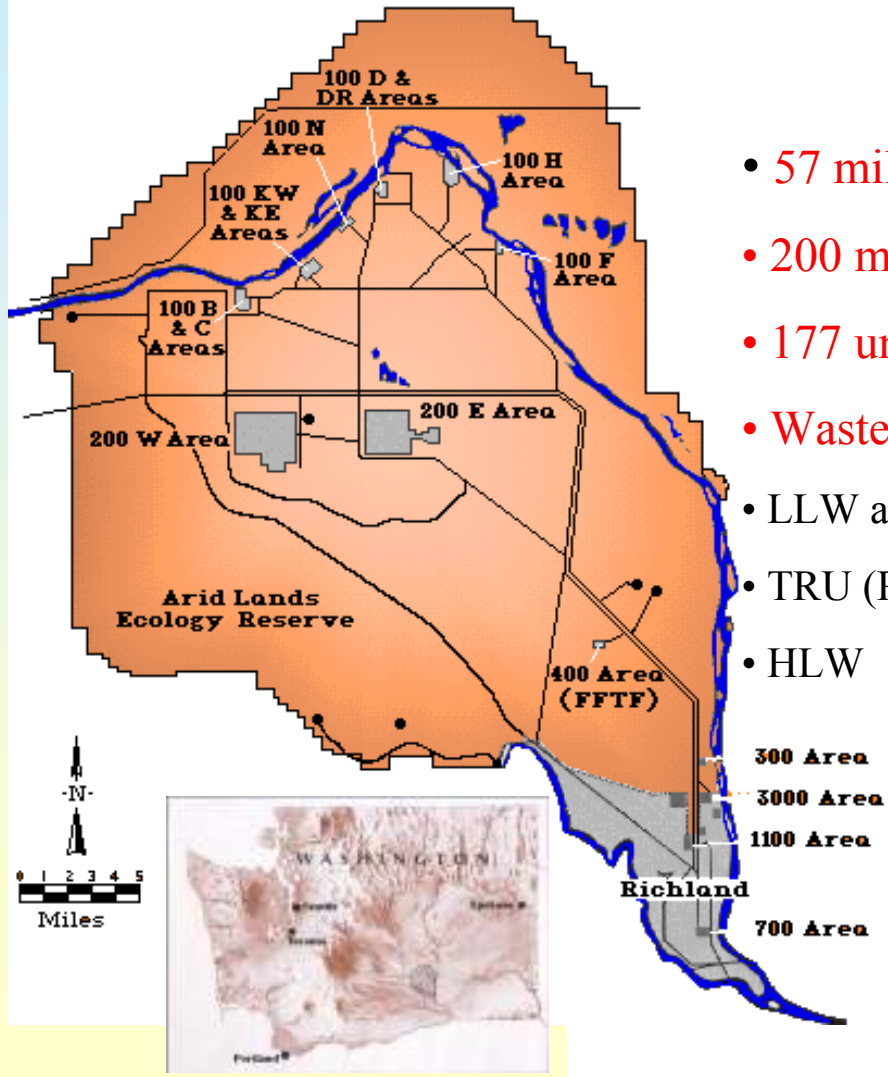


Hanford Nuclear Site



Remediation & Decommissioning at Hanford Site

Dismantle → Remove waste → Treat → Store → Dispose: onsite LLW disposal site
 : ship to TRU WIPP site
 : ship to HLW disposal site



- 57 million gallons of solid and liquid radioactive waste
 - 200 million curies of radionuclides
 - 177 underground storage tanks
 - Waste retrieval from tanks and waste treatment
 - LLW and its mixed waste
 - TRU (Pu, U, etc.) and its mixed waste
 - HLW
- Along the Columbia River,
- 50 burial grounds
 - 579 waste sites
 - 357 excess facilities for decommission
 - 8 out of 9 reactors for decommission

Hanford Remediation

Hanford remediation is

- Large scale and technically complex
- Long duration from 1989 to 2090 with the active remediation until 2050
- Very expensive
 - ◆ Annual budget of \$2 billion dollars
 - ◆ Total remediation cost of \$110 billion dollars

