Waste Management Symposium 2015

Phoenix, Arizona

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IAEA Programme on Decommissioning

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Section Head

Waste and Environmental Safety Section

Division of Radiation, Transport and Waste Safety

IAEA

International Atomic Energy Agency

IAEA Decommissioning Organization




Two IAEA Department/Division/Sections address decommissioning issues:

- *Nuclear Energy Department* / **Nuclear Fuel Cycle & Waste Technology Division** / Waste Technology Section (WTS)
- *Nuclear Safety & Security Department* / **Radiation, Transport & Waste Division** / Waste and Environmental Safety Section (WES)

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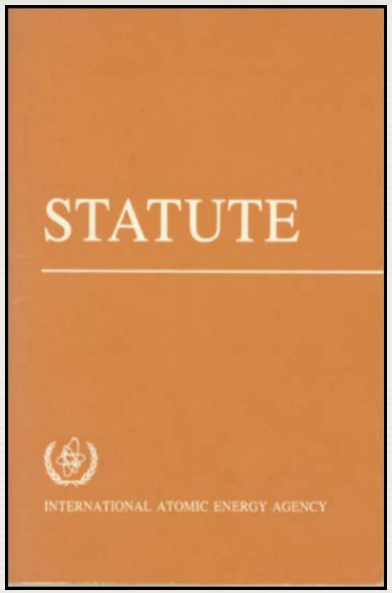
IAEA Statutory Obligations (1957)

Article III, *Functions*

" 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 (including such standards for labour conditions), and ***to provide for the application of these standards*** …; "



Article VIII, *Exchange of information*

The agency shall take positive steps to ***encourage the exchange among its members of information*** relating to the nature and peaceful uses of atomic energy and ***shall serve as an intermediary*** among its members for this purpose.

- Peer Reviews
- Technical Cooperation
- R&D
- Training
- Information Networks

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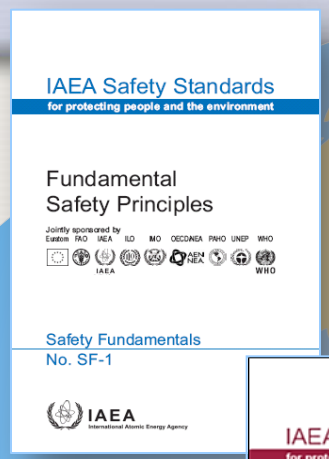
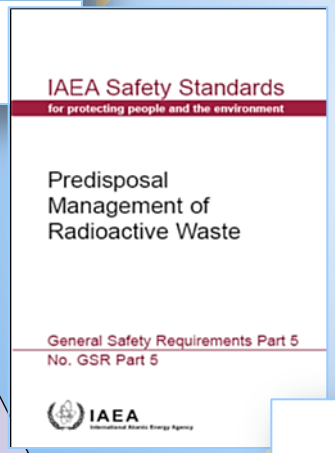
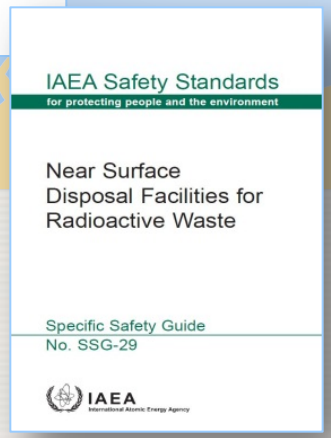
Safety Standards Categories



