1, E8.3, E8.7, E10.1, E10.6, E11.1, F1.1, F1.2, F2.1, F2.2, F2.3, F3.1, F4.1, F4.2, F4.3, F4.4, F4.5, F4.6, F4.7, F4.8, F4.12, F4.13, F4.14, F4.15, F4.17, F4.18, F5.1, G4.1, LM1.1, LM2.2, LM2.3, LM2.4, LM2.5, LM2.6, LM2.7, LM3.4, LM3.5, LM4.1, LM6.1, LM6.2, LM6.4, N2.7, N3.1, O1.1,	All the WENRA RLs, including those currently considered insufficiently implemented into valid Czech national regulation, will be implemented into Czech national regulation within the new reformed Czech nuclear law. This new Czech nuclear law will be based on the new com-	July 2017

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
O1.4, P1.3, P1.4, P1.5, P2.2, P3.2, R1.1, R2.3, R3.2, R3.6, R3.7, R4.3, R4.4, R5.1, R5.4, S2.3, T1.1, T2.1, T2.2, T3.1, T3.2, T3.3, T4.1, T4.2, T4.4, T5.1, T5.2, T5.3, T5.4, T5.5, T5.6, T6.1,T6.2, T6.3	prehensive Atomic Act No. 263/2016 Coll. and an accompanying set of implementing legal regulations prepared by the authorized Czech regulatory authority SUJB, as its regulatory Decrees. These implementing regulations are currently being passed through the appropriate legislative process. There will be 25 of these Decrees altogether: some of them have been already approved and will come in force on January 1, 2017; the others are just being passed through the approval process and are planned to be approved and put in force within the first half of 2017. All this new nuclear legislation has been being prepared too with the aim to implement all the WENRA RLs, as revised and published in September 2014. On completion of the legislative process described above, all the WENRA RLs thus will be implemented in full into the Czech national regulation.	

Finland

The Radiation and Nuclear Safety Authority (STUK) of Finland performed the self-assessment and submitted the full self-assessment report the 31 October 2015. Following the discussion during the RHWG meetings, Finland submitted a revision of the self-assessment report the 11 April 2016.

In total Finland received 183 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

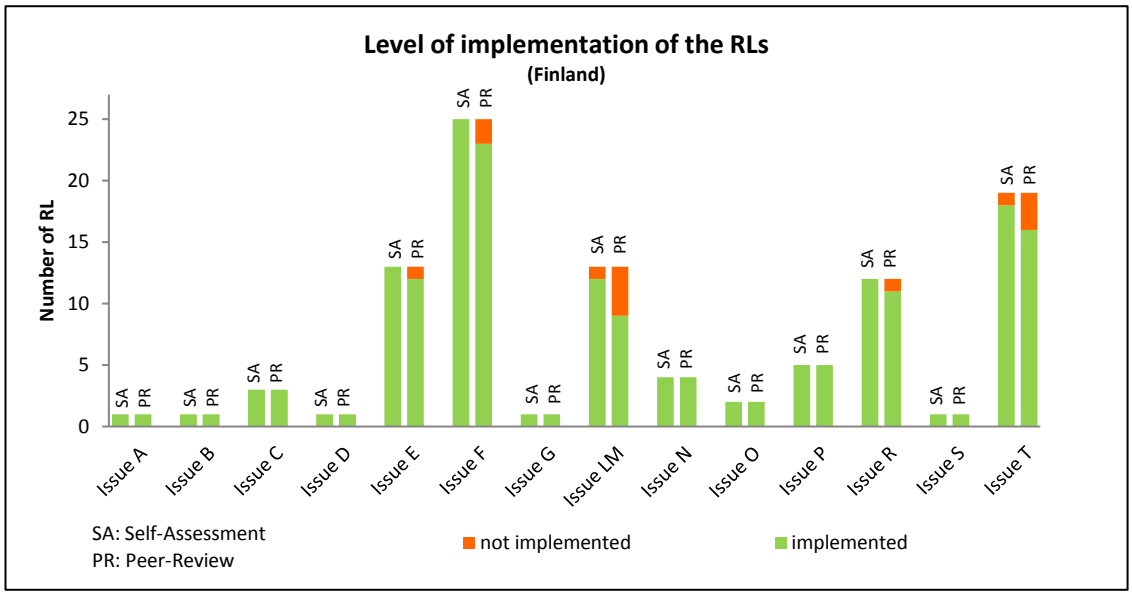

Figure 12. Level of implementation of the revised or new RLs by issue for Finland

Finland proposed the following action plan for fully implementing the remaining 11 RLs into the national regulation:

STUK's regulations and YVL guides are being updated during 2016 – 2018. In that connection STUK's safety regulations are assessed as a whole considering the need to change the level of some requirements from YVL guides to mandatory regulations and to avoid unnecessary over-lapping.

The lessons learned from the Fukushima accident were collected and studied at the renewal YVL guides. The implementation of the needed modifications to the regulations (Government Decrees and YVL Guides) were done in 2013.

The need for further modifications of STUK's regulations and new YVL guides will be re-viewed as the impact of updated WENRA 2014 reference levels and IAEA Requirements. In this context also the effects of BSS directive (Basic Safety Standards Directive, 2013/59/ Eur-atom) and Council Directive (2014/87/Euratom) amending Nuclear Safety Directive (2009/71/Euratom) on the nuclear energy regulations; the laws and STUK's safety regulations, are assessed.

Implementation of an amendment of the EU Nuclear Safety Directive will be done by 15 August 2017, BSS directive by February 2018, and WENRA 2014 Reference Levels by the end of June 2018. The safety objective and most of the new requirements in the revised Nuclear Safety Directive are already included in the Finnish nuclear safety regulations. Amendments caused by Directives will be primarily transposed into national laws. The Ministry of Economic Affairs and Employment has a project that aims at clarifying the Nuclear Energy Act and Decree simultaneously by the beginning of 2018. The Ministry of Social Affairs and Health decided to revise the whole radiation safety regulation; laws, decrees, regulations and administrative provisions for implementation of BSS Directive.

STUK participates both projects of the ministries and has subprojects of its own for creating and updating of its regulations. The progress of the law-making projects constrains the update of STUK Regulations and YVL Guides. The goal for the amended Nuclear Energy Act and Decree is to enter them into force on 1 January 2018. In the nuclear safety regulations of STUK there is referred also to the Radiation Act and Decree; their time of coming into force may go little bit further. STUK has an action plant to publish the updated STUK Regulations by the end of March 2018 and YVL Guides by the end of June 2018. New WENRA reference levels are primarily incorporated in YVL guides, but there are some essential requirements which may better fit into STUK's Regulations.

