Engineering of Subsea Production Systems - Level 1

19 – 21 June 2013, Kuala Lumpur - Malaysia

Course Director: Prof Jean-Luc CHASSEROT
- Azur Offshore Ltd, Technical Director
- TPA Professor from TOTAL Professeurs Associes
- Fellow & Regular Lecturer at Cranfield University for 24 years

What previous participants have said about this course:

- “Highly experienced trainer, one of a kind!” Production Operation Engineer, INPEX Corp
- “Excellent introductory course for subsea engineering. Very experienced training leader with excellent delivery” Manager, Engineering/Design Category Mgmt, GSCM, PETRONAS
- “Excellent” Production Engineer, Kangean Energy Indonesia
- “The philosophy and approach adopted for the course is very practical and educative” CEO, International Energy Services Ltd
- “A good course covering overall SPS” Subsea Engineer, INPEX
- “Subsea engineers with Jean Luc’s presentation skills combined with his “all-rounder” knowledge are hard to come by” Subsea Integrity Engineer, Conoco Phillips

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Course Description

This concise course is well balanced and based on more than 30 years of true project experience in Shallow and Deep Water fields around the world, from concept evaluation to first production. It is designed for Project Managers, Project Engineers, experienced or new to Subsea & highly suitable for Cost, Planning, Offshore Installation and Offshore Operation Engineers.

All the Lectures (up-dated on a regular basis) are presented with text, figures and DVDs with videos and detailed animations, used to illustrate many key points of Subsea Technologies. The objective of the course is to equip Engineers and Technicians with a good understanding on the Engineering of Subsea Production Systems (SPS) together with Umbilicals, Risers and Flowlines (SURF) required to link and operate it from the Host.

3-day Course Highlights:

- Definition of Subsea Engineering for Field Developments / Floaters requirements
- Field Lay-out and System Design
- Flow Assurance Issues, Mitigation and Hydraulic Analysis
- Well Heads and Xmas Trees
- Templates, Manifolds and Subsea Hardware
- Subsea Wells Operations and Work Overs
- Inter Field Flowlines & Small Export Pipelines
- Production Riser Systems for Floaters
- Subsea Production Control Systems & Chemical Injection (including Umbilicals)
- Reliability Engineering and Risk Analysis
- Underwater Inspection, Maintenance & Repair
- New technologies for S.P.S
- 3 Major case studies for Oil, Gas and Heavy Oil Production including updates from Total, Shell and BP

Participants will receive a set of printed documents and a CD-ROM of a large number of the presentation figures in colour in PDF as course materials for reference after the course. (330 pages of text & 460 figures)

This course is designed for:

- Engineers and Project Engineers who have recently come into the oil and gas industry or who have transferred from another discipline with only a basic knowledge of this key energy sector.

- Industry personnel who will become part of, or need to have knowledge of multidisciplinary teams involved in Asian FPSO and Subsea projects: the managerial, engineering and financial specialists who determine project engineering priorities.

What other participants have said about this course:

"Very informative – the content details were right and very comprehensive” – PTT E&P

“Good reference/source and technical data – excellent trainer” – BPMIGAS

“It gave me a strong overview of the industry and a lot of information from previous projects” – MISC Bhd

“The content fulfilled everything I needed to know with regards to everything related to Subsea” – Petronas Carigali

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3-day Programme Content

Day One, Wed, 19 June 2013; 08.30 – 17.30

08:00 - Registration and Coffee

08:30 – Morning Lectures

Course Welcome & General Course Introduction including safety brief by Prof Jean-Luc Chasserot

L1: Introduction to Offshore Engineering and Subsea Development Options;
Why subsea, other options and Operators preferences, different systems in use, current design philosophies and Technology drivers. From the most simple to the most complex, single well tie-back, template manifold, cluster manifold, daisy chain, production loops, injection headers, others. The Building Blocks. Well Head, XMas Tree, Subsea Hardware, Intra-field Flowlines, Risers, Controls & Chemicals, Umbilicals, New Technologies for Subsea, etc...

L2: Floating HOSTS Requirements;
A review of current Floating Hosts connecting to and accommodating Subsea Production, for shallow & deep water systems, eg FPSO, Semi-submersibles, SPARS or DDCV, TLP & mini TLP, other designs.