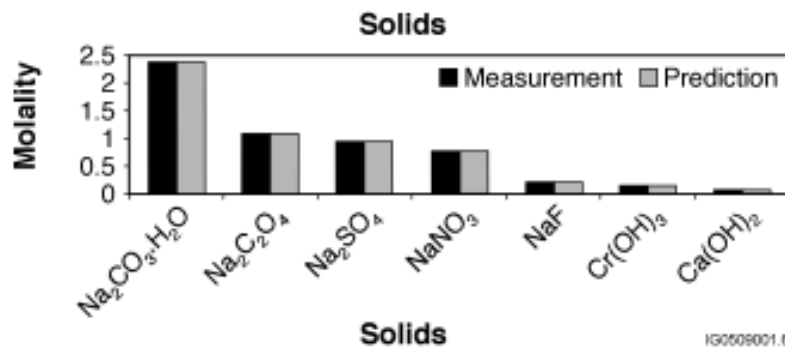
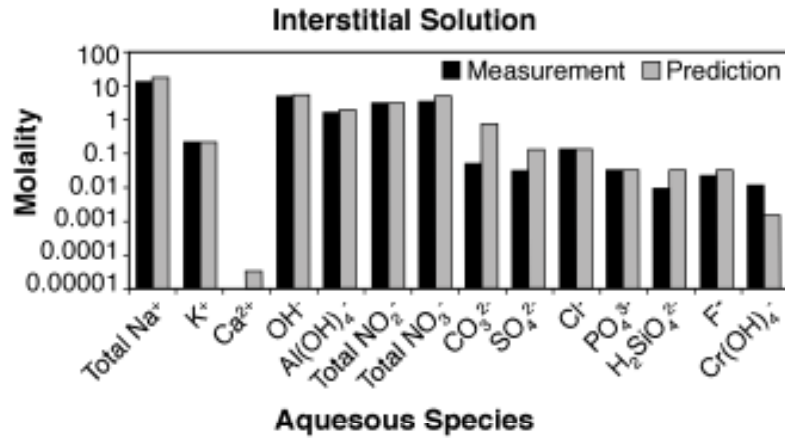
Remediation affects future lives of locals

- How clean is clean
- Future land use
- Future local industry development

Long-term R&D is needed for Hanford remediation.

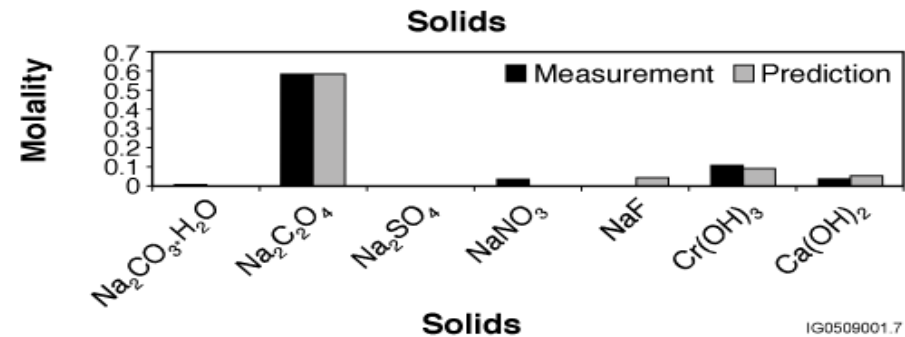
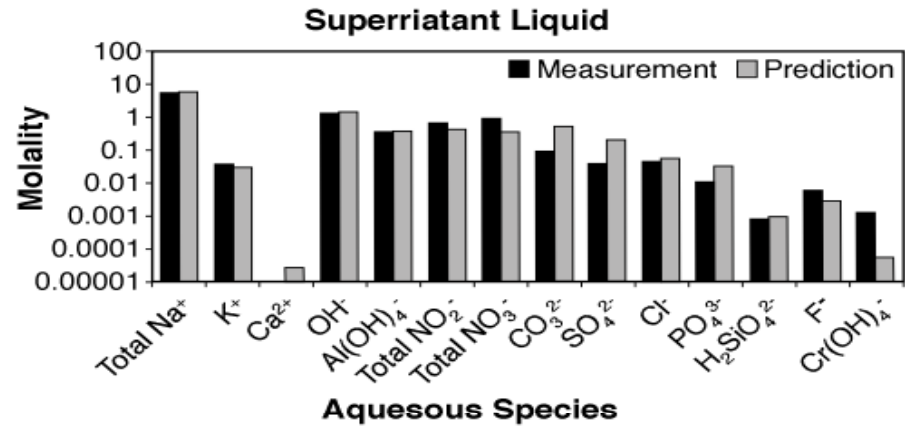
Tank Waste Chemistry Modeling for Waste Retrieval from Storage Tanks and subsequent Waste Pipeline Transport to a Waste Treatment Plant