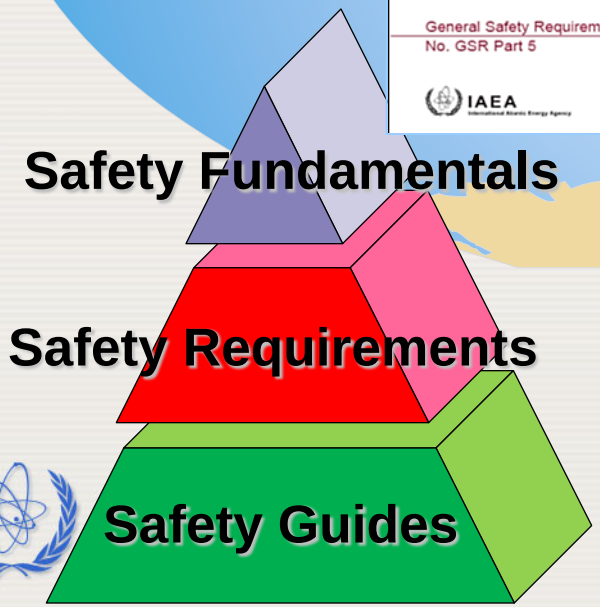
Fundamental Safety Principles



Requirements – Legal, Technical, & Procedural Safety Imperatives



Guidance on Best Practice to Meet Requirements



IAEA Publications

- Over 60 publications on decommissioning (since 1980's)
  - Safety Standards
  - Safety Report Series
  - Nuclear Energy Series
  - Technical Report Series
  - TECDOC
- Some publications cover both decommissioning and environmental remediation aspects
- Some publications prepared in cooperation with other organizations, e.g. NEA OECD

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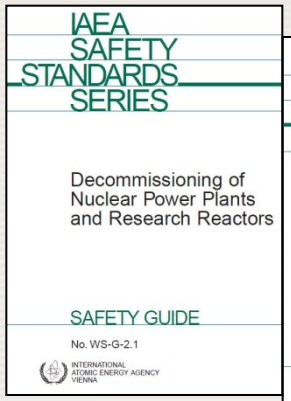
Safety Standards for decommissioning

DRAFT DS452

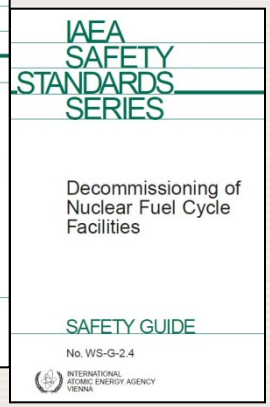
Decommissioning of NPPs, RRs and other Nuclear Fuel Cycle Facilities

