



Oil & Gas Process Simulation



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Introduction:

Many of the decisions made by oil and gas companies rely on simulations of deposits, wells, infrastructure, and operations. Companies use oil and gas simulation and modeling software to create realistic representations of reservoirs, equipment use, and resistivity, as well as environmental effects. This type of software helps oil and gas companies predict exploration or production results, and assess risks that may impact safety and profitability.

Targeted Groups:

- Program and Project Managers.
- Project Management Professionals.
- Senior-related Project Support Managers.
- Senior Management Decision Makers.
- Commercial Management Personnel.
- Project Lead Engineers.
- Project Control and business services professionals who have the responsibility for planning and controlling project schedules and costs in client and contracting companies.

Course Objectives:

At the end of this course the participants will be able to:

- Understand the goal of a process simulation.
- Explore the simulation in oil and gas.
- The importance of doing simulations.
- Understand the concept of process simulation.
- Know the objectives of simulation exercises.
- The 5 steps of a simulation.
- The 4 steps of a simulation.
- The 3 types of simulation.
- The 4 types of models in a simulation.

Targeted Competencies:

- Introduction to Process Simulation.
- Software Getting Started
- Propane Refrigeration Loop
- Low-Temperature Separation Processes "LTS Process"
- NGL Fractionation
- Gas Dehydration and Compression
- Crude Oil Stabilization and Associated Gas Compression

Course Content:

Unit 1: Introduction to Process Simulation:

- What is process simulation?
- Principles of Thermodynamic Modelling
- Which model, for which process?

Unit 2: Software Getting Started:

- Defining the simulation basis flowsheet, components, utilities, thermodynamic package, units
- Intrinsic data - Required data stream, compressor, heat exchanger, flash drum
- Results Displaying tables, graphs, phase envelopes, case study
- Hydrocarbons flash separation and gas saturation with water

Unit 3: Propane Refrigeration Loop:

- Process description and applications LNG, NGL extraction
- Vaporization of propane through an expansion valve
- Using a CONTROLLER
- Using the “defined to “ feature
- Running a case study

Unit 4: Low-Temperature Separation Processes “LTS Process”:

- Description of NGL recovery process, principles, specifications
- LTS process using external refrigeration chiller
- LTS process using a Joules Thomson valve
- LTS process using an expander
- Meeting the hydrocarbon dew point specification

Unit 5: NGL Fractionation:

- Process Description
- Simulate a distillation column performance specifications, pressure profile
- Determine the minimum reflux ratio, the number of trays
- Estimate the top tray pressure
- Optimization of the feed tray
- NGL Fractionation

Unit 6: Gas Dehydration and Compression:

- Gas dehydration with glycol process, principle, specs
- Simulate a typical TEG UNIT
- Review methods to saturate gas with water
- Determine the water dew point
- The temperature profile in the absorber

Unit 7: Crude Oil Stabilization and Associated Gas



Istanbul - Turkey: +90 539 599 12 06

Amman - Jordan: +962 785 666 966

WhatsApp London - UK: +44 748 136 28 02

Compression:

- Oil stabilization process, principle, specs
- Simulate a typical multistage oil stabilization unit
- Meeting RVP, TVP, and API specifications
- Compression of the associated gases