



# Radioactive Waste Management

# **Burying Treasure – Radioactive Waste Package Records**

Dr Andy Harris  
Head of Package Assurance  
Radioactive Waste Management Ltd

# Radioactive Waste Management (RWM)

- Our mission
  - Deliver a Geological Disposal Facility (GDF) and provide radioactive waste management solutions
- Created wholly-owned subsidiary of NDA (April 2014)
  - Currently employs around 200 staff (expected to continue to rise)
  - Continue development to become a Site Licence Company and Permit Holder
- Mission encompasses Higher Activity Waste (HAW)
  - HLW – High Level Waste from reprocessing operations
  - ILW – Intermediate Level Waste
  - Some LLW – Low Level Waste (not suitable for LLWR)
- Radioactive materials also considered in design and safety cases
  - Spent Fuel – includes fuel from new build reactors
  - Plutonium and uranium – product of reprocessing and residue of enrichment

# Geological disposal of radioactive waste

- ‘Nuclear nation’ since the late 1940s
- Wastes from power stations, medicine, industry, research and defence
- Radioactivity in wastes decays over variable timescales – some wastes will be hazardous for many 1,000s of years
- Geological disposal is the internationally adopted solution for the long-term management of HAW
- GDF to be available in 2040’s
- Safe, interim storage up to 100 years
- Scottish Govt. policy is for near-site, near-surface, rather than geological disposal



