40th Nuclear Safety Standards Committee
1 - 3 December 2015

Agenda item 2.2

DS476 Draft Safety Requirements: Safety of Research Reactors

D. Sears and A. Shokr
Research Reactor Safety Section, Division of Nuclear Installation Safety
Overview

1. Revision of NS-R-4

2. Development Status of DS476

3. Member States comments and review by IAEA technical editors / safety standards specialists

4. Comments by NUSSC/RASSC/WASSC members

5. Requested Action
Revision of NS-R-4

The scope of the NS-R-4 remains essentially unchanged. However:

- Subcritical assemblies are covered;
- A Section on “Preparation for Decommissioning” replaced “Decommissioning”;
- Interfaces between safety and security are covered.

Coherency and consistency of the technical contents with the other relevant IAEA Safety Standards (e.g. SF-1 and GRSs) ensured, including topics not originally covered. Feedback from the use of the document incorporated.

Material on “regulatory supervision”, “siting”, and “management system” was revised in accordance with the Committees and Commission decision.

Relevant feedback from Fukushima accident included;

Feedback from MS use of the document and from the IAEA Incident Reporting System for Research Reactors (IRSRR) incorporated.

Material more suitable to guidance removed.

References updated.
Contents

1. Introduction
2. Applying safety objectives, concepts and principles for research reactor facilities
3. Regulatory supervision for research reactor facilities
4. Management and verification of safety for research reactor facilities
5. Site evaluation for research reactor facilities
6. Design of research reactor facilities
7. Operation of research reactor facilities
8. Preparation for decommissioning of a research reactor
9. Interfaces between safety and security for a research reactor

App I: Selected postulated initiating events for research reactors

App II: Operational aspects of research reactors warranting particular consideration

Annex: Selected safety functions for research reactors
Development status/process:

- The DPP was approved by the Committees and the CSS in April 2014;
- The first draft was developed in two CSMs during 2014, and was subjected to a review following the internal QA process;
- The first draft was approved by the Committees in November 2014 for submission to MSs for comments;
- Table of resolution of MS comments posted on the website Sept 2015;
- DS476 reviewed by the Technical Editors;
- Submission to the Committees after resolution of MS comments. Approval by RASSC/WASSC/NSGC in Nov 2015 → NUSSC in Dec;
- Submission to the CSS for approval for publication in 2016;
- BoG approval in 2016; publication in 2017.
• 482 comments were received from 14 MSs (Belgium, Canada, China, France, Germany, India, Iran, Japan, Poland, Romania, Russia, Ukraine, United Kingdom, USA);

• The majority of comments were accepted.
Member States Comments

• Incorporating the resolutions resulted in several refinements:
  ➢ Enhancing the flow of information;
  ➢ Enhancing consistency with other SS in some areas (mainly DEC);
  ➢ Adding clarity to some areas (e.g., use of a graded approach);
  ➢ Removal of text more relevant to guidance;
  ➢ Editorial (rationalization of cross references, definitions, updating reference, etc.).

• One MS made several observations / requests for clarification.
Examples of rejected comments include:

- Comments to delete material on “regulatory supervision”, “siting”, and “management system”. Text retained as a link to applicable GSRs - no additional requirements were added;

- Conflicting comments on Design Extension Conditions: Some MS requested deletion, others requested elaboration;

- Comment to add a separate Appendix for Subcritical Assemblies;

- Comments to add text that is not coherent with SSR-2/1 or SSR-2/2.
NUSSC/RASSC/WASSC Comments

- NUSSC/RASSC/WASSC members provided 83 comments in October 2015 (Canada, France, Germany, Japan, Korea, USA);
- Some comments were general / editorial;
- All comments were carefully considered and the majority were accepted, resulting in further improvements.
NUSSC/RASSC/WASSC comments: Examples of rejected comments

- Req. 22: Add examples of DEC, e.g., significant fuel degradation due to loss of coolant;

- Comments to delete subcritical assemblies;

- Add text and/or refs. on naval propulsion systems, accelerator driven systems and homogeneous reactors;

- 4.26: PSR – to update and make improvements to ensure safety according to actual state of the art in science and technology;

- Add text that is already covered in DS476 – e.g., provisions for emergency power supply (Req. 56 and 6.192), effective means of communication (Req. 32);

- Add text that introduces inconsistencies with SF-1, SSR-2/1, SSR-2/2 or definitions, e.g.: nuclear, chemical and radiation risks; emergency response and recovery from a nuclear or radiological emergency; reactor site building
US Proposal: Inclusion of separate Appendix (or Section) for Subcritical Assemblies

Pros

- All relevant information in one location

Cons

- Repetition/duplication of requirements
- Complicates flow of information
- Significant increase in the size of the document and the number of requirements
- Delay in publication and use by MS currently planning (or operating) such facilities
Requested Action

Approval for submission CSS