60 Years
IAEA Atoms for Peace and Development

IAEA and International Perspectives on Decommissioning

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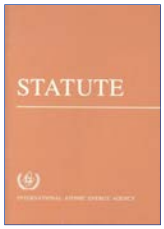
Nuclear Regulatory Commission 29th Annual Regulatory Information Conference
Bethesda, Maryland, USA

Outline

- IAEA Statute
- IAEA Programme on Decommissioning
  - IAEA Safety Standards
  - International cooperation & projects
  - Peer review and advisory services
  - Trends Analysis of IAEA Training Events on Decommissioning
- Conclusion

IAEA Statute



The IAEA Safety Standards have a status derived from the IAEA's Statute, which authorizes the IAEA "*To establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger to life and property ... and to provide for the application of these standards*".

In **1958**, the IAEA published its first Safety Standard, Safety Series No. 1, **Safe Handling of Radioisotopes**. Over the years, more than 200 publications were issued in the Safety Series.

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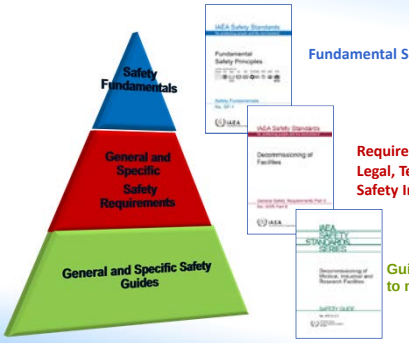
IAEA programme on decommissioning

- To develop and maintain a set of safety standards
- To promote international cooperation and projects
- To offer peer review and advisory services to MSs
- To organize training events

Safety Standards – Hierarchy & Categories



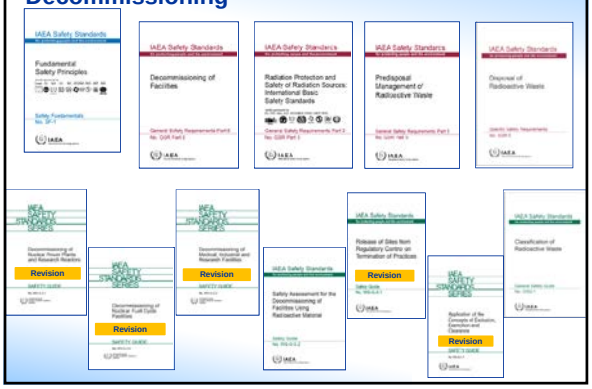
Fundamental Safety Principles

Requirements – Legal, Technical, & Procedural Safety Imperatives

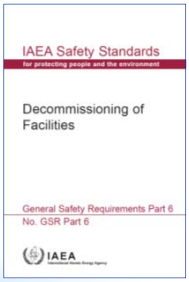
Guidance on Best Practice to meet Requirements

http://www-ns.iaea.org/standards/default.asp

Safety Standards relevant for Decommissioning



GSR Part 6: Decommissioning of Facilities



For **all aspects of decommissioning** from the siting and design of a facility to the termination of the authorization for decommissioning

Other standards and supporting documents address

- Safety Assessment
- Termination
- Clearance approach
- Risk Management etc.

Total of 15 requirements

Decommissioning and Safety Assessment

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Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

The Joint Convention

- Is a legal instrument to directly promote the safety of waste management on a global scale.
- Applies to spent fuel and radioactive waste resulting from civilian nuclear reactors
- Places obligations of the Contracting Parties based on the principles contained in the IAEA Safety Standards

73 Contracting Parties

CHAPTER 2 SAFETY OF SPENT FUEL MANAGEMENT
- ARTICLE 4 GENERAL SAFETY REQUIREMENTS
- ARTICLE 5 EXISTING FACILITIES
- ARTICLE 6 SITING OF PROPOSED FACILITIES
- ARTICLE 7 DESIGN AND CONSTRUCTION OF FACILITIES
- ARTICLE 8 ASSESSMENT OF SAFETY OF FACILITIES
- ARTICLE 9 OPERATION OF FACILITIES
- ARTICLE 10 DISPOSAL OF SPENT FUEL

CHAPTER 3 SAFETY OF RWM
- ARTICLE 11 GENERAL SAFETY REQUIREMENTS
- ARTICLE 12 EXISTING FACILITIES AND PAST PRACTICES
- ARTICLE 13 SITING OF PROPOSED FACILITIES
- ARTICLE 14 DESIGN AND CONSTRUCTION OF FACILITIES
- ARTICLE 15 ASSESSMENT OF SAFETY OF FACILITIES
- ARTICLE 16 OPERATION OF FACILITIES
- ARTICLE 17 INSTITUTIONAL MEASURES AFTER CLOSURE

CHAPTER 4 GENERAL SAFETY PROVISIONS
- ARTICLE 18 IMPLEMENTING MEASURES
- ARTICLE 19 LEGISLATIVE AND REGULATORY FRAMEWORK
- ARTICLE 20 REGULATORY BODY
- ARTICLE 21 RESPONSIBILITY OF THE LICENCE HOLDER
- ARTICLE 22 HUMAN AND FINANCIAL RESOURCES
- ARTICLE 23 QUALITY ASSURANCE
- ARTICLE 24 OPERATIONAL RADIATION PROTECTION
- ARTICLE 25 EMERGENCY PREPAREDNESS
- **ARTICLE 26 DECOMMISSIONING**

