An Overview of IAEA Activities to Support Predisposal Management of Radioactive Wastes in Member States

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Panel Session 064: Predisposal Aspects of Waste Management-IAEA, Waste Management Conference, Phoenix, Arizona, USA, 27 Feb -1 March, 2012

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Outline of presentation

- Introduction to Waste Technology Section (WTS)
- Predisposal activities of WTS
  - Publications
  - Coordinated Research Projects (CRPs)
  - Technical Cooperation Projects
  - Training courses
  - Networks
  - Peer review services

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Introduction to Waste Technology Section (WTS)

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- Nuclear Power Infrastructure
- International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO)
- Nuclear Fuel Cycle & Waste Technology
- » Fuel Cycle & Materials
- » Research Reactors
- » Waste Technology

About the Nuclear Energy Department

Our Role

The Nuclear Energy Department fosters the efficient and safe use of nuclear power by supporting existing and new nuclear programmes around the world, catalyzing innovation and building indigenous capability in energy planning, analysis, and nuclear information and knowledge.

The NE Department provides services and advice to Member States on nuclear power and the nuclear fuel cycle for:

» Continued reliable and safe lifetime operation of present reactor systems and fuel cycle facilities
» Expanded use of nuclear power, particularly for countries currently without nuclear power, or with only small nuclear power programmes
» Development of advanced rector systems and their fuel cycles for the long term
» Capacity building for energy analysis and planning
» Objective consideration of the role of nuclear power for sustainable development

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- Our Role
- NE Organizational Chart
- SAGNE (members only area)

Resources

- NE Databases
- NE Series Clickable Map
  NE Series Publications
- Other Publications
- Newsletters

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- Predisposal Management of Radioactive Waste
- Radioactive Waste Disposal
- Decommissioning of Facilities
- Environmental Remediation
- Disused Sealed Source Management
- Contact Expert Group

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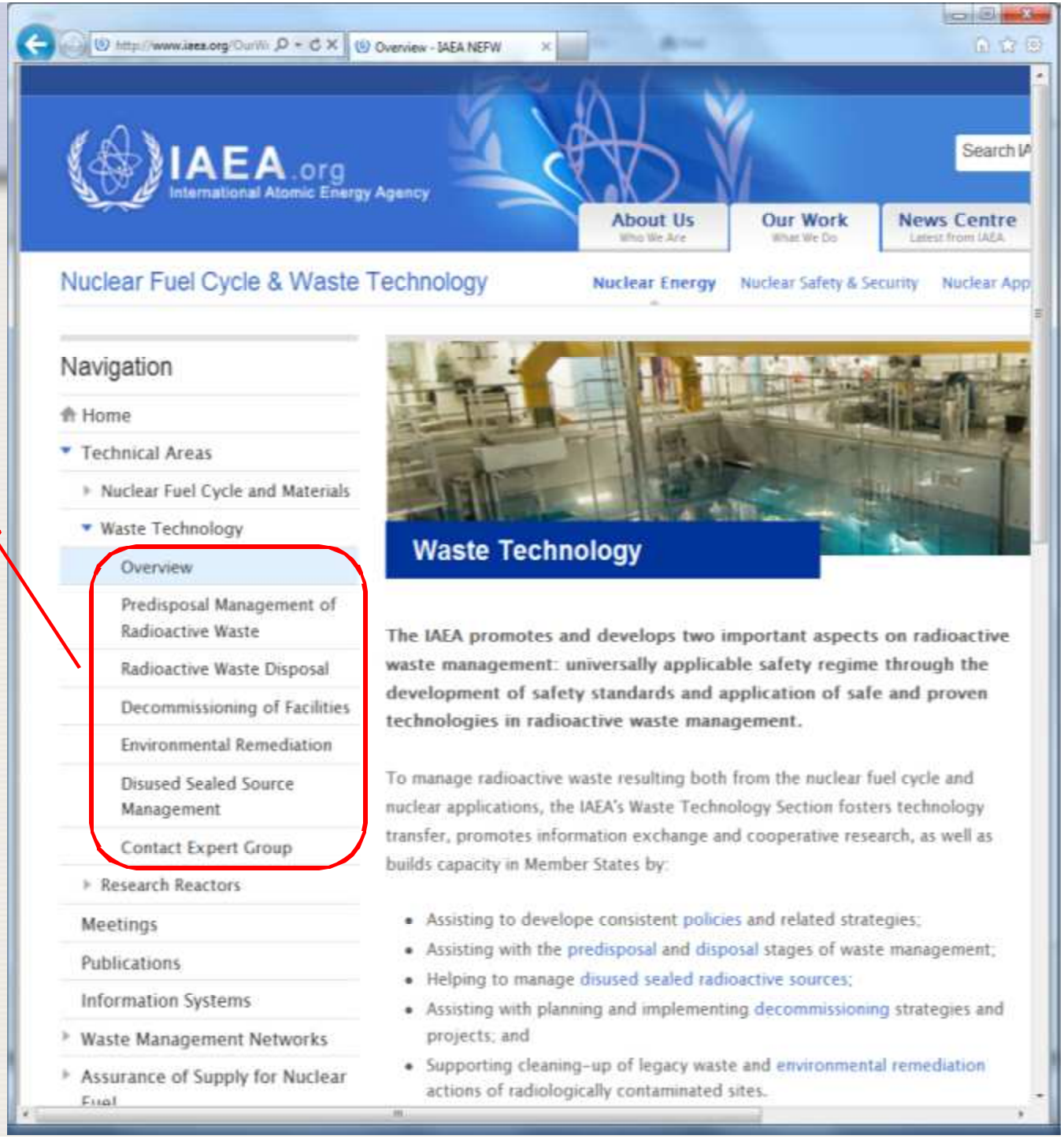