France

The Nuclear Safety Authority (ASN) of France performed the self-assessment and submitted the full self-assessment report the 05 November 2015.

In total France received 105 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

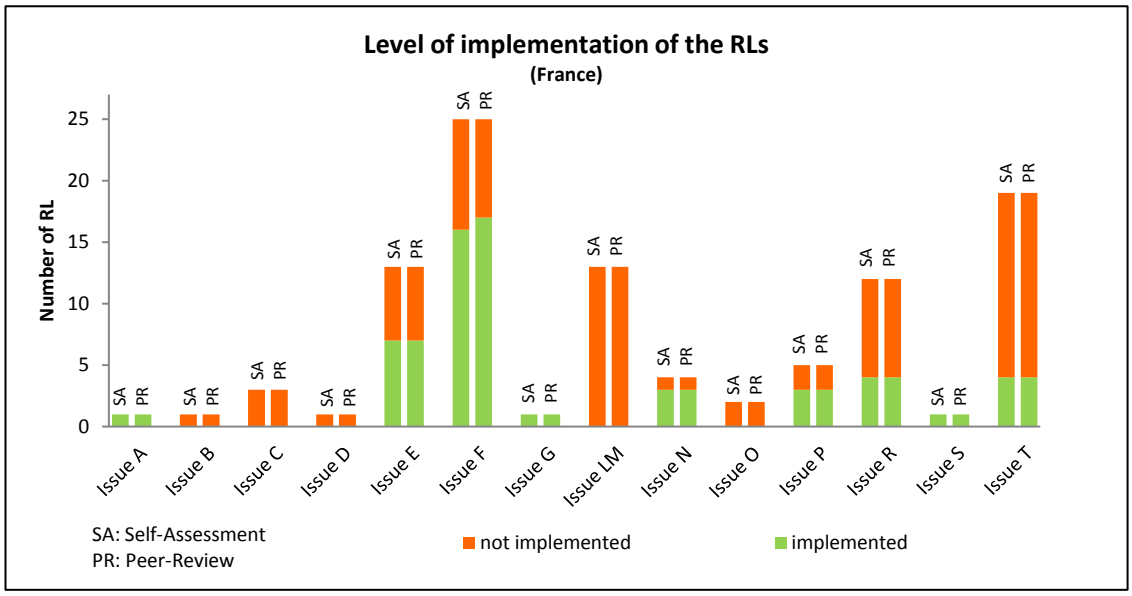

Figure 13. Level of implementation of the revised or new RLs by issue for France

France proposed the following action plan for fully implementing the remaining 60 RLs into the national regulation:

Table 10. Action plan of France to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
B2.2, C7.1, C7.2, C7.3, D3.1	Guide "Protection of Interest Policy (PPI) and Integrated Management System (SMI)"	2017
E5.1, E8.3, E9.5, E9.9, E10.1, E10.6, F2.2, F3.1, F4.3, F4.4, F4.5, F4.7, F4.17, F4.18, N2.14, O1.1, T3.1, T3.2, T3.3, T4.1, T4.2, T4.3, T4.4, T6.1, T6.2	Draft Guide "Reactor (PWR) design"	2017
LM1.1 to LM6.4	Resolution "Operations and general operating rules"	2018

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
O1.4	Draft Guide “Reactor (PWR) design“	2017
P1.3, P1.5	Draft Resolution “Safety Review“	2017
R1.1, R2.2, R2.3, R4.3, R4.4, R5.1, R5.3, R5.4	Draft Resolution “Emergency Situations”	2017
T1.1, T5.1, T5.2	Develop a new ASN Guide on natural hazards	2017
T5.3, T5.5, T6.3	Develop a new ASN Guide on natural hazards Manage interface between this new ASN Guide and the Draft Guide “Reactor (PWR) design“	2017

Germany

The Ministry for Environment, Nature Conservation, Building and Nuclear Safety (BMUB) of Germany performed the self-assessment and submitted the full self-assessment report the 30 October 2015.

In total Germany received 121 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

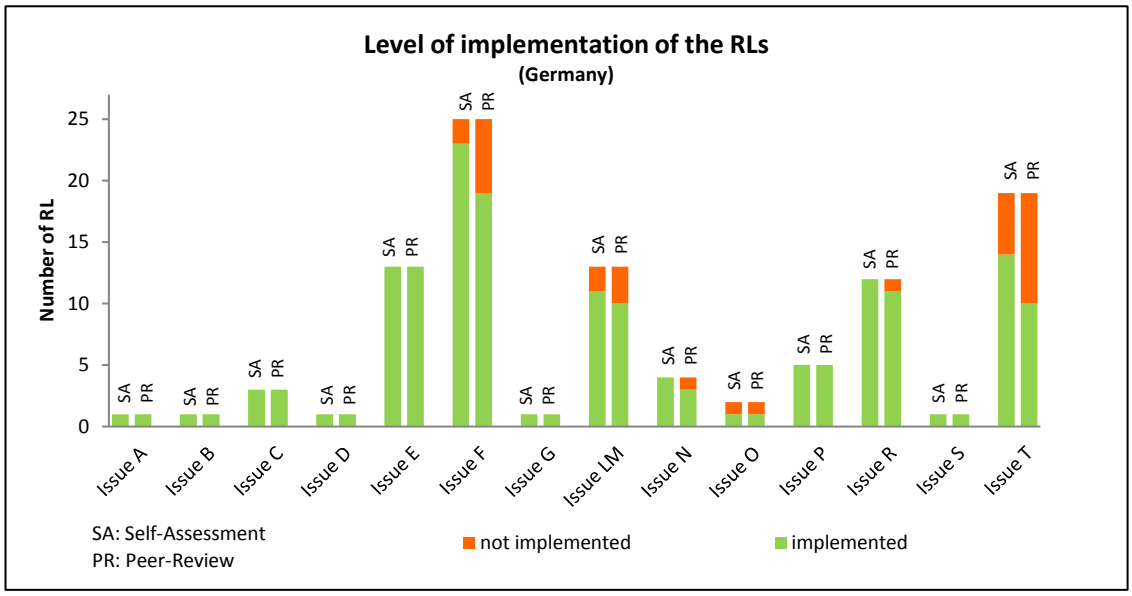

Figure 14. Level of implementation of the revised or new RLs by issue for Germany