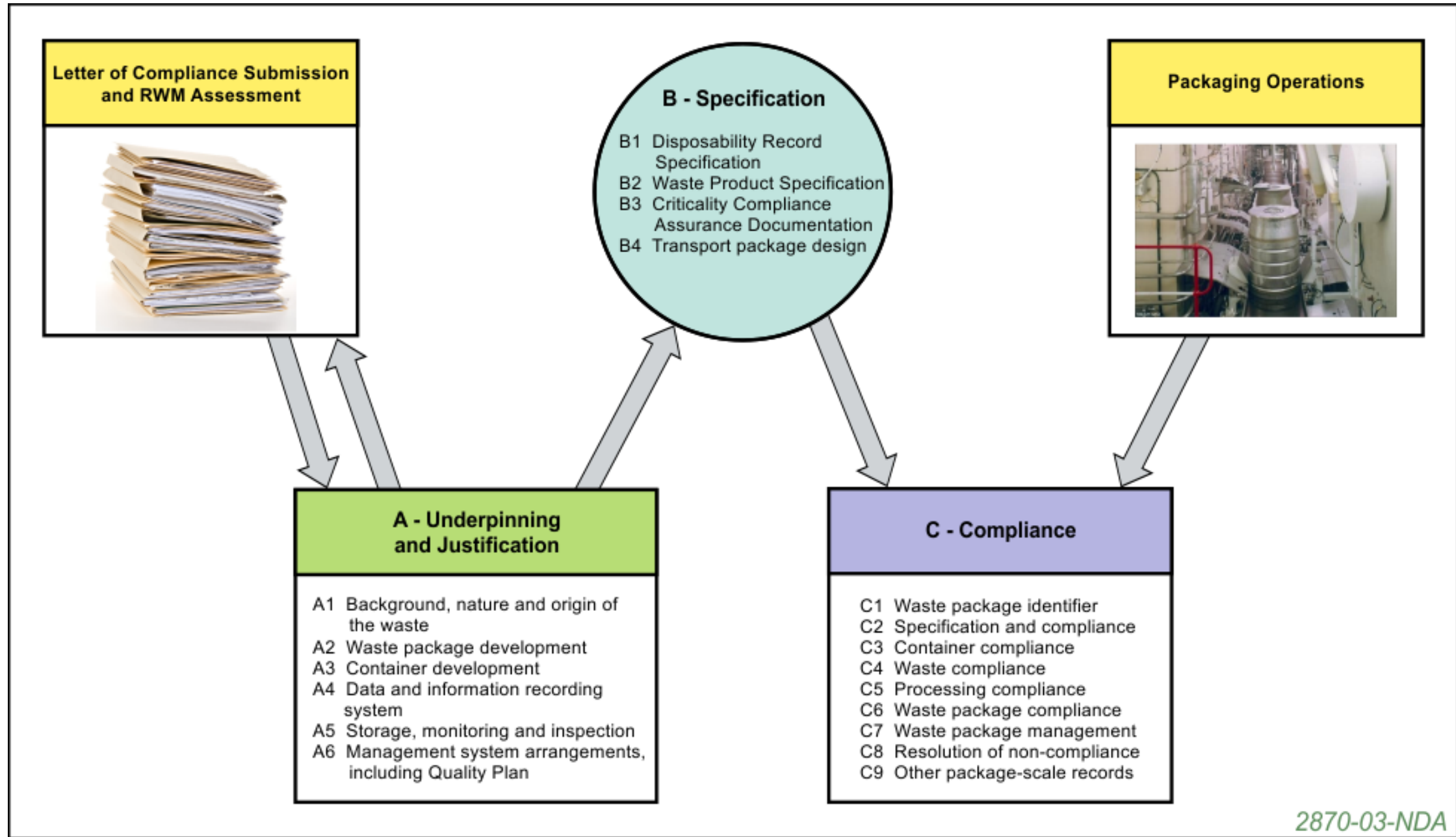
# Disposability Assessment and records

- The problem:
  - Regulator-driven requirement to improve safety for historic (legacy) wastes
  - Operational wastes still being produced
  - GDF not available for decades
- What should be done?
  - Package waste for disposal as soon as appropriate
  - Retrieval and treatment requires significant investment
- Manage risks to future management and disposal of packaged wastes
  - Waste package not maintained in suitable condition
  - Loss of data and information (or inability to access)
- The solutions to identified risks
  - Disposability Assessment and associated endorsement
  - Waste package records and associated assurance/knowledge management activities, managed through NDA Information Governance Programme (IGP) arrangements

# Purpose of Waste Package Records

- Waste Package Record
  - Collated and structured data and information relating to a waste package, fulfilling requirements for long-term management and disposal, as defined by RWM
- Data and information required to demonstrate:
  - Compliance with Transport Regulations to allow consignment
  - Compliance with the Waste Acceptance Criteria (WAC) for a GDF (or other facility)
  - General confidence in the properties and performance of waste packages
  - Potentially enable alternative waste management strategies
  - ‘Information-informed’ design and safety case development for GDF
- Underpin confidence in the quality/veracity of data and information, and assumed properties and performance
  - Distinguish from ‘contemporaneous’ operations; recognise the ‘time gap’ for a GDF
  - Engagement and auditing of operations must be done in advance

# Structure of Waste Package Records



# Records Retention and Management

- Records collated by waste packagers
- Structure and completeness tested by RWM (assessment and approval)
- Ultimately expect to transfer to NDAAL Nucleus – arrangements under development
- Practical distinction between ‘electronic’ and ‘digital’ records
  - Electronic = data and information, including narrative, held as pdf-type scans
  - Digital = sub-set of data required in accessible/manipulable ‘numerical’ format
- Principal challenges
  - Transfer of responsibility to archive vs. continued ownership by licensee
  - Prioritisation of collation and structuring vs. immediate (limited) demands for access
  - Tension between delivery/completion and necessary conservatism in scope
  - Extraction of ‘digital data’ from diverse range of sources
- Need to bring together end-user (RWM) and delivery (licensees)



# Current position and challenge

- Waste packages already exist and expected final total will be 100,000's of packages
- Challenge not too broad (only 100,000's packages), but deep (lots of detail)
- Data and information generated over past 50+ years and continuing for next 150+ years
- Data and information held in diverse and often historic formats
  - Narrative documents, including 'buried' data and information
  - Hand-completed forms (some 30-40 years old)
  - Printed forms from diverse electronic systems
  - Retained data held in aging, extensive and diverse electronic systems
  - No consistency in data formatting, units, style *etc.*
  - May be physical dispersed
- Seeking opportunities to simplify and/or use alternative arrangements, and to adopt better practice for future operations

# Drivers for ‘semi-active’ records

- Continued interim storage and Asset Management
  - Environmental monitoring
- Monitoring and inspection of packages during interim storage
  - Identified individual waste packages (surrogates)
  - Test samples, dummy packages
- Management of non-conforming packages
  - Ongoing monitoring
  - Repair and remediation of damaged/unacceptable waste packages
- Regulatory changes and additional information demands
  - Transport regulations (radioactive and Carriage of Dangerous Goods)
  - GDF design and safety case evolution
  - Evolution of digital platforms and information exchange mechanisms
  - Confirmation of waste acceptance requirements
- Completion of interim products and/or final packaging (eg spent fuel)

# Waste package storage (Magnox)



# Challenges for 'semi-active' records

- Insertion of additional data and information arising from continuing activities
  - No direct correspondence to waste packages (often linked to stores)
  - Arrangements at NDAAL Nucleus for package records not yet in place
  - Proposal is to establish separate, 'live' records for the continuing activities such as monitoring and inspection
  - Use metadata and systems in NDAAL Nucleus to provide links
- Parallel management of 'electronic' and 'digital' systems
  - Possible future changes to scope of 'digital' records requirements
- Future changes in systems
- 'Interim products'
  - partially completed packages (not yet disposable)
  - extensive further action expected, with consequent records creation (50/50 split)

# Summary

- Collation of waste package records is an exercise in ‘treasure-hunting’
- Records are essential for the future management of waste (packages)...
- ...but are not the glamorous end of the business!
- Waste package records have to be designed for use in several decades time, with limited insight into the requirements that will need to be fulfilled
- Many records will include extensive historic data and information not designed for that purpose, across multiple platforms, formats, styles *etc*
- Confidence in quality must be built-in; it cannot be gained through direct interaction at the time records are to be used
- Data and information will continue to be generated after package production, driven by the ‘time gap’ and, for interim products, by delayed completion