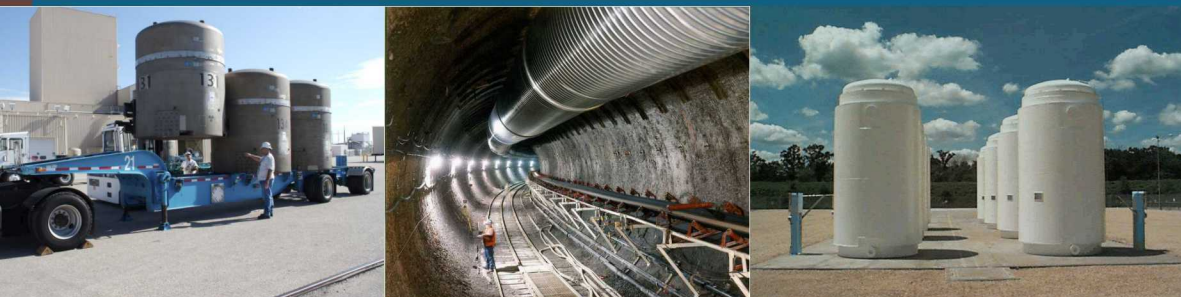


# Reducing Safeguards Accounting and Verification Efforts on Retained Wastes



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*International Atomic Energy Agency, Vienna, Austria*



Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

Waste from nuclear-energy production can contain nuclear materials

Safeguards might apply to NM-bearing wastes

Safeguards do not terminate during waste storage or after disposal

IAEA can terminate safeguards on NM (in waste) that\*

- Has been consumed
- Has been diluted
- Is practicably irrecoverable

\* Para.11 of standard Comprehensive Safeguards Agreement based on INFCIRC/ 153 (corr.)

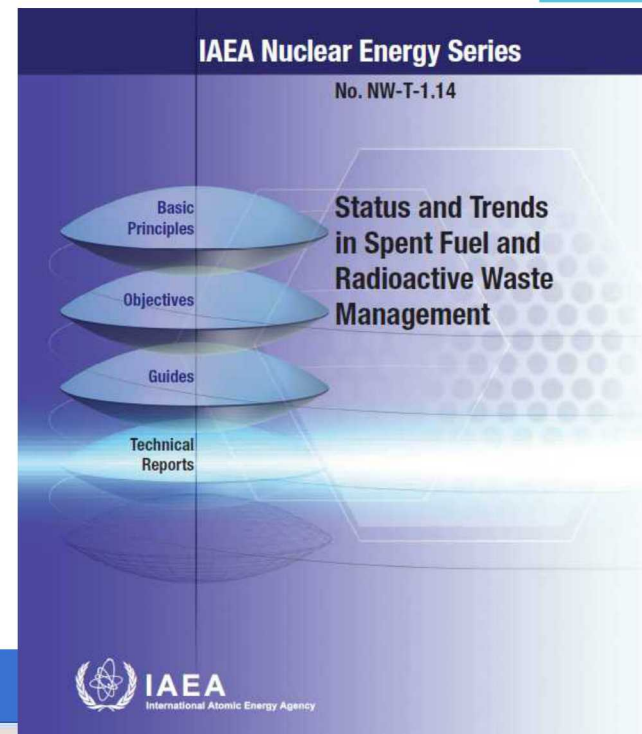
# IAEA Waste Tracking and Reporting

IAEA periodically summarizes global waste inventories

- Status & trends
- National programs

Net Enabled Waste Management Database (NEWMDB)

- Tool for reporting requirements of the *Joint Convention*\*
- Maintains international memory of waste information
- Access to radwaste-management data



News: Utah, EnergySolutions square off in court over foreign waste

Waste Counter: 29,620,000 m<sup>3</sup> in ~366 Facilities NOTE: Not including some countries



## ABOUT NEWMDB

### The IAEA Online Information Resource for Radioactive Waste Management

The NEWMDB contains information on national radioactive waste management programmes, radioactive waste inventories, radioactive waste disposal, relevant laws and regulations, waste management policies, and plans and activities. The first NEWMDB data collection cycle was conducted in March 2002 (for year 2000 data). Subsequent collections have been performed annually from 2004 onward.