1999



1999

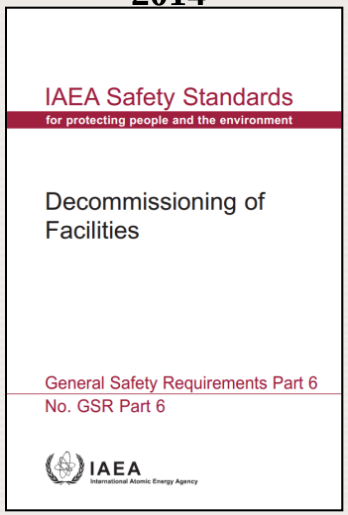
2001



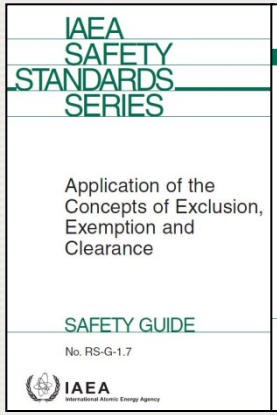
DRAFT DS403

Decommissioning of Medical, Industrial and Research Facilities

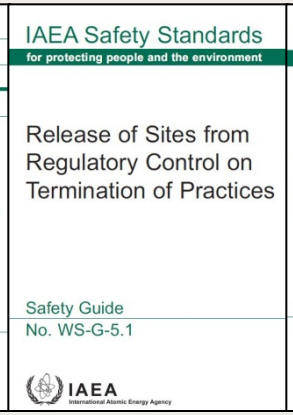
2014



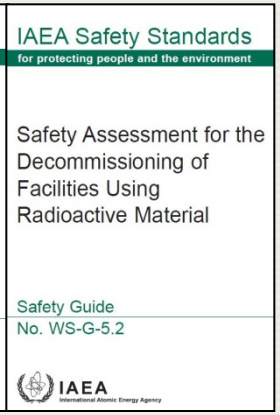
2004



2006



2008



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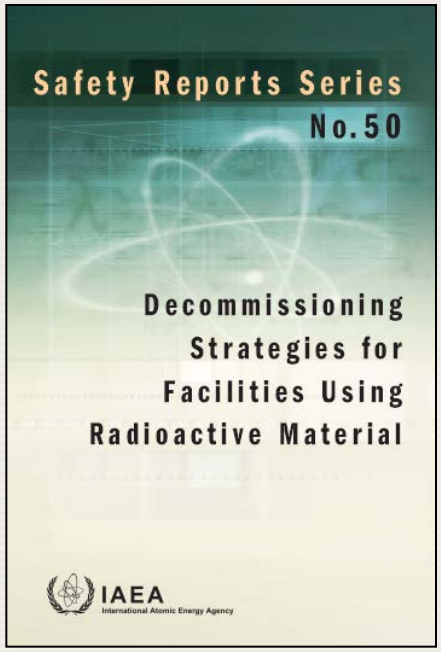
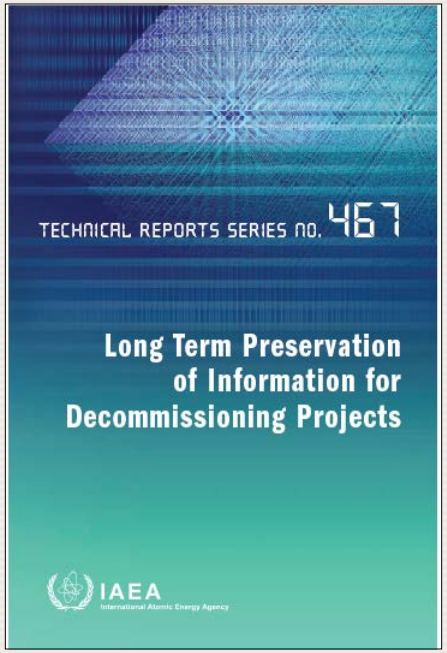
Other Supporting Publications

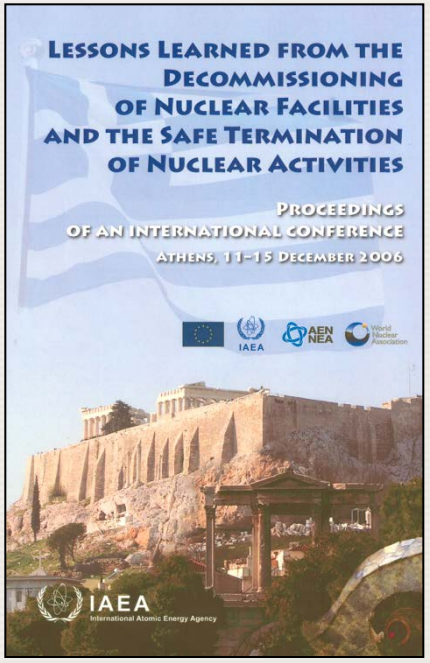


Safety Report Series



Technical Report Series

TechDoc Series



Proceedings

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IAEA Safety Reports Series

- *Safe Enclosure of Nuclear Facilities During Deferred Dismantling*, Safety Reports Series No. 26 (2002)
- *Safety Considerations in the Transition from Operation to Decommissioning of Nuclear Facilities*, Safety Reports Series No. 36 (2004)
- *Standard Format and Content for Safety Related Decommissioning Documents*, Safety Reports Series No. 45 (2005)
- *Decommissioning Strategies for Facilities Using Radioactive Material*, Safety Reports Series No. 50 (2007)
- *Monitoring for Compliance with Exemption and Clearance Levels*, Safety Reports Series No. 67 (2012)
- *Safety Assessment for Decommissioning*, Safety Reports Series No. 77 (2013)

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Technical Report 389: Characterization for Decommissioning

TECHNICAL REPORTS SERIES No. 389

Radiological Characterization of Shut Down Nuclear Reactors for Decommissioning Purposes

INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, 1998

A good estimate of the amount and type of radioactivity in a nuclear facility is important because it can directly affect the whole approach to decommissioning, including the choice of the time to start decommissioning and the desirability of delay between stages. In addition, such an estimate will be a great asset in the planning phase to ensure that the facility is decommissioned in a safe, economic and timely manner. This information will assist the planners in determining factors such as the need for decontamination, shielding or remotely operated equipment, waste management and disposal, and potential radiation exposures to the work force. This publication describes and assesses radiological characterization as a precursor to decommissioning.

