Nuclear Decommissioning Authority

Research and Development in the NDA

The UK National Cleanup Programme

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www.nda.gov.uk

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- Background to NDA
- NDA Strategy
- Management of R&D

THE NDA - A Summary

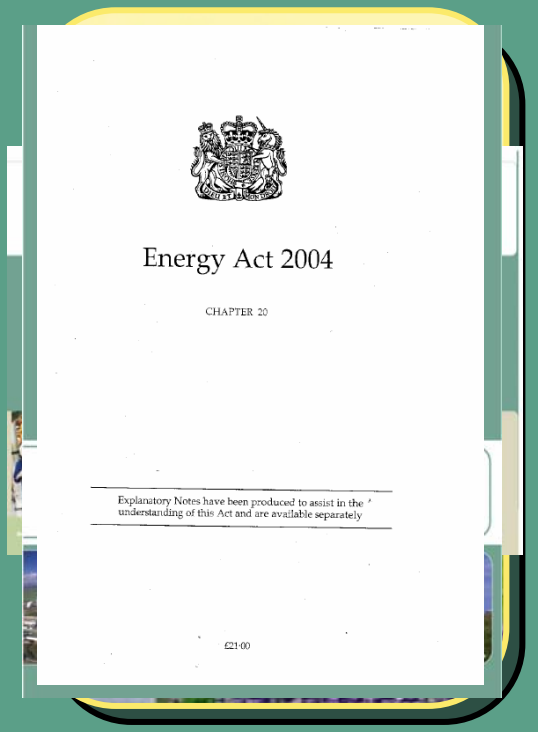
- A Non Departmental Public Body (NDPB)
- A Spend of circa £2Bn per year
- A current clean up bill of £56Bn and growing
- A team of 230 people at peak
- A number of challenging targets !

The Nuclear Decommissioning Authority - Mission

Our core objective is to ensure that the 20 civil public sector nuclear sites are decommissioned and cleaned up safely, securely, cost effectively and in ways that protect the environment for this and future generations.

The Nuclear Decommissioning Authority

- **2001: Government announced intention to make radical changes to the way that nuclear clean-up is managed and funded by the UK taxpayer**
- **2002: White Paper published proposing the creation of the Nuclear Decommissioning Authority (NDA)**
- **2004: The Energy Act 2004, which established the NDA, is enacted**
- **2004: NDA issued its first Annual Plan**
- **2005: NDA became fully operational on 1 April**
- **2005: NDA issued draft Strategy for Consultation**
- **2006: NDA Strategy Published**



