

# SAFETY ENGINEERING

## BASIS OF DESIGN FOR UPSTREAM OIL & GAS FACILITY

**FIELD OPERATIONS**  
Engineering & Construction

**E-660**

### OBJECTIVES

To provide the general knowledge of the methodology applied to “**Safety Concept**” studies, as well as the qualitative and quantitative approaches relative to studies required by **local authorities** and **regulations** (HAZOP, HAZAN, QRA...)

### COURSE CONTENT

#### FEASIBILITY STUDIES 1 day

- OBJECTIVE:** Comparison based on HSE criteria, of the different concepts and development architectures
- METHODOLOGY:** **Preliminary hazard analysis**  
Risks related to the environment (natural, human)  
Risks related to Exploration/Development/Construction (Early Production System, staged start-up...)  
Risks related to process
- Plot Plan review**  
Optimization of the Plot Plan (major risk analysis)  
Optimization of construction methods (bridges, modules, packages...),  
Optimization of the start-up of production facilities
- DELIVERABLES:** Identification of **major hazards** and compensation measures  
Reviewed **Plot Plan**, in relation to Construction and Operation hazards

#### PRE-PROJECT STUDIES 1 day

- OBJECTIVE:** Definition of the selected concept, in order to conduct **profitability studies** of the project
- METHODOLOGY:** **HAZID/What if?, HAZAN**  
Optimization of the general lay-out and specific lay-out of the different units, in relation to HSE criteria  
Identification of major hazards related to the process (fire, explosion, toxic cloud, noise...). Identification of impacted areas and restricted areas. Elaboration of action methods in the event of a major sinister (Internal and External Intervention Plan)  
Integration of environment related constraints
- DELIVERABLES:** **Statement Of Requirement (SOR)** specific to HSE  
Elaboration of the **HSE Concept**

#### BASE AND DETAILED STUDIES 2 days

- OBJECTIVE:** Detailed studies
- METHODOLOGY:** **Project study / Safety Engineering**  
Hazardous areas  
Safety System (Process Safety System - PSS, Emergency Shut-Down - ESD, Fire & Gas System + Detection)  
Protection (PSV, Flare networks)  
Active and Passive Fire Protection
- Technical Review**  
HAZAN / HAZOP  
Availability and Maintainability of equipment
- Construction / Operation**  
Risk Assessment (HAZID)
- DELIVERABLES:** **HSE document** to be implemented by the different entities involved in the different project steps (Company, Contractor, Operator)

#### HSE CONSTRAINTS RELATIVE TO CONSTRUCTION AND OPERATION 1 day

- OBJECTIVE:** Contractual strategy relative to HSE constraints  
Optimization of Safety/Security/Operability/Maintainability constraints for operation phase
- METHODOLOGY:** Role of authorities  
Qualitative Risk Assessment and Quantitative Risk Assessment (QRA)
- DELIVERABLES:** **Risk Assessment**  
**Operational Safety Case:** structure and content

#### ▲ Who should attend?

**Pre-project** engineers, in charge of the general architecture of Oil & Gas projects. Engineers in charge of basic studies, who are not familiar with Safety Design concepts.

#### ▲ Duration

**5 days**

#### ▲ Dates & Location

**November 16-20, 2009**  
Rueil-Malmaison (Paris)

#### ▲ Registration

Fees: € 2,060

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#### ▲ Course Coordinator

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