



OTC 2020 Short Courses

The Petroleum Technology Association of Nigeria (PETAN) in Collaboration with Greater Offshore will be organizing a 3 – Day short course on Subsea Systems Engineering & Project Development for delegates as part of the OTC 2020 Conference

The 3 day course is as detailed below



SUBSEA SYSTEMS ENGINEERING & PROJECT DEVELOPMENT TRAINING

30th April - 2nd May, 2020

PROPOSED DELIVERABLES

Subsea Systems Engineering and Project Development training program will offers key insights and skills for field development and operations to meet Operators' life of field services and maintenance requirements.

Greater Offshore in collaboration with its Proserv, have made special efforts to make this course relevant to the ecosystem and of practical use to the field operators, maintenance professionals, project engineers, supervisors, engineering managers, project managers and senior executives. The course therefore, features a number of worked examples, which vary from hand calculations to the use of interactive software packages.

Each candidate will go away from the course with theoretical knowledge and practical skills, the ideal prerequisite for joining a new team or taking on new responsibility in today's increasingly multidisciplinary environment.

The courses are characterized by their practical engineering nature as well as their theoretical content. The courses are presented by qualified Principal Subsea Engineers and Project Management experts, who have an established reputation in teaching petroleum engineering, as well as retaining a fully operational role as a practicing engineers and management professionals.



COURSE OBJECTIVES

The training program will covers all areas of hardware and software delivered as part of any Subsea Systems, including Subsea Control and Distribution System Scope of Supply. The training is designed for all Onshore and Offshore Operators, Maintenance/Asset Integrity personnel and Engineers. The course is prepared and will be delivered to participants in 3 days.



Greater Offshore have prepared tailored Subsea Systems Engineering and Project Development course to be delivered by a multi-discipline Principle Engineers, to meet Oil & Gas Operators, National Oil Companies, Government Regulators, and Services Contractors' training requirements, which includes:

- E&P Business Model
- The Stage Gate & Assurance Process
- Stakeholder Mapping
- Project Framing
- Project Management and Governance
- Front End Loading (FEL)
- Subsea Production Systems Building Blocks
- Requirements of a Subsea Production System
- Design Criteria
- Different Types of Subsea Control System
 - Direct hydraulic
 - Piloted hydraulic
 - Sequence hydraulic
 - Electro-hydraulic
 - Multiplex electro hydraulic
- Subsea Control System Components
 - SCM
 - SEM
 - SAM
 - MPFM
 - DCV
 - VSD
- Subsea Controls Equipment
 - HPU
 - EPU
 - UTA
 - SDU
 - PLEM
 - PLET
 - Other Subsea Distribution Unit
- Subsea Smart Sensors & Instrumentation
- Subsea Connections & Communications
- Computer Interface Options
 - Function of the Master Control Station (MCS)
 - Production Control System (PCS) with MCS
 - PCS with Subsea Interface unit
 - Stand-alone dual MCS (Hot standby- local I/O)
 - Pressure profiling
- Electrical Control Options
 - Separate electrical power and communications
 - Combined electrical power and communications
- Subsea Valves & Actuators
- Hydraulic Operation of Subsea Valves
- Subsea Control Equipment Testing & Reported Failures and Underwater IMR
- Hydraulic Control Options
 - Dual hydraulic pressure distribution
 - Single intensification
 - Closed loop hydraulics
 - Open loop hydraulics
- Subsea Safeguarding
- Hydraulic Systems on an Oil export Pipeline End & Manifold (PLEM) Structure at base of loading buoy
- Hydraulic System Requirements
- Subsea Control Fluid Technology (Synthetic Fluid)
 - Water-based fluid
 - Environmental legislation
 - Cleanliness: offshore operations
 - Cleanliness: standards
 - Hydraulic cleanliness
 - Effects of solid contamination
 - Sources of solid contamination
 - Task of the hydraulic filter
 - Filter technology
 - NAS 1638 standard
 - Hydraulic safety
- Installation and Intervention Techniques
- Subsystem Interfaces & Umbilical
- System Reliability & Availability
- Pressure and Safety Systems



- Obsolescence Management
- Inspection Plans
- Maintenance Plan (Preventive, Predictive & Reactive Maintenance)
- 3rd Party Devices
 - PTT
 - Venturi Flowmeter
 - Pig Detector
 - Sand Detector, etc.
- Subsea Completions
- Subsea Processing Systems
- Spares and Tooling
- New Technologies for Subsea Production Systems
 - Internet of Things (IoT)
 - Artificial Intelligence (AI)
 - Machine Learning (ML)
 - Data Analytics (Edge Analytic)
 - Predictive models for asset maintenance (CMMS, TIA Portal)
- Subsea Specifications

TRAINING PROCESS

The training process contains variations in classroom approach to ensure effective learning. These processes are summarized below.

- The majority of the training will be presented using an overhead PC projector using worked examples and interaction from the candidates.
- Some video and animation would be used to highlight subsea operations and installations.
- Unique hands on operator examples using demo software can be used on each candidates PC or shared PC to get a real feel for remote subsea valve control, diagnostics and monitoring.
- Remote log into an operating test system will provide a live operation and feedback from a subsea control module.

MATERIALS

Candidates will receive one electronic copy of the presentation materials along with notes and any other relevant training materials.

Candidates to come with Laptops but the course can be carried out using shared laptops. Overhead projector and screen, on site toilet and kitchen facilities, variety of desks and chairs to suit candidates and instructor(s) will be provided. Training room will be of moderate temperature and reasonably quiet to assist in training.