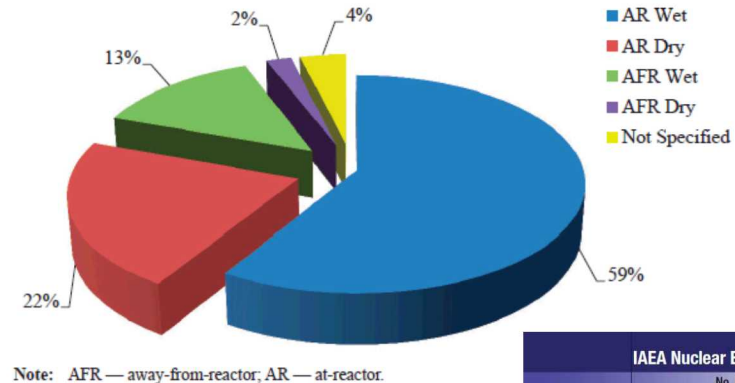
#### The principal objectives for the NEWMDB are to:

- improve access to radioactive waste management data;
- provide a system for maintaining the international "memory" of such information;
- provide readily accessible reference material to both the Member States and the Agency's Technical Assistance programme, Waste Management Technical Review and Assessment Programme (WATRP), the "Status and Trends report" and other programmes;
- provide a means to research and assess the development and implementation of national systems for radioactive waste management in Agency Member States, and
- provide a tool to Member States that supports the reporting requirements of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention). [read more...](#)

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

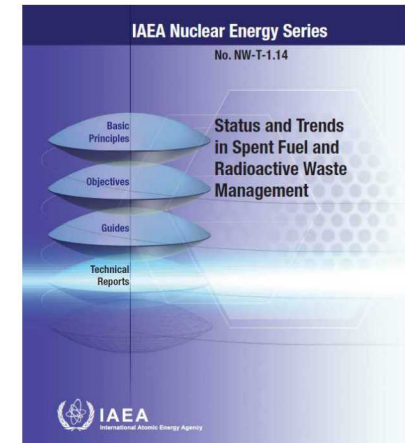
## Spent Nuclear Fuel

- 250,000 tonnes (heavy metal) in storage
- 120,000 t-HM reprocessed SNF



## Solid Radioactive Waste

- 35 million cubic meters (m<sup>3</sup>)
  - 82% disposed (28.5 million m<sup>3</sup>)
  - 18% in storage awaiting disposal (6.3 million m<sup>3</sup>)
- 98% of the volume of solid radioactive waste is classified as VLLW or LLW
  - , with most of the remainder is ILW
- 98% of the radioactivity associated with ILW and HLW (including SNF)



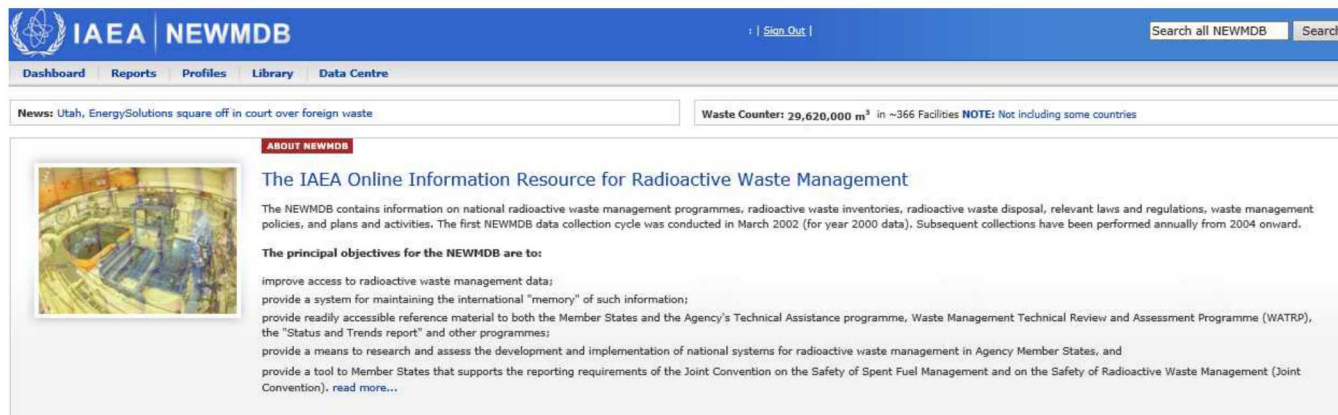


# Net-Enabled Radioactive Waste Management Database (NEWMDB)

Member State access to information about radioactive waste management

## NEWMDB

- Maintains international "memory" of such information
- Reference material to Member States and IAEA programs
  - Technical Assistance program, Waste Management Technical Review & Assessment Program (WATRP), others
- National systems for radioactive-waste management
  - Member States can research and assess national programs
- Supports reporting requirements of the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management* (Joint Convention)