L3: A review of Deep water developments in West Africa;
Analysis of key recent Oil Field developments in Nigeria, Angola & Ghana, with Subsea & large Spread moored / Turret moored FPSOs in the Akpo Field (Total), Agbami Field (Chevron), Bonga Field (Shell), Dalia Field (Total), Pazflor Field (Total) and Jubilee Field (Tullow).

L4: Field Development Architecture, the dictating Factors from Reservoir to Export;
The view of the Field Operator and how it is done, from the reservoir configuration, the subsea well drilling and well trajectories, the seabed lay-out, the Production Host position, the mooring lines and the Oil & Gas export systems

L5: System Design requirements for SPS, SURF & Topside;
A long and complex process in full co-ordination with Reservoir and Drilling Engineers, Facilities and Process Engineers, etc...within an integrated Project Team, from early concepts to a fully operational and reliable Total Production System, within budget and within schedule

L6: Overview of Principles of Fluid Flow “FLOW ASSURANCE”;
Definition of FA, chemicals, Hydrates, Wax, etc... and mitigation methods, Cold points, Insulation and active heating. Simulations and analysis.

L7: Well-Head systems and Subsea XMAS TREES

Type of Wellheads ;
for Drilling and for Subsea Completions with a Brief on drilling operations, various equipments, installation sequence in shallow & deep waters, illustrated with animations.

Type of Xmas Trees ;
with development history, Vertical Tree VXT, Horizontal Tree HXT & Drill Trough Horizontal Tree DTHXT, including Well Intervention Techniques & Operational requirements. A review of all main Manufacturers Products, Main components, Testing and Installation sequence.

L8: Subsea “Hardware”, Templates, Manifolds and Connections;
with development history & the need for templates or cluster/manifolds, daisy chains & intra-field Flowline connections or export pipelines in shallow & deep waters. Piping & Valves systems, Illustrated with animations & video sequences.

17:00 - Questions & Answers/ Discussion

17:30 - End of Day One
Day Two, Thur 20 June 2013 2013; 08.30 – 17.30

08:30 – 08:50 Morning Lectures; Subsea Well Operations, Flowlines & Risers

L9: Subsea Well Operation and Maintenance; Conventional Work-Over, done by Rig or low cost intervention by Well Service Vessel (W.S.V.) using subsea lubricator or new novel techniques.

+ Additional presentation of the new Expro Rig less AX-S system.

L10: Intra-Field FLOWLINES, small Export Pipelines, Surveys & Integrity Monitoring; Design, route selection, Materials, Lay Techniques, Offshore Operation & Integrity Monitoring, Connections & Tie-Ins, Trenching & Protections and various Surveys.

L11: Subsea Pig Launcher in the Skirne Field; A Presentation showing Subsea Pigging Facilities in the Total Norway Skirne Field, by Intec.

L12: Production (& injection) RISER SYSTEMS for FLOATERS (Flexible Hybrid Towers, SCRs); Different riser configurations, design, computer simulations, model testing, integrity monitoring, deep water solutions, installation procedures, various Hybrid solutions and performances, Steel Catenary Risers and latest FPSO applications in West Africa and Brazil.(steel lazy wave)

L13: DALIA Flowlines & Risers show case by Technip in Angola; The Manufacture & Installation of Flowlines & Riser + Structures to be integrated with SPS; Flowlines, rigid & flexible, new IP8 flexible dynamic riser for production, PLEM, PLET, FLET, in line “T”, SLED, etc

Lunch break

Afternoon Lectures;

Subsea Production Controls, Chemical Injections, Umbilical Systems & Fluids;

L14: Subsea Production Control & Chemical Injection Systems;

Overview and types of Control Systems; History of the Technology and current solutions.

Typical Equipment; Functional Design requirements for Topside, subsea Control Modules and sensors, connections and umbilical terminations solutions topside and subsea. Control fluids.

Operator interfaces; The Master Control Station, VDUs and screen dumps, UPS, HPU, etc... & the ESD Platform interfaces within the ICSS.