WTS roles and responsibilities

The Waste Technology Section is responsible for:

- Fostering technology transfer
- Promoting information exchange
- Cooperative research, and
- Building capacity in Member States

to manage radioactive wastes, resulting both from the nuclear fuel cycle and nuclear applications.

An international working group "WATEC" provides advice and recommendations to WTS to ensure that Member States' needs are adequately reflected in its activities.

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Predisposal activities of WTS

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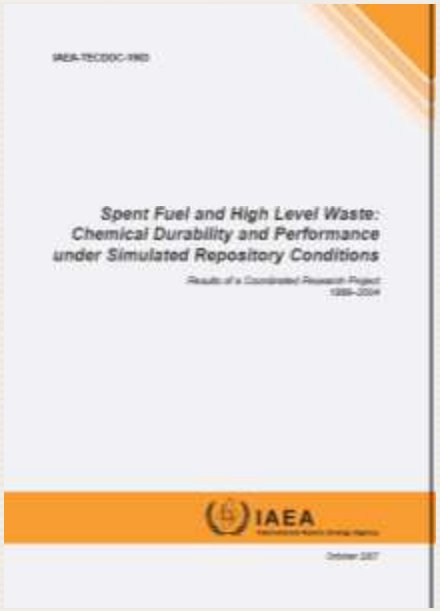
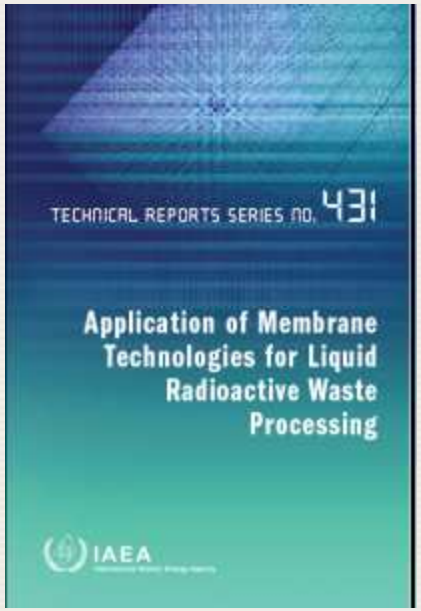
Publications

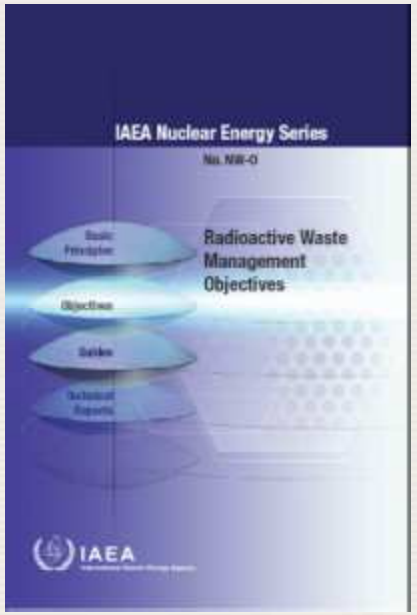
There are three types of Predisposal publications:



