

Chemistry in Brine Production Workshop

Description: 2-day workshop focused on upstream production chemistry using OLI

Summary This workshop instructs the attendee on three aspects of production water chemistry; simulating a production system using software, analyzing the field and software results to determine scale risk, learn the principles of water chemistry processes (pH, precipitation, phase partitioning). Using OLI simulation tools, this class will address the top, most-asked questions when working with produced water.

Who should attend: Production chemists and other engineers and scientists working with upstream scaling scenarios. Class level is beginner to intermediate. There are extra problems in each section that allow for independent inquiry.

Instructor: AJ Gerbino, PhD, an upstream simulation consultant and author of the workshop

Cost: \$650 USD per person early registration / \$750 USD within two weeks of course

Register: Online: <http://olitraining.aqsim.com>
Email: pat.mkenzie@aqsim.com
Phone: USA 1-973-998-0240 x112

Accommodations: Please bring a laptop.

OLI Software: We will be using OLI Studio: ScaleChem and Stream Analyzer
All participants receive 30-day evaluation copies of the full OLI Studio.

Course Content will include several sections:

Software mechanics

Learning how to use the Studio ScaleChem software tool

- Entering a water analysis and reconciling for charge balance, alkalinity, and pH,
- Entering a gas and oil analysis and reconciling for water content
- Simulating reservoir conditions including mineral saturation and multi-phase equilibrium within the reservoir matrix
- Calculating fluid properties during production, plotting scale tendencies, maximum solids potential, pH, component partitioning, vapor phase fugacities, and other important properties

- Simulating complex production scenarios, including multi-zone completions, production facilities, and evaporative scaling conditions

Analyzing results for scale risk

PowerPoint slides are used to present the chemical mechanisms of precipitation. This information will cover

- How scale tendencies are calculated
- The relationship between scale tendencies to precipitation rates
- The mechanisms of precipitation and effects of natural and commercial scale inhibitors

Produced Water Chemistry

PowerPoint slides and the training manual are used to discuss the chemical principles of water chemistry

- Activity coefficients and the effect of salinity on scale tendencies
- Gas-phase fugacity and the effects of production conditions on H₂S and CO₂ reactivity with water, oil, and gas
- Alkalinity and the chemical components that contribute to its alkalinity
- H₂O partitioning across the phases and the effect of temperature, pressure, and OWR and GWR on salinity and scaling.

Other topics covered and questions answered

- What water analysis data are important and what can be ignored
- What to do when analysis data is inconsistent with field results, e.g., wrong pH, alkalinity or scaling
- The effects of organic acids, borates and other species on alkalinity
- The importance of a Gas and Oil on scaling and when the phases can be ignored
- The impact of saturating the hydrocarbon with water and how to do it
- Saturating a hydrocarbon with organic acids and other unmeasured components
- Creating a representative reservoir fluid at reservoir conditions
- Water evaporation or condensation during production
- Detecting which water is being produced (e.g., seawater breakthrough versus reservoir water)
- Computing the corrosion rates along a production line
- Calculating corrosion products in sweet and sour wells
- Calculating H₂S and CO₂ fugacities and their impact on scaling and corrosion
- Significance of equilibrium constants and activity coefficients on fluid properties, scaling, and corrosion