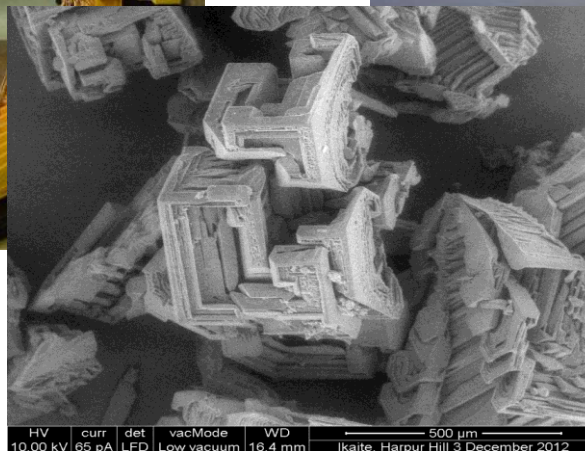
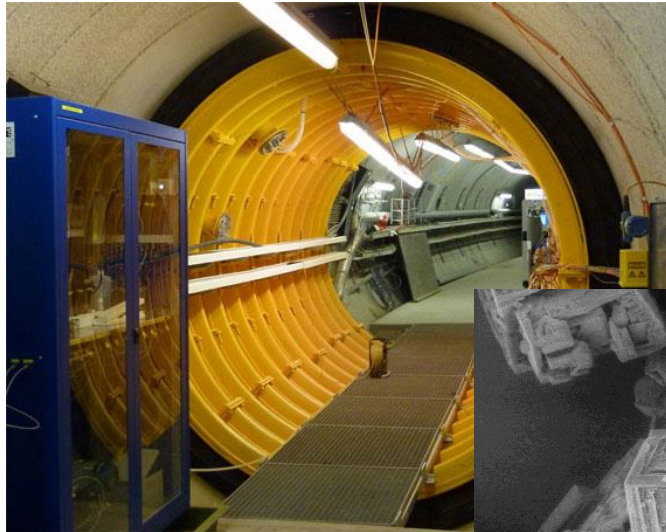
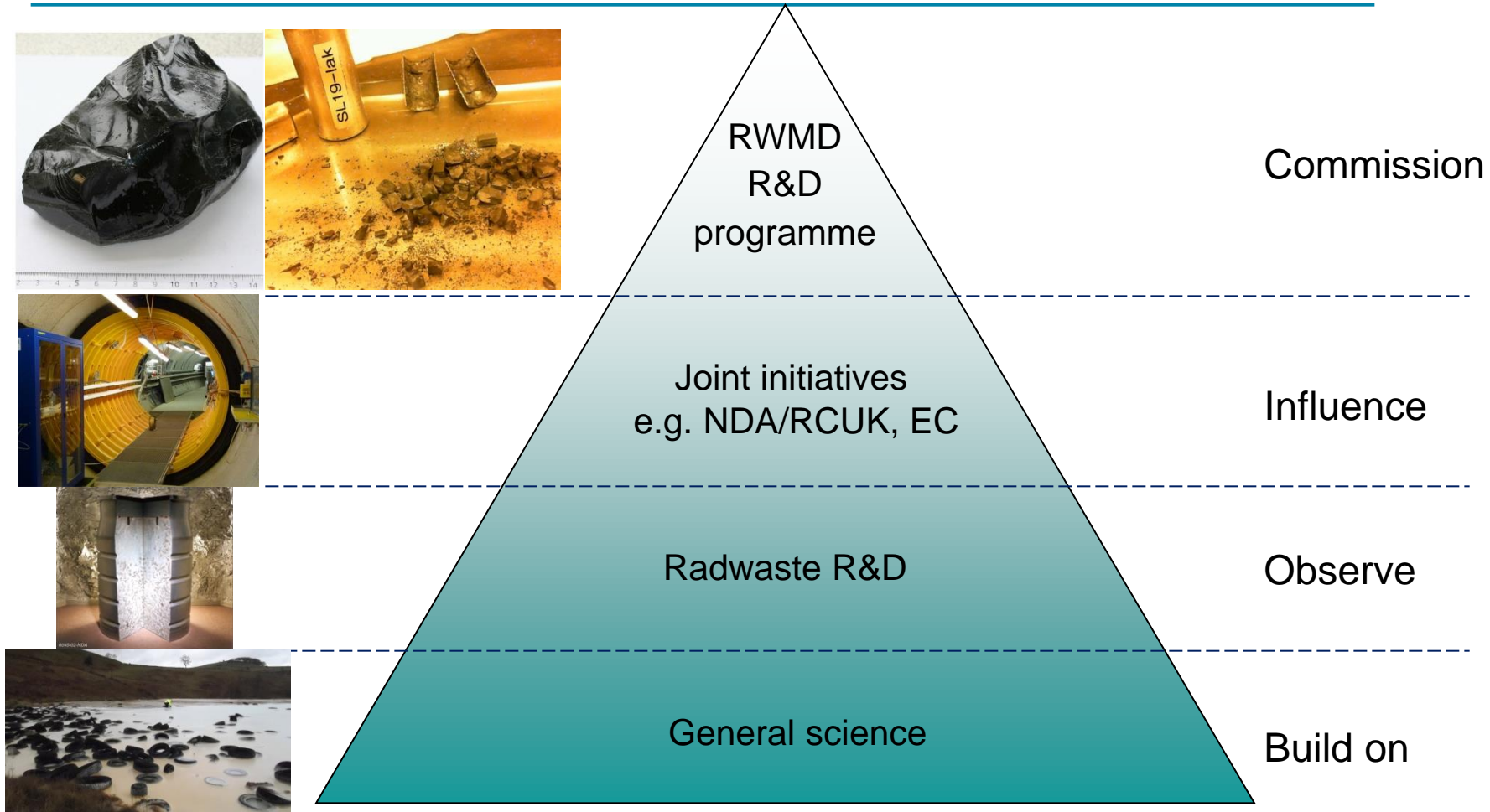


