

E- 511

▲ Who should attend?

Anyone interested in the whole Liquefied Natural Gas (LNG) chain: technical and managerial staff working in the LNG chain, equipment suppliers, personnel from engineering companies,...

▲ Duration

9 days

▲ Dates & Location

September 15 to 25, 2008
Rueil-Malmaison (Paris)

▲ Tuition Fees

€ 4,590

Module I: € 2,890

Module II: € 2,490

▲ Course Coordinator

Franck BEIJER

Ref. PROD / LNG

LIQUEFIED NATURAL GAS (LNG)

OBJECTIVES

To provide technical and economical knowledge of the LNG industry.

On completion of the course, participants know the:

- gas chain, and particularly the LNG chain
- main LNG contracts and the LNG markets
- process scheme and operating principle and conditions of the main liquefaction processes, as well as their particular constraints
- technology of the equipment used for LNG liquefaction, storage and transport
- commissioning phases and operation techniques of LNG plants
- safety aspects specific to the design and operation of LNG installations

COURSE CONTENT

Module I: THE LNG CHAIN

GAS CHAIN - CASE OF TRANSPORT IN LIQUID PHASE (LNG) 1 day

Origin of natural gas - Different types of natural gas.

Gas chain.

Description of a **typical LNG chain**: liquefaction plant, storage facilities, export terminal, transport by LNG carriers, receiving terminals, regasification, storage and distribution.

Advantages of liquid phase transport compared with gas phase.

Main end uses of natural gas.

LNG ECONOMIC ASPECTS 1 day

Gas markets: natural gas reserves and production, worldwide gas demands distribution, international natural gas trade.

International LNG projects: liquefaction plants, terminals, LNG carrier fleet and tendency of increase.

LNG contracts: specificities of LNG contracts, pricing, shipping contracts.
LNG markets trends.

REQUIRED TREATMENTS PRIOR TO LIQUEFACTION STEP 0.5 day

Components that pose problems for storage, transport, or commercialization/utilization of natural gases.

Required treatments for a transport in liquid phase (LNG) - Quality requirement for natural gases to be liquefied:

Dehydration: drying

Sweetening: removal of acid components (H₂S and CO₂)

Hydrocarbon liquid extraction: removal of heavy hydrocarbon components

Mercury removal...

Examples of industrial plant schematics for natural gas treatment processes prior to liquefaction.

NATURAL GAS LIQUEFACTION PROCESSES 1.5 days

Analysis of **different processes for natural gas liquefaction**: process principle, typical operating conditions.

Technological specificities of **liquefaction equipment**: plate fin heat exchangers, spiral wound heat exchangers, cryogenic compressors,...

Energetic performances of the different processes.

Examples of industrial plant schematics for natural gas liquefaction processes.

TRANSPORT AND STORAGE OF LNG 1 day

LNG storage: different types of tanks (Single Containment, Double Containment, Full Containment, Membrane...).

LNG transport: different types of LNG carriers (Moss Spheres, Membrane...).

Characteristics of **export and reception terminals** - Loading and offloading arms.

LNG regasification techniques at reception terminals (with or without cryogenic energy recovery).

Module II: OPERATION OF LNG PLANTS

COMMISSIONING AND OPERATION OF LNG PLANTS 2 days

The different phases of an LNG project - Operating philosophy.

Commissioning of LNG installations: Different commissioning phases - Particularities of LNG projects.

Operation of LNG installations - Operating rules specific to LNG plants

Case study of a « typical natural gas liquefaction » unit: analysis of operating variables, unit performances...

Analysis of some operating procedures: loading and offloading operations, LNG tank temperature conditioning,...

SAFETY ASPECTS RELATED TO LNG INDUSTRY 2 days

Hazards related to the:

- operation of LNG storage tanks
- loading and offloading operations
- operation of natural gas liquefaction plants and regasification terminals
- operation of LNG carriers

“Safety design” rules specific to LNG industry.