

Chemistry in Brine Production (CBP)

This 2-day course combines lecture, discussion, and software application to explain both brine chemistry principles and hands-on electrolyte simulation techniques. Topics include general aspects of reservoir brine chemistry from diagenesis to production. We present concise discussions of chemistry principles important to production engineering, including scale tendencies, activity coefficients, equilibrium constants, and speciation. We have included additional discussions including field problems associated with halite/saturated brine production. Participants will learn how to use software features to answer questions about their current production applications. The first day of the class will use ScaleChem V4.0 as the simulation tool. The second day of the class will use Stream Analyzer V3.2. Each Participant will receive a 30-day license to both software components. The class is designed for 2 days. Participants may elect to attend only Day 1, only Day 2; however, the class will be geared for the 2-day participant.

Day 1 Chemistry in Brine Production - using ScaleChem

Day 1 will include ScaleChem training plus discussions on scale tendency and the chemistry of oilfield scales.

- The simplest query : scaling scenarios
 - Add and reconcile a brine
 - Add a Scale Scenario
- Lecture / discussion : Mineral scaling and scaling tendency calculations
- Gas and hydrocarbons
 - Add a gas
 - Add and reconcile an oil analysis
- More complex calculations
 - Reservoir saturation
 - Mixing brines
- Lecture / discussion : Alkalinity, pH and Carbonate system
- Formulating facilities simulations
- Lecture / discussion : Common mineral scales
 - CaCO_3 , BaSO_4 , SrSO_4
 - $\text{CaSO}_4 \cdot n\text{H}_2\text{O}$, NaCl
 - $(\text{Fe}, \text{Zn}, \text{and Pb})\text{S}$, CaF_2
- Case studies

Day 2 Chemistry in Brine Production - using Analyzer Studio

Day 2 will include training in the types of upstream applications better suited for Stream Analyzer, plus discussions of water chemistry, halite systems, precipitation, and inhibition.

Since this is an abridged version of our 4-day workshop, time will be the limiting factor. Therefore, participants will select among possible topics for the later part of the day.

- Review of Previous Day
- Stream Analyzer mechanics
 - Single Point Calculations
 - Oilfield Units
 - Entering a water analysis and interpreting the results
- Lecture/Discussion: Produced Water - General Basis
- StreamAnalyzer - Typical Scale Scenario
 - Entering and Interpreting a water analysis
- Case Study: Halite wells
 - Halite precipitation during production
 - Gas vaporization of reservoir salt
 - Differentiating between dissolved salt and high density brines

- Mixing streams in Stream Analyzer

(Based on participants' interests, we will select from the applications in the following two sections)

- Lecture/Discussion: Oxidation/Reduction Principles
- MEG / Methanol studies
- Corrosion and metal stability
 - General corrosion Rates
 - Stability diagrams
- Scale Nucleation and growth
- Scale Inhibition
- StreamAnalyzer Case Studies or User Cases