Research Support Office

Radioactive Waste Management

RSO Discipline Update: Radiochemistry

Francis Livens (University of Manchester) & Will Bower (RWM)

Introduction

Francis Livens

Professor of Radiochemistry

Director, Dalton Nuclear Institute

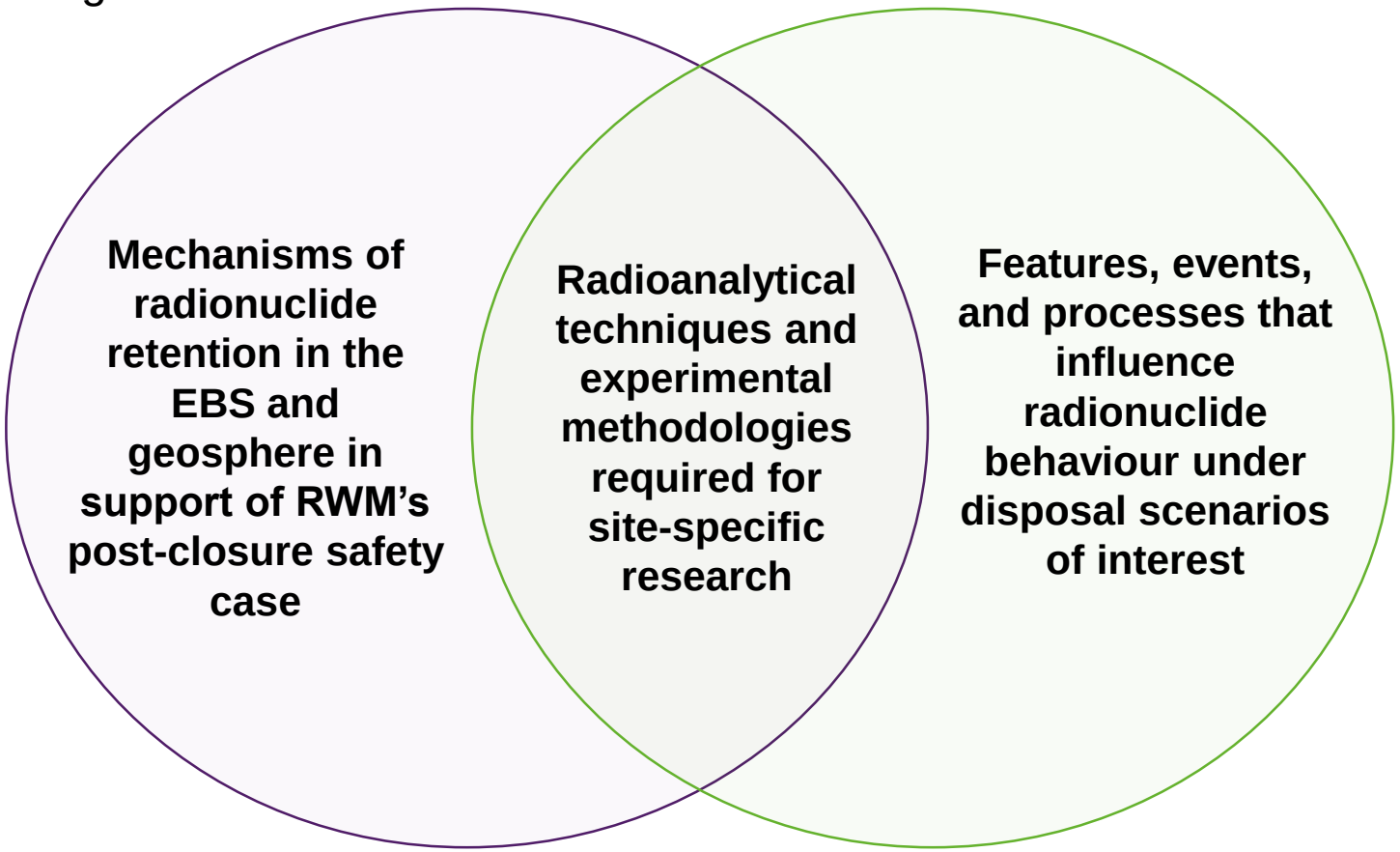
NDA Board Member

Will Bower

RWM Research Manager

Introduction

The RSO **'Radiochemistry'** theme has the broad aim of deepening RWM's understanding of the:



Current Research Areas

Research Support Office

Working to reduce assumptions/conservatisms in the treatment of:

Uranium-series radionuclides

- An improved understanding of alternative barrier materials for DNLEU disposal (e.g. phosphate-based cements)
- Development of complementary safety arguments, particularly for the period beyond that covered by probabilistic safety arguments.

High-solubility anionic radionuclides

- Understanding the limits of so-called “unlimited” solubility.
- Exploring unknown or poorly understood FEPs which influence the mobility of long-lived anionic radioelements in the near-field and geosphere.