Original Waste



IG0509001.6

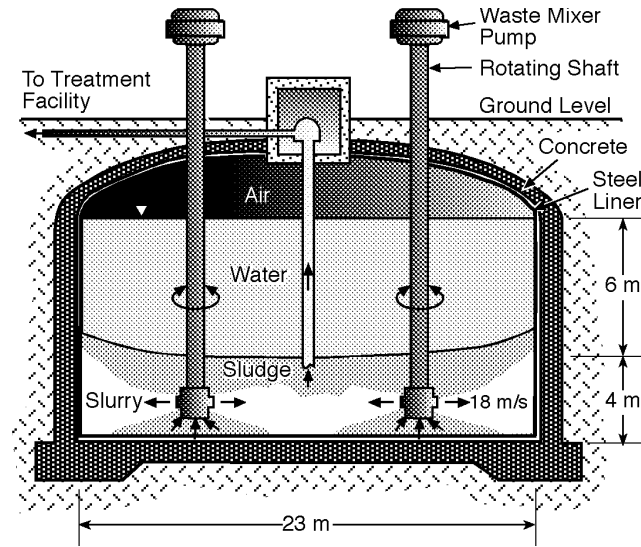
Waste Diluted by Water



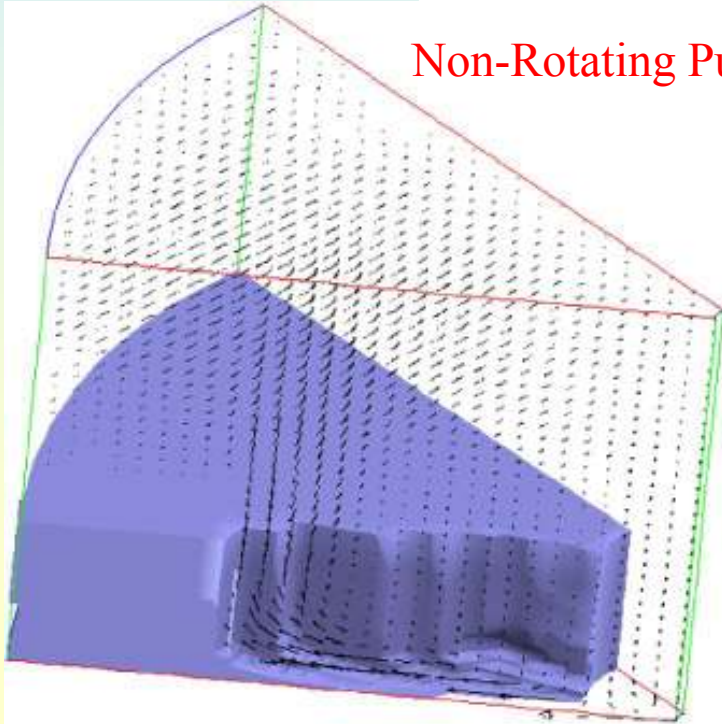
IG0509001.7

3-D TEMPEST Code: Tank Waste In-Tank Mixing Modeling

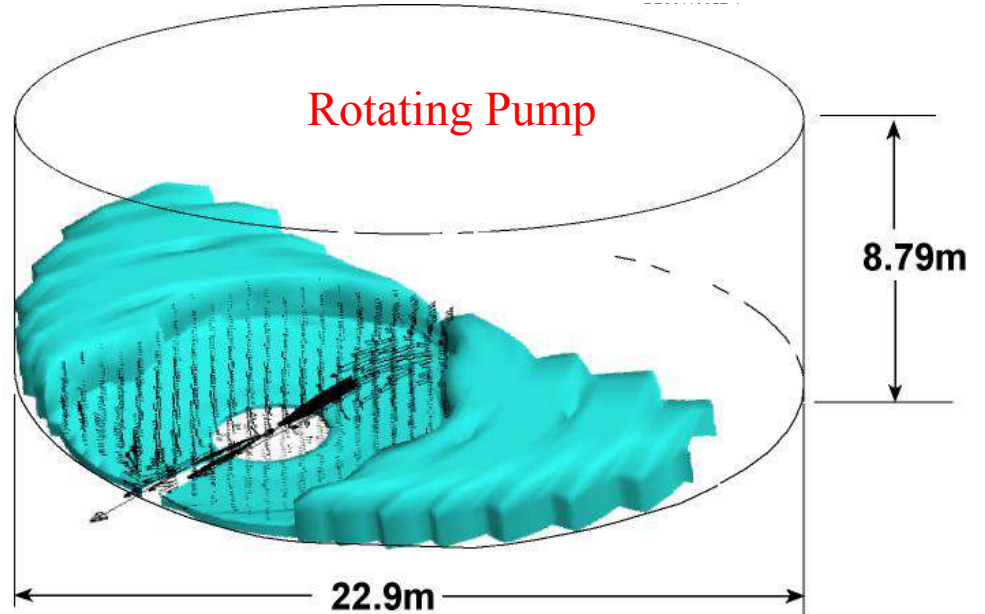
Simulation of in-tank waste mixing with two 300 hp pumps



