Spent Fuel and Waste Science and Technology: Disposal Research Highlights
(Argillite R&D, Crystalline R&D, EBS R&D, OWL)

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SFWST R&D Working Group meeting
Las Vegas, Nevada
May 22, 2018
Selected Highlights in Disposal Research

Argillite Disposal R&D

- Geoscience Symposium 2018 – Presented topics on the effects of heat generating waste including:
  - Reactive-transport modeling (THC) with decay heat effects
  - Thermodynamic modeling of barrier material interactions (clay, cement, metal)
  - Clay interaction experiments/modeling
    - High temperature mineral phase stability, clay – metal interactions
    - Low-T RN sorption/diffusion in bentonite & modeling
- High temperature thermal-hydrological-mechanical-chemical (THMC) modeling
- Spent fuel matrix degradation model development
Selected Highlights in Disposal Research

**Crystalline Disposal R&D**

- Developed a general modeling framework to synthesize field observations into a fracture network model for flow and transport predictions for fractured crystalline rocks.
- The modeling framework was tested against field data obtained at the Japanese Mizunami site sorption/diffusion in bentonite & modeling.
- New glass degradation model was developed, which provides a new perspective of long-term kinetics of glass dissolution.
- Significant progress was made in understanding smectite-illite transformation as well as in the development of new generation buffer materials.

Fracture network generated in FracMan from Mizunami data.
Selected Highlights in Disposal Research

Engineered Barrier Systems (EBS) R&D

- WM2018 - Presented results from a benchmarking study conducted in collaboration with colleagues at DBE TEC in Germany that compared semi-analytical and numerical approaches to calculating thermal response in a nuclear waste repository
Online waste Library (OWL)

- Completed receiving OWL BETA testing inputs (Nov. 2017) and began modifications to address inputs.
- Includes developing a “Preview” file that will become a link on the OWL Home page to show the “Coming Attractions” of the next version of the OWL

Completed additional FY18 re-planning based on new funding from the Omnibus Appropriations Bill passage

- Labs should have all received first tranche of funding, second week of May