Technical publications – recent and under preparation

- Planning, Management and Organizational Aspects of the Decommissioning of Nuclear Facilities, IAEA-TECDOC-1702
- International Structure for Decommissioning Costing (ISDC) of Nuclear Installations, developed jointly with the OECD Nuclear Energy Agency and the European Commission (NEA Report no. 7088)
- Safety Report on Methodologies for Assessment of Activation Source Term for Decommissioning (DRAFT, to Publication Committee in 2015)
- Cost Estimation for Decommissioning of Research Reactors*
- Decommissioning of Pool-like Facilities*
- Management of Human Resources during Decommissioning with a Focus on Motivation Aspects*
- Decommissioning – Managing the Unexpected*
- Decommissioning of Particle Accelerators*

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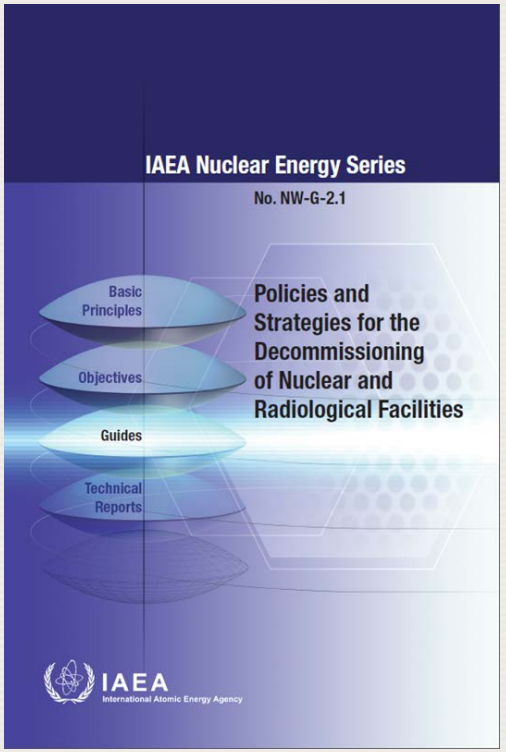
NE Series and other technical reports - recent publications

- Policies and Strategies for the Decommissioning of Nuclear and Radiological Facilities (NW-G-2.1)
- Selection and Use of Performance Indicators in Decommissioning (NW-T-2.1)
- Redevelopment and Reuse of Nuclear Facilities and Sites: Case Histories and Lessons Learned (NW-T-2.2)
- Decommissioning of Small Medical, Industrial and Research Facilities: A Simplified Stepwise Approach (NW-T-2.3)
- Experiences-and-Lessons-Learned-Worldwide-in-the-Cleanup-and-Decommissioning-of-Nuclear-Facilities-in-the-Aftermath-of-Accidents (NW-T-2.7)
- Design Lessons Drawn from the Decommissioning of Nuclear Facilities, IAEA-TECDOC-1657



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International Projects on Safety Assessment and Risk Management for Decommissioning

- DeSa project (2004-2007) and FaSa project (2008-2011)
  - Recommendations, based on the experiences in the Member States, on:
    - Safety assessment methodology for decommissioning (DeSa project)
    - Use of safety assessment results in planning and implementing decommissioning (FaSa project)
    - Test cases to illustrate the recommendations (both DeSa and FaSa)
- DRiMa project (2012-2015)–Risk Management in Decommissioning
  - Project covers all the risks that may affect the progress of a decommissioning project (safety, financial, political, regulatory, stakeholder related …)
  - Project considers risk management at strategic and operational level
- Research Reactor Decommissioning Demonstration Project (R2D2P) (2006 -)
  - 14 participating countries, focused on small programmes
  - Demonstration of all the phases / steps of a typical RR decommissioning project with a dozen workshops to date.