Germany proposed the following action plan for fully implementing the remaining 21 RLs into the national regulation:

Table 11. Action plan of Germany to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
F3.1	F3.1 item (f) is only partly implemented in German regulations. It is considered to be reasonable to complement existing regulations. It will be discussed in 2016 in which part of the German regulation the missing content can be implemented suitably.	2017
F4.4, LM2.5, LM2.7, O1.1, T3.3, T4.3, T5.3, T6.1, T6.2, T6.3	It will be discussed in 2016 in which part of the German regulation the missing content can be implemented suitably.	2017

Hungary

The Hungarian Atomic Energy Authority (HAEA) performed the self-assessment and submitted the full self-assessment report the 30 October 2015. Following the discussion during the RHWG meetings, Hungary submitted a revision of the self-assessment report the 04 March 2016.

In total Hungary received 85 written questions or comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

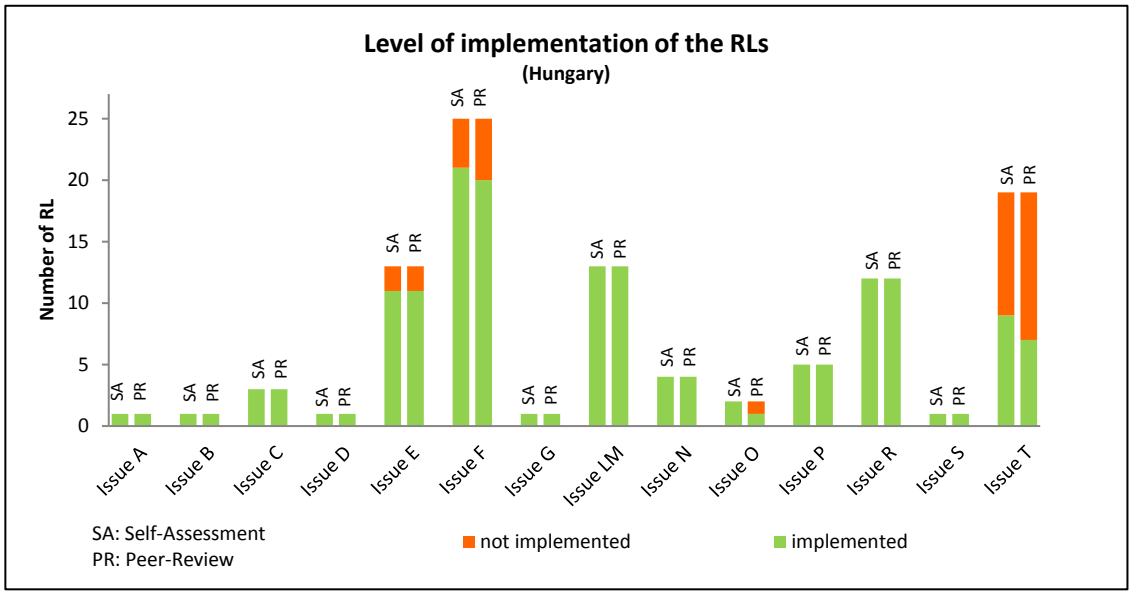

Figure 15. Level of implementation of the revised or new RLs by issue for Hungary

Hungary proposed the following action plan for fully implementing the remaining 20 RLs into the national regulation:

Table 12. Action plan of Hungary to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
E6.1, E9.5, F2.1, F2.2, F4.5, F4.7, F4.17, O1.1, S2.3, T1.1, T1.1, T3.2, T3.3, T4.2, T5.1, T5.2, T5.3, T5.5, T6.2, T6.3	The revision of the NSC is currently in progress. Every category C will be implemented in the regulation during this revision. Publishing of the new NSC is expected by the end of 2017.	31.12.2017

The Netherlands

The Authority for Nuclear Safety and Radiation Protection (ANVS) of the Netherlands performed the self-assessment and submitted the a report on the self-assessment of issues A, B, C, D, G, N, O, P, S the 11 December 2015. A preliminary full self-assessment report was submitted the 29 March 2016. Following the discussion during the RHWG meetings, the Netherlands submitted a revision of the full self-assessment report the 19 July 2016.

In total the Netherlands received 106 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

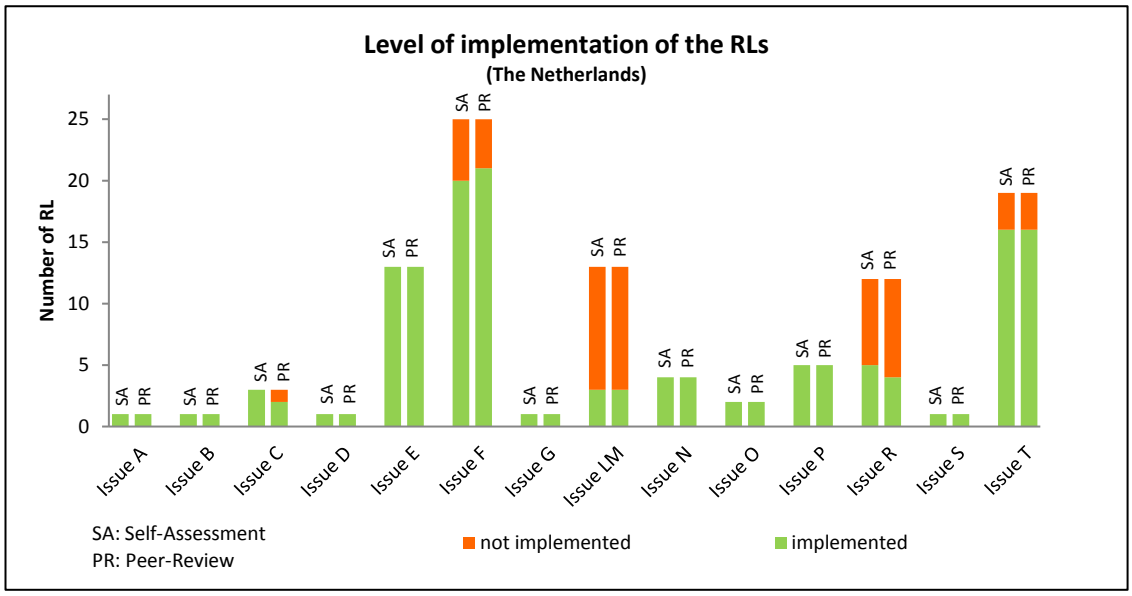

Figure 16. Level of implementation of the revised or new RLs by issue for the Netherlands

The Netherlands proposed the following action plan for fully implementing the remaining 26 RLs into the national regulation:

Table 13. Action plan of the Netherlands to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
For all C's	The C - rated RL will be partly covered by implementation of the Nuclear Safety Directive 2014. This will be finished before the end of 2017. For the remaining RL, the current plan is to implement them in the license. This will require additional time and will be finished mid 2018.	06/2018

Romania

The National Commission for Nuclear Activities Control (CNCAN) performed the self-assessment and submitted the full self-assessment report the 26 November 2015.