NDA RWMD Involvement in RATE

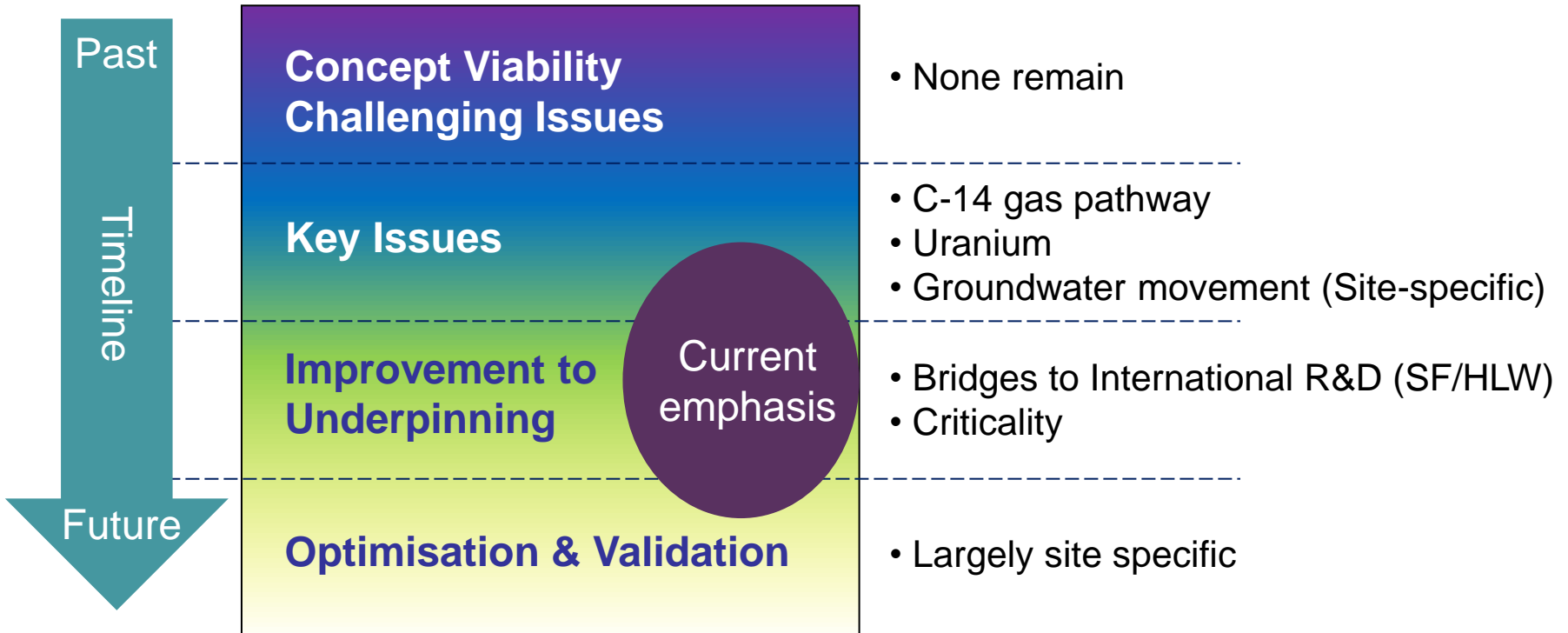
To deliver a geological disposal facility and provide radioactive waste management solutions