What have we been up to?
RSO Supported PhD Projects

Research Support Office

1. NDA ICASE PhD (October 2021):

Project title: *The Missing Sink? Exploring iodine retention in the geosphere* (Univ. Manchester)

- Providing in-kind work to Mont Terri Underground Research Lab.

2. GREEN CDT / RSO Bursary (October 2021):

Project title: *Mechanisms of radionuclide retention in aged cements* (Univ. Manchester)

3. RSO Bursary (~Jan 2022):

Project title: *Uranium and U-series radionuclide behaviour in phosphate-based cement systems*

- 'Twinned' with a materials science discipline area project: Understanding the long-term behaviour of alternative backfills for DNLEU disposal.

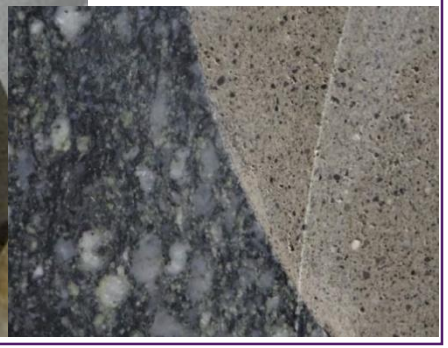
What have we been up to?
Support to International Partnerships

Research Support Office

Cross-disciplinary support -

Support to Materials Discipline Area - provision of samples from CIM experiment at the Grimsel Test Site.

PhD project: Advanced characterisation of hydrothermally aged cement – Univ. Strathclyde

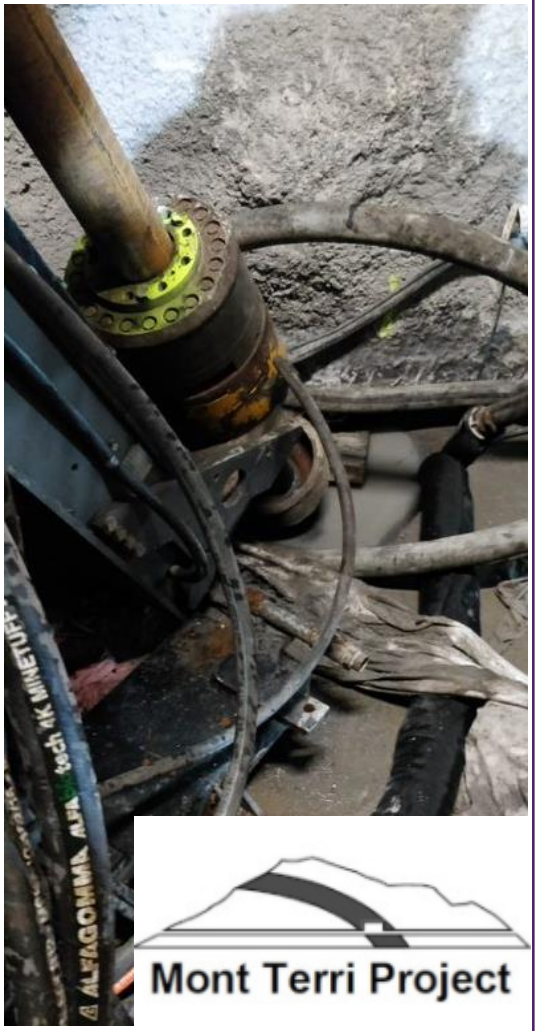


nagra. GTS

Work in-kind

Support to the DR-E experiment at the Mont Terri Test Site – samples provided for baseline experiments.

Student Opportunities:



Mont Terri Project

Upcoming PhD Projects

Research Support Office

2x PhD projects upcoming via 21/22 RSO Bursary:

1. ***Project title:*** *The co-mobility of actinides and neutron poisons in variant disposal scenarios*
    - Predictability of co-mobility of actinides and neutron poisons to underpin post-closure criticality safety arguments.
    - Differential studies on the migration of actinide/REE pairs in different disposal scenarios.
    - Understand relative behaviour of rare-earth elements (e.g. Eu) as analogues for neutron poisons (e.g. Gd).

2. ***Project title:*** *Exploring the effect of groundwater salinity on radionuclide behaviour in the geosphere*
    - Examination of radionuclide (or analogue) behaviour in highly saline groundwaters (up to brines) and comparison with current understanding.
    - Development of innovative techniques and approaches for examining post-closure radionuclide behaviour in future site-specific samples from saline environments.

Will be advertised via RSO Bursary Call

Announcement of Opportunity: DNLEU Expert Review

Research Support Office

RWM is considering key topics for future funding through the RSO.

Open call to engage in RWM's review process on the future of research in Depleted, Natural, and Low Enriched Uranium disposal.

Inviting experts for a **review of the 2016 RWM Integrated Project report:** *Recommendations for future work on DNLEU disposal.*

A reviewing panel will be selected following **a mini-competition.**

Any information provided may be incorporated into a future grant proposal.

Reviewers will be paid for their time.

Details/process will be advertised via RSO Website shortly