

Recent IAEA Activities on Safety of Decommissioning of Facilities Using Radioactive Material

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IAEA

*Atoms for Peace: The First Half Century
1957-2007*

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IAEA

*Atoms for Peace: The First Half Century
1957-2007*

Background

IAEA Objective: Global Decommissioning Safety Regime

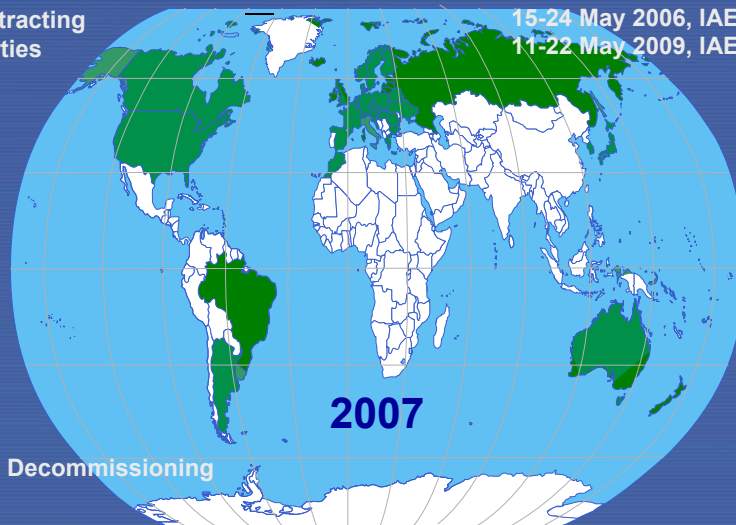
- JOINT CONVENTION on the safety of spent fuel and the safety of radioactive waste management
- INTERNATIONAL SAFETY STANDARDS for decommissioning
- PROVISION for the application of IAEA Safety Standards and guidance on Best Practices



Joint Convention

45 Contracting Parties

15-24 May 2006, IAEA Vienna
11-22 May 2009, IAEA, Vienna



Art. 26 Decommissioning



11 Oct 2008
Submission of reports

Safety Standards

- IAEA Statute:

- Develop safety standards



Nuclear safety
Radiation Safety
Waste Safety
Transport Safety

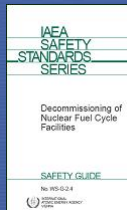
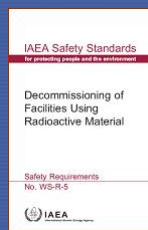
- Provide for their application



Peer reviews
Technical cooperation
Research and development
Training
Exchange of information



Safety Standards on Decommissioning (cont.)



Safety Standards on Decommissioning

- Safety Guide „Safety Assessment for Decommissioning of Facilities Using Radioactive Material“ DS376
 - Sent for MSs comments in Feb 2007
 - 314 comments from 11 MSs and 100 comments from observer (ENISS)
 - Meeting in June 2007 – France, UK, USA
 - Revised draft sent to committees for review
 - Approved by WASSC, RASSC and NUSSC (Oct 2007)
 - Planned submission to CSS in May 2008
 - Expected publication in 2008

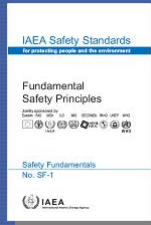


Safety Standards on Decommissioning (cont.)

- Safety Guide “Orphan Radioactive Sources and Radioactively Contaminated Material in the Metal Recycling Industry” DS411
 - Approved DPP – June 2007
 - Draft in preparation
- Scope
 - Ferrous and non-ferrous material
- Objectives
 - Guidance on strategic management of orphan radioactive sources and radioactively contaminated material discovered in the scrap metal supply chain
 - Establish or improve the capability of regulatory authorities and the metal recycling industry



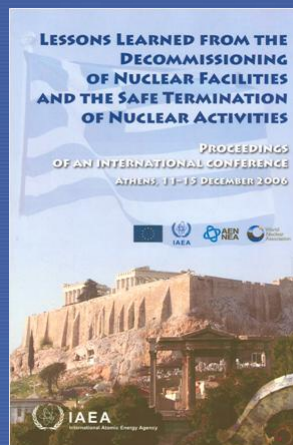
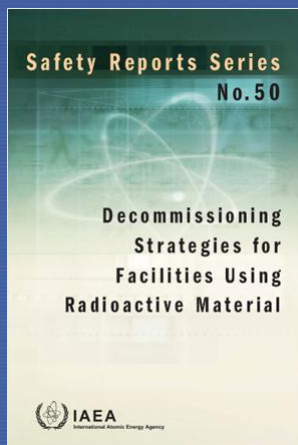
Safety Standards - Remediation



