Decisions, decisions… How research supports the NDA's spent fuel strategies

DISTINCTIVE 1st Annual Meeting

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Nuclear Decommissioning Authority

NDA Spent Fuels

Advanced Gas-cooled Reactor (AGR)

- Enriched UO_2 in stainless steel (niobium stabilised) cladding.

Magnox

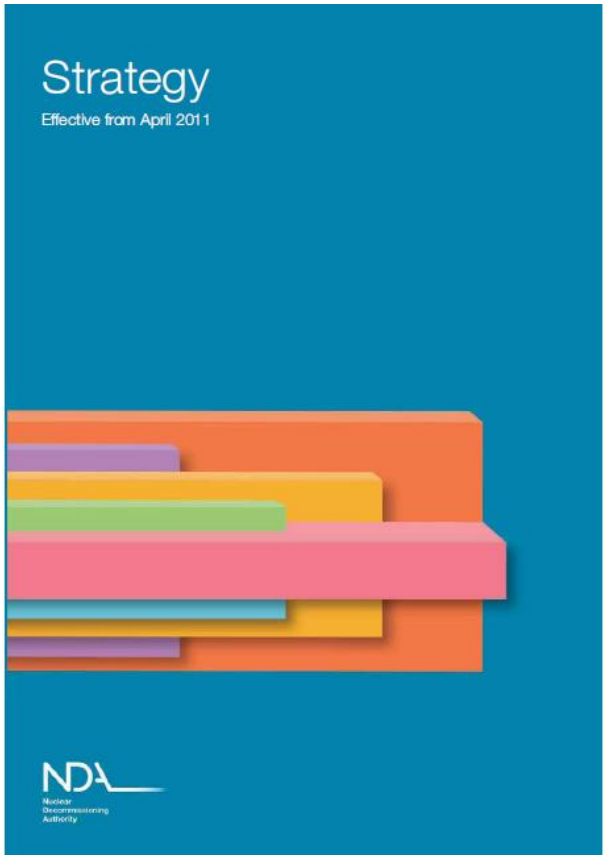
- Natural uranium metal in magnesium alloy cladding.

‘Exotics’

- Miscellaneous fuel and cladding types.

NDA Spent Fuel Strategies

NDA Strategy 2011



"Our strategy is to reprocess all Magnox fuels".

"Our present strategy is to complete the LWR and AGR reprocessing contracts as soon as reasonably practicable and cease reprocessing at THORP. We plan to place into long-term storage at Sellafield any fuel not reprocessed pending disposal, including future arisings of AGR fuel".

"We will treat exotic fuels to achieve a final disposition form as soon as reasonably practicable. This may entail reprocessing, conditioning or immobilisation".