In total Romania received 37 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

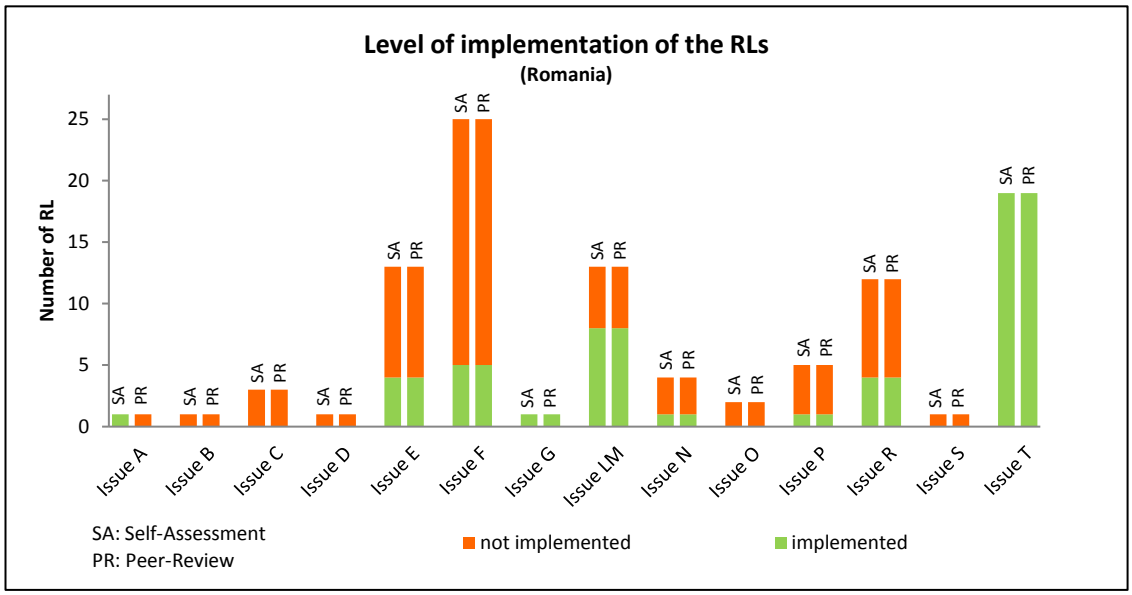

Figure 17. Level of implementation of the revised or new RLs by issue for Romania

Romania proposed the following action plan for fully implementing the remaining 58 RLs into the national regulation:

Table 14. Action plan of Romania to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
All "C"	All reference levels not yet covered by the provisions of the existing regulations will be included in regulations by the end of 2016.	12/2016

Slovakia

The Nuclear Regulatory Authority of the Slovakia (NRA SR) performed the self-assessment and submitted the full self-assessment report the 14 January 2016.

In total Slovakia received 64 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

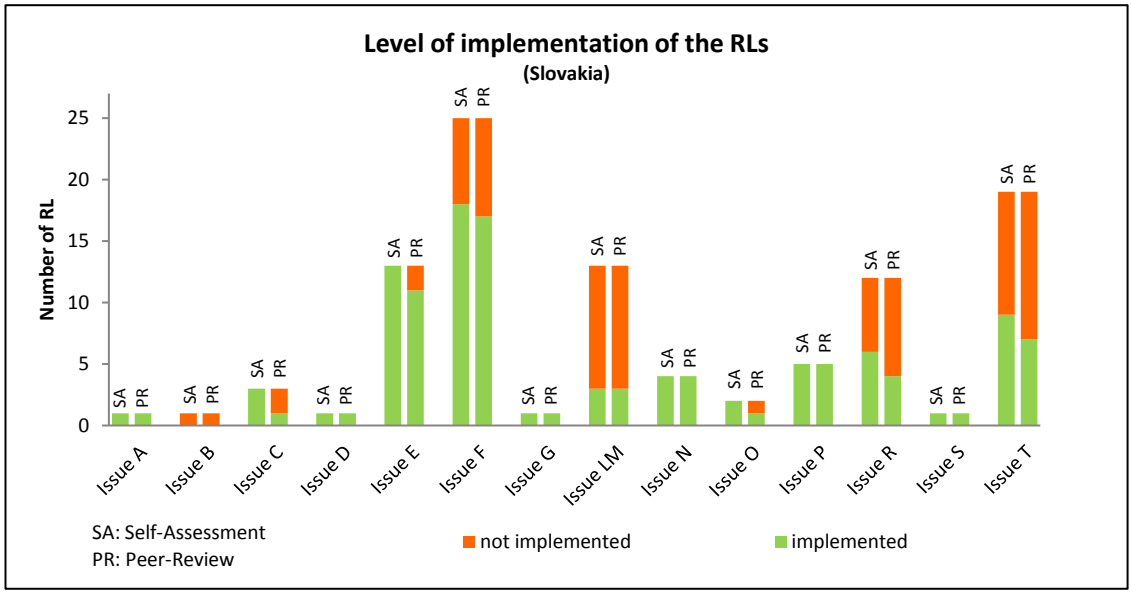

Figure 18. Level of implementation of the revised or new RLs by issue for Slovakia

Slovakia proposed the following action plan for fully implementing the remaining 43 RLs into the national regulation:

Table 15. Action plan of Slovakia to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
	New atomic act is now in approval process. RL representing obligations for licensee are incorporated into the act.	1st August 2017
	UJD SR guide BNS I.4.2/2017 – Requirements for the preparation of PSA studies and analyses will be approved to fully transposed updated RL on PSA into the national legislation.	July 2017
	Decree on Requirements for nuclear safety No.430/2011 Coll. as amended is now in an updating process. Missing RL (marked C and some B) will be incorporated into the decree.	December 2018

	Decree on Details in emergency planning for the event of an incident or an accident No.55/2006 Coll., as amended by Decree No.35/2012 Coll. is now in an updating process. Missing RL (marked C and some B) will be incorporated into the decree.	January 2018
	UJD SR guide BNS 1.11.1/2013 – Requirements for deterministic safety analyses for NPPs with VVER-440/213 reactors will be updated to reflect new Atomic act and an update of the UJD SR decree on Requirements for nuclear safety.	December 2018

Slovenia

The Slovenian Nuclear Safety Administration (SNAS) performed the self-assessment and submitted the full self-assessment report the 02 November 2015. Following the discussion during the RHWG meetings, Slovenia submitted revisions of the self-assessment report on 14 March 2016 and 01 June 2016.