A certificate of completion will be provided to each participant who duly completes the training program.



COURSE SCHEDULE

Days	Session Descriptions
Day 1:	<p>Morning : Registration and Overview.</p> <p>Getting it right: Front End Loading Management On day one we will examine what needs to happen before you can have a successful project. A main element is defining what we are going to do, and getting agreement on how the execution is going to happen, both in time and in money terms. It covers the following topics:</p> <ul style="list-style-type: none"> - E&P business model - The Stage Gate & Assurance Process - Project Framing - Stakeholder Mapping - Project Governance - Front End Loading <p>Afternoon: Another important element is project tools. How do you set up a project properly? Having spent some time on issues that define 'doing the right project' we now will spend time on looking at tools to 'do the project right'</p> <ul style="list-style-type: none"> - Work Breakdown Structure - Critical path networks and planning - Progress Measurement and controls - 'S' curves - Project progress measurement and reporting - Contracting and Procurement procedures - Tendering and tender board procedures - Document control - Change Management, control process and procedures. <p>We will then work on an example of a project in selection stage, making a proposal to progress into the define stage. The class will be divided into groups who will work on the problem as defined in this manual, with the course leaders providing the relevant details and ways how the groups should develop and present their views.</p>
Day 2:	<p>Morning :</p> <p>Requirements of a Subsea System – Examines the functional and monitoring requirements of a subsea system including Xmas Tree valves, downhole safety valves, downhole smart valves, chokes, SSIV, manifold hydraulics, analogue instruments, downhole data, fibre optic instruments, flowmeters and chemical metering valves.</p> <p>Subsea Control System Design Criteria – Water depth, step-out distances, field topography, well type (oil, gas, water), wellhead pressure/temperatures, chemical requirements including metering, flow measurement and assurance measures, surface facility, special requirements – HIPPS, subsea separation, subsea gas boosting, subsea and downhole pumping, subsurface multilaterals. Response times, life of field extension, etc.</p>



	<p>Subsea Data Monitoring – Subsea data monitoring techniques and applications.</p> <p>Subsea Instrumentation – Pressure, Temperature, Flow, Erosion, Corrosion, Water-Cut, Sand Detection, Down Hole, etc.</p> <p>Afternoon: Practical session with candidate interaction and demonstrations (Some video and animation).</p> <p>Different Subsea Control Solutions – Discusses the different solutions for subsea well, manifold and tree control. Including direct hydraulics, piloted solutions, electro-hydraulic, fibre optic, and fully automated, all electric systems and subsea processing.</p> <p>Subsea Control System Layout and Components – looks at the basic subsea control system topology and introduces the different component packages used with the system including HPU, MCS, TUTU, SDU, SAM, EDU, SCM, Flying Leads, etc.</p> <p>Subsea Control Module – A detailed look at subsea control module equipment.</p> <p>Electronic Control System – A look at the power and communications architecture of the Master Control Station (MCS), communication modems, surface interfaces to host systems and Subsea Electronics Module (SEM), etc.</p> <p>Practical session with Subsea Electronics – Remote log into a real demonstration subsea electronics module currently under long term test in UK.</p>
Day 3:	<p>Morning: Hydraulic Operation of Subsea Valves – Examines the function of hydraulically operated subsea valves and control requirements from the Directional Control Valves (DCVs).</p> <p>Hydraulic System Requirements – Considers the surface Hydraulic Power Unit (HPU) requirements, storage, cleanliness, regulation, maintenance, subsea accumulation, redundancy, subsea pressure intensifiers, open and closed loop systems.</p> <p>Flying Leads – Discusses the various considerations required for subsea flying lead connections.</p> <p>Acoustic Communications and Positioning – Different acoustic and wireless technologies used subsea.</p> <p>Practical session, including operation of simulation operator screens using demo software with theoretical applications and remote log into an operating test system.</p> <p>Installation and Intervention Techniques – looks at ROV and diver requirements. Includes ROV tooling, running tools, surface support requirements.</p> <p>The Sense in Diving – A workshop examination of diver and ROV abilities and limitations with respect to subsea control system workplace and hazards.</p> <p>Afternoon: Practical session with candidate interaction and demonstrations (Some video and animation).</p> <p>Umbilical – Examines the basic requirements of an umbilical and distribution system, the umbilical elements, construction and termination. With a basic look at installation and connection considerations.</p>



	<p>Hydraulic and Electrical Analysis – Examination of the importance of system analysis, input requirements and expectations.</p> <p>Operator Screens – Typical operating screens and functionality.</p> <p>Future Subsea Technologies – Digitalisation (IoTs, AI, MI, Smart Sensors, Predictive Maintenance), Subsea Factory, Aquanaut (Combination of ROV & AUV) Technology, Umbilical-less Systems and Remote Facilities, etc.</p> <p>Subsea System Specifications – Detailed examination of the parameters and elements within a subsea control system specifications, etc.</p> <p>Practical Session – Participant operations of simulation operator screens including well control, data read back, housekeeping, alarms, event log and trending.</p> <p>Recap and Close</p>
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Venue:

The Crowne Plaza Hotel, (Opposite the Reliant Stadium, Houston Texas)

Date:

April 30 to May 02, 2020
Time: 8:00 am each day

Course Fee:

\$3, 000 per participants for PETAN member companies
\$3,500 per participants for Non PETAN member companies
(Fee includes: Course Material, Tea Breaks,
Lunch and Certificate)

Registration ends by March 31, 2020.

For information on registration and participation contact:

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