TECDOC



Technical Reports Series



Nuclear Energy Series

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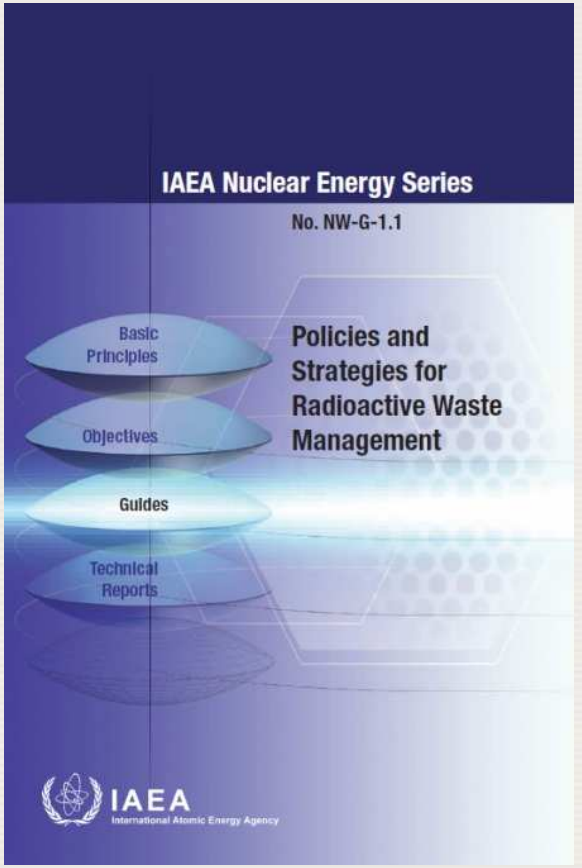
Publications on Waste Management Strategies

- "Policies and Strategies for Radioactive Waste Management",

  NE Series No. NW-G-1.1, IAEA, Vienna (2009).



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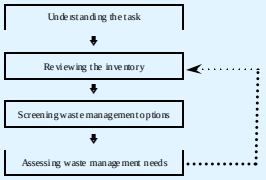
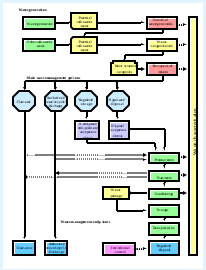
Publications on Waste Management Strategies

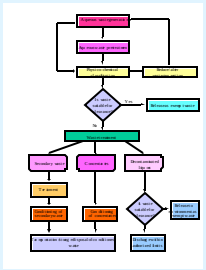
Supporting documents under preparation:

Methodology for Establishing an Inventory of Radioactive Waste and for Assessing the Subsequent Management Needs

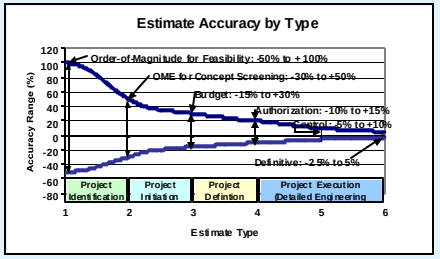


Selection of Technical Solutions for the Management of Radioactive Waste





Economics of Radioactive Waste Management



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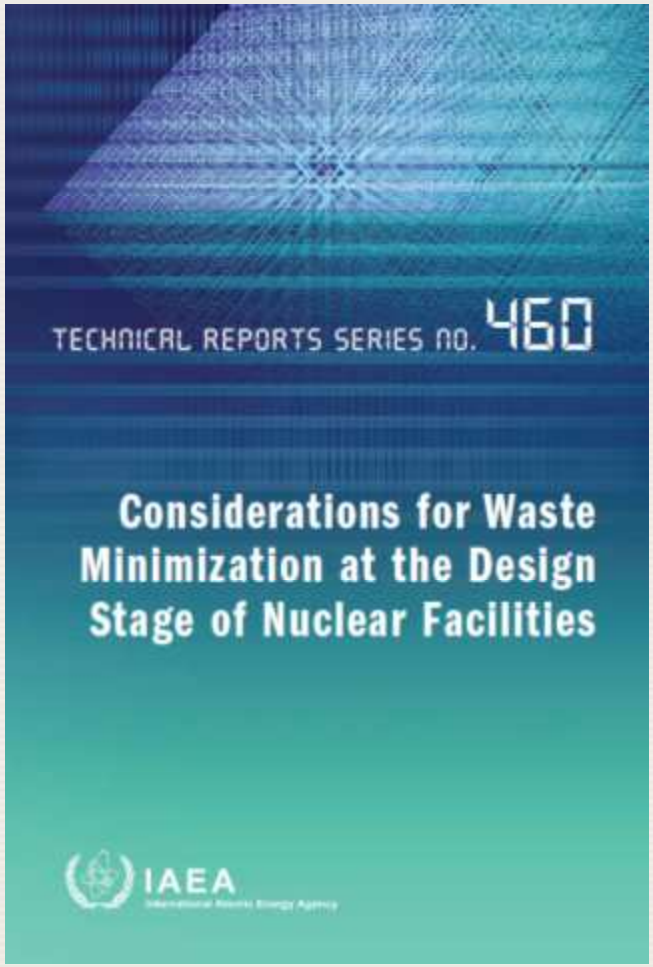
Publications on Waste Minimization