Control Fluids and Injected Chemicals; Fluids as true components of SPS, anatomy of various fluids and chemicals, environmental impact and operational logistic. Material from Castrol Offshore.

L 15: Umbilicals for Controls (shallow & deep), Chemicals & Connections; Complex and expensive Life Lines of any SPS for reliable operation, flexible umbilicals are carrying small pipes for hydraulic power, subsea injected chemicals, power and signal electric cables but also high power cables to drive subsea pumps. Optical fibers are also incorporated. Connections at both ends are critical for maximum reliability and long operating life. They are static on seabed but dynamic in riser configurations. Materials are different for shallow or deep water applications. API 17E requirements.

L 16: Maintenance of Subsea Controls components; How Control Modules & other critical components are replaced underwater. With Jumpers installation Animations, Methanol flooding, control modules, MPFM, chemical injection valves, etc...

17:00 - Questions & Answers/ Discussion

17:30 - End of Day Two

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Day THREE – Fri 21 June 2013, 08.30 – 17.00

08.30 – Morning Lectures; Case Study and Underwater IMR;

**Case Study; BP Angola Block 18 --Greater Plutonio Hub, training for Operations.**
After a slide presentation to introduce this key BP Project & Field Development, we will review the “Training by CD” (duration of 70 mn) any Operator on the FPSO must take before going offshore. This Level 1 Operation Training Program does cover, after an Introduction & a summary of operations, the HSSE detailed requirements, the Reservoir, Drilling and lay-out Architecture, the Operation of the Subsea Production Facilities, the Operation of the FPSO including all processing systems & utilities and the Oil export by Shuttle tanker. The future Gas export pipeline network is also presented.

**L17 – Remote intervention, Underwater Inspection, Maintenance & Repair (I.M.R.);**
For shallow waters and deep waters operations, during surveys, installation, pressure testing, hook-up, commissioning and production start-up. Regular Inspection, Maintenance & Repair (IMR) underwater operations and data base management. ROV and AUV types and operations. ++ Animations.

**+ The views of a major Operator;**
This additional Presentation will explain the views of an Operator with Divers, ROVs and AUVs operations in shallow and deep waters, for underwater construction, inspection and maintenance.

**Lunch break**

Afternoon Lectures;

**New Technologies for SPS and SURF & Subsea Reliability Design;**

**L18 – NEW Technologies for Subsea Production Systems;**
Multiphase Boosting, Subsea Processing and water re-injection, Multiphase Metering, Subsea Wet Gas Compression, All Electric SPS & Subsea Wells Controls.

Subsea processing will review the 3 current techniques with Horizontal, Seabed vertical & Caisson vertical separators in operation, in the North Sea, in the GOM, in Brazil and in Angola.

+ One NEW Presentation will introduce the Total Pazflor Field, incorporating three novel vertical, gas to liquid seabed Separators and liquid boosting, with animation and the latest operational report.

**L19: Novel “all electric” SPS system;**
Two presentations by SUT/Cameron & Total, for the World First system installed offshore Holland in the K5-F field, on stream since 2008. A solution for the future with the latest operational report.

**L20 : Introduction to Subsea Reliability and Risks;**
With materials from Prof John Strutt addressing the needs to incorporate Subsea Reliability at Design stage. + review of new API RP 17 N.

**16.00 - Questions & Answers / Discussion**

**16.30 - Presentation of Course Certificates**

16.45 - End of Course.
Your Expert Trainer: TPA Professor Jean-Luc CHASSEROT  BSc . MSc
Technical Director & Senior Consultant – Field development with SPS, URF & Floaters
Azur Offshore Ltd.

Started work in the Oil & Gas industry in 1972, after qualifying in Mechanical Engineering BSc and Industrial Engineering BSc, in France. Worked on the design & construction of several LNG carriers in La Ciotat shipyard (France) and Newport News shipyard (USA). Joined the Comex Indust/Seal Group in 1976, to work on diving systems, submarines and ROVs then on Subsea production XTrees & Work Over riser after moving to Aberdeen in 1978. Joined the Subsea engineering consulting (AOL) in 1981 to start the local branch and in 1983 moved to work in London on new Field Development Projects: Balmoral / Glamis for SUN OIL, Draugen FPV for Aker, GASP Subsea Separator (R&D JIP), Froy for ELF, Lyell to Ninian for CONOCO, Toni for AGIP, Alba with T.M. FSO for CHEVRON and Telford to Scott for Amerada HESS.