Site Locations

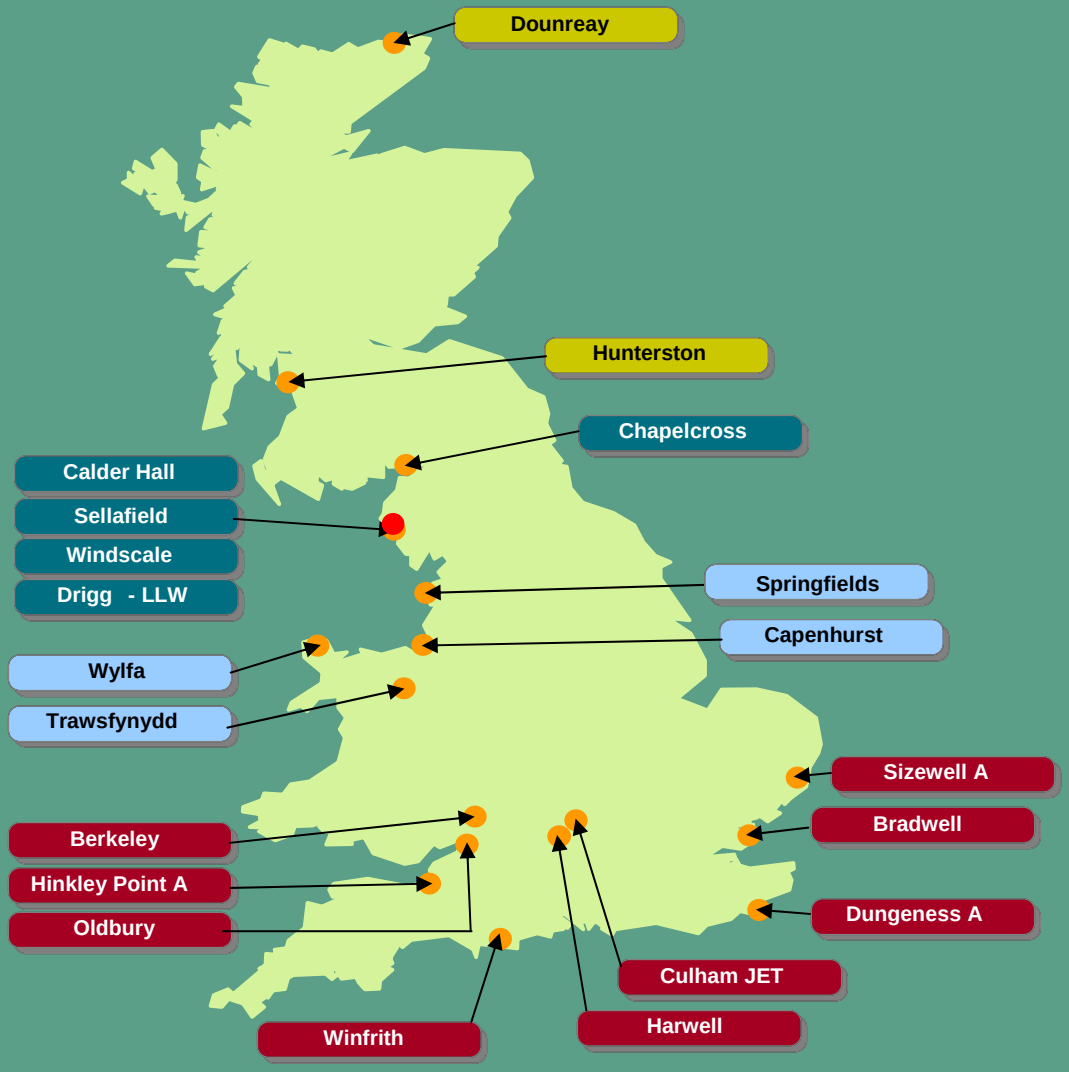
Region 1

Region 2

Region 3

Region 4

Headquarters