CHAPTER 5 MISCELLANEOUS PROVISIONS
- ARTICLE 27 TRANSBOUNDARY MOVEMENT
- ARTICLE 28 DISUSED SEALED SOURCES

https://www-ns.iaea.org/conventions/waste-jointconvention.asp

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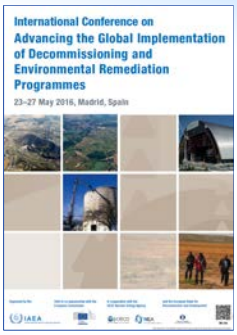
International Conference on Advancing the Global Implementation of Decommissioning and Environmental Remediation Programmes

- National policies and strategies to enable and enhance decommissioning and environmental remediation
- Regulatory framework and standards for decommissioning and environmental remediation
- Decision-making process: societal and stakeholder involvement during the life cycle of decommissioning and environmental remediation projects
- Technical and technological aspects of decommissioning and environmental remediation
- Project management and supply chain considerations
- Optimizing waste and materials management in decommissioning and environmental remediation
- International cooperation



http://www-pub.iaea.org/iaeameetings/50801/DER

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Trends on D&ER from the International Conference 2016

- Need to develop national strategies & approaches for decommissioning and associated safety and technology infrastructure
- Decommissioning plans need to consider realistic cost estimates and define financing mechanisms
- Decision process and stakeholders involvement
- Importance of addressing legacies from past activities
- Importance of the international cooperation
- Human resources. Motivating young professionals

International Cooperation: Example Projects

- R2D2 Project
  - Research Reactor Decommissioning Demonstration Project
- DRiMa Project
  - Project on Decommissioning Risk Management
- DAROD Project
  - Project on Decommissioning and Remediation of Damaged Nuclear Facilities
- Iraq Decommissioning Project
  - Decommissioning of the Iraq former nuclear complex

(Source: https://gnssn.iaea.org/RTWS/r2d2/)

International Decommissioning Network

The IDN is a joint initiative of the IAEA's Departments of Technical Co-operation, Nuclear Energy, Nuclear Safety & Security to act as a "Network of Networks" to increase visibility and leverage learning from national and regional decommissioning projects & existing networks.

IDN activities in 2016 (examples):

- DACCORD Phase II (cost estimation for decommissioning of research reactors);
- GRAPA (management of spent irradiated graphite from decommissioning – being implemented jointly with the International Predisposal Network);
- CIDER Phase II (on constraints to the implementation of D&ER programmes – being implemented jointly with ENVIRONET).

International Peer Reviews

- IRRS (Integrated Regulatory Review Service)
- OSART (Operational Safety Review Team)

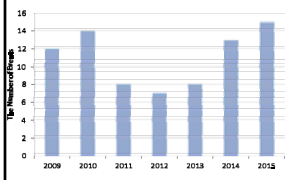
.../...

- **ARTEMIS** Peer reviews on RWM, D&ER
  - To improve programmes for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation
  - Several are in planning and development (e.g. Poland, France, Spain, Australia, Italy, etc.)
  - Demand is expected from the obligations of the EU "Waste Directive"

ARTEMIS
Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation

  - Special missions, such as France on CIGEO in 2016

Trends Analysis of IAEA Training Events on Decommissioning



Time distribution of 104 training events on decommissioning in period2009-2015

On going TC Projects

- China 'Implementing the Decommissioning of the Heavy Water Research Reactor and Key Technology Research';
- IRQ 'Decommissioning and Remediation of Former Nuclear Facilities and Sites, Phase II';
- SLR 'Increasing Effectiveness of Radioactive Waste Management and Quality of Documentation for Decommissioning Projects';
- UKR 'Supporting Radioactive Waste Management and Nuclear Power Plant Decommissioning';
- UKR 'Rendering Assistance in Decommissioning and Radioactive Waste Management at the Chernobyl Nuclear Power Plant Onsite';
- UZB 'Strengthening Nuclear Safety and Improving Use of the Research Reactor at the Institute of Nuclear Physics';
- INT 'Overcoming the Barriers to Implementation of Decommissioning and Environmental Remediation Projects';
- RER 'Enhancing Capacities in the Member States for Management of Decommissioning Projects'.

Trends Analysis of IAEA Training Events on Decommissioning

- **Planning and Project Management-** 16 events (2009-2015), been delivering for more than 20 years, needs to be repeated periodically to train new generations
- **Costing-** 5 events (2009-2015), been focusing on DACCORD under IDN and R2D2 project
- **Characterization-** 9 events (2009-2015), covering characterization in more general terms or addressing specific aspects of characterization (for example, advanced technologies for visualization and simulation, statistical approaches, activation analyses)
- **Safety Assessment-** requesting training events on safety assessment, in most cases as follow-up to training for decommissioning planning
- **Management of Materials Arising from Decommissioning Activities**- 24 events (2009-2015), expected to grow in step with increased decommissioning activity
- **Final Survey and Release of Sites-** 1 event (2009-2015), would be requested more often in the future, as many decommissioning projects advance toward completion

Conclusions

- Decommissioning is a growing activity worldwide that involves several technical and non-technical disciplines and challenges (funding, HRs, stakeholders involvement…)
- IAEA offers assistance to MSs through its Programme on Decommissioning
  - safety standards
  - international cooperation
  - peer-review and assistance services
  - Training
- Decommissioning has been identified as priority area for IAEA strategy and programme of work on nuclear safety (NSR-2017)

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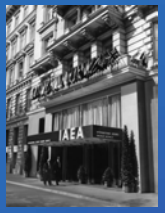

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