NDA

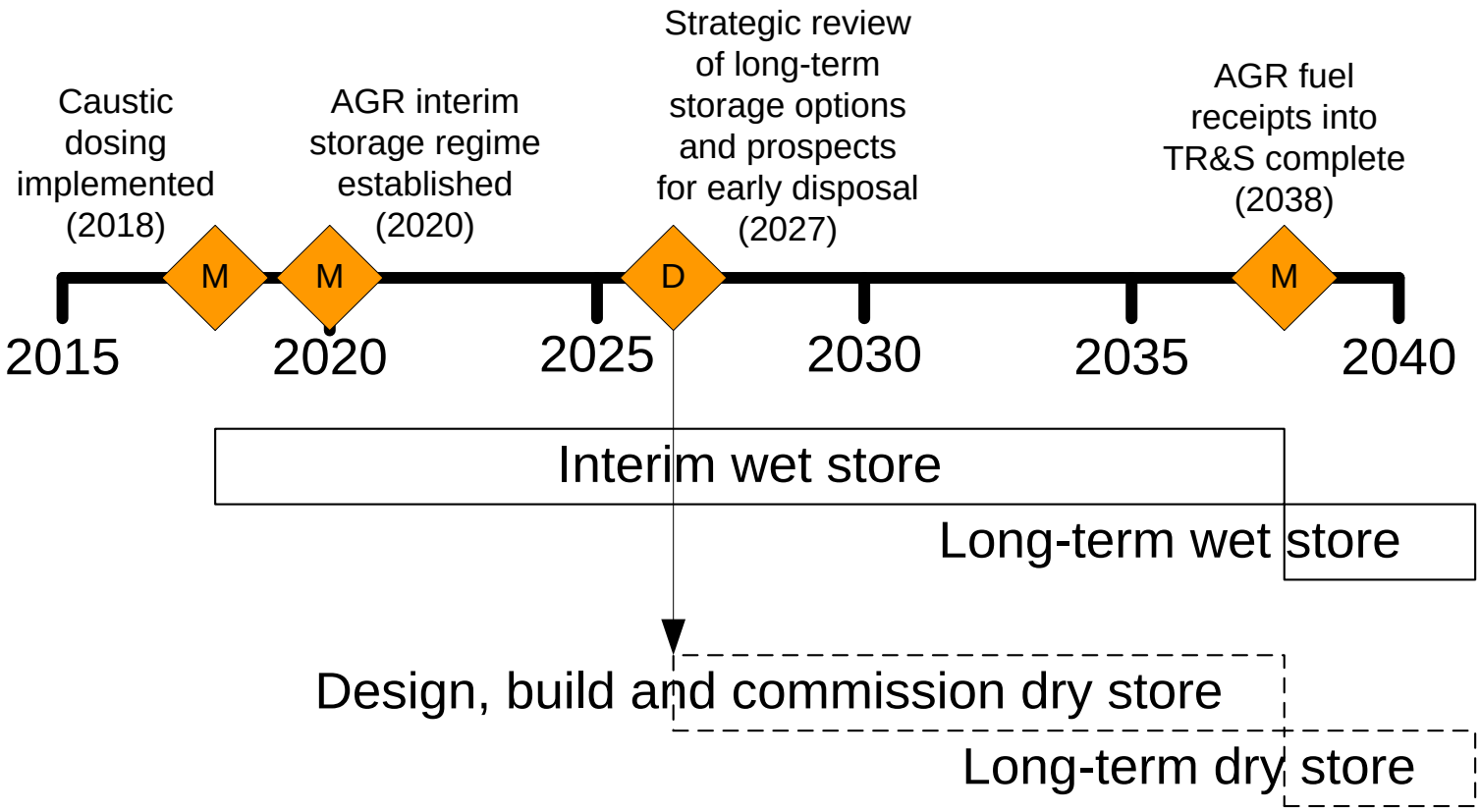
NDA Spent Fuel Inventories

Over 90% of the lifetime arisings of Magnox fuel have already been reprocessed. Remainder to be reprocessed at Sellafield.