The screenshot shows the IAEA NEWMDB website. The header features the IAEA logo and the text "IAEA NEWMDB". Navigation links include "Dashboard", "Reports", "Profiles", "Library", and "Data Centre". A search bar is located on the right. Below the header, a news ticker displays "News: Utah, EnergySolutions square off in court over foreign waste". A "Waste Counter" shows "29,620,000 m³ in ~366 Facilities" with a note "NOTE: Not including some countries". The main content area is titled "ABOUT NEWMDB" and "The IAEA Online Information Resource for Radioactive Waste Management". It describes the database's purpose and lists its principal objectives: to improve access to data, maintain the international "memory", provide reference material, and support reporting requirements.

**IAEA NEWMDB**

Sign Out | Search all NEWMDB Search

Dashboard Reports Profiles Library Data Centre

News: Utah, EnergySolutions square off in court over foreign waste

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## Waste Class Matrix

- States report their waste classes
  - Convert into standard IAEA waste classes

## Infrastructure for radioactive waste management (framework)

- Groups
  - Major regulatory or physical divisions
  - Government vs. Commercial or Past Practices vs. Current
  - Can be used to account for waste in other countries (e.g., SNF reprocessing)
- Sites
  - Waste-management locations (sites) within a country
  - States can define virtual sites (e.g., "All NPPs") or similar categories
    - Too many sites to list individually or individual sites not tracked
    - Tracked at the Site level or Facility level
- Facilities
  - Individual waste management facilities
    - Physical details of each facility
  - Three functional categories:
    1. Processing
    2. Storage
    3. Disposal

## New Effort (2020)

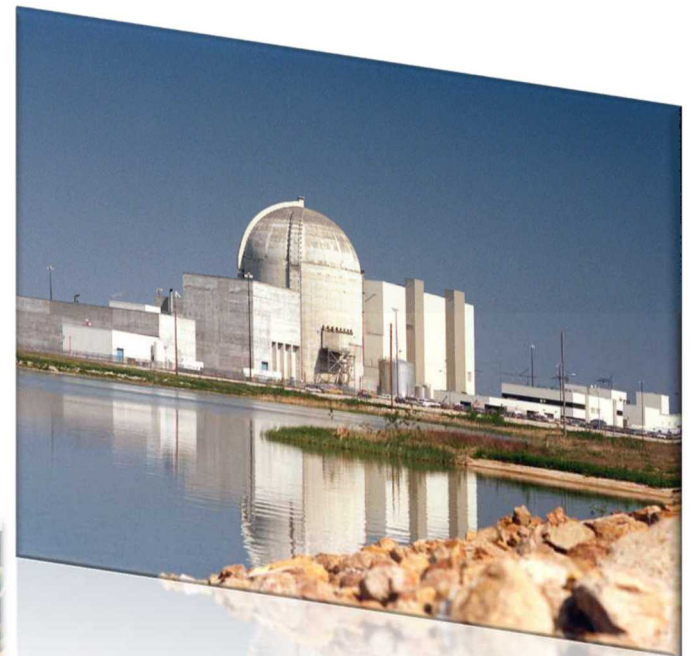
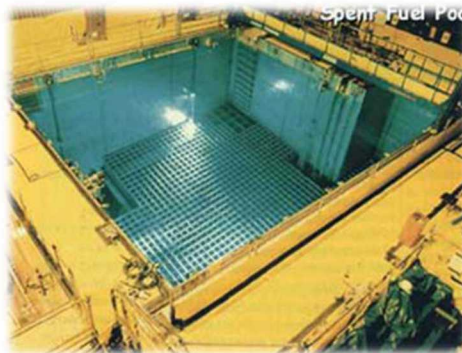
- Help Member States plan more comprehensively for future waste generation
- Emphasis on nuclear materials potentially subject to safeguards

## Begin with nuclear-power reactors

- Assess common reactor types worldwide
- Examine wastes generated from power reactors by type

## Continue effort for other nuclear facilities

- Research reactors
- Front-end facilities
  - conversion, enrichment fuel fabrication, etc.
- Back-end facilities
  - reprocessing, conditioning, disposal, etc.