In total Slovenia received 81 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

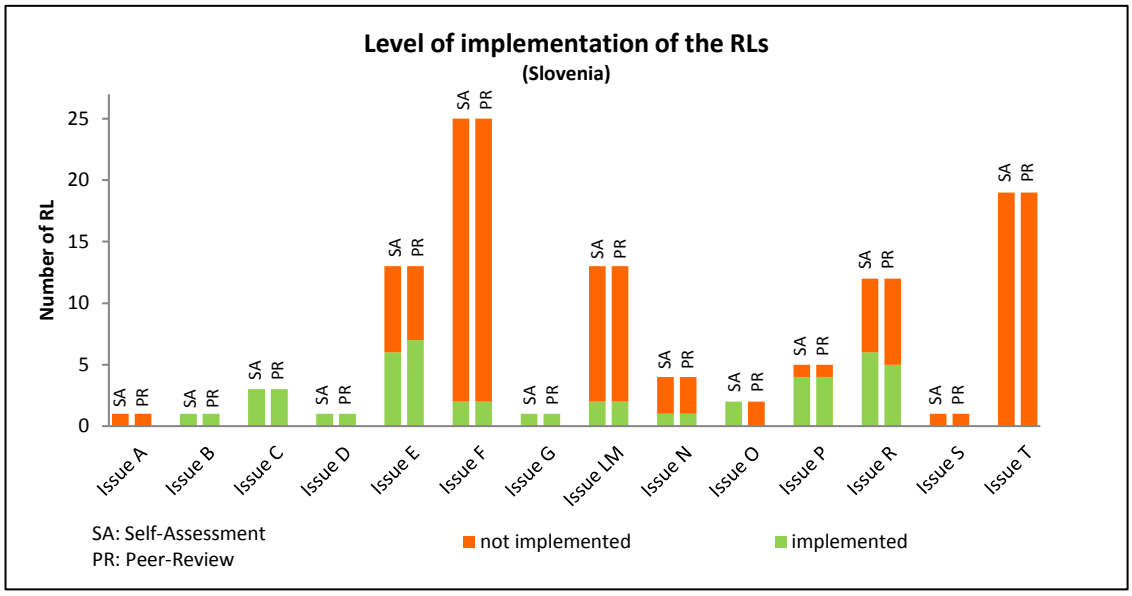

Figure 19. Level of implementation of the revised or new RLs by issue for Slovenia

Slovenia proposed the following action plan for fully implementing the remaining 74 RLs into the national regulation:

Table 16. Action plan of Slovenia to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
	Out of 101 RLs, 77 RLs are categorised into Category C, 10 Category B and 14 Category A. During the benchmark draft versions of the relevant amendments of the Rules JV5 and JV9 were quoted (in Slovene) for every RL categorised as Category C and in some cases for category and A. All of them have been already implemented in the new revisions of the Rules JV5 and JV9 by December 2016. The table of concordance with the WENRA Reference Levels is published on the www pages of the SNSA. The harmonised legislation is currently being translated to English. The translated table of concordance will be published on the www pages of the SNSA during next months, but not later than December 2017. Explanation: Rules JV5 - Rules on radiation and nuclear safety factors Rules JV9 - Rules on operational safety of radiation or nuclear facilities Act ZVISJV - Ionising Radiation Protection and Nuclear Safety Act	31.12.2016

Spain

The Spanish Nuclear Safety Council (CSN) performed the self-assessment and submitted the self-assessment of issues A, B, C, D, G, N, O, P, S the 30 October 2015. The full self-assessment report was submitted on 21 December 2015. Following the discussion during the RHWG meetings, Spain submitted revisions of the self-assessment report on 16 March 2016 and 21 June 2016.

In total Spain received 198 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

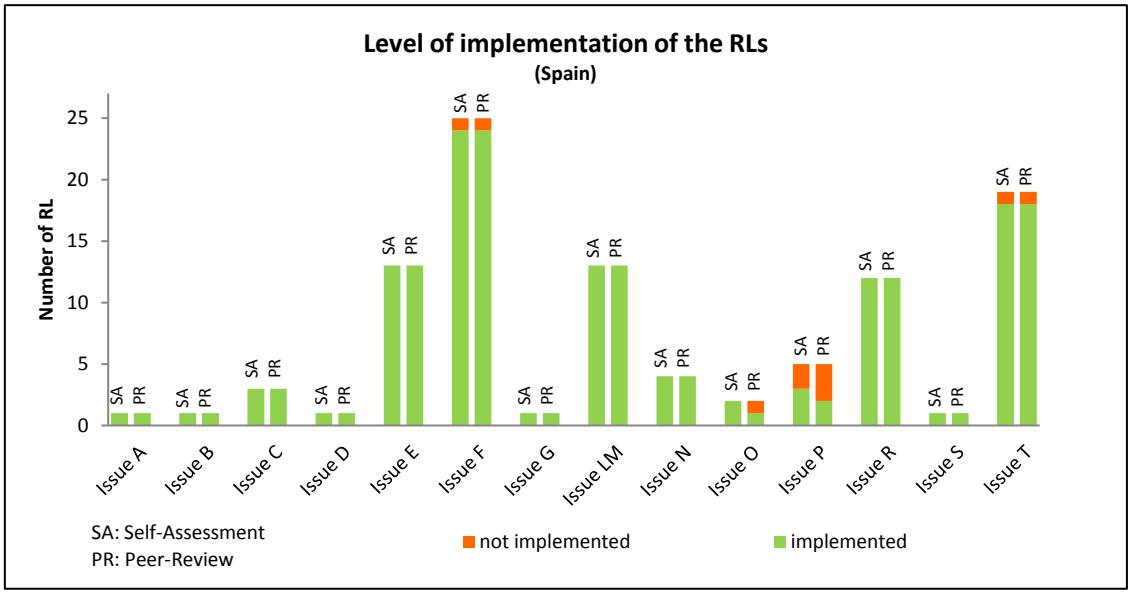

Figure 20. Level of implementation of the revised or new RLs by issue for Spain

Spain proposed the following action plan for fully implementing the remaining 6 RLs into the national regulation:

