Bespoke Training for the Energy Industries

COURSE TITLE: FUNDAMENTALS OF OFFSHORE OIL AND GAS PRODUCTION SYSTEMS

Course Duration: 5 days Classroom course

Course Level: Foundation

Overview of Course:

This course is a broad introduction to offshore oil and gas development. It conveys a background understanding of the origins of oil and gas, how subsurface developments are decided and how these link with the selection of the surface facilities development.

Primary surface oil and gas production systems are covered with an emphasis on offshore production systems and pipelines. These include oil processing, handling produced water, gas processing, water injection systems and also the support utility systems.

Both fixed and floating offshore structure systems are described including subsea systems and the challenges of flow assurance for these, particularly deep-water systems.

The course includes an introduction to the basic principles of project development including handling uncertainties, HSE and managing risk. It also provides a basic understanding of the role of Operations in managing the reservoir, wells and facilities through field life.

DESIGNED FOR YOU, IF YOU ARE...

- A Facilities or Process Engineer, either a Graduate or a more experienced Technical Professional looking to develop theoretical competence
- A Project Manager who seeks greater understanding of the process and mechanical design of plants
- An Operations Engineer looking to deepen your knowledge of the design principles of the plants
- A Sub-Surface Engineers seeking to broaden your technical knowledge

HOW WE BUILD YOUR CONFIDENCE

The course links theory to application. It reinforces this through real industry problems and examples which are solved by the participants as part of the sessions.

The course is highly interactive and participants are encouraged to share their own experiences and problems to the benefit of all.

THE BENEFITS FROM ATTENDING

By the end of the course, you will have a basic understanding of the different types of oil and gas reservoirs and how they can be developed from a subsurface perspective. You will be able to link

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the selection of the subsurface development to the choices for the surface handling and product export facilities.

You will appreciate the technical differences between the major concepts for offshore production systems; fixed structures, floating systems and subsea systems. You will also have seen examples of deep-water production systems and learnt about pipelines, offshore loading systems and shuttle tanker transport.

You will have an introduction to the principles of project development including handling uncertainties and risk and the basics of gated development processes and HSE management. You will also appreciate the important role of planning for Operations and managing the wells and reservoir production throughout field life.

TOPICS

- Origins of Oil & Gas, Exploration Techniques and Subsurface Development
- Primary Surface Production Systems
- Offshore structures and Floating Production Systems
- Offshore Structures
- Floating Production Systems, Subsea Engineering & Flow Assurance
- Basic Project Development principles including handling Uncertainties, HSE and Managing Risk
- Operations and Well & Reservoir Management

DAILY AGENDA

Day 1: Oil & Gas Origins, Exploration and Subsurface Development

- Origins of Oil & Gas
- The Oil & Gas Lifecycle
    - Cash Flow for an Oil & Gas Project
- Exploration & Appraisal
    - Seismic Acquisition
    - Exploration Drilling
    - Appraisal & Prospect Evaluation

Exercise 1 : Quiz

- Sub-Surface Development
    - Estimating Volumes of Reserves
    - Reservoir Recovery Mechanisms
    - Wells & Well Completions
    - Artificial Lift
    - Secondary, Tertiary & Enhanced Oil Recovery

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- Water Injection
- Gas Injection
- Tertiary Oil Recovery

Exercise 2 : Exploration Well

Day 2: Primary Surface Production Systems

- Introduction
  - Oil Types and Compositions
  - Oil Export Specifications
    - Crude oil Qualities
- Primary Production Systems
  - Oil Processing
    - Separation & Stabilisation
      - 2 Phase & 3 Phase Separators

Exercise 3 : Separator Sizing Challenge

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- Dehydration
  - Types of Separators & for Dehydration
- Handling Wax
- Desalting

Exercise 4 : New Field – Upstream Conceptual Processing

- Produced Water Treatment
  - Gravity Separation, Gas Flotation & Hydrocyclones
  - Other types of De-oiling Systems
- Water Injection
  - Water Sources
  - Water Quality Specifications
  - Seawater Treatment Systems
  - Other Water Treatment Requirements
  - Water Injection Pumps

Exercise 5 : Water Injection – Scheme for Treatment of Produced Water & Injection Water

Day 3: Surface Systems Cont.

- Gas Processing
  - Phase Envelopes
  - Gas Reservoir Types

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Exercise 6 : Producing a Gas Condensate Field

- Gas Specifications
- Gas Separation
- Water Content of Gas
- Hydrates & Hydrate Inhibition

Exercise 7 : Hydrate Inhibition

- Gas Dew Point Control
- Dehydration (TEG, Absorption, Membranes)
- LPG / NGL Extraction

Exercise8 : Gas Processing Schematic

- Refrigeration
- Turbo-Expanders
- NGL Processing

- Utility Systems
  - Production Support Systems
  - Flares
  - Accommodation & Personnel Support

Day 4: Offshore Production Systems

- Offshore Structures
  - Drilling Systems
  - Production Systems
  - Steel Jackets
  - Concrete Gravity Structures
  - Compliant Platforms
- Floating Production Systems

Speciality Structures

Exercise 9 : Structure Concepts Selection for Feasibility

- Export Systems
  - Pipelines
    - Pipeline Design
    - Pipeline Design Safety
    - Offshore Pipeline Installation

Exercise 10 : Offshore Pipeline Challenge

- Offshore Loading Systems

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- Basics of Flow Assurance
- Subsea Engineering
    - Dry vs Wet Trees
    - Subsea System Components

Exercise 11 : Deepwater Development

Day 5: Project Development & Operations

- Offshore Topsides Layout & Construction methods
    - Layout Principles & Examples
    - Modules vs Integrated Decks
    - Construction & Installation Methods
- Project Development
    - 'Gated' Development Processes
    - Development Stage Deliverables
    - Health Safety & Environment

Exercise 12 : Project Risk Assessment

    - Handling Uncertainties
    - Managing Risk
- Introduction to Operations & Maintenance
- Introduction to Well & Reservoir Management

Exercise 13 : Planning for WRM

- Examples of Challenging Offshore Projects
    - Floating LNG
    - Extreme Deep Water
    - Arctic Development
- Course Wrap-Up

INSTRUCTOR:

Phil Tudhope is currently Director of a consulting company, specialising in technical and project management training for graduates and more senior technical staff. He has a first-class honours B.Sc. in Mechanical Engineering from Bristol University and is a Chartered Engineer, Fellow of the Institution of Mechanical Engineers and Associate Member of the Institution of Chemical Engineers.

Phil has over 40 years' experience in Project Management, Technical Development and Change Management in the oil & gas industry and proven technical and managerial capabilities to achieve results with a strong business focus and to effect significant positive change. He is a specialist in front-end (feasibility & concept selection) phases of upstream oil & gas developments with midstream (LNG) experience and project execution experience and has the ability to perform analysis and development work as well as lead and motivate teams.

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Amongst other roles, he was Specialist Front End Advisor at Petronas Carigali, Chief Process Engineer at BG Group and Head of Upstream Engineering at Shell Technology India. He has experience worldwide in differing political, social and remote environments, having worked overseas for 28 years including the Far East, USA, Europe, the Middle East and India.

Phil is an experienced instructor including the development and delivery of technical and project management courses.

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