

IAEA Safety Standards Relevant to Decommissioning



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*Research Reactor Decommissioning Demonstration Project (R2D2P)
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Background

- **Increase in decommissioning activities worldwide with differing complexity and hazard potential**



Rocky Flats, USA



RR, Georgia



Laboratory, UK

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Background (cont)

- **Need for evaluation and demonstration of safety**
 - Safety standards
 - Integral with decommissioning plan
 - Graded approach – commensurate with hazard and complexity
 - Regulatory review and approval
- **Limited experience available**
- **Differing approaches used worldwide**
- **Increasing requests to IAEA for assistance with safety assessment for decommissioning**

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Background (cont)

IAEA Statute:

- **Develop safety standards**



Nuclear safety
Radiation Safety
Waste Safety
Transport Safety

- **Provide for their application**



Peer reviews
Technical cooperation
Training
Exchange of information
Research and development

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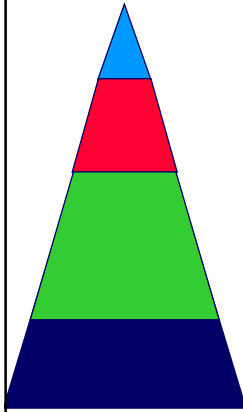


SAFETY STANDARDS ON DECOMMISSIONING OF RESEARCH REACTORS

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Safety Standards on Decommissioning



Safety Fundamentals (111-F) under revision

Safety Requirements “Decommissioning of Facilities Using Radioactive Material” (DS333)
Safety Requirements „Safety of Research Reactors“ (NS-R-4)

Safety Guide “Decommissioning of NPPs and Research Reactors” (WS-G-2.1)

Safety Report “Standard Content of Safety Related Decommissioning Documents” (SR 45)
TECDOC 1476 „Financial Aspects of Decommissioning“

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Safety Standards on Decommissioning (cont)

- **Fundamentals**
 - Provide basic objectives, concepts and principles of safety
- **Requirements**
 - Establish requirements that must be met to ensure safety
Use “shall” statements
 - Governed by objectives and principles in the Safety Fundamentals
- **Safety Guides**
 - Recommend actions, conditions or procedures for meeting requirements
 - Use “should” statements
 - Implication is that recommended methods or equivalent alternative methods should be used

NSRE/WSS

2006-08-25

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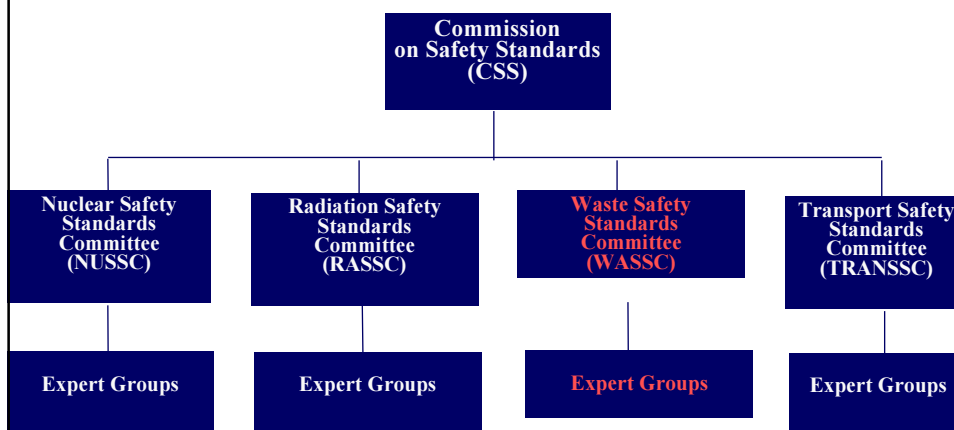
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IAEA Related Documents

- **Safety Report**
 - Describe good practices
 - Give practical examples and detailed methods that can be used to meet safety requirements
 - Do not establish requirements or give guidance
- **Technical Reports and TECDOCs**
 - Provide technical information
 - Over 20 specific topics concerning decommissioning
 - Characterization
 - Recordkeeping
 - Planning
 - Technologies

