

22ND -26TH MAY 2023

ATENEA HOTEL, BARCELONA



SIMULATION OF NATURAL GAS TRANSMISSION AND PROCESSING

Background fundamentals of Natural Gas Transmission and Processing, lectured by an industry expert, combined with hands-on process simulation exercises.

INTRODUCTION

This participative and interactive five-day course covers the processes in the Natural Gas transmission and processing industry, using a commercial process simulator to carry out the calculations. The Elsevier's Handbook of Natural Gas Transmission & Processing, co-authored by the course lecturer, is the basis for the material presented during theoretical morning lectures, coupled with comprehensive afternoon hands-on sessions based on typical gas transmission and processing facilities. With this combined approach, attendees will **Review** the properties of natural gas, basic equations, PVT behavior, vapor-liquid equilibria, and gas hydrates. **Learn** the basics of natural gas transmission and processing as well as the recent advances and new opportunities for solving current gas transmission and processing problems. **Discuss** key considerations to be taken into account for any natural gas field project in development. **Acquire** good simulation practices through the guided creation of simulation cases of increasing complexity. **Understand** and **Discover** optimization ways for the several common units found in the natural gas processing industry, using simulation exercises. **Incorporate** the necessary know-how in steady state process simulation that should allow them to afford the design and operation of any possible future process in the natural gas and associated industries. **Transform** current processes into more competitive ones by an optimal use of process simulators. **Reduce** the execution time of projects

COURSE OBJECTIVES

- Overview of the natural gas industry from wellhead to marketplace
- Discuss principles and advances in natural gas transmission and processing
- Practical advice on how to improve gas plant design and operations
- Learn about the engineering principles used in simulating natural gas processing facilities

The governing engineering principles are reviewed, applied to relevant problems, and solved using commercial Process Simulators. Emphasis is placed on the understanding of the underlying concepts and principles as well as the associated applications of process simulators to solve real problems.

COURSE AUDIENCE

New process/chemical engineering graduates and technologists who need to develop an understanding of natural gas transmission and processing. Professionals who have been working in industry but are new to the natural gas transmission and processing industry. Professionals who are familiar with natural gas transmission and processing but are unfamiliar with how process simulators can be used to solve everyday problems.

INSTRUCTORS

Morning lectures on the background fundamentals of natural gas transmission and processing will be lectured by **Saeid Mokhatab**, one of the most recognizable names in the natural gas community through his contributions to advancing the technologies in the natural gas processing industry. He is the co-author of the Elsevier's Handbook of Natural Gas Transmission & Processing, which has been very well received by professionals in the natural gas industry and academia worldwide.

Inprocess instructors, with more than 5 years of experience in lecturing process simulation courses (as a minimum), will facilitate the afternoon hands-on sessions with steady state simulators that allow students to apply the lecture material to solve various gas processing problems.

MODULES CONTENT

Theoretical lectures are listed with numbers. Simulation exercises are listed with letters.

MODULE	MODULE TITLE AND SHORT DESCRIPTION	TIME	DAY
1	NATURAL GAS FUNDAMENTALS Introduction to Natural Gas by describing the origin and composition of natural gas, gas sources, phase behavior and properties, and transportation methods.	1 hour	Day 1
2	RAW GAS TRANSMISSION This session covers all the important concepts of multiphase gas-condensate transmission from a fundamental perspective.	1.5 hours	
3	BASIC CONCEPTS OF NATURAL GAS PROCESSING General overview of the design and function of the different process units within a natural gas processing plant.	1.5 hours	
A	INTRODUCTION TO THE PROCESS SIMULATOR Working with an existing case. Getting used to GUI elements. Setting-up a user preferences file. How to work with fluid streams. How to install stream utilities. How to install and connect unit operations. The Degrees Of Freedom concept.	1 hour	
B	BASIC THERMODYNAMICS Creating a new case. How to select components for a simulation: Traditional - hypothetical. The need of thermodynamic correlations and methods.	1 hour	
C	PHASE ENVELOPES AND PHASE BEHAVIOR Analysis of different phase envelopes according to fluid composition. Expected production. Expected behavior. Influence of heavy components.	1 hour	
D	PRODUCTION GATHERING Intensive use of the Pipe Segment to calculate separation plant inlet conditions, estimate well conditions, evaluate pressure drops and heat losses for different types of pipe insulation.	1 hour	
4	PHASE SEPARATION Review of the principles governing the basic separation process and to describe the commonly used separation facilities in the gas processing industry.	1 hour	Day 2
5	CONDENSATE PRODUCTION Some of the basic processes for condensate stabilization, and the associated facilities such as condensate storage, condensate hydrotreating, monoethylene glycol (MEG) regeneration and reclaiming, and sour water treatment.	1.5 hour	
6	NATURAL GAS COMPRESSION Brief overview of the two major types of compressors, a procedure for calculation of the required compression power, as well as additional and useful considerations for the design of compressors.	1.5 hour	
E	HYDRATE FORMATION AND INHIBITION Use of the existing utility to evaluate the possible formation of hydrates and exploration of methods to depress them and avoid its formation.	1 hour	
F	PHASE SEPARATION AND CONDENSATE STABILIZATION Building a separation plant to obtain the phases that constituted the inlet fluid. Condensates stabilization by distillation.	3 hours	