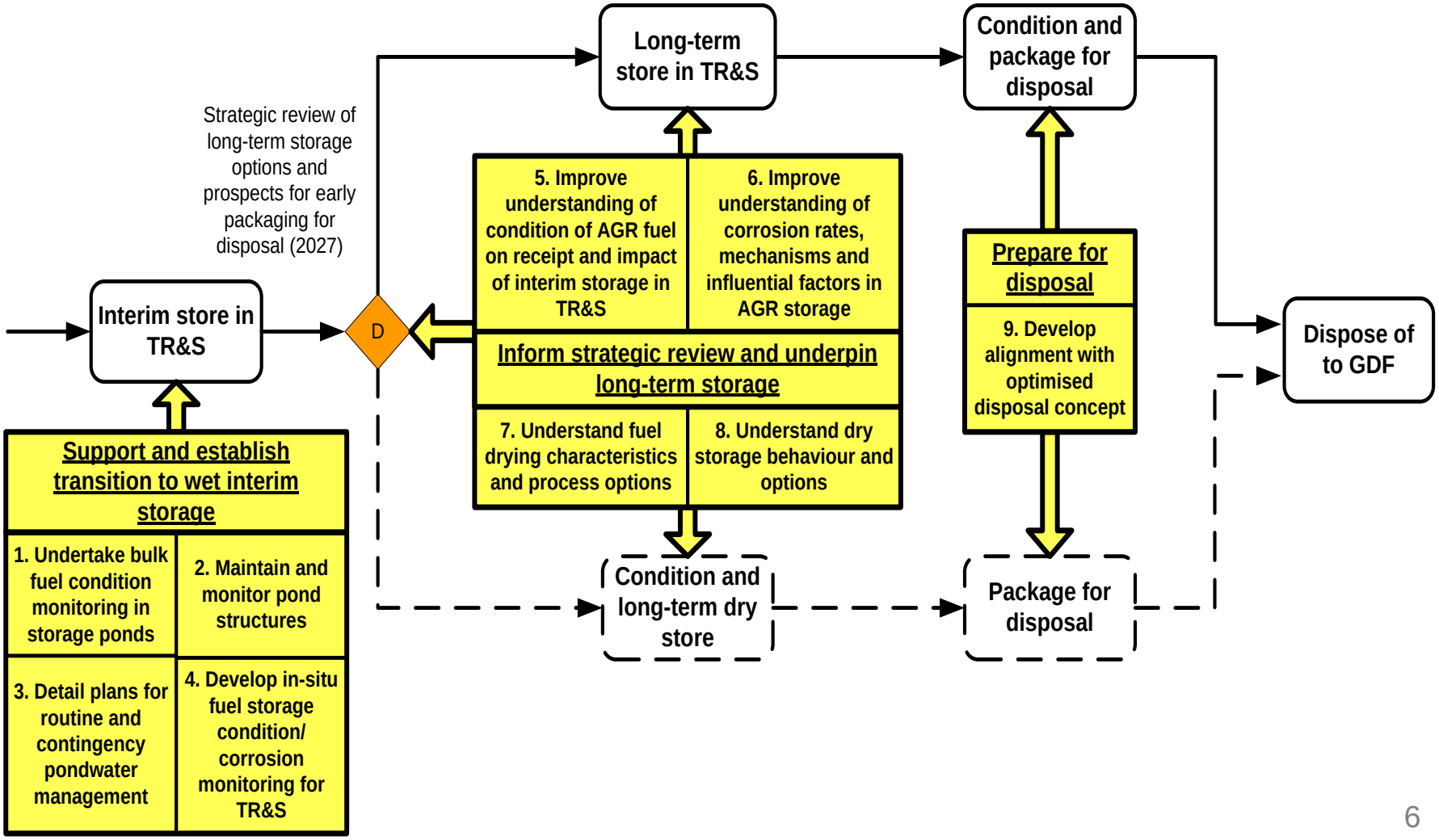
Expect to need to interim store *ca.* 6,000tU of spent AGR fuel.

There are *ca.* 500tU of exotic fuels.

AGR Fuel R&D Planning: Timeline, Milestones and Decisions



AGR Fuel R&D Planning: Process Wiring Diagram



AGR Fuel R&D: Key Areas

Improve understanding of condition of AGR fuel on receipt and impact of interim storage in TR&S.

Improve understanding of corrosion rates, mechanisms and fundamental factors in AGR storage.

Understand fuel drying characteristics and process options.

Understand dry storage behaviour and options.

Develop alignment with optimised disposal concept.