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Process of Preparation and Review

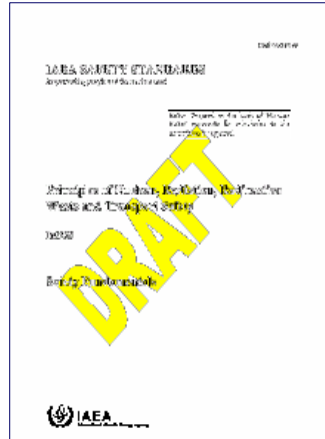


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Safety Standards

- **New Draft Safety Fundamentals (DS298)**

- **Consolidates existing fundamentals:**
 - **Principles of waste management (SS111-F),**
 - **Safety of nuclear installation (SS. 110)**
 - **Radiation protection of sources (SS 120) approved by CSS – June 2006**



<http://www-ns.iaea.org/standards/draft-standards-by-dsnumber.htm>

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Safety Standards (cont)

- **New Safety Requirements**

- **Draft „Safety Requirements for Decommissioning of Nuclear Facilities“ DS333**
 - **Approved by CSS – June 2006**
 - **Expected BOG approval – Sept 2006**



- **Revision of Existing Safety Guides:**

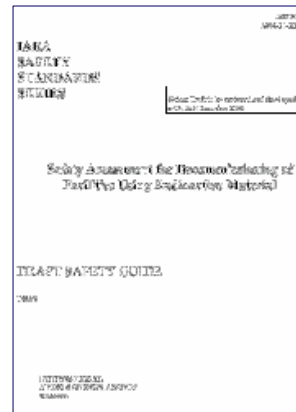
- **Decommissioning of NPPs, RRs (WS-G.2.1)**
- **Medical, industrial facilities, etc (WS-G.2.2)**
- **Fuel Cycle Facilities (WS-G.2.4)**
- **DPP approval of CSS expected – Nov 2006**
- **Revision - 2007**



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Safety Standards (cont)

- **New Safety Requirements on Safety Assessment and Verification of Nuclear Facilities (DS348)**
 - Covering all facilities and activities
 - In preparation for submission to MSs for comments
- **Safety Guide on Safety Assessment for Decommissioning of Nuclear Facilities (DS376)**
 - Based on the DeSa activities
 - Planned submission to WASSC and NUSSC before MSs comments – Oct 2006



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Safety Standards (cont)

- **Safety Guides**
 - **Application of the Concepts of Exclusion, Exemption and Clearance (RS-G-1.7)**
 - Bulk material (over 1 tonne per year)
 - Activity concentration values
 - Natural and artificial radionuclides
 - Published - 2004

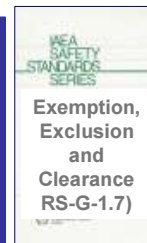
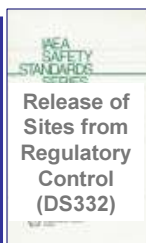
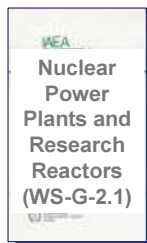
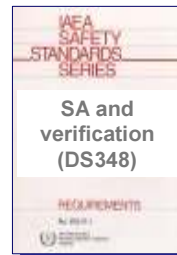
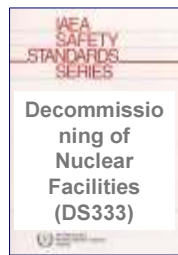


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Safety Standards (cont)

- **Safety Guides**
 - **Release of Sites from Regulatory Control on Termination of a Practice (DS332)**
 - Land
 - Unrestricted and restricted release
 - New practice on a released site
 - **Approved by CSS – November 2005**
 - **Expected publication - 2006**

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Standards Supporting Documents

- **Published**



Standards Supporting Documents (cont)

