Australian Government
Department of Industry, Innovation and Science

National Radioactive Waste Management Facility

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Waste Management at the National Radioactive Waste Management Facility

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What we will cover

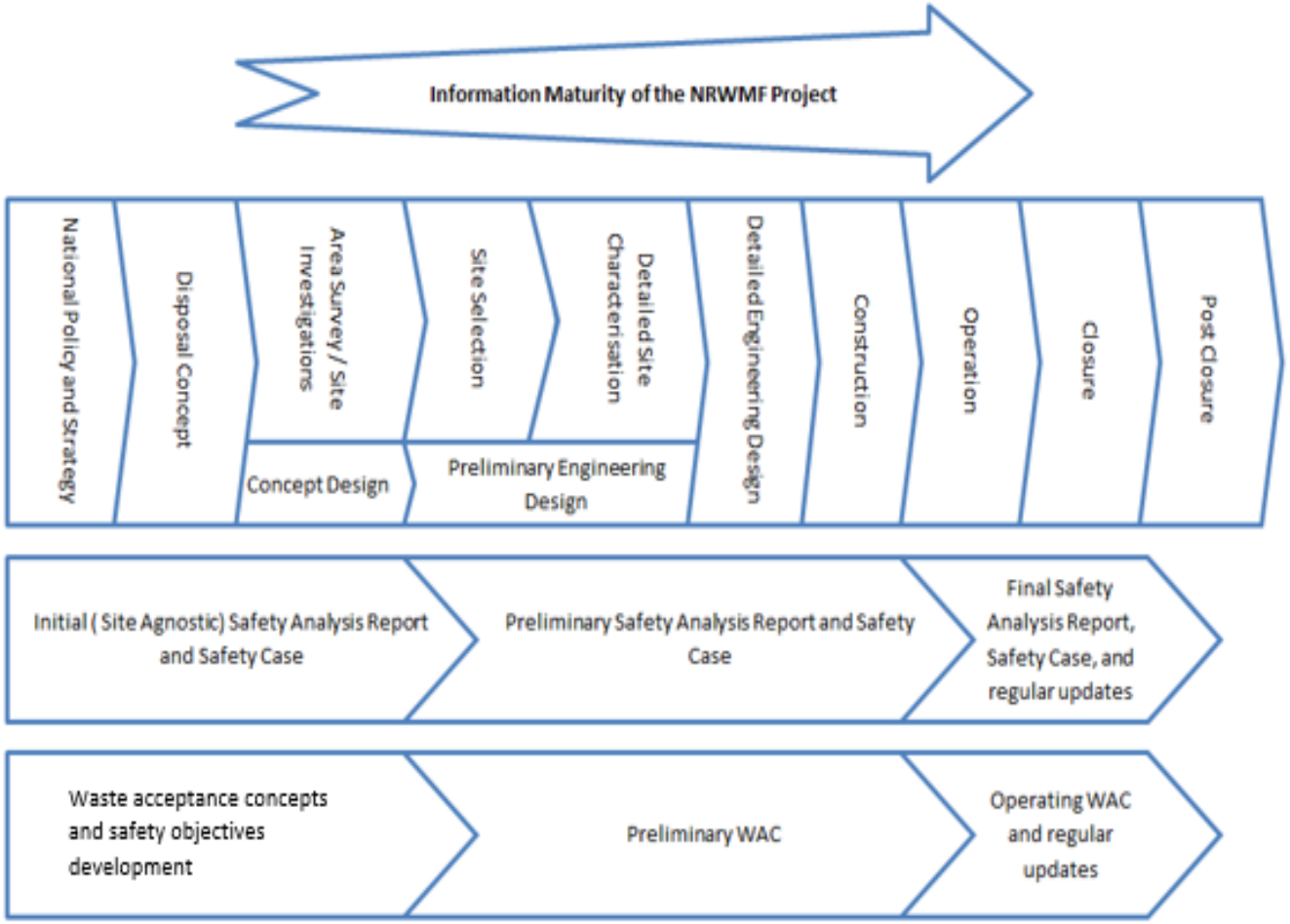
- Waste management principles at the facility
- NRWMF project development
- Waste acceptance process
- General conditions of waste acceptance
- Types of waste in the inventory
- Defence in depth / multi-barrier approach
- Case studies

Waste management principles

- Safe disposal of LLW and safe interim storage of ILW, based on international best practice and licensing conditions set by regulators
- Waste is treated, conditioned and packaged before arrival at facility
- Multi-barrier approach, natural and engineered barriers, passive safety, ensuring waste is isolated and contained

