

POWER PLANT PROCESS MODELING AND SIMULATION

Power Plant Process Selection and Optimization

There are a number of process options available for new power plant designs, including single-, double-, and triple-flash units, binary cycles and hybrid plants using steam turbines and binary bottoming units. Computer simulations help predict efficiencies and provide guidelines for the corrosion and scaling potential in a proposed power cycle. However, geothermal chemistry is extremely complex and corrosion and scaling is often difficult to predict with a high degree of confidence. A pilot plant study offers tremendous value by identifying optimal scale and corrosion mitigation regimes without putting your wells and power plant at risk.

Pilot Plant Testing Solutions

Given that new power plants may cost hundreds of millions of dollars, Thermochem offers a combination of computer simulation and field pilot plant testing to efficiently guide the optimal power cycle process design. Thermochem's team of experienced geochemists and chemical engineers ensure you have the necessary information to design the power plant appropriate for your resource. After initial computer simulations, we design, build, commission and operate pilot plants to evaluate new process options, or optimize existing processes, to minimize corrosion, scale and emissions.

Thermochem solutions are comprehensive:

- 1) Geochemical field sampling and lab analysis
- 2) Data interpretation and field-wide resource predictions
- 3) Power plant process simulations
- 4) Pilot plant design, commission, testing
- 5) Process validation, optimization, final design
- 6) Supply of specialty treatment and monitoring systems

Geothermal fields are unique- solutions must be tailored to the enthalpy and chemistry of each reservoir. Thermochem's pilot plants can be integrated at an existing plant or installed on exploration wells. Our pilot plants enable:

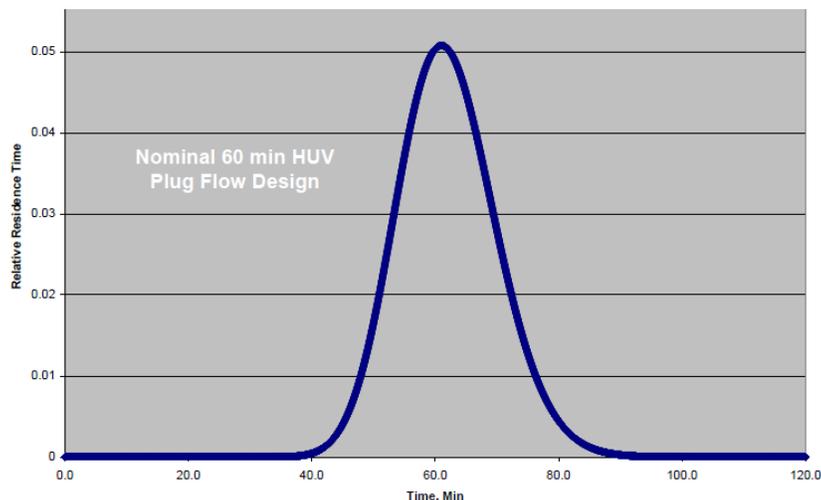
- Quantification of actual scaling and corrosion rates
- Investigation into a wide range of process conditions
- Evaluation of multiple chemical inhibitors
- Determination of injection formation plugging potential



Thermochem Pilot Plant Features

Thermochem geochemists and engineers have the experience and knowledge to customize pilot plant designs based on our reservoir geochemical conceptual modeling and power plant process simulations. Thermochem has been building and operating pilot plants for 30 years, and knows how to apply test results to full-scale process designs.

- Pilot plant control systems using micro-PLC technology
- Fully-automated and remotely controlled
- Simultaneous trials of multiple inhibitors
- Plug-flow, stirred injection system simulation vessels
- High-pressure Packed-bed formation plugging tests



ABOUT THERMOCHEM

Thermochem is an integrated consultancy, service, and OEM instrument firm empowering energy industries since 1985. Our mission is to protect the assets and resources of our clients, ensuring the most efficient use of equipment and resources, through preventing corrosion and scale damage to valuable equipment and providing early detection and solutions to resource problems. We service clients in more than 30 countries, providing chemical engineering solutions and equipment for geothermal energy, oil and gas, combined cycle, cogeneration, fossil fuel and nuclear power plant projects from our offices and laboratories based in the USA and Indonesia. We provide solutions to our clients from the ground up: exploration through operations. Our extensive range of products and services includes greenfield exploration, well testing, geochemical modeling, chemical process engineering, analytical chemistry, reservoir engineering, permit support, due diligence and specialized instrumentation such as two-phase wellbore samplers, pH-modification equipment and on-line steam quality and purity meters.