- **“Safe Enclosure of Nuclear Facilities during Deferred Dismantling” (Safety Report Series No. 26) 2002**
- **“Safety Considerations in the Transition from Operation to Decommissioning of Nuclear Facilities” Safety Report Series No. 36)**
- **Additional safety reports on strategy selection, safety analysis process, surveillance and maintenance, management of waste**

Standards Supporting Documents

- **In preparation:**
 - **Monitoring for Compliance with Clearance Criteria (draft SR)**
 - **Monitoring for Compliance with Remediation Values (draft SR land)**
 - **Selection of a Decommissioning Strategy (draft SR)**
 - **Management of Decommissioning Waste (draft SR)**

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Standards Supporting Documents

- **In preparation:**
 - **DeSa Project**
 - **Safety Report on Safety Assessment Methodologies for Decommissioning of Nuclear Facilities (draft SR)**
 - **Assessment methodology (vol 1)**
 - **Application of the methodology – NPP, RR, and a Lab (vol 2)**
 - **Regulatory Review on Safety Assessment (vol 3)**
 - **Graded Approach in Safety Assessment for Decommissioning (vol 4)**

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SAFETY STANDARDS APPLICATION

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Standards Application

- **Research and development**
 - **DeSa project „Evaluation and Demonstration of Safety During Decommissioning“ (2 phase)**
 - 50 experts from 30 countries
 - Finalised 2007
- **Research Reactor Decommissioning Demonstration Project (R2D2P)**
 - PPR-1 reactor, Manila, Phillipines
 - Start 2006 (for 6 years)
 - Over 30 experts from 12 countries

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Standards Application

- **Peer review**
 - Decommissioning plans of NPPs (e.g. Lithuania)
 - Decommissioning plans for research reactors – Romania in 2007
 - Development of a systematic appraisal mechanisms in the field of decommissioning



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Standards Application

- **Technical cooperation**
 - **Regional level**
 - RER/9/058 „Safety of Research Reactors“, including assistance on decommissioning (2005-6)
 - RER/3/003 „Decommissioning of NPPs“ (2005-6)
 - Continuation in 2007-2008
 - Main objective – assist development of decommissioning plans
 - **National level**
 - Research Reactor decommissioning - China, Georgia, Serbia and Montenegro, Romania, Congo Dem. Rep.
 - NPP decommissioning - Ukraine, Lithuania, Kazakhstan

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Standards Application

- **Training on RR decommissioning**
 - **Workshops at national and regional level**
 - Legal and regulatory aspects of decommissioning of research reactors (Obninsk, Russia, 2005)
 - Planning of Decommissioning of RRs (Romania, China, Egypt, 2002 - 2005)
 - Radiological Characterisation (Serbia, 2005, and Bulgaria 2006)
 - Cost Estimation for Decommissioning (Serbia and Montenegro, 2006)
 - Project management – Kazakhtsan (2006)
 - **Development of training material on decommissioning**
 - Syllabus
 - Lectures, practicals, presentations and evaluation



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Standards Application

- **Exchange of information**



- **International Conference on Management of Spent Fuel from Nuclear Power Reactors – 19-22 June 2006, IAEA, Vienna**

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Standards Application (cont)

- **Further technical assistance to Iraq**



IRT 5000 Research Reactor



Tammuz_2 Research Reactor

Joint Convention

- **Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management**
 - In force – 18 June 2001
- Based on IAEA fundamental principles of radioactive waste management
- Recognises the IAEA safety standards
- Safety of decommissioning (Art. 22, Art 26)



Joint Convention (cont)