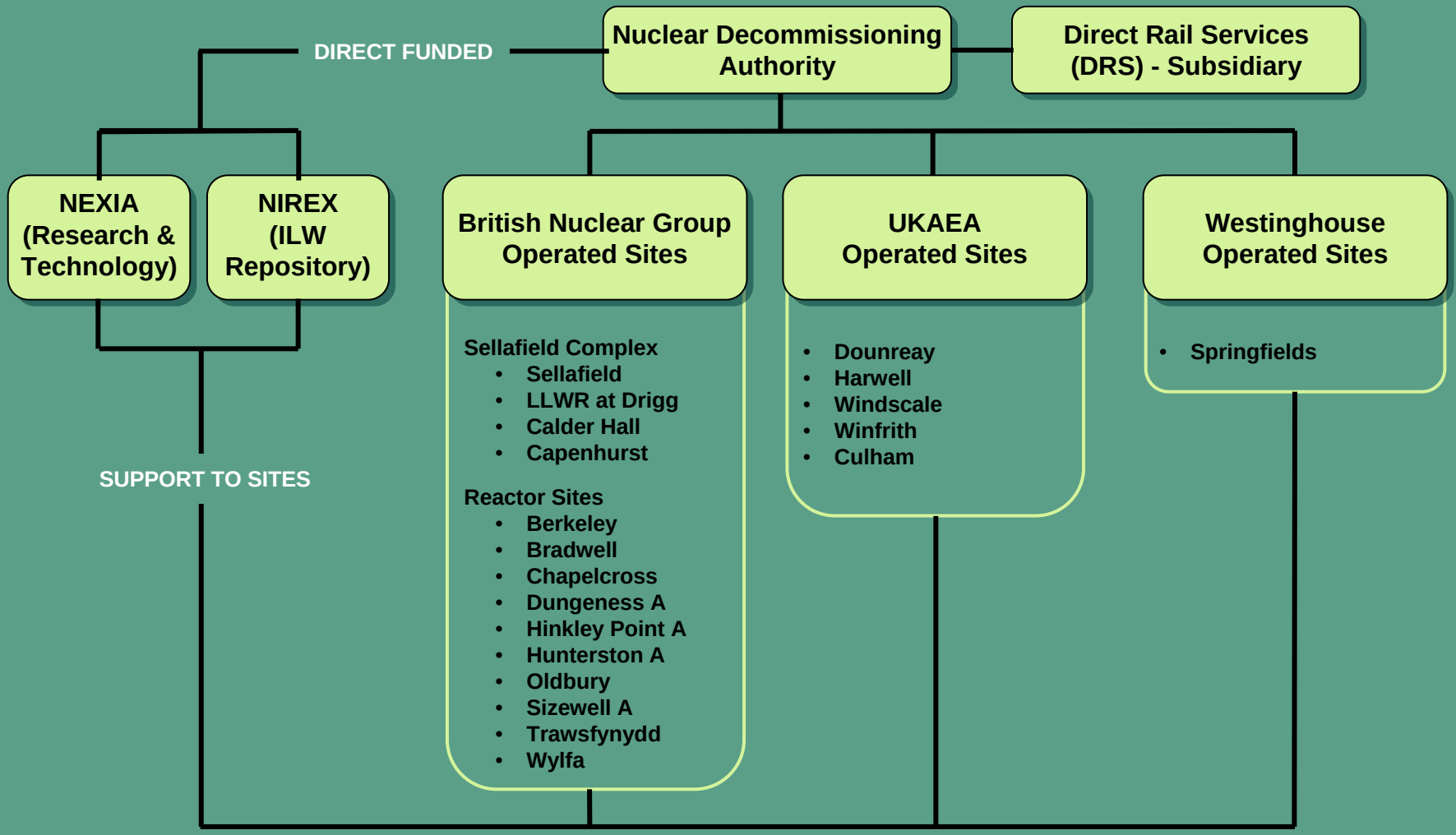
NDA Strategy

Our Aims

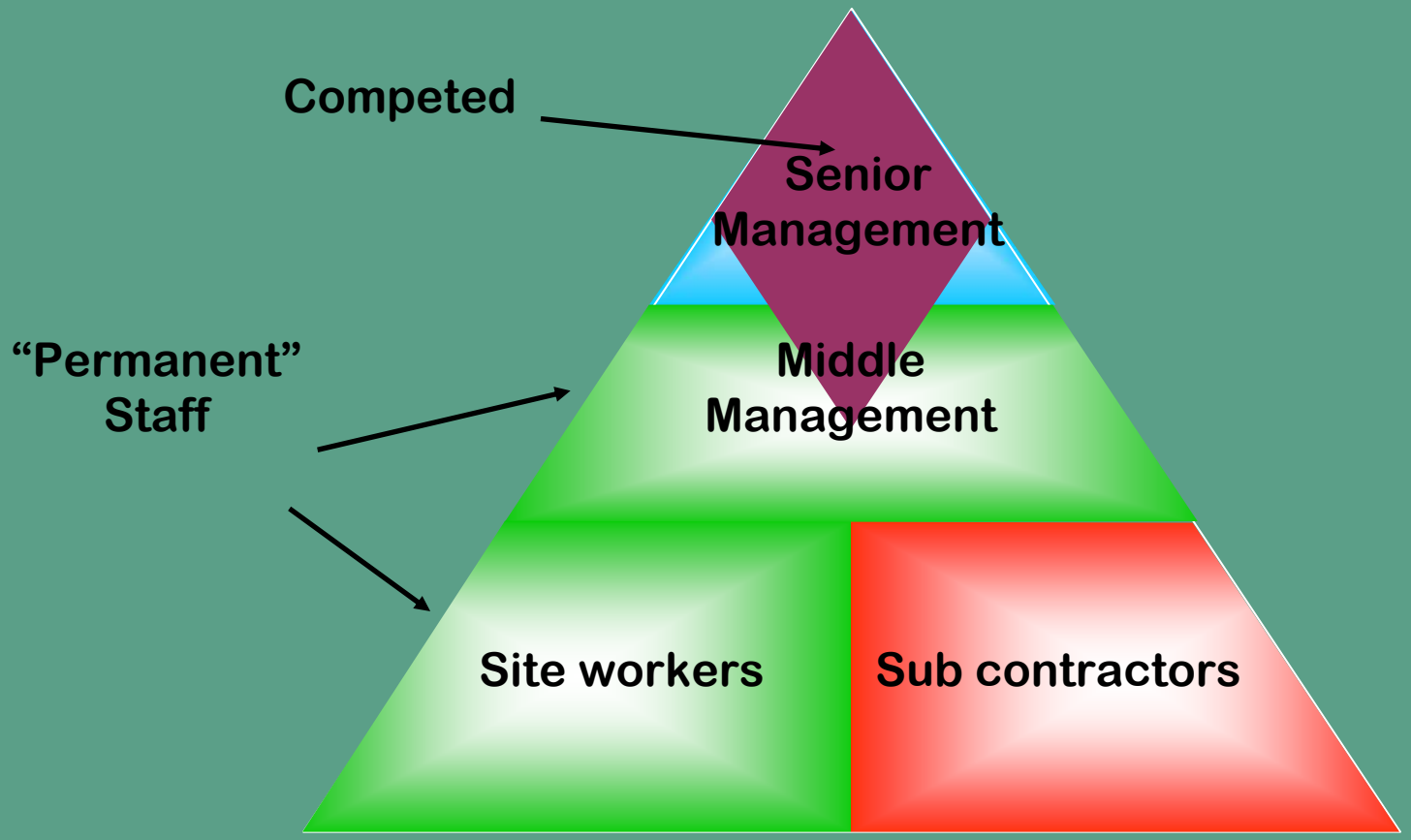
Priorities for the next 5 years:

- Create robust, costed and funded plans to clean up sites based on a comprehensive understanding of the liabilities
- Demonstrate real progress in reducing high hazards in legacy facilities, especially at Sellafield
- Complete competitions for managing and operating nearly all our sites
- Agree a better approach to interim Intermediate Level Waste (ILW) storage and Low Level Waste (LLW) disposal
- Accelerate the decommissioning timescales for Magnox sites
- Define end states and agree timescales for all sites

NDA Existing Contracts



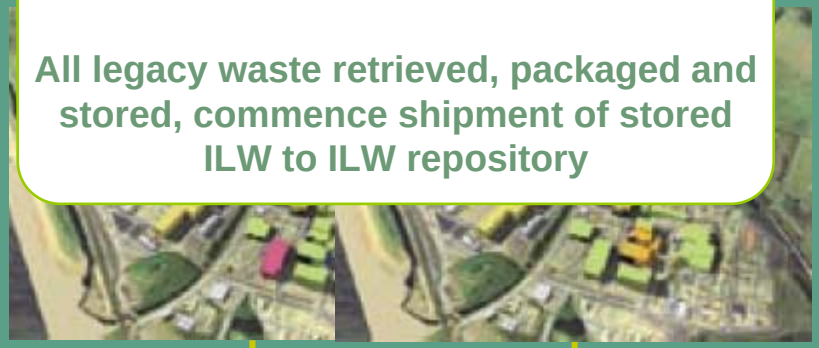
Site licence company



Current Lifecycle of the Sellafield Site

2040

All legacy waste retrieved, packaged and stored, commence shipment of stored ILW to ILW repository



2016

A ssociated w cation of

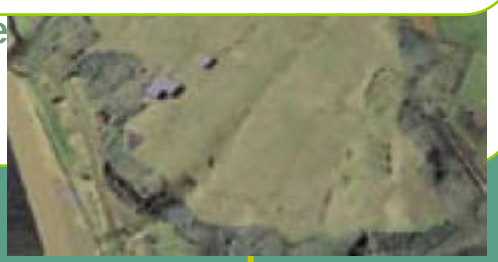
2000 **2005** 2010 **2016** 2020 2030 **2040** 2050 2060

Current Lifecycle of the Sellafield Site

2080

Strategy Aim

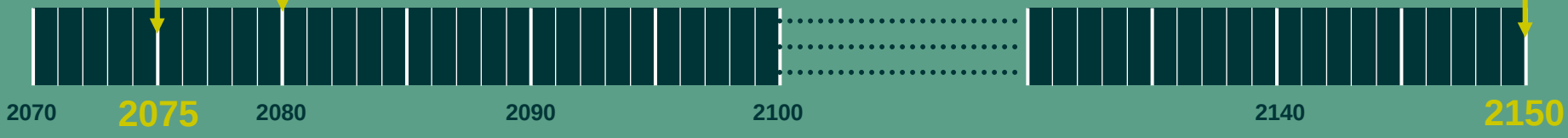
Commence



2150

Site End State

A schematic representation depicting plutonium and uranium stores on site. Site in a safe, passive state subject to institutional controls pending final decision on its future



Waste Management

- Ensure targets for reducing liquid high level waste (HLW) are met and material put into passive safety;
- Review options for interim storage of intermediate level waste (ILW);
- Press for early decision by Government on long-term management arrangements for HLW and ILW;
- Reduce volumes of LLW produced: seek new approaches to low level waste (LLW) disposal.

Determine best approaches for interim management of HLW and ILW: and disposal of LLW

Vitrification Test Facility
Courtesy BNG Sellafield

Commercial Operations and Assets

- Continue to run Magnox power stations and fuel fabrication facilities efficiently and effectively;
- Plan to review future of THORP and Sellafield Mox Plant with Government;
- Evaluate all contract extensions or new business against strict criteria agreed with the Government;
- Discuss with the Government which non-core assets and operations could be divested;
- Evaluate longer term options for AGR spent fuel.