NRWMF project development

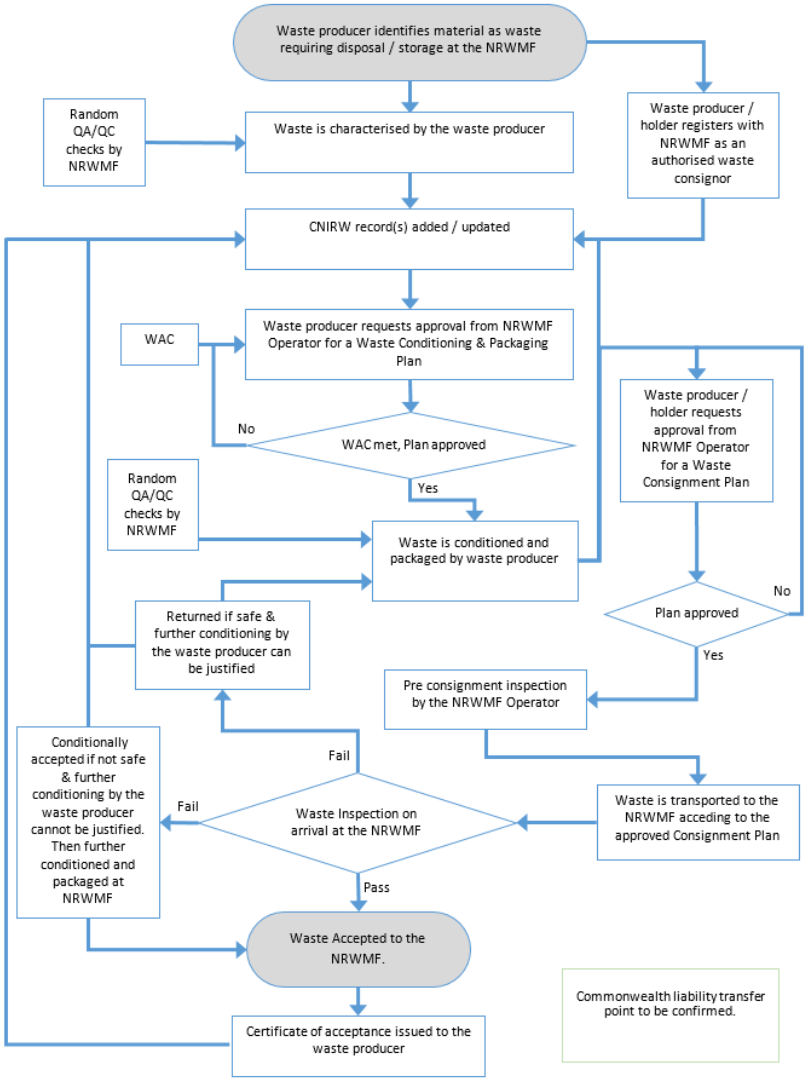
Process of project development including safety objectives and waste acceptance concepts



Waste acceptance process

To help waste holders, regulators and the operator understand the steps required before waste is accepted at the NRWMF. These steps being:

- from waste production
- determining acceptability through key controls on waste through:
  1. Identification
  2. Characterisation
  3. Treatment
  4. Packaging
  5. Transport
- leads to a decision on disposal, storage or rejection (if the waste is non-compliant)



General conditions of waste acceptance

Waste must be conditioned and packaged, ensuring passive safety in line with international best practice.

- Stable and non-reactive wasteform
- Physically and chemically stable wasteform and container
- Energy removed from the wasteform
- Solid and non-dispersible wasteform
- Radionuclides are immobile as far as practical
- Resistant to degradation

- Reactive, corrosive or flammable
- Containers of liquid

General conditions of waste acceptance

Strict criteria are applied to ensure the following aspects will be specified, limited or controlled:

Physical Properties (LLW and ILW)
- Waste Conditioning
- Waste Volume
- Waste Degradation, Settlement Properties and Voidage
- Gas Generation

Radiological and Nuclear Properties (LLW and ILW)
- Activity
- Dose
- Surface Contamination
- Material subject to Safeguards Act
- Criticality Safety