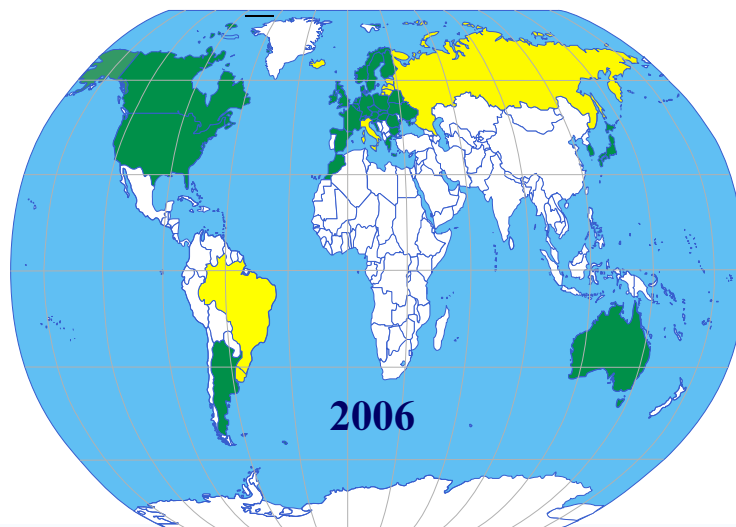


- Adequate financial resources are available to support the safety of facilities for spent fuel and radioactive waste management during their operating lifetime and for **decommissioning** (Art 22);
- Financial provision is made which will enable the appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of a disposal facility (Art 22)
- Qualified staff and adequate financial resources are available for **decommissioning** (Art 26)

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41 Contracting Parties-2nd Review Meeting

15-24 May 2006, IAEA Vienna



Recent ratifiers – Russian Federation, Brazil
Expected ratifier - China

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Code of Conduct on the Safety of Research Reactors (2004, BOG)

“Application of this Code is accomplished through national safety regulations pertaining to all stages in the life of research reactors. In doing so, States are **encouraged to make appropriate use of IAEA safety standards** relevant to research reactors and those relating to the legal and governmental infrastructure for nuclear, radiation, radioactive waste and transport safety.”

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International Action Plan on Decommissioning

- Magnitude of decommissioning
- **Safety standards**
- Safety Assessment
- Research reactors decommissioning
- Waste management
- Information exchange
- Funding
- Release and reuse of material, sites and buildings
- Longterm preservation of information
- Stakeholders and social issues



**Reviewed
and if
necessary
revised**

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TEGDE

- **Technical guidance on the Agency's programmatic activities**
- **Assistance and guidance to the Agency in the development of harmonized policies and strategies for decommissioning**
- **A focal point for the discussion and resolution of technical issues**
- **Preparation on request, status reports on relevant issues**
- **A forum for the exchange of information on lessons learned**



- **Financial Aspects of Decommissioning**
- **Selection of Decommissioning Strategies – Issues and Factors**

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IAEA /NEA

- **Working Party on Decommissioning and Dismantling (WPDD)**
 - **Achieving the goals of the decommissioning safety case - A status report (2005)**

<http://www.nea.fr/html/rwm/wpdd.html>

Current Focus

- **Review of international experience on decommissioning**
 - DeSa project
 - International Conference - Greece
- **Revision of decommissioning safety standards in accordance with new safety requirements**
 - New safety standards on safety assessment
- **Technical assistance to MSs**
 - Planning of decommissioning – RRs and NPPs
 - Performance of decommissioning – demonstration project
- **Coordination with international organisations – e.g. NEA, ICRP**

Summary

- Evaluation and demonstration of safety during decommissioning is an internationally agreed requirement
- IAEA standards aim to support the establishment of a global safety regime
- IAEA technical assistance to MSs aims effective application of these standards at national level by regulators, operators, technical support organisations
- R2D2P Project provides an important contribution to achieve these goals

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Useful Web Sites

- **IAEA Publications**
<http://www-pub.iaea.org/MTCDD/publications/series1.asp>
- **Joint Convention**
<http://www-ns.iaea.org/conventions/rw-national-reports.htm>
Contact H. Kazumasa (K. Hioki@iaea.org)
- **IAEA Conferences and Meetings (2006)**
<http://www-pub.iaea.org/MTCDD/Meetings/Meetings2006.asp>
- **TC web site**
<http://www-tc.iaea.org/tcweb/default.asp>

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