Our science base

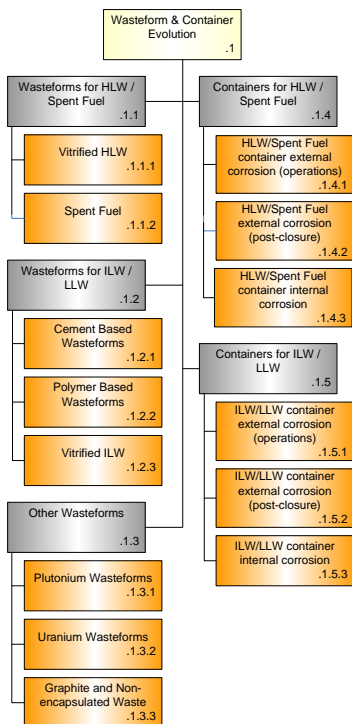


Evolution of Geo-disposal R&D

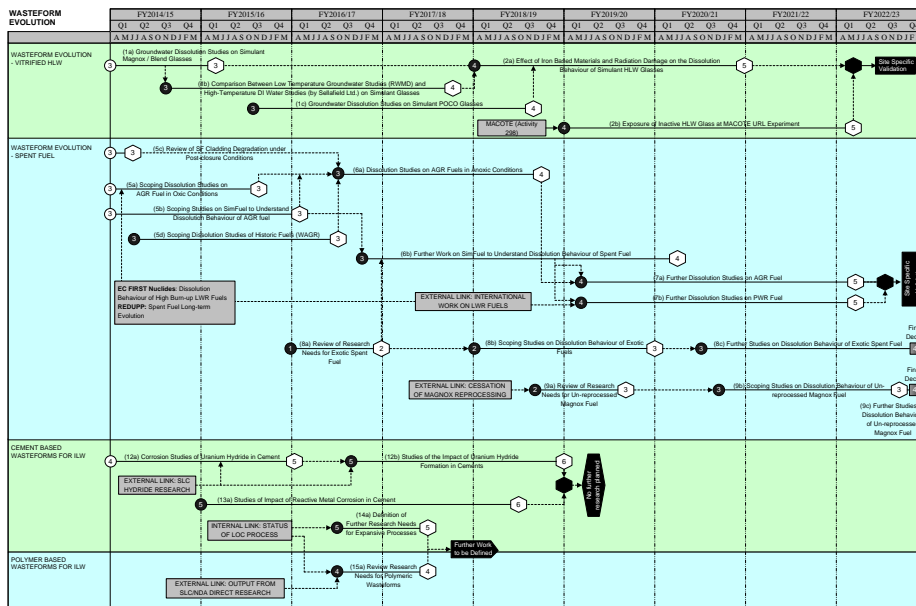


Academic Engagement

Appendix A



Appendix B



Draft for Technical Advisory Panel
Not Protectively Marked

RWMD Report

**Geological Disposal
Science & Technology Plan**

Document preparation and approval

Prepared by:	J P Martin, R Whittaker
Checked by:	S Vines
Approved by:	A Ellis

Document information

Document Number:	Linklink no
Revision:	
Date:	
Publication Tracking No.	