- "Waste Minimization Considerations at the Design Stage of Nuclear Facilities",

  Technical Reports Series No. 460, IAEA, Vienna (2007)



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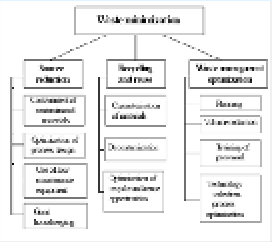
Publications on Waste Minimization

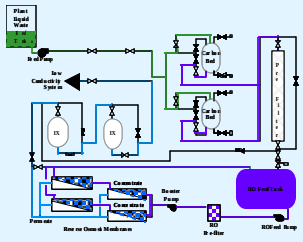
Reports under finalization:

Organization and Technical Options for Waste Minimization during Operation and Maintenance

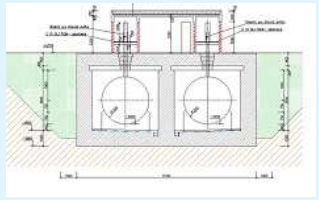


Minimization of Liquid and Solid Radioactive Waste generated at NPP Sites - VVER Reactors

Techniques and Technologies for the Reduction of Radioactive Discharges from Nuclear Power Reactors



Decay Storage of Radioactive Effluents from Medical and other Institutional Applications and Monitoring during Discharge



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Publications on Waste Categorization, Characterization and Acceptance Criteria

- Categorizing Operational Radioactive Wastes, TECDOC-1538, IAEA, Vienna (2007).
- Strategy and Methodology for Radioactive Waste Characterization, TECDOC-1537, IAEA, Vienna (2007).
- Determination and use of Scaling Factors for Waste Characterization in Nuclear Power Plants, IAEA NE Series No. NW-T-1.18, IAEA, Vienna (2009).

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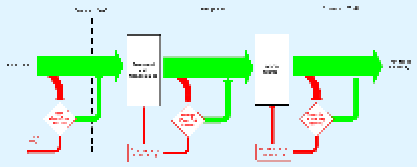
Publications on Waste Categorization, Characterization and Acceptance Criteria

New document under preparation:

Approach to develop Waste Acceptance Criteria for Low and Intermediate Waste



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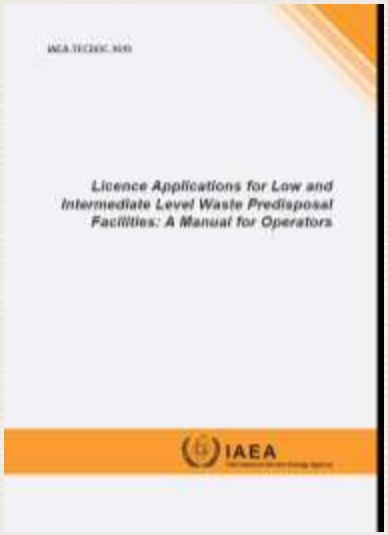
Publications on Technical Assistance to Member States with Small Volumes of Radioactive Waste

- Licence Applications for Low and Intermediate Level Waste Predisposal Facilities: A Manual for Operators, TECDOC-1619, IAEA, Vienna (2009)



- Documents under finalization:

Guidance for the Development of Management System Procedures for Small Scale L&IL Waste Predisposal Facilities

Modular Design of Processing and Storage Facilities for Small Volumes of L&IL Level Radioactive Waste including Disused Sealed Sources

