Radioactive waste sites: Contaminant migration & remediation

School of Civil & Environmental Engineering

Capacity to examine hydraulic and biogeochemical drivers behind radioactive waste migration and trial novel, field-based remediation technologies based on a comprehensive understanding of the underpinning science

Issue: Legacy radioactive waste sites

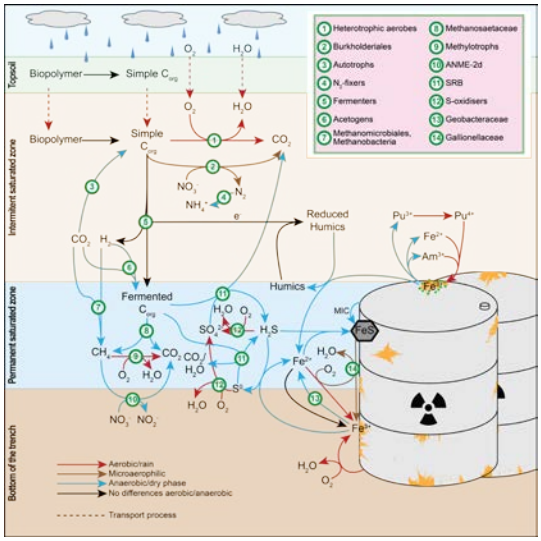
- Legacy low-level radioactive waste (LLRW) sites are common around the world, including Little Forest Legacy Site, Sydney Australia
- They frequently contain radionuclides (e.g. Pu, Am and U) along with a range of co-disposed inorganic (heavy metals) and organic contaminants
- Understanding contaminant interactions and mobilisation pathways is essential for their future remediation

Biogeochemistry and hydrology tools

- Multiple analytical tools (e.g. shotgun metagenomics, α & γ spectroscopy) have been used at the Little Forest site to identify biogeochemical drivers
- Coupling this with reactive transport modelling allows further understanding of hydraulic mobilisation pathways (see diagram left)

Remediation technologies: Laboratory to field-scale

- In conjunction with the Australian Nuclear Science and Technology Organisation (ANSTO) we are in the process of constructing full-scale replicate trenches at the legacy LLRW site which we are subjecting to relevant remediation measures (see photo below)
- Specific remediation scenarios investigated include engineered capping and in-situ stabilisation (via colloidal silica grouting)
- Field trials will enable a comprehensive feasibility assessment (scientifically robust) of different remediation strategies prior to implementing on the actual waste form



Shotgun metagenomics coupled with multiple field- and laboratory techniques allowed the reconstruction of major biogeochemical pathways at the Little Forest Legacy Radioactive site, Australia. This is essential for understanding contaminant migration pathways

Field-scale replication of legacy waste trenches at Little Forest Site, Sydney Australia. Photo shows one of four trenches excavated to replicate hydraulic and biogeochemical processes, and also to test remediation technologies (e.g. in-situ grouting using colloidal silica).

Our experts

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More information

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