Natural Gas Transport by Pipeline

General Objectives:

To provide an overview of technical and economic issues of natural gas transport by pipeline.

Specific Objectives:

At the end of training the trainees will be able to:

- Look over the world map of natural gas pipeline networks;
- Review marketed gas pipeline design: route, sizing, material, compression stations positioning and design;
- Assess pipe laying organization, management, constraints, planning and techniques;
- Understand gas transportation network maintenance and daily operations within the framework of regulations;
- Grasp fundamental issues of natural gas transport economics and third-party access.

Audience:

Professionals interested in natural gas transport by pipeline, including equipment and services suppliers to gas transport companies.

Workload:

24 hours

CONTENTS:

Module I – Introduction to natural gas

- From reservoir to end user;
- Chemical composition and properties of natural gas. Comparison to other combustible gases;
- World reserves;
- Panorama of offer, demand and movements.

Module II – Transport network

- Overview of networks worldwide;
- Perspectives of the development of world network;

- Interaction with the other blocks of natural gas chain: storage, LNG terminals, compression stations, network interconnections, delivery to the client;
- Economical and technical comparison between transport by pipeline and LNG carriers.

Module III – Design and construction of a gas pipe

- Design standards: pressure, length, volume, diameter;
- Fundamentals of metallurgy welding techniques, and coating materials;
- Pipe laying;
- Different steps of pipe laying operations;
- Cost and durations of pipe laying, and compression stations construction.

Module IV – Compression

- Characteristics of compressors: compression ratio, run-time frequency, environment related issues (exhaust gases, noise…), power types;
- Types of compressor units: driver type (engine, electrical motor, gas turbine…), reciprocating or centrifugal compressor;
- Comparison between gas turbine and motor drivers, fuel gas and electricity power.

Module V – Operation of a network

- Maintenance, monitoring and technical management, risk prevention, safety regulations, cathodic protection, equipment maintenance, monitoring and controls, metering;
- Network operation management: planning, execution, allocations and accounts.

Module VI – Economical aspects of gas transport by pipeline

- Investment cost (CAPEX);
- Life time of a gas pipe;
- Operation costs (OPEX);
- Pricing for access of third parties to the gas transport network in world: analysis of the price breakdown;
- Simulations of cost price per kWh delivered, for some typical cases.