STATUS: DRAFT / PROVISIONAL / FINAL

PROVISIONAL status means this Technical Note has been prepared to facilitate the NDA RWMD work programme and does not necessarily reflect the company's final position.

Top Level Report

Not Protectively Marked
Draft for Technical Advisory Panel

Appendix C

Appendix B. Task Sheets for Wasteform Evolution Subsection of the Science and Technology Plan

Task Number	Isa
PSS level 4	Wasteform evolution
PSS level 5	Wasteforms for HLW/spent fuel
PSS level 6	Spent fuel

Review of Research Needs for Exotic Spent Fuel

Background

Although work has been undertaken in the UK on the evolution of HLW glass and spent fuels, this has not been focused on disposal issues. Conversely, significant work has been carried out in other countries to understand the behaviour of these materials under disposal conditions. Current work in the UK focuses on gathering available information and commissioning studies aimed at evaluating the behaviour of materials whose composition and properties are specific to the UK.

There is a good understanding of the behaviour of Light Water Reactor (LWR) spent fuel under conditions relevant to geological disposal. However, the UK inventory contains spent fuels from a number of different reactor types with characteristics that are unique to the UK, for example Advanced Gas Reactor (AGR) fuel. RWMD plans to study a variety of spent fuels arising from commercial and research reactors that have been operated in the UK, initially focusing on fuels that are likely to require disposal in significant quantities (AGR) and, to a lesser extent, PWR fuels and, going forward, considering fuels that are likely to be disposed in smaller quantities or whose disposal inventory (if any) is largely dependent on the efficiency of ongoing reprocessing operations (Magnox and Exotic fuels). Work on the leaching behaviour of spent (irradiated) mixed oxide fuel (MOX) may be also carried out depending on the outcome of strategic decisions on the use of plutonium (see also 'Wasteforms for plutonium' section).

Initial research studies will be aimed at developing an initial understanding of the typical leaching rates and identifying the key factors controlling the leaching behaviour. In the case of AGR fuel, which currently features the largest in the disposal inventory for which leaching methodologies are being developed, and for which any mechanistic understanding gained is expected to be applicable to a good fraction of the remaining spent fuel inventory, initial studies will be more substantial in scope and carried out in two stages (first see 'first stage conditions'). These studies will be followed by additional (further) studies aimed at providing additional understanding and at underlying data for use in safety assessments. In this context, RWMD will consider recent advances in mechanistic understanding and modelling of spent fuel evolution achieved internationally and its applicability to UK spent fuels.

Research Need

To develop a mechanistic understanding of the evolution and dissolution behaviour (instant release and long-term dissolution rate) of UK spent fuels in near-neutral and to a lesser degree, alkaline groundwater to support the assessment of packaging solutions, the development of suitable disposal concepts, the development of the safety case and, where appropriate, strategic decisions on suitable waste management strategies for these materials.

Research Objective

To identify research needs for Unreprocessed MOX fuels on the basis of available information about their chemical characteristics.

Scope

Review of chemical characteristics of exotic fuels and of any PWR work that has been carried out in the past.

Identification of future research needs

Task ID	SRIL at task start	SRIL at task end	Knowledge gap	Target SRIL	Target Urgency
1	H	H	H	4	M

End point 1 task 20

Further information

This task will be carried out by our Contractors and/or NDA internal resources.

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RWMD Involvement

- **Member of Programme Executive Board**
- **Nominated leads to support each project**
 - HydroFrame – Rob Whittleston / Simon Norris
 - Lo-RISE – Rebecca Beard
 - TREE – Ray Kowe
- **Coaching / guidance**
- **Facilitation of opportunities**
- **Links to EPSRC Geowaste cohort**

Thank you

RWMD Bibliography:

<http://www.nda.gov.uk>

Any questions:

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