Offshore Drilling Operations: Floating Rigs, Dynamic Positioning, Riser and Subsea BOP

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Paris - Right Bank business hotel



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Introduction:

Offshore drilling operations add a moving hull, a marine riser and a subsea BOP to every well, and small gaps in station-keeping, riser tension or disconnect planning can turn a routine connection into a drift-off, a riser gas event or a lost wellhead. This Core Concept course takes drilling engineers, supervisors and offshore rig staff through rig selection, jack-up preload, mooring and dynamic positioning, metocean limits, riser and tensioner behaviour, subsea BOP control, emergency disconnect and deepwater well control. Participants build an Offshore Well Operations Plan for a case deepwater well.

Course Objectives:

- Select a jack-up, tender assist unit, semi-submersible or drillship for a well from water depth, metocean exposure, deck load and mobility criteria
- Approve a jack-up location or a mooring pattern from seabed soil data, spudcan penetration, preload results and line tension cases
- Set well-specific operating guidelines, watch circles and weather windows for a dynamically positioned rig using its DP class and FMEA findings
- Check a marine drilling riser stack-up, top tension, flex joint angles and heave compensation settings against operating and disconnected modes
- Plan subsea BOP functions, emergency disconnect sequences and deepwater well control responses for riser gas, choke line friction and hydrates
- Assemble an offshore well operations plan covering top-hole hazards, subsea wellhead landing, logistics interfaces and offshore drilling HSE

Target Audience:

- Drilling engineering functions that plan wells drilled from jack-ups, semi-submersibles and drillships
- Rig supervision functions that approve station-keeping limits, riser running and disconnect decisions at the well centre
- Subsea and BOP functions that maintain stack control systems and support emergency disconnect readiness
- Marine and DP functions that hold position, monitor metocean conditions and coordinate with the drill floor
- Well operations planning functions that prepare offshore campaign programmes, logistics and HSE sections

Course Outline:

Day 1: Offshore Rig Types and Rig Selection

- Offshore Rig Classes: Jack-Up, Tender Assist, Semi-Submersible and Drillship Configurations
- Water Depth, Variable Deck Load and Moonpool Capacity Comparison Sheet
- Rig Selection Matrix: Well Depth, Metocean Exposure, Mobility and Spread Rate
- Operator, Drilling Contractor and Marine Crew Authority Lines on a Floating Unit
- Offshore Campaign Sequence from Rig Mobilisation to Rig Release

Day 2: Jack-Up Site Assessment, Preload and Mooring Systems

- Jack-Up Site-Specific Assessment: Seabed Soil Data, Leg Penetration and Air Gap
- Spudcan Penetration Analysis and Punch-Through Risk Screening
- Preload Procedure with Ballast Water and Hold Period Criteria
- Spread Mooring Patterns, Anchor Types and Line Tension Monitoring
- Mooring Analysis Concepts: Intact and One-Line-Damaged Cases

Day 3: Dynamic Positioning, Metocean Limits and Weather Windows

- DP Equipment Classes 1, 2 and 3 and Redundancy Concepts
- DP FMEA Report Review and FMEA Proving Trials
- Position Reference Systems: DGPS, Hydroacoustic USBL and LBL and Taut Wire
- Well-Specific Operating Guidelines and Watch Circle Limits
- Metocean Criteria, Weather Window Planning and Consequence Analysis Alarms

Day 4: Marine Drilling Riser, Tensioners and Heave Compensation

- Marine Drilling Riser Stack-Up: Main Tube, Choke, Kill and Hydraulic Auxiliary Lines
- Riser Buoyancy Modules and Top Tension Calculation
- Riser Analysis Concepts Under ISO 13624-1: Connected, Hang-Off and Disconnected Modes
- Riser Tensioner Systems and Drill String Heave Compensation
- Flex Joint Angle Limits and Riser Recoil Awareness

