

## E-502

### ▲ Who should attend?

Engineers and technicians, looking for technical information not only on the Oil & Gas field treatments, but also on the technology of equipment and installations, used in these onshore and offshore processing facilities.

### ▲ Duration

**10 days**

### ▲ Sessions in English

**December 06-17, 2010**  
Rueil-Malmaison (Paris)

**Additional session**  
**April 19-30, 2010**  
Rueil-Malmaison (Paris)

**French sessions: F-502**

### ▲ Registration

Fees: € 3,720

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### ▲ Course Coordinator

**Frank BEIJER**

Ref. **PROD / FPSPF**

At request, this course may be organized for a single company, and tailored to its specific requirements.

# FIELD PROCESSING AND SURFACE PRODUCTION FACILITIES

## OBJECTIVES

To provide technical knowledge of Oil & Gas field processing techniques (onshore and offshore), as well as the technology and operating principle of the equipment used in these facilities.

Upon completion of the course, participants know the:

- fundamentals of Oil & Gas production techniques,
- operating principle of the Oil, Water and Gas processes, and their main operating conditions,
- techniques used for offshore production and their specificities,
- technology of the main equipment used in these processing facilities,
- fundamentals of process control and typical safety systems layout,
- fundamentals of metering techniques and corrosion prevention and monitoring.

## COURSE CONTENT

### FUNDAMENTALS OF RESERVOIR, DRILLING AND COMPLETION 0.5 day

Hydrocarbon genesis

**Reservoirs:** types, exploration techniques

**Drilling** principle - Case of offshore drilling

Main **completion** equipment - Principle of artificial lift by pumping, gas lift...

Enhanced Oil Recovery (EOR): aim and principle of the main techniques

### WELL EFFLUENTS BEHAVIOR -

#### NEED FOR EFFLUENT FIELD PROCESSING

**0.5 day**

Well effluent composition - Different types of well effluent (black oil, light oil, volatile oil, wet gas, retrograde gas, dry gas)

Main characterization parameters: GOR, CGR, FVF, Bo, Bg, BSW, WOR, Water Cut, Bo, Bg, B'g...

Liquid/Vapor equilibrium of pure substances and mixtures - Vapor pressure curves and **phase envelopes**

**Well effluent behavior** from pay zone up to the surface processing plant inlet

Constituents that pose problems for storage, transport, or commercialization/utilization of crude oils and natural gases

Main **specifications** to be respected and required treatments

*Examples of compositions of well effluents and commercialized crude oils and natural gases*

### CRUDE OIL TREATMENT

**1 day**

Crude **stabilization** (gas removal) by Multi Stage Separation (MSS) - Foaming problems and main available solutions

Crude **dehydration** (water removal) and desalting - Emulsion problems and main available treatments

Crude **sweetening** (H<sub>2</sub>S removal)

*Examples of oil treatment and associated gas compression process schemes*

### PRODUCTION AND INJECTION WATER TREATMENT

**1 day**

Production water networks: drain drums, open and closed drains, safety considerations

**Reject water** environmental constraints and required treatments

**Injection water:** aim, quality requirements and required treatments (chlorination, filtration, oxygen removal, sterilization)

### GAS PROCESSING AND CONDITIONNING

**2 days**

**Gas dehydration** (drying): TEG units, desiccants - Hydrate formation inhibition: injection of MeOH, MEG, DEG, LDHI...

**Gas sweetening** - Acid components (H<sub>2</sub>S et CO<sub>2</sub>) removal: amine units, molecular sieves, membranes

**Natural Gas Liquids (NGL) extraction:** use of cryogenic refrigeration, Joule-Thomson expansion, or Turbo-expander

Fundamentals of Liquefied Natural Gas (LNG) chain

### CASE OF OFFSHORE DEVELOPMENTS - FLOW ASSURANCE

**1 day**

Different offshore production structures: jacket, semi-submersible, Spar, TLP, FPSO... - Selection criteria

Storage and offloading vessels (**FSO, FPSO, buoy**...)

Deep offshore developments - Examples of subsea architecture

Subsurface/surface flow assurance - Problems related to multiphase flow

**Flow Assurance:** problems of slug, erosion, hydrate formation, deposits (paraffins, asphaltenes, naphthenates, carbonates, sulfates, salts...) - Main preservation techniques and pigging solutions

### ROTATING MACHINERY

**1 day**

Pumps, Compressors, turboexpanders and gas turbines: types, operation, technology - Examples of application

### THERMAL EQUIPMENT

**0.5 day**

Heat exchangers, Air coolers, Furnaces, Heaters, fire tubes: types, operation, technology

### FUNDAMENTALS OF CORROSION

**0.5 day**

Different types of corrosion, prevention and monitoring

Case of corrosion due to sea water

### INSTRUMENTATION & PROCESS CONTROL - SAFETY SYSTEMS

**1 day**

Elements constituting a simple process control loop - Case of cascade and split-range loops - DCS

Technology and working principle of sensors, transmitters and control valves

Safety Systems: HIPS, ESD, EDP, F&G, USS

### METERING AND ALLOCATION

**1 day**