MODULE	MODULE TITLE AND SHORT DESCRIPTION	TIME	DAY
7	NATURAL GAS SWEETENING Basic concepts and discussion about some of today's gas sweetening problems.	1 hour	Day 3
8	SULFUR RECOVERY AND HANDLING Properties of elemental sulfur and description of some of the common methods for processing H ₂ S.	1.5 hours	
9	NATURAL GAS DEHYDRATION AND MERCAPTANS REMOVAL While this session addresses dehydration design, the different methods and configurations of mercaptans removal are also discussed at the end of this session.	1.5 hours	
G	ACID GAS SWEETENING WITH AMINES Acid Gas Treating unit. Removal of acidic components by amines reaction and absorption.	1 hour	
H	MULTISTAGE GAS COMPRESSION Rigorous simulation of a multistage gas compression unit. Determination of optimal working condition as a function of intermediate pressure values.	2 hours	
I	NATURAL GAS DEHYDRATION WITH TEG Construction of a dehydration plant to dehydrate a gas stream using triethylene glycol. Evaluate optimal plant operation conditions.	1 hour	
10	NATURAL GAS LIQUIDS RECOVERY AND FRACTIONATION Production of NGL from hydrocarbon dew pointing to propane and ethane recovery, including their history, and various technologies and design options as well as NGL fractionation.	2 hours	Day 4
11	SALES GAS TRANSMISSION Important concepts of sales gas transmission from a fundamental perspective.	2 hours	
J	TURBO EXPANDER FOR ETHANE RECOVERY Construction of a turbo-expander plant for deep recovery of ethane from a natural gas stream. Heat recovery network is built in a separate subflowsheet.	1 hour	
K	NATURAL GAS LIQUIDS RECOVERY AND FRACTIONATION Natural Gas Liquids are extracted by LTS technology. Recovery of light hydrocarbons by successive distillation. Column Design.	3 hours	
12	NATURAL GAS LIQUEFACTION PROCESSES Critical overview of the process technology options available for the liquefaction of natural gas, and discusses the factors that should be considered by project developers in order to select the most appropriate process for their situation.	2 hours	Day 5
13	SELECTING BEST PROCESS TECHNOLOGY LINEUP Most commonly used process technologies for designing the gas processing units and shows how integration of process technologies and expert process know-how make a difference.	2 hours	
L	REFRIGERATION LOOPS Analysis of the effect of pressure drops in refrigeration loops. Determination of optimum intermediate pressures for economizer. Impurities effects.	1 hour	
M	NATURAL GAS LIQUEFACTION BY CASCADE REFRIGERATION These facilities use the classical cascade cycle where three refrigeration systems are employed: propane, ethylene and methane.	3 hours	

HOW TO REGISTER

To book your place at the course please, send us an email to: training@inprocessgroup.com detailing:

- Course name and dates
- Attendee name
- Company/Department/Position
- Phone number
- email
- Short (less than 50 words) background description
- Need for proforma invoice?
- Attach the completed Appendix A that you will find at the end of this brochure

After receipt of the registration request, places will be reserved for 10 days. After payment of the course fee, the registration is firmly confirmed. For organization purposes, all the registrations shall be carried out 4 weeks before the start of the course.

For an optimal learning experience, the number of available places is limited to 20 attendees. Please, register as soon as possible in order to ensure your participation.

COURSE VENUE



The course will be held at Hotel Atenea Barcelona, (C/Joan Güell, 201-211, E-08028 Barcelona). The hotel is located 50m from the Av. Diagonal, near María Cristina metro station, directly connected to the city centre and main railway stations.

The hotel has pre-booked rooms for course attendees at special rates. Please mention the attendance to the course during reservation.

Atenea Hotel website: www.aparthotelatenea.com.

COURSE PRICE

This 5 days course is priced **€ 4,400**. All prices and rates quoted in this document are exclusive of taxes and duties.

The course price includes: the course lectures, the use of the software, the printed course material, a copy of the Elsevier's Handbook of Natural Gas Transmission & Processing, the coffee breaks and the lunch meals.

PAYMENT

All bank transfers in Euros to:

Deutsche Bank

CCC: **0019 0020 9240 1029 4972**

IBAN: **ES17 0019 0020 92 4010294972**

SWIFT: **DEUTESBBXXX**

Send us an email with a copy of the bank transfer to inform us about the payment (training@inprocessgroup.com)

Appendix A: Workflow for Order

Please fill in and sign the information below: **Order** (page 6) and email or fax to us at least 1 month before start of the training.

Please provide complete and clearly printed contact and billing details:

	<u>Contact Information</u>	<u>Billing Information</u>
		o same as contact information
Name :		
Title / Department :		
Company :		
Complete Address :		
Telephone Number :		
Fax Number :		
Email Address :		
VAT # :		
Signature :		

Purchase order (number / date):

- is enclosed will follow by mail
 my company does not require a purchase order