Day 5: Week-One Integration: Guided Station-Keeping and Riser Case

- Case Study: Rig Type Selection for a Deepwater Exploration Well
- Case Study: Jack-Up Location Approval with Preload and Punch-Through Review
- Case Study: DP Operating Guideline and Weather Window for a Drillship Campaign
- Case Study: Riser Stack-Up and Tension Envelope Check
- Week-One Station-Keeping and Riser Review with Peer Challenge

Day 6: Subsea BOP Stack, Control Systems and Emergency Disconnect

- Subsea BOP Stack Arrangement: Annulars, Pipe Rams, Shear Rams and LMRP
- BOP Control Systems: Multiplex Pods, Subsea Accumulators and Pod Redundancy
- Emergency Disconnect Sequence Design and Shear-and-Seal Timing
- Drift-Off and Drive-Off Scenarios with Yellow and Red Watch Circle Actions
- Autoshear, Deadman and ROV Intervention Backup Functions

Day 7: Deepwater Well Control: Riser Gas, Choke Line Friction and Hydrates

- Deepwater Kick Tolerance and the Effect of Water Depth on Drilling Margins
- Choke Line Friction Measurement and Compensation During Subsea Kills
- Riser Gas Detection, Diverter Line-Up and Riser Gas Handling Procedure
- Gas Hydrate Formation Risk, Glycol Inhibition and Hydrate Plug Remediation
- Trapped BOP Gas Removal and Riser Displacement After a Subsea Kill

Day 8: Shallow Hazards, Top-Hole Drilling, Subsea Wellheads and Rig Interfaces

- Shallow Gas and Shallow Water Flow Hazard Assessment from Site Survey Data
- Riserless Top-Hole Drilling with Pump-and-Dump and ROV Returns Monitoring
- Structural Conductor Setting by Jetting or Drill-and-Grout
- Subsea Wellhead Housings and Low-Pressure and High-Pressure Landing Checks
- Supply Vessel, Deck Space and SIMOPS Hand-Off Interfaces with the Rig

Day 9: Offshore Drilling HSE, Barrier Assurance and Performance

- Offshore Drilling Major Accident Hazard Register and Safety Critical Elements
- Offshore Emergency Response: Muster, Abandonment and Well Secure Actions
- Marine and Drill Floor Interface Drills and Crew Competence Records
- Floating Rig KPIs: Weather Downtime, Riser Running Time and BOP Test Time
- Deepwater Lessons Learned Review and Rig Spread Benchmarking

Day 10: Capstone: Offshore Well Operations Plan

- Capstone Build: Rig Selection and Station-Keeping Basis for a Case Deepwater Well
- Capstone Build: Riser, Subsea BOP and Emergency Disconnect Plan
- Capstone Build: Top-Hole, Wellhead and Deepwater Well Control Contingencies
- Capstone Build: Weather, Logistics and Offshore HSE Sections
- Offshore Well Operations Plan Presentation and Technical Panel Review

Skills You Will Gain:

- Offshore Rig Selection
- Jack-Up Preload Assessment
- DP Operating Guideline Setting
- Riser Tension Analysis
- Emergency Disconnect Planning
- Subsea Well Control
- Shallow Hazard Screening
- Offshore Barrier Assurance

Why Attend This Course:

- Return with an Offshore Well Operations Plan for a case deepwater well, ready for technical review
- Rehearse drift-off, riser gas and hydrate scenarios in time-pressured exercises before meeting them at the well centre
- Speak the same language as marine, DP and subsea crews when station-keeping and disconnect decisions are made
- Compare floating rig and jack-up practice with drilling, subsea and marine peers from different operators and contractors

Conclusion:

Offshore wells are delivered safely when rig choice, station-keeping, riser, BOP and well control plans are written as one. Week one moves from rig types and selection through jack-up preload, mooring, dynamic positioning, metocean limits and the marine riser, closing with a guided case. Week two adds the subsea BOP and emergency disconnect, deepwater well control, shallow hazards and subsea wellheads, offshore HSE and performance, and ends with an Offshore Well Operations Plan for a case deepwater well.