Table 17. Action plan of Spain to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
F4.14	It will be included in the transposition of the EU Nuclear Safety Directive to the Spanish legislation (New Royal Decree on Nuclear Safety)	15/08/2017

O1.4	This revised RL is entirely applied in actual regulatory practice but "mission times" does not explicitly appear in legal framework. Current legal framework for PSA consist on: Safety Instruction IS-28 on criteria and requirements on the performance of probabilistic safety assessments and their applications for NPP and guidelines GS-01.14 Rev1 Basic Criteria for implementation of PSA and GS-01.15 Rev.1 Updating and maintenance of PSA. Guidance will be updated to be in compliance with this RL in due time.	-----
P1.5	SG 1.10 (Periodic Safety Review on NPP) revision will include the requirement that PSR identifies any issues that might limit the future safe operation of the plant and explain how they will be managed.	30/06/2017
P2.2	Current regulations in Spain related PRS does not use the name of *Safety Factors*, *Aspects of Safety* is used instead. Nevertheless, the areas for safety review included in SG 1.10 (Periodic Safety Review on NPP) match quite well with safety factors included in IAEA SSG 25, only few safety factors are missing. There are short-term plans for SG 1.10 (Periodic Safety Review on NPP) revision to follow IAEA SSG 25 and consequently require to licensees to review all safety factors.	30/06/2017
P3.2	Current regulations in Spain related PRS does not include requirements similar to RL P 3.2. There are short-term plans for SG 1.10 revision to follow IAEA SSG 25. As a requirement very similar to RL P.32 is included in SSG 25, it will be incorporated to Spanish regulations.	30/06/2017
T4.2	This revised RL is entirely applied in actual regulatory practice, but it is only partially implemented in the national regulatory framework (not yet implemented: target values of frequency not higher than 10^{-4} /year, and 0.1g PGA as minimum). Full implementation is planned as the next action in a new CSN Safety instruction on "Siting" that will include natural hazards.	Dec/2017

Sweden

The Swedish Radiation Safety Authority (SSM) performed the self-assessment and submitted the full self-assessment report the 30 October 2015. Following the discussion during the RHWG meetings, Sweden submitted revisions of the self-assessment report on 18 January 2016, 19 February 2016 and 21 June 2016.

In total Sweden received 103 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

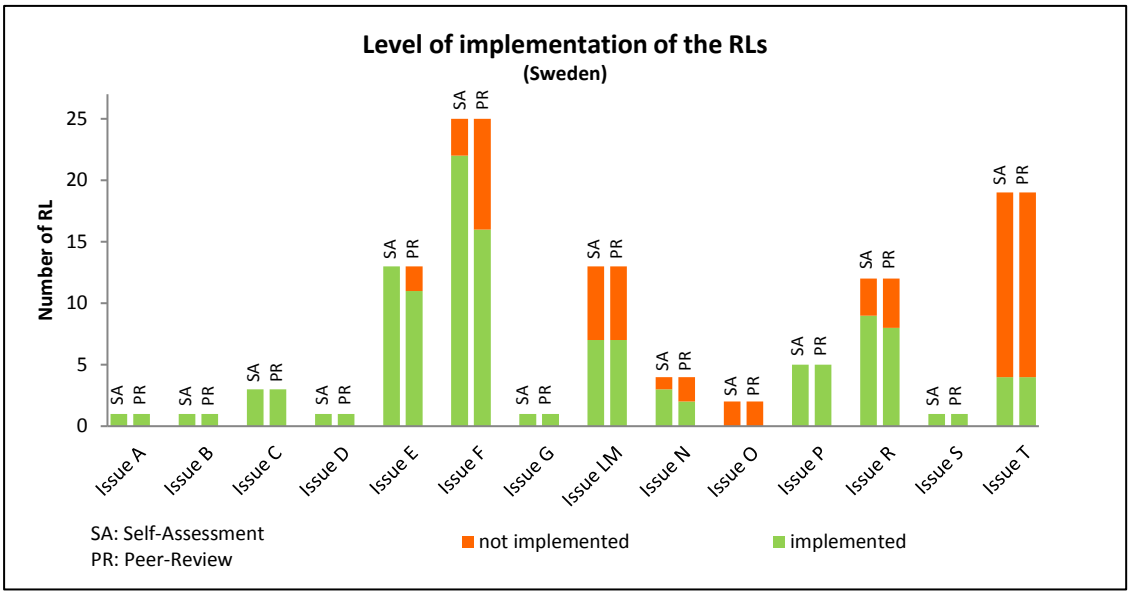

Figure 21. Level of implementation of the revised or new RLs by issue for Sweden

Sweden proposed the following action plan for fully implementing the remaining 42 RLs into the national regulation:

Table 18. Action plan of Sweden to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
	A comprehensive work producing new regulations regarding radiation safety is ongoing at SSM. All planned parts of the new regulations involving nuclear reactors are scheduled to be finalized and adopted in 2017, with the exception of the regulations governing the handling of nuclear material and nuclear waste and radioactive waste, as well as rules on decommissioning of nuclear facilities. These are scheduled to be completed in early 2018. The substance of the RLs that have been categorized as a C will be incorporated in the new regulations.	2017-08-15/ 2018-10-31

Switzerland

The Swiss Federal Nuclear Safety Inspectorate (ENSI) performed the self-assessment and submitted the full self-assessment report the 29 October 2015.

