

Harmonisation of regulations on back-end activities – WENRA

B. Hedberg

Swedish Radiation Safety Authority
Sweden

S. Theis

Swiss Federal Nuclear Safety Inspectorate
Switzerland

Abstract

The Western European Nuclear Regulators Association (WENRA) was established in 1999. The main objectives at that time were to develop a common approach to nuclear safety in Europe and to provide an independent capability to examine nuclear safety in applicant countries.

Two working groups were launched to harmonise safety approaches between countries in Europe, the Reactor Harmonisation Working Group (RHWG) and the Working Group on Waste and Decommissioning (WGWD). In response to the events in Japanese reactors following the tsunami in 2011 WENRA established the contents of the “NPP stress test”. Recent WENRA activities are concerned with inspection practices and research reactors.

The WGWD has to date developed Safety Reference Levels (SRL) reports for decommissioning and storage according to its original mandate (WENRA, 2011, 2012a). WENRA members have experienced a benchmarking process and established national action plans for the modification of their national legal systems and practices according to benchmarking results.

WGWD is currently working on developing a SRL report for disposal facilities for radioactive waste. A first draft version with SRLs for disposal was published in November 2012 on WENRA’s web page, for comments from stakeholders. This paper presents the current status of development and elaborates on the role of WENRA WGWD work in harmonising approaches in Europe regarding development of the safety case for disposal of spent fuel and radioactive waste.

Introduction

There were two main reasons for the establishment of the Western European Nuclear Regulators Association (WENRA) in 1999. Firstly, nuclear safety was included in the European Union set of enlargement criteria, and secondly, national safety approaches have been developed from IAEA Safety Standards and the Convention on Nuclear Safety, though independently.

The main objectives of WENRA at that time were to develop a common approach to nuclear safety and to provide an independent capability to examine nuclear safety in applicant countries. In March 2003 the objectives of the co-operation within WENRA was

extended, in addition to the objectives set out in 1999, to become a network of chief nuclear safety regulators in Europe exchanging experience and discussing significant safety issues.

Today, WENRA consists of 17 members¹ and 9 observers². WENRA countries are committed to developing their national practices so that agreed SRL will truly be achieved in the regulatory system of each member country.

Two working groups were launched to harmonise safety approaches between countries in Europe, the Reactor Harmonisation Working Group (RHWG) and the Working Group on Waste and Decommissioning (WGWD).

The mandate of the working groups was to analyse the current situation and the different safety approaches; to compare individual national regulatory approaches with the IAEA Safety Standards; to identify any differences; and to propose a way forward to possibly eliminate the differences. The proposals were expected to be based on the best practices among the most advanced requirements for existing power reactors and nuclear waste facilities.

The harmonisation process in the field of reactor safety was the first to get underway; selected technical areas with identified needs for harmonisation were addressed.

WENRA WGWD activities

The Working Group on Waste and Decommissioning (WGWD) was established about two years after the RHWG and had to face a much greater variety of installations and tasks. This working group chose a holistic view on the safety of its facilities and practices rather than looking at a selected set of topics. Due to this completely different approach a first set of storage references, which was supplementing a copied set of reactor safety reference levels, turned out to be impracticable. Employing a rather time consuming second approach, WGWD finally managed to define comprehensive sets of SRL for decommissioning (of any type of nuclear facility) and storage (spent fuel and radioactive waste) (WENRA, 2011, 2012a). A first set of draft SRL for disposal was published in November 2012 on WENRA's web page for comments from stakeholders. The draft disposal SRL report is currently being reviewed and updated according to comments received.

Development of safety reference levels

The safety reference levels (SRL) are based on national safety requirements, corresponding IAEA Safety Standards, lessons learned from previous work to develop SRL, feedback from stakeholders and – last but not least – the personal experience of WGWD members.

Once the SRL are formulated, the countries have to go through a self-assessment process to evaluate the compatibility of their own regulatory systems with the SRL. In the case of storage SRL the operational practice in the relevant facilities has been benchmarked as well.

Benchmarking

The national benchmarking process is initiated after the realisation of self-assessment. During the benchmarking exercise, SRL fulfilment quotations from national regulatory

-
1. Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Hungary, Italy, Lithuania, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, the Netherlands, United Kingdom.
 2. Armenia, Austria, Denmark, Ireland, Luxemburg, Norway, Poland, Russian Federation, Ukraine.

systems of each country are discussed and finally approved in subgroups of four to five WENRA countries. SRL are regarded as deficient (C-rating) unless they are clearly covered by existing national regulatory requirements (A-rating). On rare occasions justified deviations may be accepted (B-rating). Some typical examples for B-ratings are:

- In a small country one specific facility will be sufficient for the total nuclear programme, that facility already exists and the respective SRL is covered as a license condition.
- Due to the specific nature of the national management programme for spent fuel and radioactive waste, the respective SRL is not applicable.

National action plans

National action plans (NAP) are established for each country on the basis of its C-ratings in the benchmarked self-assessment. WENRA members strive to complete their national action plans by adjusting their regulatory systems usually within a period of two to three years, which is a quite challenging task. Countries who notify the completion of their NAP will undergo a re-benchmarking using the already familiar methodology, eventually with the result that they have implemented the full set of SRL in their regulatory system.