Major Projects only from 1996 – to date :
- Mid 1996 / march 98 OTTER FINA UK – Subsea engineering Manager responsible for FEED, detail design functional specifications and ITTs & bids evaluations. Two options costing (CAPEX & OPEX) for AFEs. FPSO + Subsea cluster and long tie-back to Magnus/Tern platforms. Left the team to return to France for ELF Angola.
- 1998/02 GIRASSOL field development based in Pau & Beziers, after full SPS audit, looking after flowlines, connectors & hybrid Riser tower design with Cameron France. Also involved with DALIA field preliminary evaluations and advantages of the novel Drill Through Horizontal Tree costs savings during drilling ops. Assisted Cameron & Shell for the MALAMPAYA field development in the Philippines (-800m) responsible for System design, Flow assurance issues and started detail design / offshore installation methodology. SIT in 2000.
- Mid 2003 / Feb 05 Senior Project Engineer / Auditor on TIOF Field studies for WOODSIDE Mauritania. Work done in Perth and Nouakchott in direct assistance to Project Manager for concept evaluations, F.A. issues, SPS and FPSO up to screening study awarded to Doris in Paris. (included training in Mauritania)
- 2005/06 Assisted BP operations on GREATER PLUTONIO Field to develop an Operation modular CD/ DVD for level one training of Angolan Operation personnel. Reviewing all the building blocks from, drilling, reservoirs, SPS / URF, SPS, FPSO up to oil export loading lines & buoy. Job completed in June 06.
- 2006/ Feb 07- 7 months mission to assist Total Angola on DALIA field development, deep water, world Largest S.P.S.71 wells + large FPSO. Audited complete system and prepared with all Packages Managers OTC papers covering all topics from Subsurface, Drilling, S.D. & F.A. issues, SPS, UFL, FPSO & Export system.

Lecturing activities
For the past 24 years, regular lecturer in Offshore and Subsea engineering at various engineering Schools / Universities for new engineers (final year MSc & PhD) and at various public and private in-house courses organised in several countries (Thailand, Vietnam, Malaysia, Singapore, Lybia , Angola, Nigeria, Mauritania, Ghana & Australia). Several courses delivered in-house to Petronas New Subsea Team between 2008 and 2010 in Kuala Lumpur. Started to work with Petro Edge in Dec 2010. Latest courses in Singapore (July 12) on FPSO & Subsea Controls Level 2.

Other qualifications
S.U.T. Registered Subsea Engineer in 88 and Fellowship awarded in 92 Modular MSc in 88 from Cranfield University & Fellowship awarded in 96 (regular Lecturer for the past 20 years at MSc level). Made TPA Prof of Total Professeurs Associés in Oct 2006 to present lectures in Offshore & Subsea Engineering in China, Russia and France (Ecole Centrale-Paris / Arts et Metiers-Angers).

Key domain of expertise in summary: (involved with 5 Deep Water Projects since 1998)
- Field development architecture with SPS, URF, UFL, Floaters & Controls/C.I. (including Drill. /W-O. Ops)
- System Design and Flow Assurance issues from reservoir to topside process ( including Well interfaces)
- SPS detail design, construction, installation and start-up (including WH, XT, M, T, U, R. & Flowlines)
- System design, construction & installation of flowlines, small diam. pipelines and risers ( flex, hybrid & rigid)
- Interfaces with reservoir, drilling, down hole completion, floats FPV / FPSO & fixed platforms
- Project management assistance, planning, costs for CAPEX, control and interface engineering coordination
- Project team assistance for Operators and Contractors (including ITTs prep, Bids evaluations, Supervision, & HUC)

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DELEGATE DETAILS

Kuala Lumpur, Malaysia
19 – 21 June 2013

Engineering of Subsea Production System
- 3 day course

Early Bird Price: SGD 3199
Normal Price: SGD 3399

TEAM DISCOUNTS!

PetroEdge recognises the value of learning in teams. Group bookings at the same time from the same company receive the following:

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