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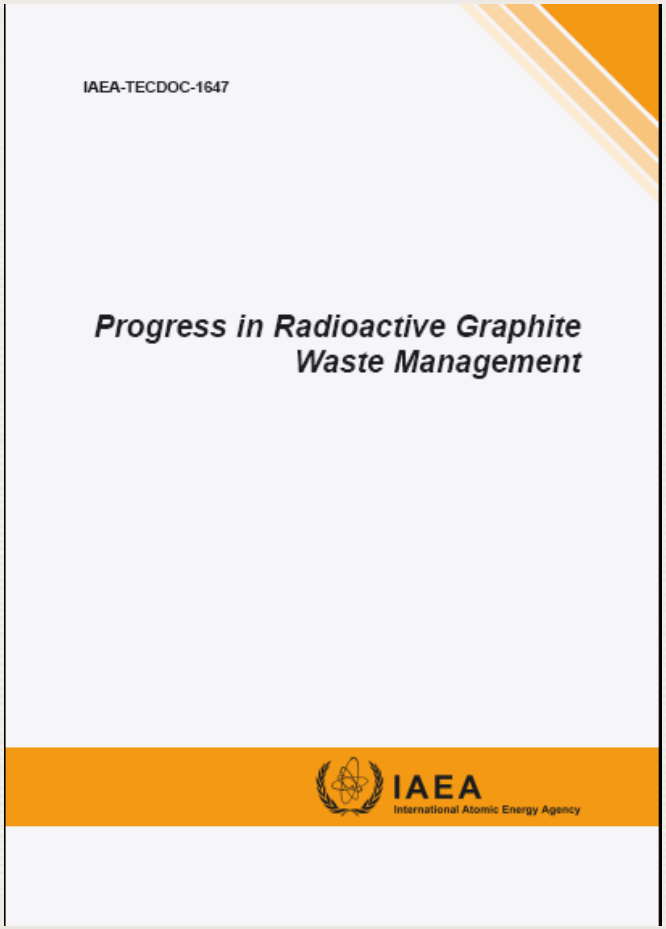
Publications on Innovative Approaches and New Developments



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Publications on Innovative Approaches and New Developments

Documents under finalization:

Processing of Waste from Innovative Types of Reactors and Fuel Cycles

Considerations for the Application of Mobile Processing Systems for Radioactive Waste Management

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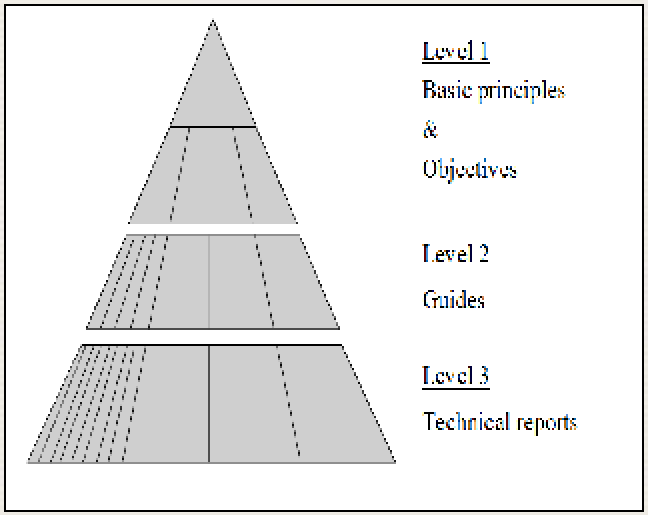
Publications: New Predisposal Handbooks

1. Pre-Treatment of L&IL Waste
2. Treatment of L&IL Liquid Waste
3. Treatment of L&IL Solid Waste
4. Treatment of Gaseous Waste
5. Conditioning of L&IL Liquid, Solidified & Solid Waste
6. Processing of HL Waste and Spent Nuclear Fuel Declared as Waste
7. Characterization and Monitoring of Radioactive Waste, Waste Forms and Packages
8. Storage of Radioactive Waste and Conditioned Waste Packages



