

# TRANSCEND: Collaborative Research Programme in Transformative Science and Engineering for Nuclear Decommissioning

## **Overview and Progress**

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UK Nuclear Academics Meeting, University of Strathclyde, 7th-8th September 2022



### Background

- 1<sup>st</sup> October 2018 to 30<sup>th</sup> September 2023, includes 12 month extension due to covid-19 impact and delays in accessing active facilities
- £4.59M EPSRC  $\rightarrow$  total £5.73M, plus £3.70M from industry = £9.43M
- World-class University network:



Technical Themes: Integrated Waste Management / Site Decommissioning and Remediation / Spent Fuels / Nuclear Materials

**Cross-Cutting Activities: Facilities / Impact** 



Progress (since last year)

#### People:

• 1 PDRA left with post advertised

#### Meetings and Publications:

- Leadership Team, Management Board and Impact Committee meetings held November 2021 and May 2022
- International Advisory Group meeting held November 2021
- Annual Meeting held in Harrogate November 2021
- Technical Theme meetings May 2022
- TRANSCEND session at Waste Management 2022 and display in UK Pavilion
- NDA Supply Chain Event July 2022
- 3<sup>rd</sup> newsletter recently published, 92 journal and conference publications to date





# WM Symposia 2022

- Session 9.7b, 'The UK EPSRC "TRANSCEND" Collaborative Research Programme', Thursday 10<sup>th</sup> March, 13:00-16:35
- Session chair lan Pegg
- Papers:
  - Overview
  - Integrated Waste Management
  - Site Decommissioning and Remediation
  - Spent Nuclear Fuels
  - Nuclear Materials
  - Active Sample Research
  - Industry Overview of TRANSCEND
- UK featured country
- Presence in UK Pavilion (23 organisations + NDA group + NNL + us)



Elanor Murray (Birmingham) and Angus Siberry (Bristol) – awarded Roy G Post Foundation Graduate Scholarships





Progress (since last year)

### **Research Projects:**

- Experimental and numerical simulation researchers most impacted by covid-19 assisted by transferring funds for 3-6 month extensions to 4 PDRAs
- 7 PDRAs subsequently given additional support (2-3 months)
- Proposals for EPSRC / NDA / RWM funds for active work submitted, 10 approved, 1 under review

### Impact and Training:

- 2 BEIS secondments completed, 1 underway, 1 position advertised
- Established YouTube channel, including VR activity (joint venture leveraging RAEng funding), 3 videos about project (1 completed, 2 underway, narrated by Jim Al-Khalili), and interviews with researchers
- Public outreach activity nearing completion, game being developed as route to providing public understanding of research and development needs, opportunities and solutions
- Proposal writing training for PDRAs and early career researchers held in conjunction with Annual Meeting in November 2021



## **Research Success**

- Technical progress available on Gateway to Research
- Novel synthesis methods developed for new materials for removing radionuclides from effluent
- Behavioural modification techniques for improved flow, mixing and separation of wastes during retrieval and POCO activities demonstrated
- Application of colloidal silica grout to repair damaged cementitious waste packages demonstrated to restore strength to fractured cement
- Electrokinetics demonstrated to form in-situ barrier to prevent radionuclide migration within soils
- Laser-based techniques used to develop extensive spectral database for spent fuel applications to be shared as open-access resource
- Properties and release behaviour of products from metallic / exotic fuel corrosion under 'partially wet' and GDF conditions established
- Novel techniques for measurement of water adsorption at actinide oxide surfaces developed, with measurements on PuO<sub>2</sub> surfaces planned
- Uncertainties relating to use of ceramic / glass-ceramic waste forms for Pu disposal under conditions relevant to GDF being reduced through comprehensive experimental programme





### What's Next

Still catching up on work impacted by covid Researchers:

- Additional support for PDRAs will be provided, funds permitting
- **In-Person Activities:**
- Leadership Team, Management Board and Impact Committee meetings, International Advisory Group meeting, and Annual Meeting in Glasgow in November 2022
- Final Annual Meeting around Easter 2023
- Challenge-led meetings to focus on specific challenges within sector being organised on Pu and digital twins
- Further attendance at science festivals; PDRA industry placements; summer school training in public, media, industry and government engagement

#### Output:

- Continue roll-out of innovative technologies that can be applied on plant
- Impact cases to provide information sheets for BEIS / publications





### The Future



- Advised that there will be no follow-on call
- Currently preparing Programme Grant proposal on 'Design for Decommissioning' – transformational approach to waste management and sustainable fuel cycles to allow design for decommissioning





Thank you for your attention – Any questions? Website – transcendconsortium.org Twitter – @Transcend\_epsrc