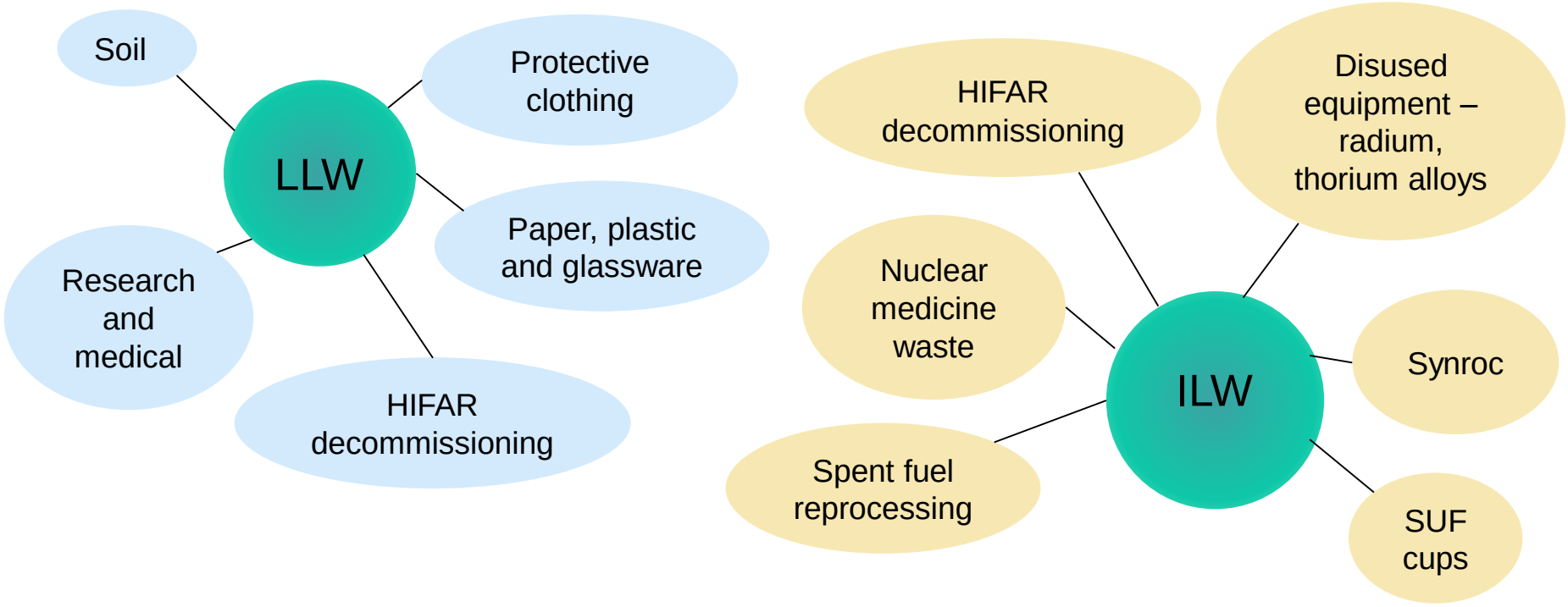
Excluded Substances (LLW and ILW)
- Non-Waste Materials
- Reactive Metals and Pyrophoric Materials
- Explosive Materials
- Free Liquids
- Soluble Solids
- Strong Oxidising Agents
- Corrosive Substances
- Pressurised Gas Receptacles and Aerosols
- Chemically Toxic Substances
- Chemical Complexing or Chelating Agents
- Cellulosic, Biological, Infectious and Pathogenic Materials
- Hazardous Substances and Dangerous Goods

Packaging and Transport Criteria (LLW and ILW)
- General
- Package Venting
- Package Identification
- Transport

Consignment Records (LLW and ILW)

Additional for ILW only
specific criteria for waste to be stored in multi-purpose containers; and
specific criteria for waste to be stored in shielded vaults

