AQSim
OLI electrolyte solutions

Solutions to water-based chemical processes

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## Electrolyte chemistry simulation in oil & gas production

Description: 4-day training in electrolyte simulation techniques focused on oil and gas production

Time: Four 8-hour days

Summary The four day OLI training will focus on upstream oil and gas production. Secondary topics include basic chemistry principles, phase equilibrium and scale formation, oxidation-reduction and corrosion, speciation, and lastly, non-ideal effects like activity coefficients, and fugacities. Additional topics can be included, depending on participants' interests.

The base software for the training will be the OLI Studio, including ScaleChem, Stream Analyzer, and Corrosion Analyzer. Using OLI in flowsheets will be addressed using either OLI Flowsheet: ESP or the OLI Engine in Alliance Partner flowsheet simulators. OLI's link to the pipeline package PIPESIM and how OLI works with OLGA will be optional topics.

Sessions: The training will be divided into eight session:

| | |
|---|---|
| Session 1 - 3 | Basic chemical principles and calculations |
| Session 4 - 5 | OLI aqueous corrosion technology |
| Session 6 | OLI in flowsheet applications |
| Session 7 to 8 | Field and plant applications |

Who should attend: Beginning and prospective OLI clients
Class is designed for participants with little or no knowledge of OLI simulation techniques. Intermediate level clients wanting to refresh their skills may also join this class.

Instructor: AJ Gerbino, PhD, an electrolyte simulation expert and author of the workshop

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## Course content

### Session 1 to 3 - Introduction to OLI technology and the OLI Studio ScaleChem and Stream Analyzer

*(Day 1 and morning of Day 2)*

AM……. This session is an introduction to OLI software interface and is designed for those who have not used OLI Software before, or for those wishing a refresher course. Attendees are trained on how to formulate basic cases using the single-point and multi-point calculation tools.

PM……. This session introduces OLI electrolyte thermodynamics, the AQ and MSE frameworks, chemistry model manipulations, and advanced software functions. The advanced functions include mixers, water/gas/oil analyses and multivariate surveys.

AM……. This session will focus on building process applications with the OLI Studio software. Applications include autoclaves, dehydration, evaporation. The ScaleChem calculation tools will also be introduced in this session. Technical discussions will focus on alkalinity, scale tendencies, precipitation kinetics, and phase equilibrium. This day will also include techniques for using OLI calculations in PIPESIM.

### Session 4 & 5 - OLI Studio: Corrosion and REDOX Corrosion Analyzer

*(Day 2 afternoon and Day 3 morning)*

PM……. This session will introduce the Corrosion Analyzer software tools. Attendees will perform calculations using the Pourbaix, Corrosion Rate, and Extreme Value Statistics tools. Technical discussions will focus on Oxidation-Reduction reactions, the Nernst equation, and Butler-Volmer equations; the basic tools for calculating Pourbaix diagrams and corrosion rates.

AM……. This session will focus on field applications using the corrosion rates tool. It will also include plant and field cases in which the conditions of corrosion are computed. This includes gas dew points in pipelines, salt desublimation in a crude distillation overhead. There will be discussion on field and laboratory validation of the corrosion rate calculations.

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## Segment 6 - Electrolyte Flowsheet simulation

### OLI Flowsheet: ESP
### OLI Engine in <UniSim Design, Aspen Plus / HYSYS, PRO/II>

*(Day 3 afternoon)*

PM……. Introduce participants to electrolyte flowsheeting using OLI: Flowsheet ESP or client's . Learn to set up a basic case and converge controllers and recycle streams. If time permits, multi-stage blocks will be presented. While some of this instruction is specific to this particular flowsheet simulator, concepts can be applied to using OLI as a property method inside our Alliance Partner flowsheet simulators as well

## Segment 7 & 8 - User/Plant/Field Applications

### Software will depend on the application
### *(Day 4)*

AM……. Example cases are used to introduce standard approaches for setting up applications. This session will utilize common applications such as gas absorption, water treatment, brine evaporation/crystallization, and/or sour water stripping.

PM……. Continuation of the morning session, and moving to more advanced case studies, such as MEG regeneration, gas dehydration, gas and oil production, and/or Reservoir injection. Upstream application includes constructing representative reservoir fluids, producing the well with or without artificial lift, and processing the fluids at the surface.

## Additional Topic to be included

The following unscheduled topics, will be part of the four-day general discussion: Reaction Kinetics and mass-transfer limited reactions, dynamic/time-dependent simulations, OLI Software use in other industries and how they can be used in oil and gas, measured fluid properties such as NAN, TAN, TDS, COD, TSS, surfactants, emulsions, and other measured properties that can or cannot be used in equilibrium thermodynamic software.