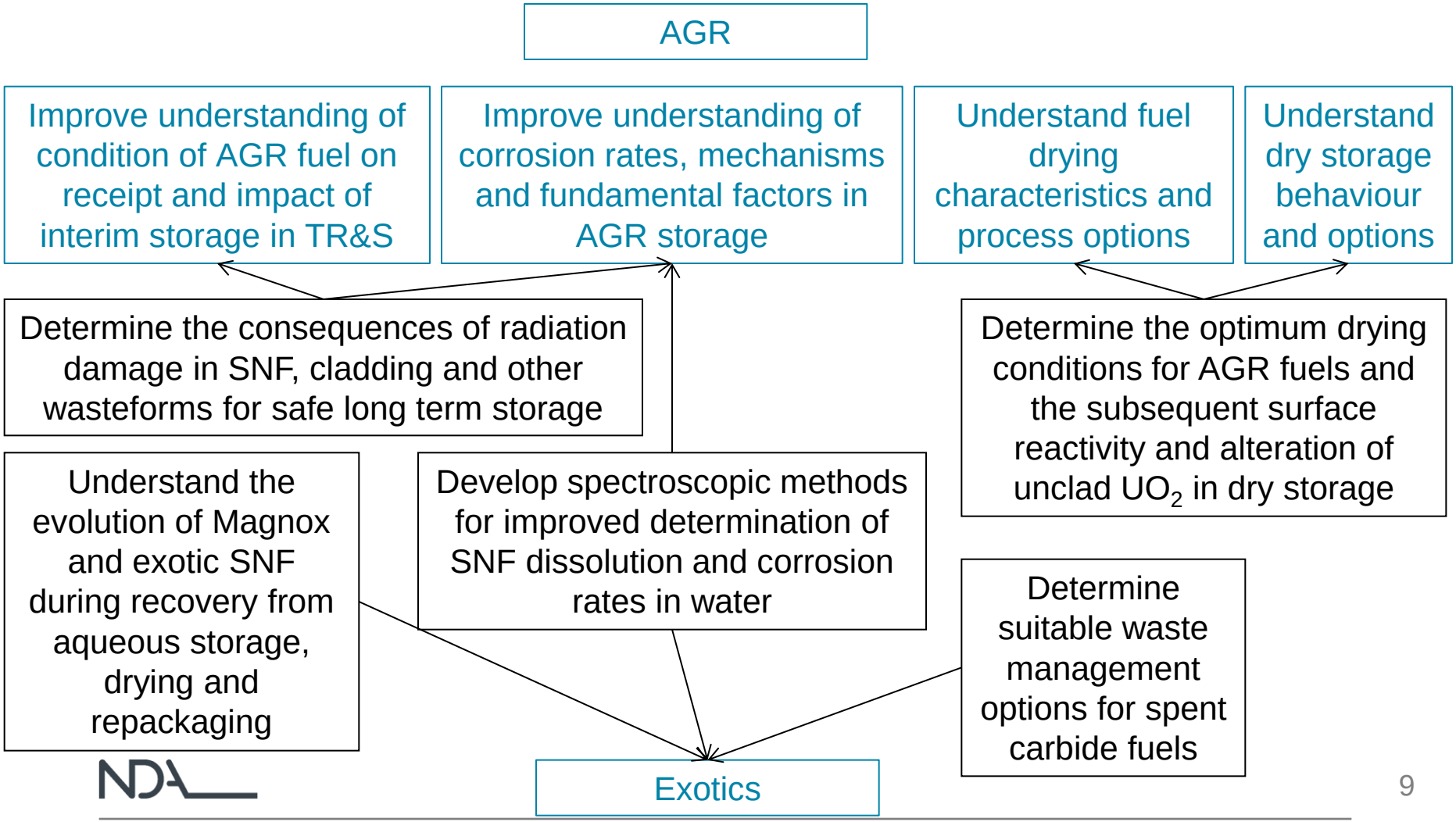
Exotic Fuels R&D

Amounts small but inventory varied, including PFR oxide and carbide fuel and breeder material, PIE remnants, damaged SGHWR fuel and potentially small amounts of Magnox fuel.

Management of much of exotics inventory likely to be supported by generic work to manage the future lifecycle of bulk metal and oxide fuels.

But, in some limited cases (e.g. carbide fuel), R&D may be required to support future management and disposition.

NDA Key Areas and DISTINCTIVE Objectives



Spent Fuel R&D : How DISTINCTIVE can contribute

Contribute directly to key R&D areas.

Develop and maintain important technical skills and knowledge.

Increase awareness of NDA strategy and goals in academia.

Acknowledgments

- Carwyn Jones, Nuclear Technologies
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