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Nuclear Safety Action Plan

- Activities related to the accident at the Fukushima-Daiichi NPP and its consequences
  - Assistance to Japan, with activities of global interest
- Several tasks on decommissioning and remediation after an accident
  - Experience and lessons learned worldwide on approaches, main issues, safety considerations, techniques, tools and equipment – NW-T-2.7
  - International Experts' Meeting on Decommissioning and Remediation after a Nuclear Accident, Vienna, 28 January - 1 February 2013
    - http://www-pub.iaea.org/iaeameetings/44453/International-Experts-Meeting-on-Decommissioning-and-Remediation-after-a-Nuclear-Accident
  - Decommissioning peer-review missions to Japan
    - http://www.iaea.org/newscenter/news/2013/fukushimareport.html
  - New international project on Managing the Decommissioning and Remediation of Damaged Nuclear Facilities - to start in Jan 2015

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Coordination and cooperation with other international organizations

- IAEA works closely with other international organizations
  - Organization of conferences and topical meetings
  - Review of national decommissioning programmes
  - Development of harmonized regulatory requirements for decommissioning
  - Specific topics as development of recommendations on characterization, clearance of material, cost estimate, stakeholders involvement
- Nuclear Energy Agency (NEA) of OECD
- World Nuclear Association (WNA)
- European Commission (EC)
- Western European Nuclear Regulatory Association (WENRA)
- Contact Expert Group for International Radioactive Waste Projects in the Russian Federation (CEG)

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Conclusions

- Increased activity on decommissioning worldwide
- Importance of ensuring safety of workers, public and the environment
- IAEA is working systematically to address this challenge
  - Developing Safety Standards and technical publications
  - Facilitating international safety conventions
  - Offering wide variety of services to the Member States
    - Projects
    - Training events
    - Appraisal services
    - Information exchange
- Activities coordinated with other international organizations

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IAEA | WES

Waste & Environmental Safety

Radioactive Waste Management

Assessment & Management of Environmental Releases

Decommissioning & Remediation

Thank you for your attention

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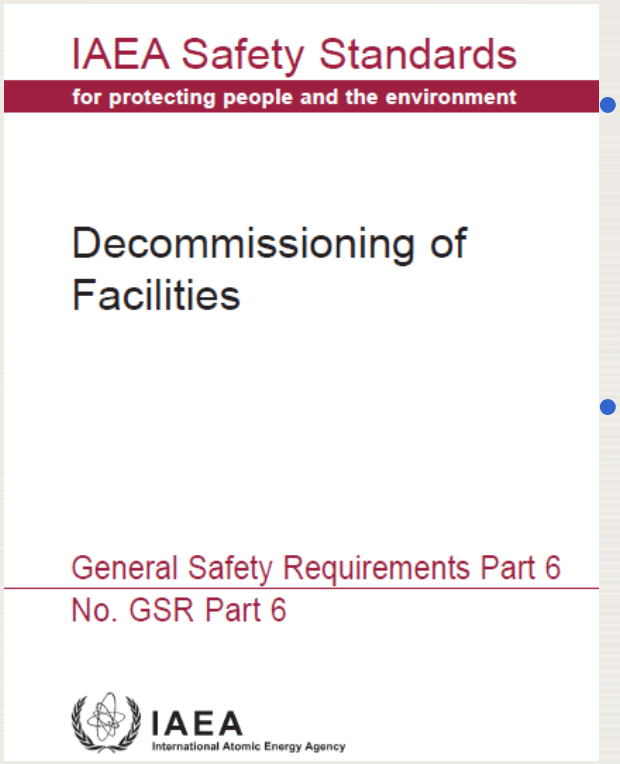
International Atomic Energy Agency

GSR Part 6, July 2014



- Regulatory body responsibilities shall:
  - Establishing requirements for conducting radiological surveys for determining levels of contamination at the facility;
- Licensee responsibilities shall:
  - Performing radiological surveys in support of decommissioning.
  - Verifying that end state criteria have been met by performing a final survey.
- Planning for decommissioning:
  - At the siting stage, a background survey of the site,…shall be performed prior to the construction of a new facility…..
  - During the preparation and updating of the final decommissioning plan, the extent and type of radioactive material at the facility (e.g. activated and contaminated structures and components) shall be determined by means of a detailed characterization survey and on the basis of records collected during the operational period.