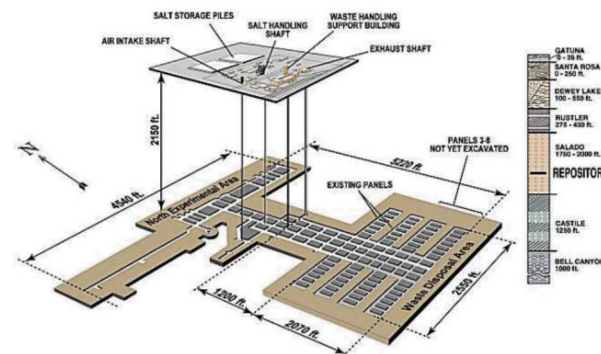


Begin with IAEA consultancy and technical meetings

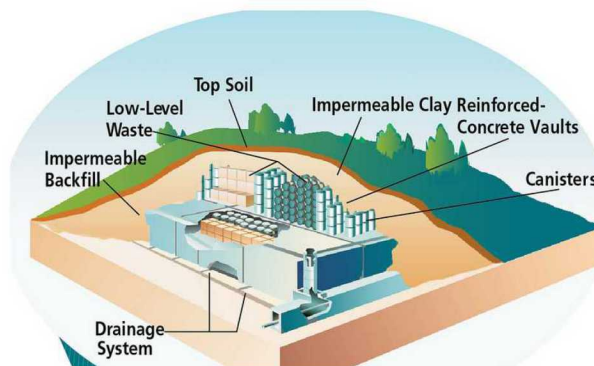
- Member States with nuclear facilities of interest develop reporting methodology
- Help Member States seeking assistance to estimate waste generation

## Objectives

1. Generate data by facility type
  - Waste types generated
  - Accumulation rates
2. Plan for waste-management facilities
  - Member State requirements
  - Storage & Disposal
  - Size and type
3. Plan for safeguards requirements & obligations



Low-Level Waste Disposal





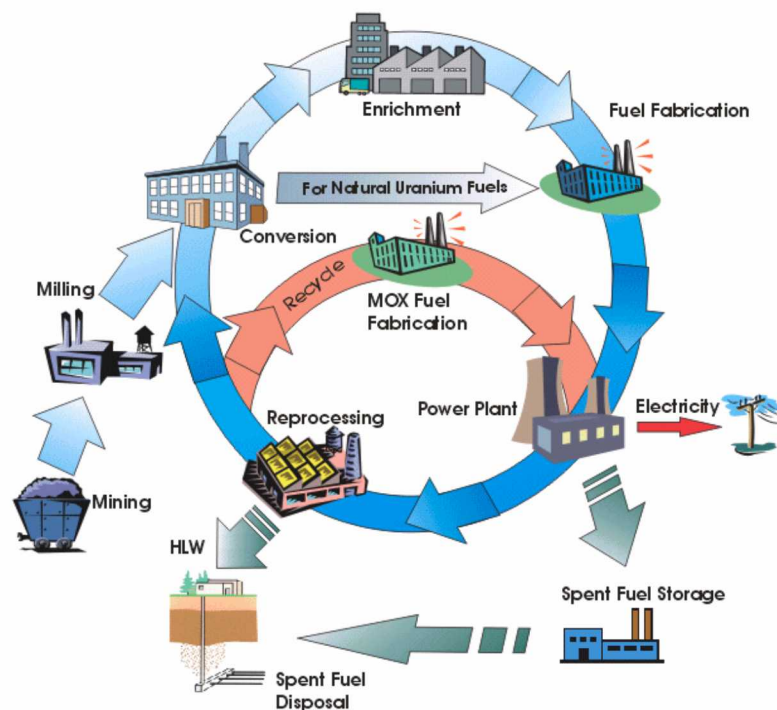
IAEA and Member States\* can use these estimates to plan for storage and disposal of wastes generated throughout the nuclear fuel cycle and to anticipate future safeguards obligations on NM-bearing wastes

Member States can plan for waste facilities

- Based on type of waste generated
  - Spent nuclear fuel (SNF)
  - High-level waste (HLW)
  - Intermediate-level waste (ILW)
  - Low-level waste (LLW)
  - Very low-level waste (VLLW)

IAEA can use estimates

- To plan future safeguards obligations
- In agency reports



\* Including Member States developing or planning new nuclear-energy programs

Thank You