

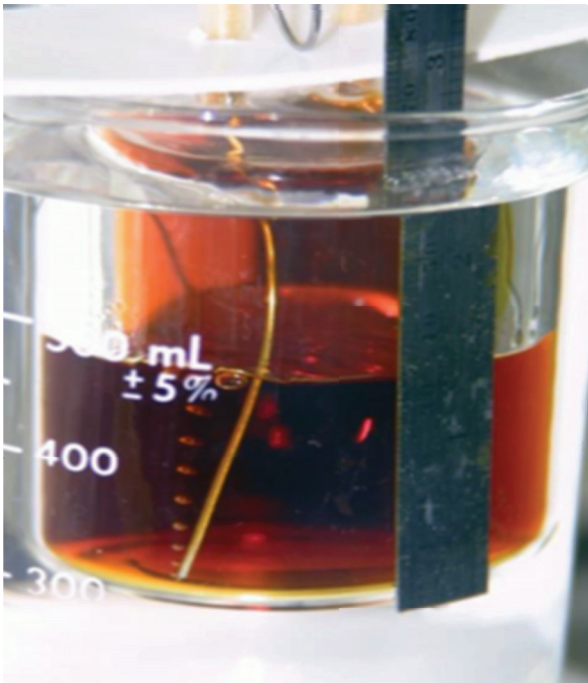
Nuclear Waste Technology Group



Laboratory Services

Operational nuclear facilities and legacy reprocessing sites have unique engineering challenges to address. Safe and efficient handling of nuclear and contaminated materials can require innovative technical solutions without which a basic engineering task can appear very complicated.

Fauske and Associates, LLC (FAI) has more than 35 years of analytical, field and laboratory experience supporting complicated engineering projects. Our comprehensive laboratory solutions address all project aspects from fundamental process and safety evaluations to efficiency and technical justification.



“RED OIL” thermal stability test

Laboratory Capabilities

- Aerosol Physics (entrainment, resuspension, etc.)
- Calorimetric
- Chemical Reaction Rates
- Chemistry Interactions (i.e. sodium/water interactions)
- Dust Explosion
- Evaporation Rates
- Flammability Limits
- Heat & Gas Generation Rates
- Heat Flux
- Hydrogen Generation & Ignition
- Ignition Criteria
- Mechanical Stability of Gas-Generating Sludge
- Physical Properties (density, heat capacity, etc.)
- Reaction Rates
- Pressurization Rates
- Safety Relief Vent Sizing
- Stability

Previous Projects

• “RED OIL” Thermal Stability

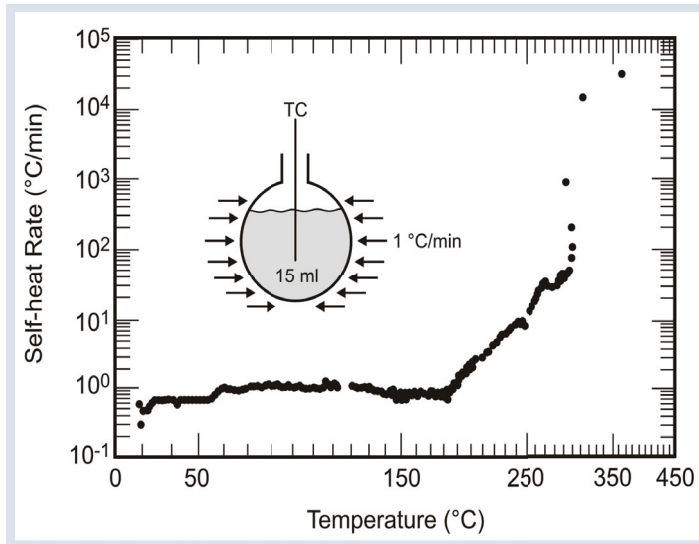
Tri-n-butyl phosphate (TBP) saturated with concentrated nitric acid (HNO_3) can form two-layer organic/aqueous morphology in solvent extraction system evaporators and tanks. The organic phase reacts exothermically and under certain conditions this can lead to a thermal runaway. Testing was performed to determine the response of “RED OIL” under various process conditions.

• Organic Nitrate Evaluation

High level waste streams can include organic-bearing sludge and salt cake waste. Organic complexants like sodium acetate along with oxidizers like sodium nitrate present the potential for spontaneous runaway chemical reactions (thermal instability). Several oxidizers have been tested to determine their potential for an exothermic runaway reaction.

• Dust Explosion Testing

Performing explosion severity tests determine the extent of protection needed in the process. Numerous testing protocols can be evaluated. As an example, testing can be performed to determine the maximum explosion overpressure (P_{MAX}) generated during an ignition event of a flammable mixture, as well as the deflagration index (K_G) which is the maximum rate of pressure rise normalized to the vessel volume. These parameters are used to help pressure rate a vessel for containment purposes or to be used to design an explosion relief system.



Evaluation of organic-nitrite mixture



Dust explosion testing

Benefits

Recognized as proven experts, FAI offers our customers both expertise and experience to effectively generate solutions to complex engineering problems. By coupling our analytical, field service and laboratory capabilities together, FAI can provide full service solutions.

With more than 35 years of success servicing the nuclear and chemical industries, we have acquired broad expertise and continued our education process to support complex engineering problems. We welcome First Of A Kind (FOAK) projects and regularly think outside of the box.

The following is an abbreviated list of the customers we have been fortunate enough to service.

- Hanford Site
- Savannah River Site
- UK's Sellafield Site
- Sandia National Lab
- Numerous operating & closed commercial nuclear power generation plants