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IAEA Technical Cooperation Programme

- The main mechanism through which the IAEA delivers services to its Member States
  - to build, strengthen and maintain capacities in the safe, peaceful and secure use of nuclear technology

  - Group events – Workshops, Training Courses, Group Scientific Visits
  - Expert missions
  - Individual scientific visits
  - Fellowships
  - Procurement

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On-going TC projects

- INT9175 (2012-2015) “Promoting Safe and Efficient Clean-up of Radioactively Contaminated Facilities and Sites”
- RER9120 (2012-2015) “Supporting Decommissioning Implementation for Facilities Using Radioactive Material“
- RER9106 (2012-2013) “Supporting Decommissioning and Waste Management for the Chernobyl, Ignalina and A1 Nuclear Power Plants“ (mini-regional TC project)
- Number of national projects to address country specific issues
  - Ukraine, Lithuania, Slovak Republic, Serbia, Romania, Bulgaria, China, Indonesia, Iraq, Egypt

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International Decommissioning Network (IDN)

- Joint initiative of the IAEA's Departments of Technical Co-operation, Nuclear Energy, Nuclear Safety & Security
- Launched in 2007 as a forum to improve the exchange of information and organization of practical / “hands-on” decommissioning training
- Annual meetings, Steering Group, members, participants
- Many WSs and TCs offered to the IAEA TC programme (RER/3/005, RER/3/009, RER/9/120, INT/9/175)
- CONNECT - concept and a tool to facilitate interactions between individuals and organizations involved in all aspects of RWM

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International Decommissioning Network (IDN)

- IDN Annual Meeting 8-11 December 2014, Vienna
- IDN Projects
  - Decommissioning Risk Management (DRiMa)
  - Data Analysis and Collection for Costing of Research Reactor Decommissioning (DACCORD)
  - Constraints to Implementing Decommissioning and Environmental Remediation Programmes (CIDER)
- ENVIRONET - Network of Environmental Management and Remediation
- Other networks on RWM
  - LABONET - International Network of Laboratories for Nuclear Waste Characterization
  - DISPONET - International Low Level Waste Disposal Network
  - URF - Underground Research Facilities Network
  - Preparations to launch a new network on spent fuel management

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Coordinated Research Projects

- CRP on Planning, Management and Organizational Aspects in Decommissioning of Nuclear Facilities (2008-2012), IAEA-TECDOC-1702 published in 2013
- CRP on Innovative and Adaptive Technologies in Decommissioning of Nuclear Facilities (2004-2008), IAEA-TECDOC-1602 published in 2008
- Decommissioning Techniques for Research Reactors (1997-2001), IAEA-TECDOC-1273 published in 2002

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Links - publications

- IAEA Publications
  - http://www-pub.iaea.org/books/IAEABooks/Serial_Publications
- IAEA Safety Standards
  - http://www-ns.iaea.org/standards/
- Decommissioning Safety Standards
  - http://www-ns.iaea.org/downloads/rw/waste-safety/decom-safety-standards.ppt
- Documents other than Safety Standards
  - http://www-ns.iaea.org/publications/default.asp
- Decommissioning Publications – Technical Reports
  - http://www.iaea.org/OurWork/ST/NE/NEFW/Technical_Areas/WTS/decommissioning-publications42693.html

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Links – activities / projects

- Decommissioning:
  - http://www-ns.iaea.org/tech-areas/waste-safety/decommissioning.asp
  - http://www.iaea.org/OurWork/ST/NE/NEFW/Technical_Areas/WTS/decommissioning.html
- DRiMa: http://www-ns.iaea.org/projects/drima/
- R2D2P: http://www-ns.iaea.org/projects/r2d2project/
- Iraq Decommissioning Project:
  - http://www-ns.iaea.org/projects/iraq/
- Waste Management Networks:
  - http://www.iaea.org/OurWork/ST/NE/NEFW/WTS-Networks/overview.html
- Joint Convention:
  - http://www-ns.iaea.org/conventions/waste-jointconvention.asp
- TC Programme: http://www.iaea.org/technicalcooperation/Home/index.html

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