The Safety of Radioactive Waste and Spent Fuel Storage

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What is storage?

- Storage is *temporary* placement of radioactive waste/spent fuel in a facility; where it is isolated and monitored.
- Storage is an *interim measure*.
- **Scale** widely variable (designated and secure rooms to bespoke facilities – graded approach to safety appropriate).
Life cycle, storage & disposal
Role of storage in the life cycle

RW/SF generation → Storage → Final Management

- **Industry**
- **Medicine**
- **Research**
- **Power gen.**

- **Accidents**
- **Other**

- **Collection**
  - before/after other predisposal measures

- **Activity decay**

- **Heat decay**

- **Release (gaseous or liquid)**
- **Recycling/reuse**
- **Disposal**
Storage of Radioactive Waste

• Normal practice
• Sometimes essential
• Cost effective
• Demonstrated safety
• But a temporary measure
  – Beyond reasonable times affects safety/security and drives costs
Storage of Spent Fuel

- Normal practice and essential
- Sometimes centralised
- But a temporary measure

Examples of SF storage, dry (left) wet (right)
Basic principles apply

- Protection principles apply – *planned* exposure
- Safety principles apply
- Controls and responsibilities as for other facilities
- Over-all safety demonstrated in the **Safety Case**
Looking ahead

• Importantly, look ahead to ensure that all actions during predisposal management are focussed on safety of the waste in perpetuity following the ultimate solution.
Challenge: conditioning

- To be acceptable for disposal
- E.g. for liquid ILW/HLW

Example: ANSTO Synroc ® treatment of liquid ILW to immobilise the radionuclides in an inert matrix
Challenge: accidents

• From the 4th Review Meeting of JC, CPs requested to report on (at next meeting):

  progress on lessons learned from the Fukushima accident in particular regarding strategies for spent fuel management

Waste storage, Date City 2014
Challenge: no disposal solution

• From the 4th Review Meeting of JC, CPs requested to report on (at next meeting):

  safety implications of very long storage periods and delayed disposal of spent fuel and radioactive waste

The Road to the Disposal Solution
Conclusions

• Storage is standard procedure
• Demonstrated safety but scientific & technological challenges remain
• Reliant on timely establishment of final management option
• Absence of which extends storage and:
  – drives costs;
  – is detrimental to trust and confidence;
  – ultimately may become a safety concern;
  – all of which is avoidable
The journey continues

Storage is a part of the journey, between its beginning and its end

Keeping the destination, final management and disposal, in sight is essential

And, bring the Safety Case!
Thank you

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