Ensure that operational facilities continue to run efficiently until they close

Management of Nuclear Materials

- Ensure nuclear materials are stored safely, securely and without danger to the environment;
- Discuss with Government what proportions of civil-owned uranic materials and plutonium should be regarded as strategic stock; and what proportions as waste;
- Discuss and agree with Government whether to sell plutonium to an overseas manufacturer of Mox fuel;
- Commission R&D to address Pu disposition

HIP Process - Pu waste treatment
Courtesy Nexia Solutions

Discuss issues relating to uranic material and plutonium with the Government

Management of R&D

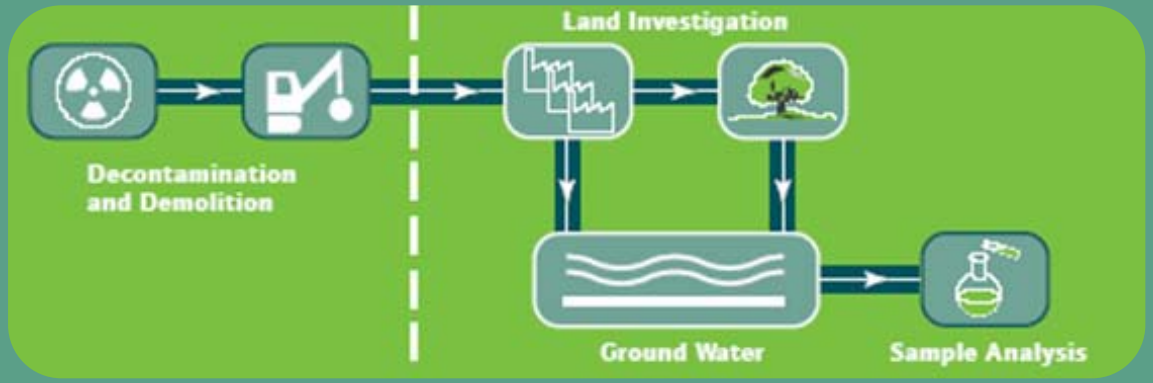
Underpinning LCBL's

NDA need to be convinced that the plans are technically underpinned.

LCBL 05 – required Technical Baselines and Research Requirements.

Full life cycle analysis.

Technical Baseline – Decommissioning e.g. Site End State



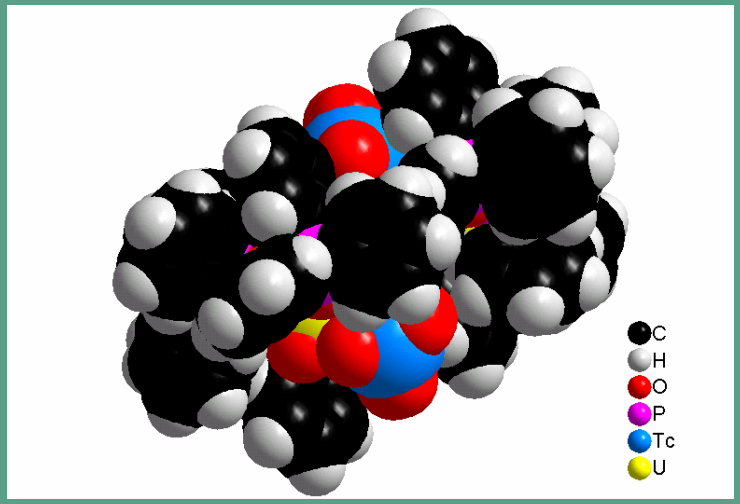
Array of boreholes Drilled across the site

Borehole monitoring

End state following demolition

Research and Development

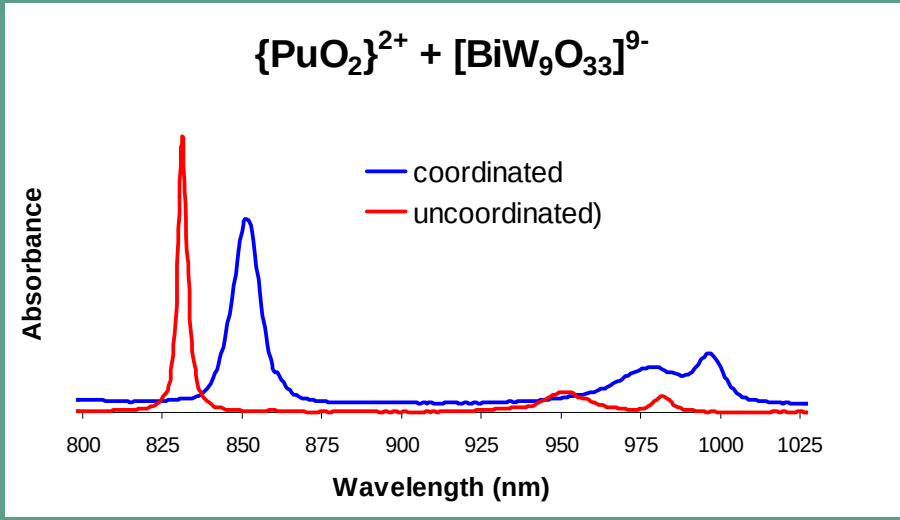
- Site License Companies (SLC) are accountable for conducting R&D programmes to deliver the LCBL - innovative improvements.
- The majority of NDA R&D will be conducted by the SLC as an integral part of LCBL activities.
- Requirements for identification of these R&D plans are described in the NDA Procedure – Lifecycle Baseline requirements