Published in 2007



Supporting Documents Published in 2007



Supporting Documents in Preparation

- Safety Report on Monitoring for Compliance with Clearance Values (DD740)
 - Finalised and expected publication in 2008
- Safety Report on Monitoring for Compliance with Remediation Values (DD744)
 - Finalised and expected publication in 2008
- Safety Report on Safety Assessment Methodologies for Decommissioning (DD741)
 - Meeting – 21-25 Jan 2008, Lyon, France
 - Expected publication in 2008
- Safety Report on Remediation of Legacy Facilities and Sites (DD963)
 - DPP approved in 2007
 - First meeting – Sept 2007



Peer Review Service on Decommissioning

- Increased request for IAEA assistance
- Case by case basis through national or regional technical cooperation projects



Establishment of an international peer review and advice mechanism:

- Different types of facilities (e.g. NPPs, fuel cycle facilities, research reactors)
- At the request of Member States
- Complementary to OSART, IRRS, WANO services

Launch in 2008



Technical Assistance on Decommissioning

Chernobyl NPP, Ukraine



Turbine hall of ChNPP

- Review of draft decommissioning plan for units 1, 2 and 3
 - Mission May 2007
 - Participation of ChNPP, Ministry of Emergency, Regulatory Body, and their supporting organisations
 - Mission report – June 2007
 - Revision on the draft plan under way
 - UKR/3/002 TC project



Technical Assistance on Decommissioning

Heavy Water Research Reactor, CIAE, China

- Review of the draft preliminary decommissioning plan
- Mission – 25-29 June 2007, China
- Participation of CIAE and Regulatory Body
- Detailed plan to be developed and submitted to RB for approval before 2009
- CRP/9/034 TC project



Technical Assistance on Decommissioning

VVR-S Research Reactor, Magurele, Romania



- Advice to Regulatory Body on draft final decommissioning plan
- Mission – 10-14 Sept 2007, Romania
- Report – Oct 2007
- ROM/4/029 TC project



Technical Assistance on Decommissioning

VVR-M Research Reactor, Tbilisi, Georgia

- IAEA review and advise:
 - Legislation on decommissioning – 1-18 May 2007, Georgia
 - Draft Law on Nuclear and Radiation Safety – 26-28 Sept 2007, Vienna
 - Report to Georgia – Oct 2007

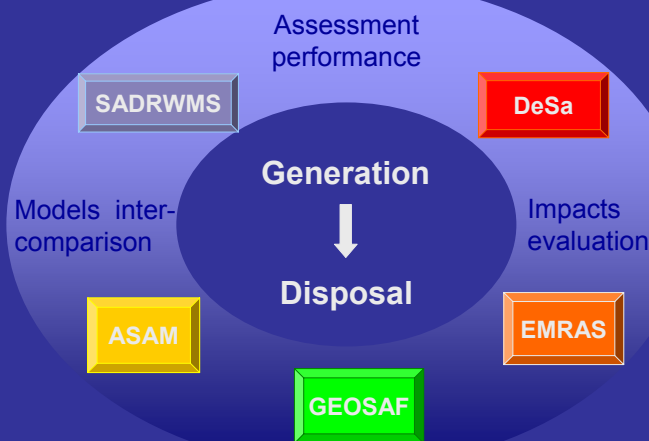


Technical Assistance on Decommissioning

Research Reactor, Vinca, Serbia



- Review and advise on legislation related to decommissioning
 - Meeting 21-23 Feb 2007, IAEA, Vienna
 - Recommendations and proposed future actions
 - SRB/3/002 TC project



Safety Demonstration Framework for Management of Radioactive Waste and Decommissioning

International Projects

SADRWMS Project

- Ongoing
- Interface with DeSa
- Waste management and decommissioning SA
- SAFRAN tool

EMRAS Project

- Draft reports finalised
- 5th meeting (5-9 Nov 2007)
- Follow-up project planned for 2008-9

ASAM Project

- Finalised – Feb 2007
- Reports in preparation for publication
- Follow-up project (10-14 Dec 2007)

GEOSAF Project

- Commenced 2007
- Harmonisation of safety assessment and safety case for geological disposal



International Projects (cont.)

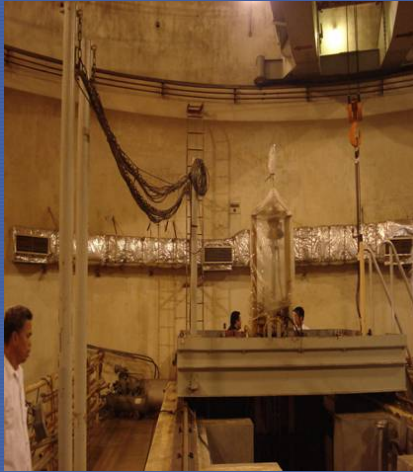
DeSa Project

- Implemented according to the work plan
- Six report developed
- Important input to DS376 and IAEA technical assistance services
- Recognised at the Athens conference
- Interface with SADRWMS and ASAM projects
- SAFRAN tool tested on Laboratory Test Case
- Planned follow-up project (Nov 2008)



The project aims to develop a harmonized approach for evaluating the safety of decommissioning activities and reviewing their safety assessments

International Projects (cont.)



