IAEA Safety Standards Relevant to Decommissioning

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**Background**

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

[Images of decommissioning sites]

**Rocky Flats, USA**  
**RR, Georgia**  
**Laboratory, UK**

**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
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

SAFETY STANDARDS ON DECOMMISSIONING OF RESEARCH REACTORS
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“

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
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

Process of Preparation and Review

Commission on Safety Standards (CSS)

Nuclear Safety Standards Committee (NUSSC)  Radiation Safety Standards Committee (RASSC)  Waste Safety Standards Committee (WASSC)  Transport Safety Standards Committee (TRANSSC)

Expert Groups  Expert Groups  Expert Groups  Expert Groups
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


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
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

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
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
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)

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 teh methodology – NPP, RR, and a Lab (vol 2)
      • Regulatory Review on Safety Assessment (vol 3)
      • Graded Approach in Safety Assessment for Decommissioning (vol 4)
SAFETY STANDARDS APPLICATION

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
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

• 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
    • NPP decommissioning - Ukraine, Lithuania, Kazahkstan
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

Standards Application

• Exchange of information

• International Conference on Management of Spent Fuel from Nuclear Power Reactors – 19-22 June 2006, IAEA, Vienna
Standards Application (cont)

• Further technical assistance to Iraq

IRT 5000 Research Reactor

Tammuz_ 2 Research Reactor

Joint Convention

  • 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)
• **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)

“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.”

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
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

Reports:
- Financial Aspects of Decommissioning
- Selection of Decommissioning Strategies – Issues and Factors

International Atomic Energy Agency
IAEA /NEA

• Working Party on Decommissioning and Dismantling (WPDD)

  • Achieving the goals of the decommissioning safety case - A status report (2005)


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

Useful Web Sites

• IAEA Publications

• 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/MTCD/Meetings/Meetings2006.asp

• TC web site
  http://www-tc.iaea.org/tcweb/default.asp