U – Tc Complex formed in Purex process
Courtesy University of Manchester

Research and Development - NDA

Plutonium Coordination
Courtesy University of Manchester



- NDA will establish direct contracts with organisations to support R&D activities when generic to a no. of our sites
- Output of R&D all activities will be made available to other organisations that are delivering work scope on NDA sites
- NDA will annually produce an overview of R&D activities supported by the NDA

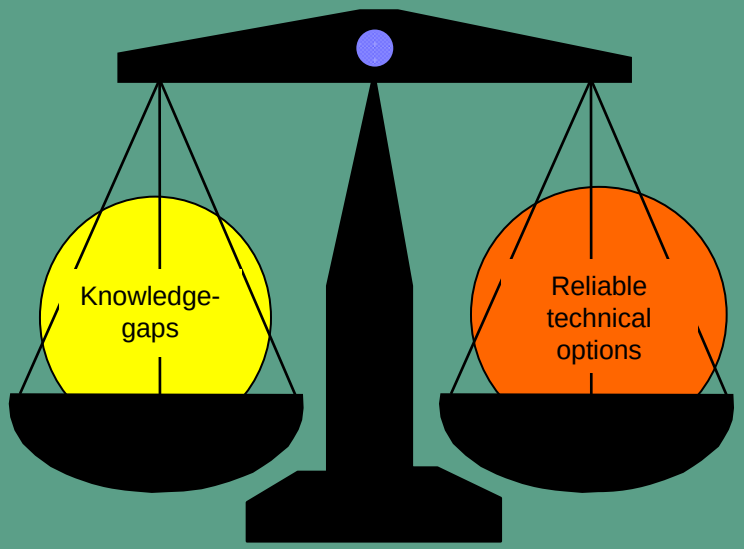
Research & Development

Mainly Incremental development.

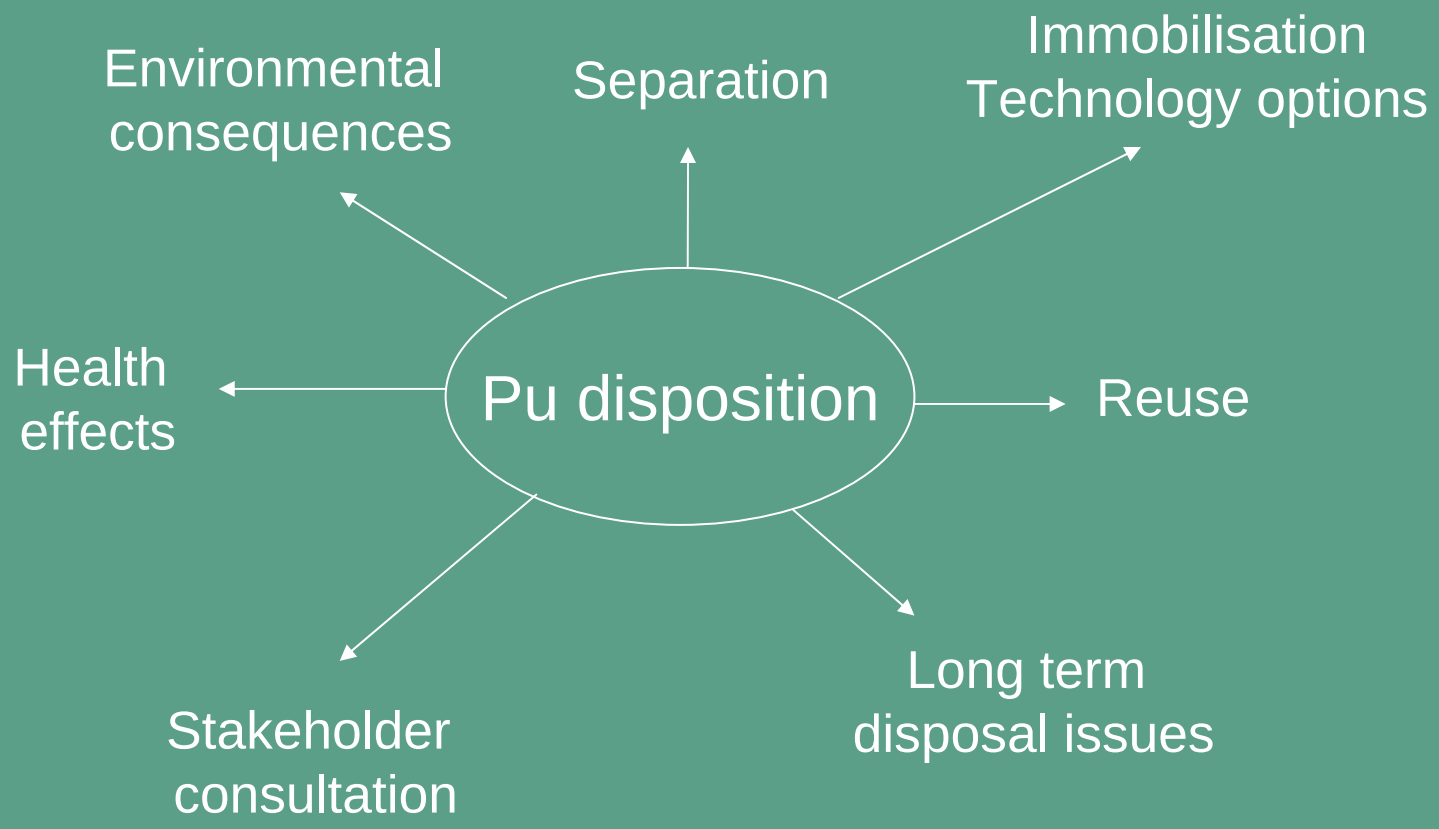
No. key issues. requiring high level of R&D – Pu / Spent fuel / legacy ponds etc.