By end of February 2013, 12 out of 17 WENRA member countries had successfully carried out their NAP for storage SRL, with several other countries nearly finished. For the decommissioning SRL the same situation is expected one year later.

In addition to benchmarking against the regulatory systems, storage SRL were also benchmarked against factual implementation by implementers through a comparable assessment and benchmarking procedure. The most interesting results were:

- No single SRL already addressed in national regulations was missed in facility operation.
- In many cases SRL which were C-rated during the benchmarking of regulatory systems were already implemented in facility operations, due to e.g. peer review missions or as a result of the continuous improvement incentive of their own management systems.

Safety reference levels for disposal

For most types of nuclear facilities much input for developing SRLs can be extracted from existing national safety requirements, as they are based on extensive feedback of experience from regulating construction and operation of such facilities. The situation for disposal is rather different.

There is considerably less experience from construction and operation of disposal facilities, especially disposal facilities for spent fuel or high-level and/or long-lived waste. Thus, more emphasis has been placed on using IAEA Safety Standards as a basis for the development of disposal SRL, compared to development of SRL for non-disposal nuclear facilities.

Siting aspects for a reactor – or a storage facility – requires consideration of the operational time of the facility only, i.e. the safety assessment must consider all relevant influence from the chosen site on the operations of the reactor to prevent any accident from occurring. Also, there are no post-closure (post-decommissioning) aspects to be considered for siting and design of reactors or storage facilities.

Siting aspects have a very different implication on the post-closure safety for disposal facilities especially with regard to the extremely long time frames to be considered. The characteristics of the host environment are more or less crucial in order to provide for long-term containment and isolation of the spent fuel or radioactive waste disposed of.

A general challenge as regards development of SRL for disposal is that SRL are expected to be implemented in a member state's regulatory system, and the requirements in the regulatory system are in general only applicable to licensed activities. Much of the needed research and development activities to develop a safety case take place before a license is applied for. Hence it might not be possible to enforce requirements during this pre-licensing phase, i.e. at the early stages of the development of a disposal facility. It is therefore anticipated in the disposal SRL report that whenever SRL are addressing a future licensee who is not yet subject to formal regulatory review, the licensee shall demonstrate fulfilment of these requirements at least when applying for the first licence.

Another challenge relates to the fact that disposal is to be seen as the endpoint of a long sequence of activities, from generation through conditioning, storage and transport to disposal, and quite frequently involves different operators and licensees. Thus, the conditioning and packaging of waste may have a large influence on post-closure safety. As individual licensees can only be responsible for activities within the envelope of their respective licence, it is important that the regulatory system ensure that interdependencies between different licensees are properly addressed in the overall regulatory system, i.e. to apply a cradle-to-grave approach.

Yet another challenge is that some disposal facilities are likely to be operated for many decades where construction of the facility and emplacement of waste as well as partial closure of the disposal facility may be carried out in parallel. Thus, the development of the safety case for a disposal facility and system presents specific challenges compared to the safety case for nuclear facilities of other types: it has to address post-closure safety in conjunction with operational safety. Further, the safety case matures as the disposal concept develops and the facility is constructed and operated.

Future activities

WENRA WGWD is currently working on reviewing and updating the draft disposal SRL report according to comments received by stakeholders. It is envisaged that the first version of the final report to be used for the benchmarking process against national regulatory systems will be finalised by WENRA in 2014.

Also, in order to cover all back-end activities WENRA foresees the development of SRL related to pre-treatment and conditioning of waste. The timeline for the development of such SRL is not yet defined.

As discussed above, disposal of spent fuel and waste is to be seen as the endpoint of a long sequence of activities, from generation through conditioning, storage and transport to disposal, involving different operators and licensees, where each licensee is responsible for activities within the envelope of their respective licence. In order to provide a proper context for WGWD work and to better understand the interfaces between the different WENRA WGWD SRL reports, WENRA also foresees the development of a general descriptive document. Such a document would also address the interdependencies between different licensees in a national context.

Concluding reflexions

WENRA members agreed to use the safety reference levels (SRL) as minimum requirements to be implemented in their regulatory systems. Nevertheless, they are free

to further enhance their regulatory framework by introducing additional and/or more stringent requirements.

The concept for developing the SRL, i.e. benchmarking against national regulatory systems and the IAEA Safety Standards, contributes to harmonised safety approaches, including the development of safety cases. The participants of the WGWD are all involved in the elaboration of the national regulatory framework and also carry out inspections in their home countries. That results in a deep understanding during the elaboration of SRL and a fast and pragmatic implementation. This is the most unique and valuable property of the WENRA and especially the WGWD procedure. WENRA safety reference levels are genuinely respected documents, and the clear results and benefits are recognised by the stakeholders.

References

- Western European Nuclear Regulators' Association (WENRA) (2011), *Waste and Spent Fuel Storage Safety Reference Levels Report, Version 1.2*, WENRA Working Group on Waste and Decommissioning.
- WENRA (2012a), *Decommissioning Safety Reference Levels Report, Version 2.1*, WENRA Working Group on Waste and Decommissioning.
- WENRA (2012b), *Radioactive Waste Disposal Facilities Safety Reference Levels, Draft Version*, WENRA Working Group on Waste and Decommissioning.