Non-Rotating Pump

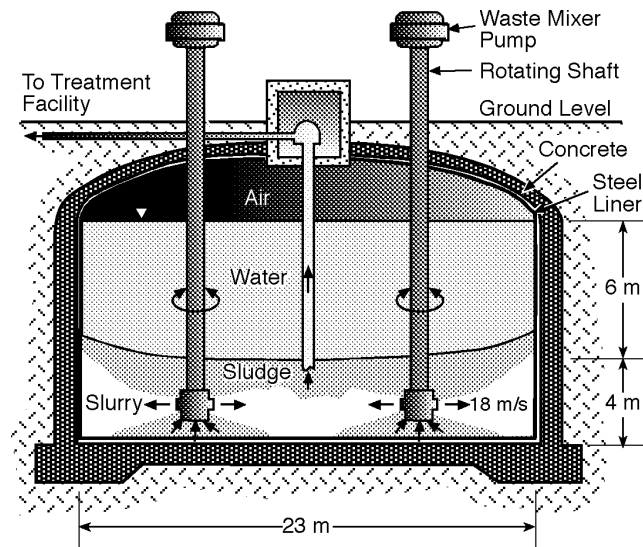
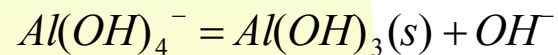
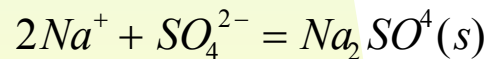
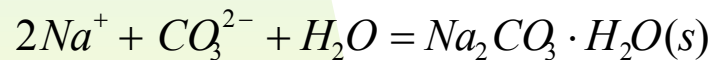
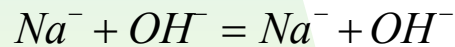
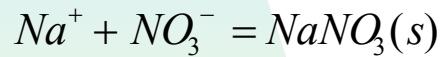
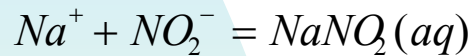
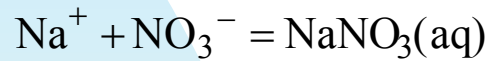


Rotating Pump

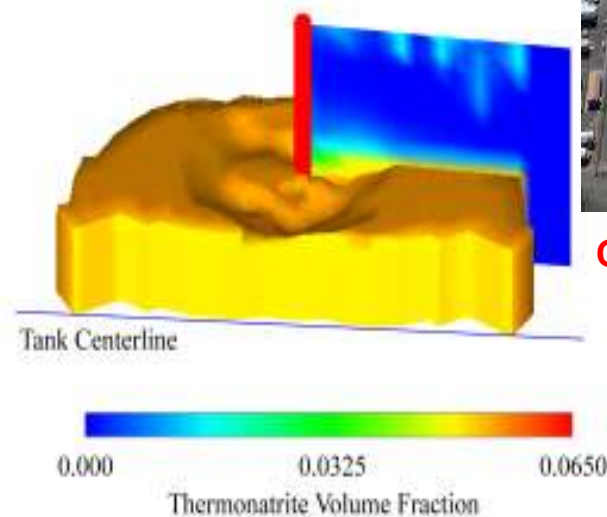


3-D Ariel Code's Coupled Reactive Transport Modeling: Radioactive Tank Waste Chemical Reactions and Mixing

Simulation of in-tank waste chemistry and mixing



C Tank and AN Tank



0.000 0.0325 0.0650

Thermonatrite Volume Fraction