

Offshore Managed Pressure Drilling (MPD)

Introduction to Offshore Managed Pressure Drilling



Practical understanding of adaptive drilling technology methods used to resolve recurrent drilling problems and difficulties that conventionally exist

⏱ Duration/Dates of Course

4 - 5 days (Classroom format)

📌 Overview

Managed Pressure Drilling 'MPD' is an adaptive technology currently solving a wide range of offshore related problems associated with conventional overbalanced drilling methods 'OBD'. Application examples are: un-drillable well's, resolving differential sticking, wellbore instability, well bore breathing, lost circulation, loss-gain situations that often result in narrow margin wells such as deep-water, HPHT, extended reach, horizontal, depleted and complex well reservoirs or associated troublesome formations. The case studies presented in this course review and highlight safety, operational and cost benefits from the drilling examples presented.

🎯 Target Participants

Those engaged in drilling projects seeking to manage, lead, supervise, engineer, provide technical support, serve, administer or finance the use of adaptive drilling technology methods.

🎯 Purpose

Be able to actively manage and control annular pressure to enable uninterrupted drilling through problem prone abnormal or subnormal formation related pressure regimes and geo-mechanical stresses. Pressure control being managed via a combination of fluid density, circulating friction, and surface pressure adjustment.

🎯 Goals and Objectives

- How to manage and control difficult offshore drilling problems using MPD in narrow pore or fracture pressure windows, when using 'OBD' methods.
- Increase knowledge in regards to all concepts of overbalanced, managed and underbalanced drilling to assess MPD delivery benefits in offshore wells.
- Participants will learn the origins and history of offshore MPD, how to apply a well's candidate selection process, select the appropriate fluid system, how to identify key hazards and risks, assess operating boundaries, conditions, use of MPD equipment and how to perform both QHSE and operational assessments for an adaptive MPD drilling application.
- Review case studies, equipment and operation application of adaptive MPD drilling from different operating regions where it is currently being applied.

🎯 Course Take Away

- A solid foundation of Offshore Managed Pressure Drilling to enable participant to apply greater control of the annular pressure profile delivered throughout the wellbore.
- Provides the knowledge to help prevent and eliminate current drilling problems, cost overruns and difficulties that conventionally often results.
- Be familiar with applying IADC screening toolkit in regards to well candidate selection, design, and project management principles for MPD well application.
- Appreciate the adaptive MPD methods and technologies that exist for offshore wells today.

The suggested topics are preliminary and only serve as a guide. Elected trainer may modify, amend and improve specific topic contents or reorder presentation sequence as deemed appropriate.



Course Summary

Offshore Managed Pressure Drilling (MPD)



Session	Day 1	Day 2	Day 3	Day 4
08:00 to 09:45	Course Introductions Expectations Objectives	MPD candidate selection Standards rules and regulations <i>IADC toolkit</i>	MPD Constant Bottom hole pressure drilling 'CBHP' <i>Discussion</i>	Pressurized mud cap drilling <i>Media files and examples</i>
15 - 30 mins		Break		
10.15 to 12.00	Why MPD? Managing drilling pressures Riserless drilling	MPD simplified <i>(multi-media)</i> Case studies, <i>Discussion</i>	Dual gradient drilling 'DGD' <i>Media files</i>	Mud cap and pressurized mud cap drilling <i>Media files Case studies and examples</i>
12:00 to 13:00	Lunch Break			
13:00 to 14:30	Why MPD in offshore wells? <i>MPD multi-media files and discussion</i>	Simple MPD <i>case histories</i> MPD Common Equipment	Dual gradient drilling 'DGD' <i>Case studies and examples</i>	HPHT Case studies Worked example <i>Discussion</i>
15 - 30 mins		Break		
15:00 to 16:30	Definitions Origins and history Objectives of a MPD program <i>Discussion</i>	Situational problem and challenges	Mud Cap Drilling <i>Media files Case studies and examples</i>	New technologies <i>Media files</i> Course debrief Feedback, Close out

*Note: This outline serves as an example.
Course duration and content can be
customized to suit customers' specific needs*

Course Details

Offshore Managed Pressure Drilling (MPD)