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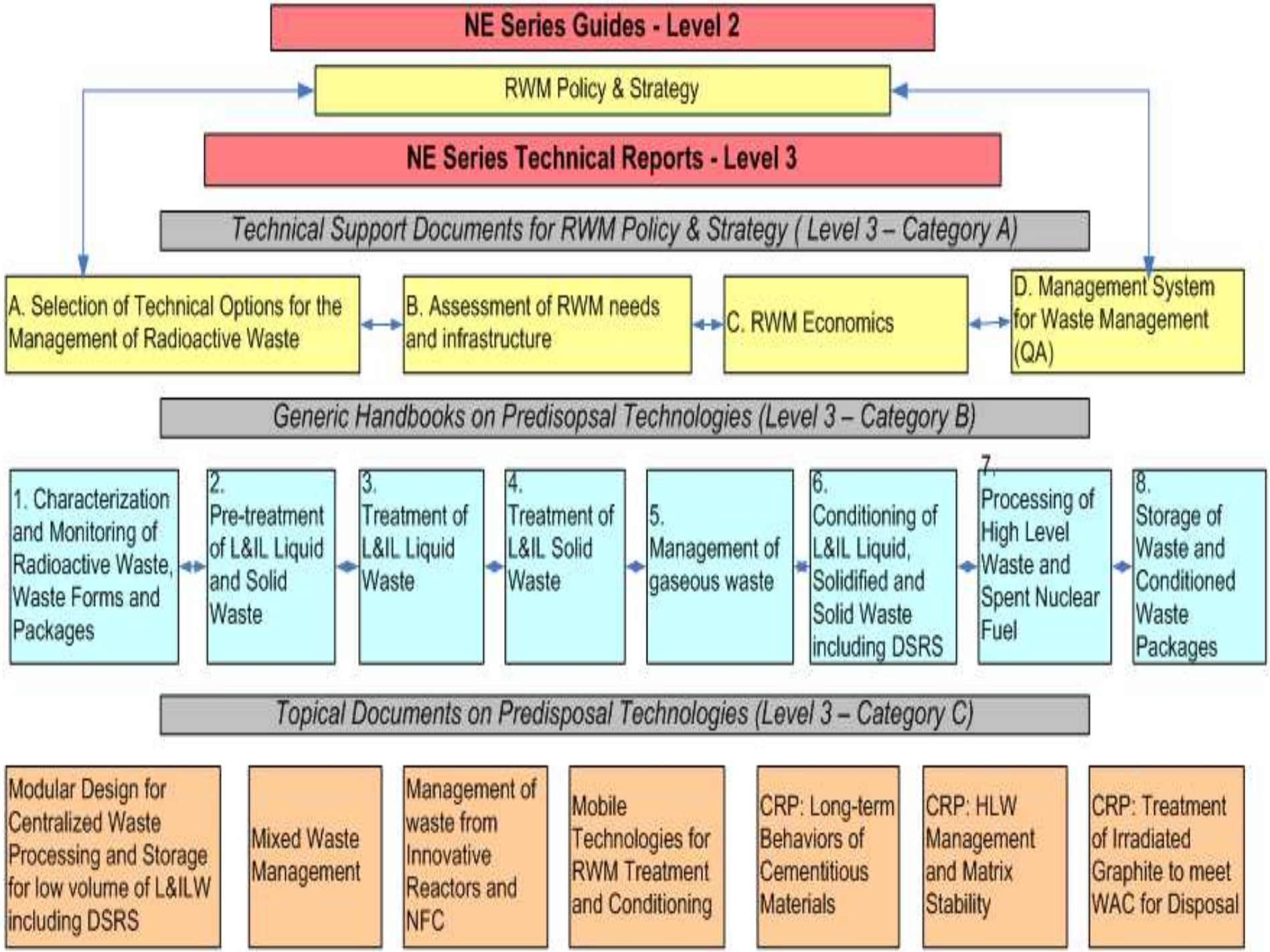
NE Series Guides - Level 2
RWM Policy & Strategy
NE Series Technical Reports - Level 3
Technical Support Documents for RWM Policy & Strategy (Level 3 – Category A)
A. Selection of Technical Options for the Management of Radioactive Waste
B. Assessment of RWM needs and infrastructure
C. RWM Economics
D. Management System for Waste Management (QA)
Generic Handbooks on Predisopsal Technologies (Level 3 – Category B)
1. Characterization and Monitoring of Radioactive Waste, Waste Forms and Packages
2. Pre-treatment of L&IL Liquid and Solid Waste
3. Treatment of L&IL Liquid Waste
4. Treatment of L&IL Solid Waste
5. Management of gaseous waste
6. Conditioning of L&IL Liquid, Solidified and Solid Waste including DSRS
7. Processing of High Level Waste and Spent Nuclear Fuel
8. Storage of Waste and Conditioned Waste Packages
Topical Documents on Predisposal Technologies (Level 3 – Category C)
Modular Design for Centralized Waste Processing and Storage for low volume of L&ILW including DSRS
Mixed Waste Management
Management of waste from Innovative Reactors and NFC
Mobile Technologies for RWM Treatment and Conditioning
CRP: Long-term Behaviors of Cementitious Materials
CRP: HLW Management and Matrix Stability
CRP: Treatment of Irradiated Graphite to meet WAC for Disposal

Publications: New Predisposal Handbooks

- The 8 new handbooks will consolidate and update information in large number of existing publications.
- They are expected to assist professionals involved in field implementation (design, construction, operations) as well as regulatory review of RWM facilities and activities.
- The drafts will be uploaded on WTS webpage for comments and inputs.
- New handbooks will be published as hard copy with accompanying CD-ROM.

