

LNG Process Simulation

5 days

LNG/LNGSIMGB

Overview

LEVEL

Proficiency

PURPOSE

This course aims to acquire a comprehensive knowledge and practical know-how in the simulation of natural gas pre-treatment and liquefaction processes, with an emphasis on condensate recovery, fractionation and integration with the liquefaction process.

LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:

- assess various problems that can be induced by unwanted elements and compounds in gas streams, design, explain the operation and operating parameters of gas condensate recovery systems and natural gas liquefaction processes,
- perform steady-state simulations with PRO/II™ or HYSYS™, model set-ups, and simulate gas processing and liquefaction processes,
- optimize process operating conditions, compare processes performances, evaluate power requirements, size equipment...
- check plant performance under different operating conditions, implement the optimal process scheme.

WAYS AND MEANS

Highly interactive training course delivered by industry experts and adapted to participants' experience. Numerous simulation and case studies performed using PRO/II™ or HYSYS™. Simulation of DMR, MFC, N2/dual-expander & SMR processes can be performed in classroom or as e-learning upon request.

LEARNING ASSESSMENT

Assessment by test at the end of the course.

PREREQUISITES

Advanced knowledge in Process Design Engineering.
Use of process simulators (PRO/II™ or HYSYS™).

Agenda

NEED FOR GAS FIELD PROCESSING - QUALITY REQUIREMENTS

0.25 d

Review of main concepts and products within the gas/condensate chain.
Undesired constituents for storage, transport, or end use of natural gas.
Different specifications and quality requirements for natural gas: sales gas specifications, reach/lean gas specifications.
Required treatments and overview of gas processing.
Examples of compositions of commercialized natural gases.

STEADY-STATE PRO/II™ OR HYSYS™ SIMULATION CASE STUDIES

0.75 d

Equations Of State (EOS); uses, examples, selection:
Reservoir fluids phase envelope.
Flash separation of multicomponent mixtures.
Phase envelope of gases versus composition.
GHV and WI calculation using PRO/II™ or HYSYS™.
Construction of simulation reports.

CONDENSATE RECOVERY, FRACTIONATION & REFRIGERANT MAKE-UP

0.5 d

Condensate fractionation: choice of the operating conditions.
Quality requirements for methane, ethane, propane and butane used for MR make-up.
Storage of methane, ethane, propane and butane for make-up.
Nitrogen requirements for make-up.

SIMULATION OF CONDENSATE RECOVERY & FRACTIONATION USING PRO/II™ OR HYSYS™

0.5 d

Selection of thermodynamics packages.
Simulation of a condensate fractionation and stabilization process.

CASCADE PROCESS OPERATING CONDITIONS & SIMULATION

0.5 d

Process diagram and operating parameters.
Simulation of the liquefaction process: optimization of the operating conditions, compressors sizing.

COMPARISON OF THE MAIN MIXED REFRIGERANTS LIQUEFACTION PROCESSES

0.5 d

Fields of application of liquefaction processes.
Comparison with cascade process and turbo expander based process.

LIQUEFACTION WITH C3 - MIXED REFRIGERANTS - OPERATING CONDITIONS & SIMULATION

1 d

Process diagram and operating parameters.
Simulation of the liquefaction process: optimization of the operating conditions, compressors sizing.
Optimization of MR composition.

LIQUEFACTION WITH 2 MIXED REFRIGERANTS - OPERATING CONDITIONS & SIMULATION

0.5 d

Process diagram and operating parameters.
Simulation of the liquefaction process: optimization of the operating conditions, compressors sizing.
Optimization of MR composition.

LIQUEFACTION PROCESSES PERFORMANCES COMPARISON

0.5 d

Heat and mass balance for each process.
Comparison of power requirements for the different processes.