R²D²P (Philippines)

- Decommissioning plan expected in 2008
- 13 MSs participating
- Workshop in Australia and Philippines 2007
- Australia and China to join the project



International Projects (cont.)

Iraq Project

- Progress to date
 - Establishment of legal basis and a regulatory body
 - Drafting regulations on decommissioning and waste management
 - Scoping characterisation



Training in 2007

- Training course on decommissioning of research reactors (Uzbekistan) May 2007
- National workshop on safety assessment for decommissioning of NPPs (Slavutich, Ukraine) – 8-10 Oct 2007
- National workshop on IAEA safety standards on decommissioning and waste management – 11 Oct 2007, Kiev, Ukraine

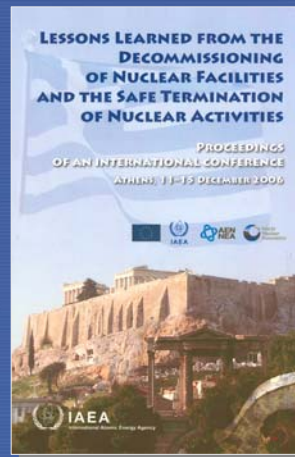


Training in 2008

- **Regional events**
 - WS on ALARA during Decommissioning – March 2008 (Europe)
 - WS on Decommissioning of Facilities – L. America (Argentina, April-May 2008)
 - WS on Decommissioning of NPPs – India (end 2008)
- **National events**
 - WS on Safety Assessment - China (April 2008)
 - WS Safety Related Documentation – Ukraine (May 2008)
 - WS on Cost Estimation of Decommissioning – China (Aug 2008)



Exchange of knowledge and experience



**Revision on
Action Plan
(up to 2010)**

<http://www-ns.iaea.org/meetings/rw-summaries/athens-2006.htm>



Revision on Action Plan (up to 2010)

- Outcomes of Athens Conference presented at BOG (March 2007)
- Revision of Action Plan (2004)
- **Objective**
 - (a) Enable the IAEA
 - to focus its future activities on decommissioning by addressing key areas
 - to develop the international safety regime in the field of decommissioning
 - (b) Establish the IAEA as the international focal point to:
 - assist all Member States with planning, undertaking and termination of decommissioning in accordance with the relevant internationally agreed safety standards and state-of-the-art recommendations
 - in particular in the case of the decommissioning of small facilities
- **Finalised** revision in September 2007



Main Conclusions and Planned IAEA Actions

Governmental Support to Decommissioning

Need to increase the awareness of governments and interested parties:

- early planning
- adequate funding
- governmental support
- long term strategies for decommissioning, waste and spent fuel management



Advice to Governments:

- Joint Convention and its peer review mechanism
- Regional cooperation and technical assistance to decision makers
- IAEA Board of Governors
- General Conference

Main Conclusions and Planned IAEA Actions

Decommissioning Strategies

- Immediate dismantling - preferred option
- Deferred dismantling may be a justified option for some facilities
- Need for clarification of entombment concept



- Specific recommendations for planning and implementation of an entombment strategy
- Legal liabilities upon termination of practices
- Update of international financial liabilities of decommissioning of different facilities

Main Conclusions and Planned IAEA Actions

Maintaining Competence in Decommissioning

- Need for national and international mechanisms to preserve and maintain:
 - operational knowledge
 - decommissioning experience that is important to the safety of decommissioning.
 - records
 - skilled personnel during decommissioning, etc.



Facilitating regular exchange of knowledge and lessons learned between Member States:

International network of decommissioning centres (IND)

International training mechanism for preparation and qualification of decommissioning experts from regulatory bodies, operators, etc.