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Coordinated Research Projects (CRPs)

- CRPs are tools to encourage exchange of advanced information on the on-going R&D activities in Member States on selected topics
- Usually participants from 10-15 countries take part
- The duration of CRPs is 3-5 years
- IAEA organizes periodic Research Co-ordination Meetings (RCMs) to facilitate exchange of progress, discussions and bilateral/multilateral collaborations.
- Results of CRP are published as Agency Reports

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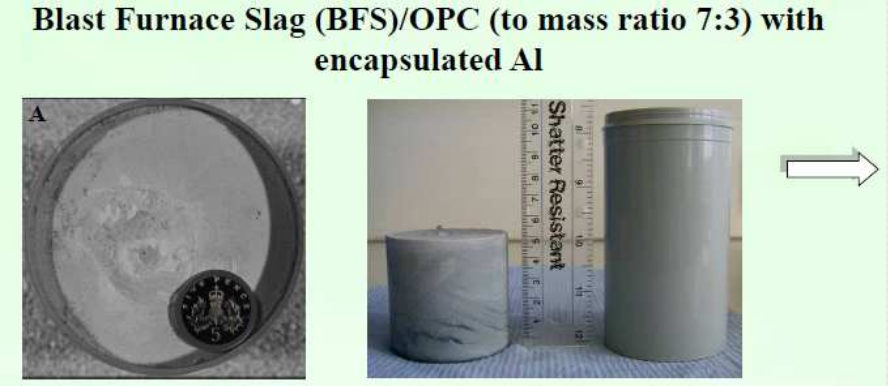
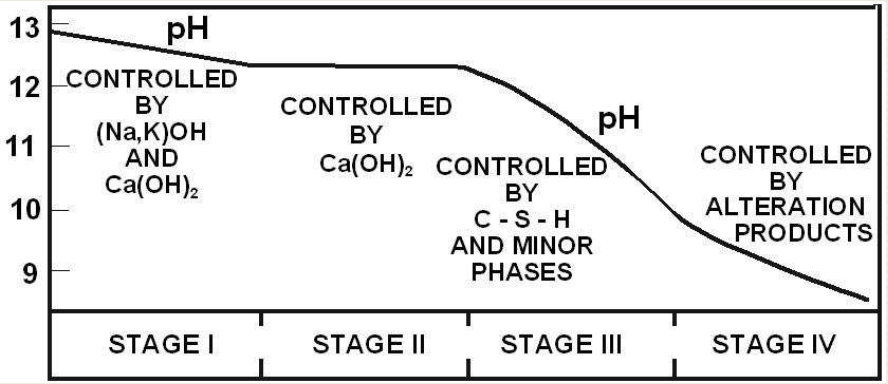
Recently completed CRP

- "Performance and Behaviour of Cementitious materials in long term storage and disposal of radioactive waste"
  - Started in 2007, completed in 2011
  - Results of CRP to be published in 2012





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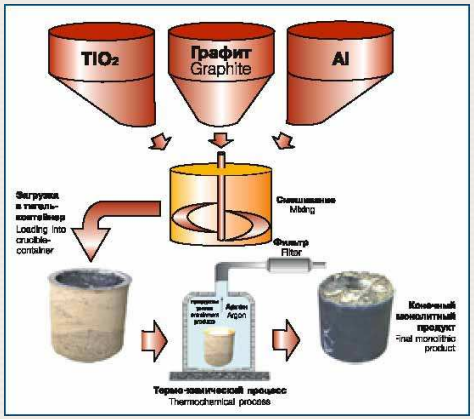
On-going CRPs

- "Treatment of Irradiated graphite to Meet WAC for Disposal"
  - Launched in 2010, first RCM held in 2011



- "Processing technologies for high level waste, formulation of matrices and characterisation of waste forms"
  - Launched in 2012, research proposals invited

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Technical Cooperation (TC) Projects

- Direct technical assistance to recipient Member States is provided through Technical Co-operation (TC) Projects.
- This assistance is delivered in the form of
  - Expert advice on topics of interest
  - Procurement of equipment
  - Scientific visits to facilities and organizations
  - Training fellowships in advanced organizations
  - National workshops and training courses.
- Country-specific issues are addressed through National TC projects.
- Issues of general interest to a specific region or regions are addressed through Regional or Inter-Regional TC projects.