Opportunities for common solutions.

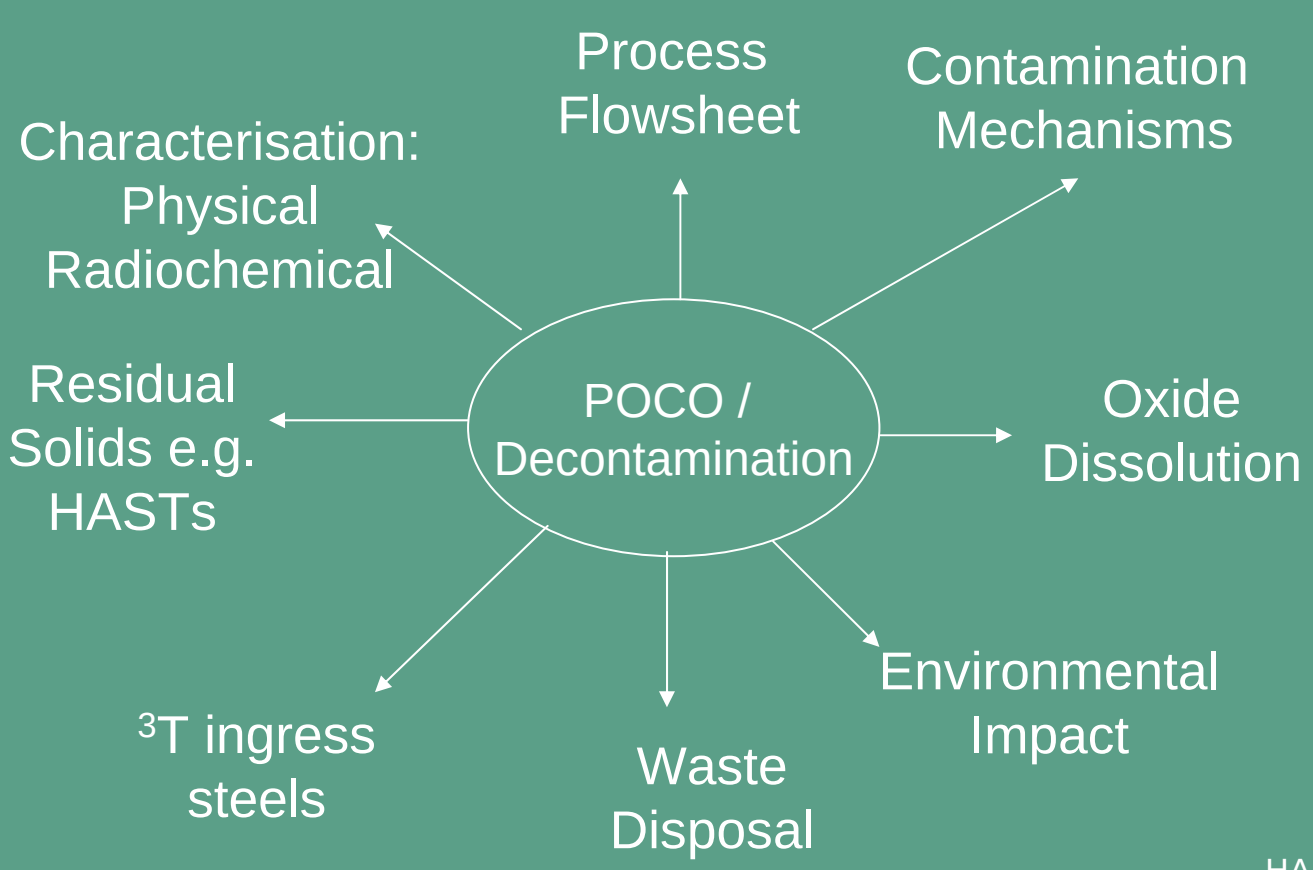
Balance underpinning knowledge vs moving projects forward.