In total Switzerland received 118 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

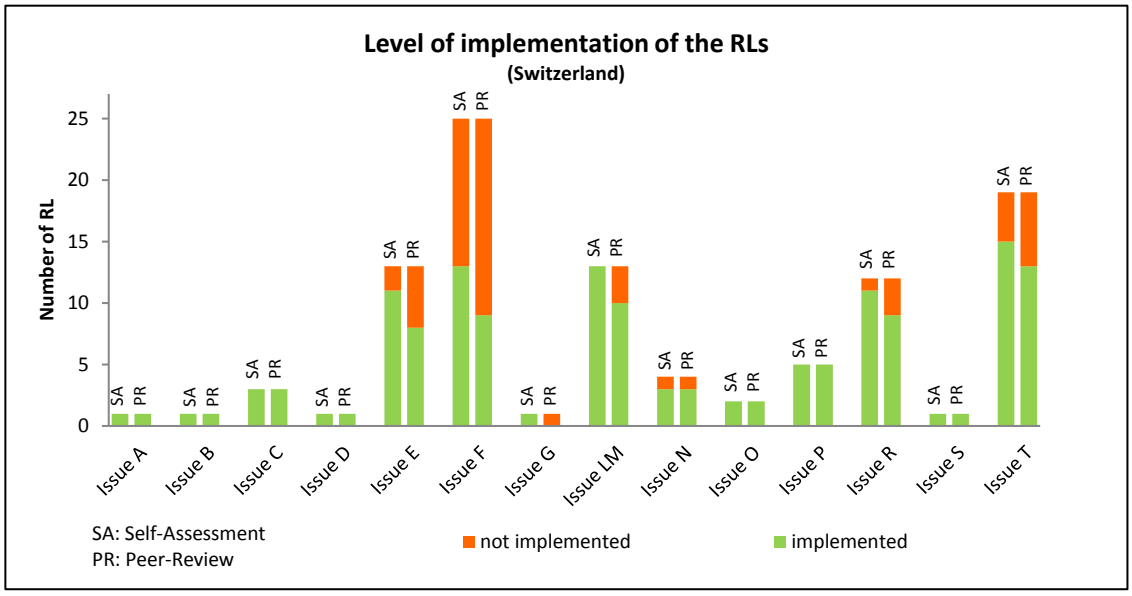

Figure 22. Level of implementation of the revised or new RLs by issue for Switzerland

Switzerland proposed the following action plan for fully implementing the remaining 35 RLs into the national regulation:

Table 19. Action plan of Switzerland to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
E4.2, E9.5, F1.2, F4.1-4.5, F4.7-4.8, F4.14, F4.17 G4.1, R3.6, R4.4 T5.3, T5.6	Several SRLs were implemented in the new guideline ENSI-G02, part 1 (General Design Requirements for Existing NPPs), which was issued in Sept. 2016 (i.e., in the time frame of the peer reviews).	Done
E10.1, E10.6 F4.16, F4.18	Will be implemented in the guideline ENSI-G02, part 2 (Specific Design Requirements for SSCs of existing NPPs)	End of 2017

E6.1 F2.1-F2.3, F3.1 N2.7 T1.1, T4.2, T6.1	Will be implemented in the guideline ENSI-A01 (Deterministic Safety Analysis).	End of 2017
LM2.5, LM2.7, LM3.5 R5.4	Will be implemented in the guideline ENSI-B12 (Emergency Preparedness)	End of 2017
T3.3	Will be implemented in the guideline ENSI-A05 (PSA: Scope & Quality)	March 2018

Ukraine

The State Nuclear Regulatory Inspectorate of Ukraine performed the self-assessment and submitted a report on the self-assessment of issues A, B, C, D, G, N, O, P, S the 03 November 2015. The full self-assessment report was submitted the 24 March 2016.

In total Ukraine received 49 written questions and comments for which written answers were provided.

The following figure shows the status of the self-assessment before the peer-review and the result of the peer-review.

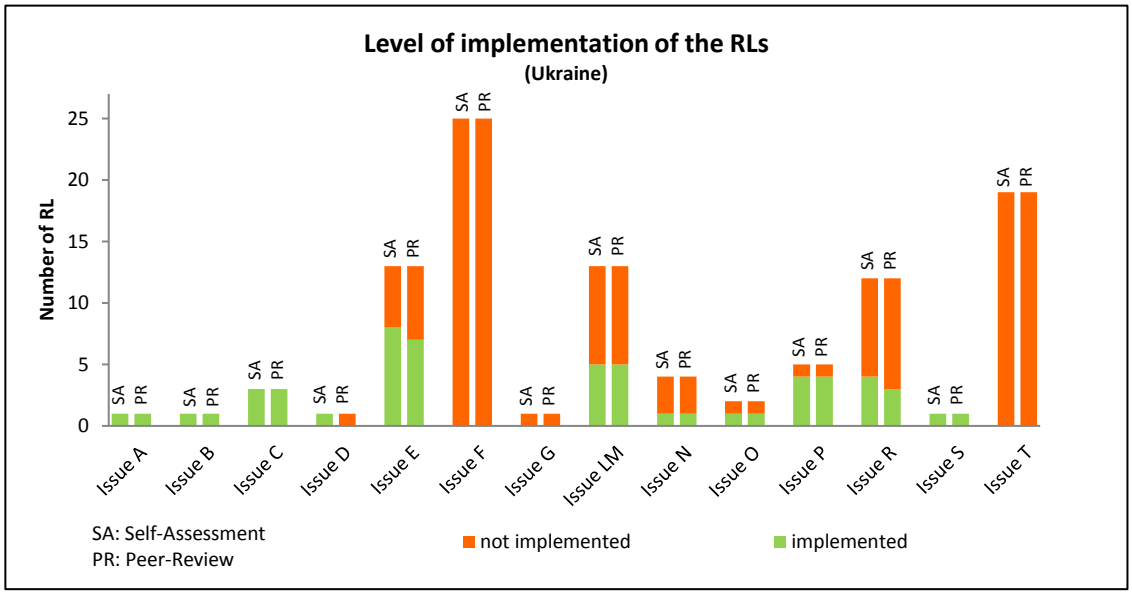

Figure 23. Level of implementation of the revised or new RLs by issue for Ukraine

Ukraine proposed the following action plan for fully implementing the remaining 74 RLs into the national regulation:

Table 20. Action plan of Ukraine to implement the remaining RLs

RL No.	Description of the idea how the RL will be implemented in the national regulatory framework	Scheduled date to finalize implementation
D3.1, E3.1, E8.7, E9.5, E9.9, E10.1, E10.6, Issue F, G4.1, LM2.2, LM2.4, LM2.5, LM2.6, LM2.7, LM3.4, LM3.5, LM6.4, N2.7, R1.1	RLs will be implemented during revising of NP 306.2.141-2008 «General provisions of NPP safety»	March 2018
E8.7, N3.1	RLs will be implemented by amending the NP 306.2.162-2010 "Requirements for the safety assessment of nuclear power plants"	March 2018