Types of waste in the inventory



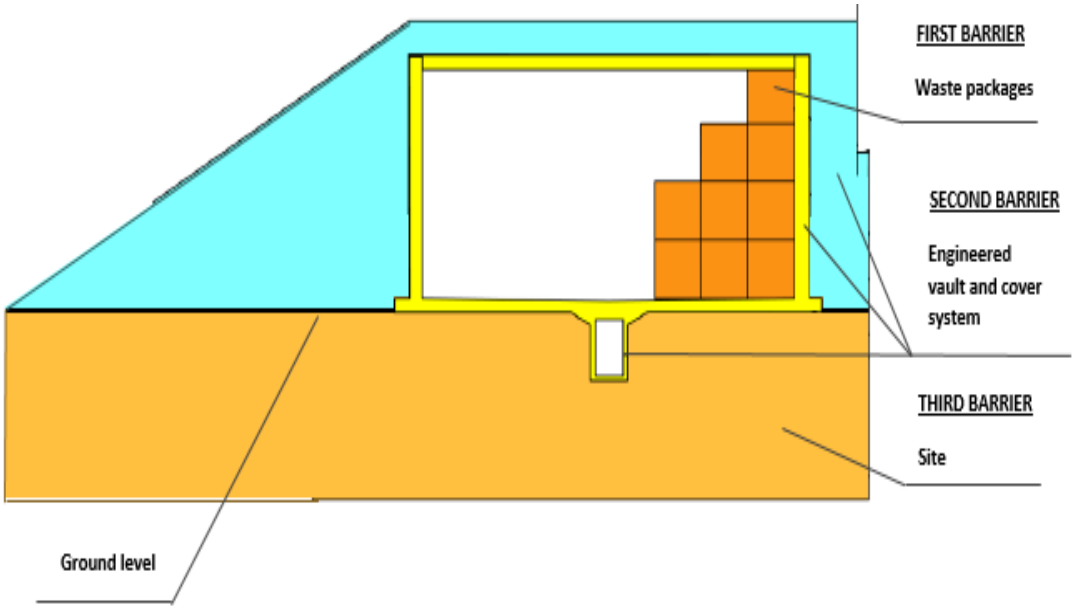
Long-lived disused sealed sources

Short-lived disused sealed sources

Material subject to Safeguards Act

Multi-barrier approach

Several protective layers to ensure passive safety



LLW Disposal

- Above-ground, engineered concrete vaults
- Waste isolation achieved by combination of 3 barriers
- Barriers will remain effective through operational and institutional control phases

ILW Storage

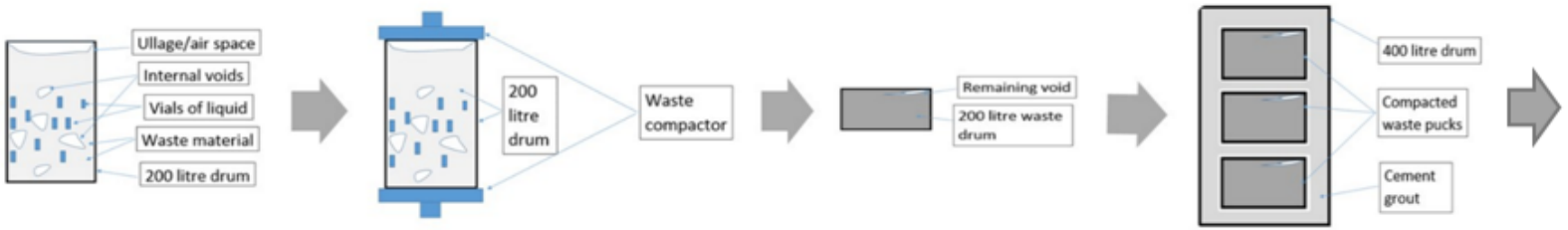
- Radioactivity confined by:
  - Waste packages
  - Storage building design
- Shielded packages in non-shielded buildings

  or

  Non-shielded packages in shielded buildings

Case studies - LLW

Example of waste treatment process for LLW in steel drums, such as laboratory waste including swabs, paper tissues, plastic gloves, used vials and medical tools.



Step 1
LLW, in 200 litre metal drum, contains vials of liquid and air pockets. Drum is scanned to determine the composition, sampled to confirm chemical properties and LLW status confirmed

Step 2
Waste material and drum compacted in a super-compactor

Step 3
Compacted waste now has voids and free-flowing liquids have been squeezed out.

Step 4
Waste pucks are cemented into a 400 litre drum

Step 5
Waste packages are transported to the NRWMF

Case studies – ILW

Synroc

Intermediate level liquid waste from nuclear medicine production → Synroc

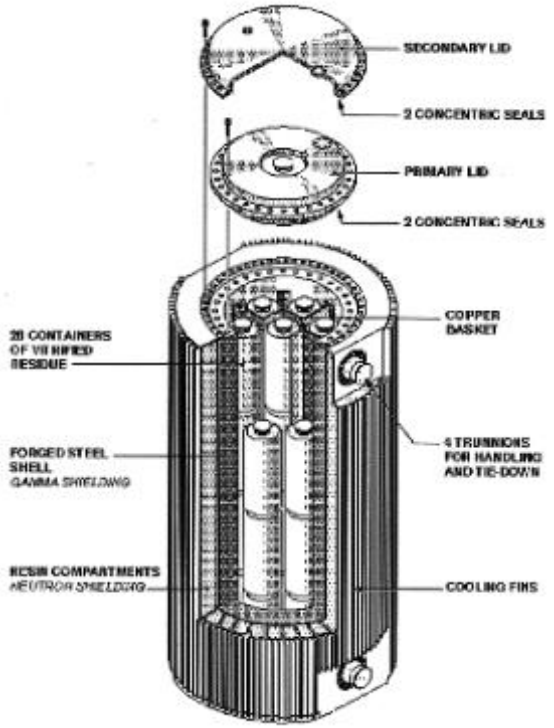
- Liquid waste dried into powder, mixed with additives, treated by pressure and heat → Stable, solid, glass wasteform
- Licensed by ARPANSA

Case studies – ILW

TN81

Research reactor spent fuel reprocessing

Vitrified glass waste in shielded TN81



Questions?