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Technical Cooperation (TC) Projects

- TC Projects for predisposal management of institutional (non-NPP) waste:
  - Retrieval and processing of legacy waste, waste characterization, conditioning of liquid waste, and assistance in design and/or operation of waste processing and storage facilities.
  - e.g. Argentina, Bangladesh, Belarus, Chile, Columbia, Croatia, Egypt, Georgia, Iraq, Jordan, Latvia, Lithuania, Mexico, Moldova, Romania, Serbia, Tunisia, Vietnam, Ukraine etc.
- TC projects for pre-disposal management of NPP waste:
  - Operational, decommissioning or legacy waste streams
  - e.g. China, Lithuania, Slovakia, Ukraine, etc
- The above areas are also supported through two Regional Projects in Europe and Latin America

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Training courses

- Standardized regular courses:
  - Two week training course for waste operators that combines lectures and technology demonstrations and is best conducted in a designated regional Centre of Excellence, for example Moscow SIA RADON.
  - Two week training course for designers, operators and regulators based on an integrated package that combines technology, safety and security for setting up Modular Waste Processing and Storage Facilities and is targeted at Member States with small volume of waste generation.

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Training courses

- New developments:
  - Longer training up to six weeks devoted to predisposal.
  - 4 weeks for general overview of all aspects of radioactive waste management & 2 weeks of specialised training in selected areas. Includes practical exercises, demonstration of applied methods, operation of facilities, site visits.
  - Two such courses were successfully held at Technical University of Clausthal (TUC), Germany in 2010 and 2011 with focus on waste disposal.
  - Another course, specially focussed on predisposal management, is envisaged in 2012 in collaboration with Moscow State University and Moscow SIA RADON.

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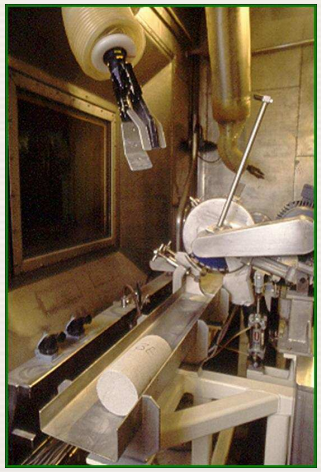
LABONET

LABONET is an International Network of laboratories & specialists involved in Radioactive Waste Characterization activities

- Forum for
  - sharing information and lessons learned
  - transferring knowledge
  - comparing approaches
  - sustaining relationships amongst participants
- Launched in 2010



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Peer review services

- Provided by the Agency with the help of an international team of experts at the request of Member States
- Recent reviews performed in predisposal areas are as follows:
  - *Long term strategy for waste management at ChNPP (Ukraine)*
  - *Processing of high activity waste from accident at A1 NPP (Slovakia)*
  - *Waste forms and packages for near surface disposal facilities (Lithuania)*

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Activities in Response to the Nuclear Accident in Japan

- On-going monitoring of status of waste collection, handling and treatment and dissemination of information
- Review and suggestions of options for on-site and off-site waste management
- Participation in International Mission to Japan and subsequent reporting
- Participation in Workshop in Japan to provide inputs on waste issues
- Contribution to the IAEA Action Plan formulation
- Development of proposals for addressing accident related waste issues in technical documents and CRPs

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Summary

- The IAEA promotes safe and effective management of radioactive waste and has suitable programmes in place to serve the needs of Member States in this area.
- Technical assistance in predisposal area is delivered through publication of technical documents, coordinated research projects, technical cooperation projects, training, networks and peer review services.

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WM2012: Predisposal Session-IAEA

Panelists:

- Susanta Kumar Samanta, IAEA (Austria);
- Christine Langton, SRNL, Aiken, South Carolina (USA);
- Anthony Wickham, Nuclear Technology Consultancy (United Kingdom);
- Vladimir Kascheev, JSC "VNIINM" (Russia);
- Svetlana Bratskaya, Institute of Chemistry FEDRAS (Russia);
- Kamil Kravarik, VUJE, Inc. Trnava (Slovakia);
- Olga G. Batyukhnova, SUE Moscow SIA “Radon”, Moscow (Russia).

Panelists from different Member State organizations will present details of some selected activities discussed in this overview and describe their involvement and experience.

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Thank you for your attention!