Pu Management

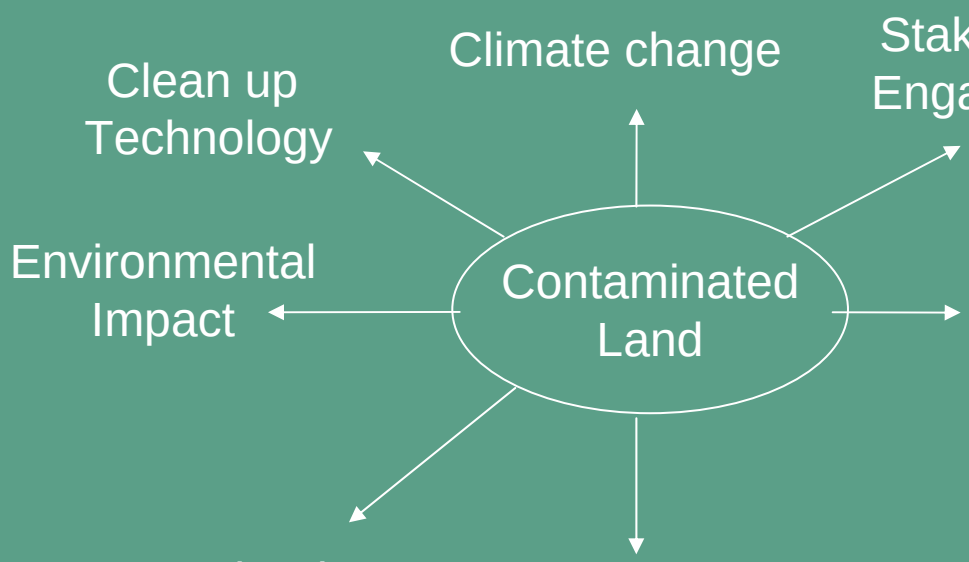


Key Areas - Plant Washout



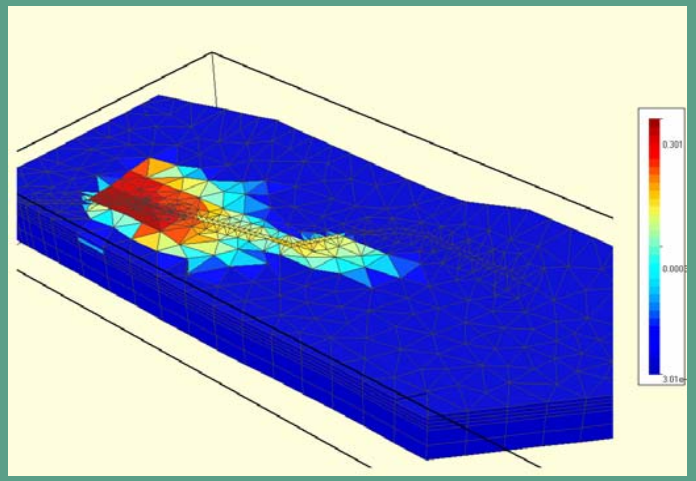
HAST Solids Formation
Courtesy Nexia Solutions

Key Issues – Contaminated Land



Model of radioactive plume of contamination ground water

Courtesy Nexia Solutions



Environmental Research - Opportunities

- Radioanalytical
- Hazard management
- Disposal
- Health impact
- Environmental Methodology – BPEO / BPM
- Process optioneering

Conclusions

- Fundamental understanding of behaviour of radiochemical's fate essential to NDA Mission
- Availability of skills key issue
- NDA Strategy for Environmental Restoration
- Opportunity for the scientific community from fundamental science to operations

Watch This Space!!!

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ANY QUESTIONS?