Treatment and Disposal of Radioactive Waste

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High-level Challenges

• Planning must move in this order:
  1. Waste Disposal Site
  2. Waste Disposal Criteria
  3. Waste Package/Transport
  4. Equipment Design

• Remote cutting must meet waste criteria

• Volumes and packing factors must be anticipated

• Waste package characterization often the slowest part of process
Example – Windscale Pile 1
Damaged Fuel Waste Strategy

• 1 – Waste Disposal Site – Sellafield on-site storage
• 2 – Waste Criteria –
  • Large debris separated from dust
  • Space between elements for cooling
  • Must be encapsulated in polymer
• 3 – Package and Transport
  • 500l Stainless Steel Drum
    • Lost paddle design for dust
    • Helical design for large debris
  • On-site transport
Equipment and Waste

Retrieval Equipment ->

<- Separation and Loading

Encapsulation and Package ->
Example Mixed Waste
Brookhaven Reactor

- Large decommissioning projects have a wide variety of waste
- Waste strategy must address them all
- Equipment must be able to handle them all
- Packaging must be flexible and compliant
Brookhaven Waste Forms

Graphite ->
<- Control Rods

Steel ->
<- Concrete