Main Conclusions and Planned IAEA Actions

Independent Review of Facilities Decommissioning

- Increased request for IAEA assistance
- Case by case basis through national or regional technical cooperation projects



Establishment of an international peer review and advice mechanism:

- Different types of facilities (e.g. NPPs, fuel cycle facilities, research reactors)

- At the request of Member States

Main Conclusions and Planned IAEA Actions

Lessons Learned from Decommissioning in New Facilities

- Recent increase in plans for development of nuclear facilities worldwide
- Lessons learned from decommissioning to date be used as an input in the design, operation and maintenance of all new nuclear facilities



Consolidate the experience to date from decommissioning projects

Design, operation and decommissioning of new facilities:

- Facilitate their operation and decommissioning
- Minimize waste generation
- Improve protection of the public, workers and the environment
- Facilitate the release of material and sites from regulatory control



Main Conclusions and Planned IAEA Actions

Decommissioning of Small Facilities

- Need for international support for decommissioning of small facilities in countries with limited human and financial resources
- Following the experience of R²D²P (Asia)




• Technical support on safety and technology aspects

• Development of regional projects for demonstration of decommissioning of small facilities in Europe, Latin America and Africa



Main Conclusions and Planned IAEA Actions

Establishment and Application of Safety Standards for Decommissioning

- Clear regulatory framework:
 - National regulatory policy
 - Safety requirements and criteria
 - Interaction mechanisms between regulators and operators, etc.
 - Flexible and graded approaches to the application of regulatory framework
- 
- Revision of the Safety Guides on decommissioning
 - Establishment of a forum for the exchange of experience and harmonization of approaches to development and review of safety cases
 - Review of compliance during decommissioning

Main Conclusions and Planned IAEA Actions

Management of Material and Sites during Decommissioning

- International consensus on clearance values (RS-G-1.7)
 - Early planning is essential (spent fuel and waste management)
 - Lack of disposal facilities not reason for delay of decommissioning
 - Restricted use of sites can become a preferred option
 - Early involvement of stakeholders
- 
- Cooperation at national and international level (e.g. WTO, UNECE, WENRA) on harmonized application of clearance values
 - Facilitate release of sites:
 - Socio-economic factors
 - Clear waste management strategies, etc.

Main Conclusions and Planned IAEA Actions

Funding and Cost Estimation

- Establishment and management of funding mechanisms
- Realistic costs



Detailed recommendations:

- Application of the cost estimation methodology for the different types of facilities
- Regulatory review of cost estimates and funding mechanisms

Main Conclusions and Planned IAEA Actions

Decommissioning Technologies

- Straightforward, proven and available decommissioning technologies are generally preferable
- New technologies - provisions for their testing and demonstration in planning stage
- Involvement of operational workforce in the application and development



Development of recommendations:

- Selection and implementation of technologies
- Adequate and economic solutions for developing countries

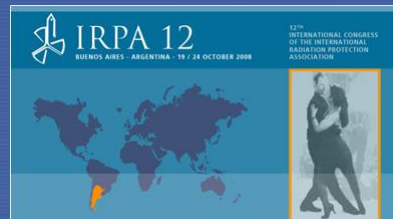
Participation in Conferences in 2007

- Second All African IRPA Congress, 22-27 April 2007, Cairo, Egypt
- 11th International Conference on Environmental Remediation and Radioactive Waste Management IREM2007, Bruges (Belgium)
- 2007 ANS Topical Meeting on Decommissioning, Decontamination and Reutilization, 16-19 September 2007, Chattanooga, TN, United States of America
- 6th EPRI International Decommissioning and Radioactive Waste Workshop, 23-25 October 2007, IAEA
- International Conference on Research Reactors: Safe Management and Effective Utilization, 5-9 Nov 2007, Sydney (Australia)



Conferences in 2008

- Decommissioning Challenges: An Industrial reality?
 - Avignon, France 29 Sept – 2 Oct 2008
- 12th International Congress of the International Radiation Protection Association (IRPA)
 - 19-24 Oct 2008, Buenos Aires, Argentina



- Management of Radioactively Contaminated Scrap Metal,
 - Feb 2009, Spain
 - IAEA, CSN

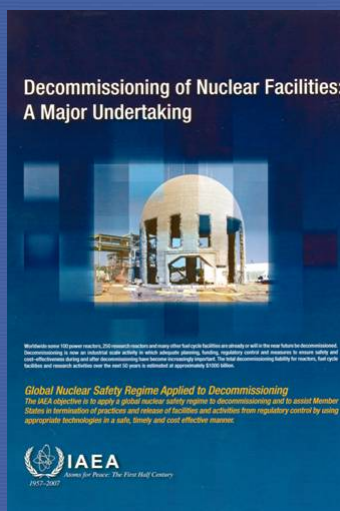


Summary

- A set of IAEA safety standards related to decommissioning almost complete (2008)
- Increased number of MSs requests for assistance
- Revised Action Plan (Athens conference)
 - Focus on application of safety standards
 - Facilitate exchange of experience and lessons learned (e.g. DeSa follow-up)
 - Technical assistance to operators, regulators, technical support organisations
 - International focal point on decommissioning



Further Information about IAEA Activities on Decommissioning



<http://goto.iaea.org/decommissioning>