Day 1

Introduction to MPD

Why MPD? (Pressure and stability management)

- Standard offshore well design revisited
- What is effective pressure management?
 - Pressure prediction techniques
- Importance of offset well data analysis
- Wellbore pressure and stability fundamentals.
- Complex pressure problems
- Riserless 'OBD' in offshore wells
- Group Exercise 1. Riserless drilling

Debrief: Self-test

Understanding MPD in offshore wells

- Normal Overbalanced Drilling 'OBD'
- Basic requirement for simply MPD
- Group exercise - the need for MPD
- Transition and reservoir zone 'OBD'
- Other 'OBD' drilling problems and issues
- How MPD can reduce OBD problems
- Group exercise - conventional drilling

Debrief: Self-test, MPD in offshore wells

MPD Basic definition: History and Objectives

- What MPD is clearly not?
- MPD Basics defined
- Offshore MPD technical benefits
- MPD Origin and History
- Purpose goals and objective of MPD

Debrief: Definition, history and objectives

Day 2

MPD design and equipment process simplified

MPD Selection, Standards Rules, Regulations

- MPD classification and order of perspective
- IADC well classification
- MPD Hazard identification and phases

Debrief: IADC/MPD/HSE and regulatory guidelines

- API, Norsok, DNV, Lloyds, ABS, IOGP etc.
- Handouts to be provided

Offshore MPD simplified

- OBD pressure management problems
- Why MPD is often demanded?

Debrief: Self-test questions

MPD simplified examples and case studies

- Simple MPD
- Standard CBHP MPD explained

MPD Common Equipment

- MPD equipment systems
- QHSE reliability and assurance
- Rotating and circulating devices
- MPD choke types
- Surface and Downhole drilling equipment
- Subsea equipment
- Other MPD tools and equipment

Debrief: Self-test MPD equipment

Situational problem and MPD

- Key situational problems
- MPD situational challenges
- MPD operational situations
- MPD best operating practices

Debrief: Review of Day 2. Case study handouts provided

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Day 3

Managed Pressure Drilling Methods

Constant Bottom Hole Pressure drilling 'CBHP'

- **Constant bottom hole pressure methods**
- What is the CBHP method
- Other CBHP methods considerations

Debrief: Handouts to be provided

Advanced offshore MPD – Dual Gradient drilling

- Single and dual gradient drilling 'DGD'
- Deepwater casing and mud programs
- Dilution based DGD
 - Hollow spheres DGD
 - Subsea systems
 - Dilution based DGD outlined
- Single and DGD well control aspects
 - Single gradient well control indicators
 - DGD well control indicators
 - Drilling on the seabed
- Seafloor DGD considerations
- DGD worked examples
- DGD latest media files

Debrief: Self-test dual gradient drilling

DGD Case studies

- DGD MPD exercise to be conducted
- Case study reviews
- Discussion

Debrief: Handouts to be provided

Advanced offshore MPD – Mud cap drilling

- Mud cap drilling (MCD)
- Typical mud cap drilling step by step operational outline
- General mud cap drilling considerations

Debrief: Handouts to be provided

Day 4

Advance MPD - Technology review

Pressurized Mud Cap Drilling (PMCD)

- Pressurized mud cap drilling
- The four elements of PMCD
- **PMCD General**
- PMCD case study examples

Debrief: Pressurized mud cap drilling

Mud cap and Pressurized Mud Cap case studies

- Case study of CBHP and PMCD
 - Overview, Equipment
 - Systems, Procedures used
 - PMCD objectives
 - Well control matrix

Debrief: Handouts to be provided

Offshore HPHT MPD

- Kirsten HPHT Field case study introduction
- Field overview, layout, well's status
- Kirsten MPD drivers

Debrief: HPHT depleted reservoirs and MPD application

MPD Offshore technologies

- Mud cap, Pressurized mud cap
- Dual gradient drilling
- Annular management systems
- New tools, systems and equipment
- Competency and training requirements

Debrief: Offshore MPD technologies. Course feedback

Note: Course attendees will receive a 16-page Glossary of UBD/MPD terms with the course handout materials