N2.7, N2.14, O1.4	RLs will be implemented during developing of «Requirements for structure and contents of SAR of NPP Unit with PWR»	November 2017
P1.3	RLs will be implemented during developing of «Requirements periodic safety review report of NPP»	November 2017
R2.2, R2.3, R3.2, R3.6, R3.7, R4.3, R4.4,R5.4	RLs will be implemented during revising of NP 306.5.01/3.083-2004 «Radiological emergencies response plan»	March 2018
Issue T	RLs will be implemented during developing of «Requirements on assessment of natural hazards»	March 2018

United Kingdom

Summary description of UK approach

While most WENRA countries implement the RLs by transposing them into national legally binding requirements or into regulatory guidance to licensees, UK adopted a different and unique approach. This unique approach was a topic discussed both in the country group review and in RHWG plenary session.

The operators of nuclear plants in the UK must, like their counterparts in other industries, conform to the Health and Safety at Work etc Act 1974 (HSWA74). HSWA74 is goal setting in nature and places a fundamental duty on employers to ensure, so far as is reasonably practicable (SFAIRP), the health, safety, and welfare at work of all their employees. It also imposes a duty to ensure that members of the public are not exposed to risks to their health or safety because of the activities undertaken. SFAIRP is a legal term within UK and this is equivalent to requiring that the risk must be as low as reasonably practicable (ALARP).

The starting point for demonstrating that risks are ALARP and safety is adequate is that the plant complies with relevant good practice (RGP). This is reflected in ONR's Enforcement Policy Statement.

ONR inspectors use Safety Assessment Principles (**SAPs**, latest version published in 2014), together with the supporting Technical Assessment Guides (**TAGs**), to guide regulatory decision making. Both SAPs and TAGs are available on ONR website.

The primary purpose of the SAPs is to provide inspectors with a framework for making consistent regulatory judgements on the safety of activities. The principles are supported by TAGs to assist the decision making within the nuclear safety regulatory process. They are used to grant licenses, to regulate licensee's activities and as basis for enforcement action. Although it is not their prime purpose, the SAPs and TAGs may also provide guidance to designers and licensees on the appropriate content of safety cases.

The SAPs (2014) recognises that "*WENRA has developed reference levels that represent good practices for existing civil nuclear power plants, radioactive waste management and decommissioning. ONR has previously acknowledged the reference levels as relevant good practice*" And that "*the WENRA safety reference levels are explicitly incorporated as relevant good practice within ONR's technical assessment guides*".

More specifically, ONR's Technical Assessment Guide T/AST/005 (**TAG 005**, Guidance on the Demonstration of ALARP (As Low As Reasonably Practicable), December 2015) formally adopts the extant WENRA RLs as RGP: "*In addition to SAPs, the IAEA Safety Standards and the Safety Reference Levels developed by WENRA for reactors, decommissioning, and the storage of radioactive waste and spent fuel [21] should be considered to be UK relevant good practice… The UK, as a member of WENRA, has formally signed on to the Reference Levels and, in*

line with ONR's enforcement policy [22] in relation to relevant good practice, we expect them to be followed."

Most of the TAGs address specific technical areas. TAG 005 is different to these as it directly addresses how the licensee should meet the overall legal requirement in HSWA74 to demonstrate that the risk is ALARP. UK view is that the reference to the RLs in TAG 005 is therefore all that is required to ensure that the RLs are adopted as RGP by the licensees.

ONR's published enforcement policy requires that RGP is met. Failure to do so could lead to enforcement action. UK therefore argues that the WENRA RLs as a whole are directly implemented into the national regulatory framework by identifying them as RGP in TAG 005. Since the RLs are written in English, no translation is necessary.

Discussion in RHWG

The UK approach was discussed during all three review meetings, first within the country group C and then in the plenary. UK claimed that WENRA RLs are implemented in UK regulatory framework by, solely, TAG 005. UK gave several presentations explaining the UK regulatory framework and the application of the ALARP / SFAIRP (As Low As Reasonably Practicable / So Far As Is Reasonably Practicable) principle through TAG 005.

RHWG debated whether TAGs qualify as a general recommendation. RHWG agreed that SAPs and TAGs meet the criteria set out in section 03.2 and therefore qualify as a "general recommendation" in the context of the review process, i.e. SAPs and TAGS can therefore be credited to implement in UK WENRA RLs.

However, the UK approach for implementing RLs through a single document by reference was questioned by several RHWG members. It was pointed out that a number of other regulatory documents (e.g. other TAGs) explicitly refer to single RLs and in some cases to the older versions of the RLs in general. During the peer review process, ONR recognised that, despite their view that an up to date reference within all TAGs was not required for implementation of the WENRA RLs as TAG 005 exists, the continued reference to the previous version of some RLs was not ideal. The TAGs were therefore been reviewed to identify those which referred to the previous version of the RLs and the following statement was added to each relevant TAG:

> "ONR's SAPs and the WENRA reference levels were re-issued in 2014. This TAG will be updated to reflect these changes in due course and in the meantime inspectors need to check that they are using the correct versions of those publications during their assessments."

For ONR, this update was an administrative process and did not impact on any of the technical content of the TAGs, but was an open recognition that assessors and any other users of the TAG, must recognise that the RLs have been updated when using the documents.

Some RHWG members stressed that incorporating the RLs into the national framework is not only a question limited to translation but also a step to a better understanding of the RLs and a better interface within the national general approach. UK confirmed that, in the UK approach, this process is carried out later when inspectors assess the licensee's safety case.

RHWG concluded that a peer-review RL per RL was not possible considering the self-assessment provided and that considering UK unique approach a classification into "A", "B", and "C" was not possible. RHWG accepted that the UK considers that RLs have been implemented as relevant good practice in its regulatory framework.

RHWG noted that ONR suggested ensuring that specific WENRA RLs are appropriately reflected in all relevant TAGs by means of their regular TAG review program although, according to ONR view, this was not necessary to demonstrate adequate implementation. ONR proposed an action that will ensure that all TAGs referencing previous versions of RLs would be updated before end of 2017. This date was consistent with the declared date for implementation of the RLS in all WENRA countries. RHWG strongly supports this action.