MERCURY

Advanced Directional and Managed Pressure Drilling Course

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Advanced Directional and Managed Pressure Drilling Course is a 1-week advanced course for engineers and wellsite supervisors who already plan or run vertical wells and now face deviated, horizontal and narrow-margin sections. You plan trajectories, select steering assemblies, model the pressure window and set managed pressure procedures, and you take back a Trajectory and Pressure Plan. Mercury Training Center delivers this directional and managed pressure drilling course.

About This Course

Long laterals and depleted or fractured zones leave a thin margin between pore and fracture pressure, so conventional methods bring losses, kicks and stuck pipe. To follow the course you should already plan or supervise operations on a rig. You practice with survey data, hydraulics calculations and pressure scenarios from real field settings.

Who It Is For

- Engineers who plan trajectories, casing points and bottom-hole assemblies.
- Wellsite supervisors who direct steering, connections and tripping on the rig.
- Contractor staff who run rotating control devices, chokes and surface back-pressure equipment.
- Mudlogging and geology staff who track gas, cuttings and pore pressure trends while steering.
- Asset staff who approve plans for complex or narrow-margin sections.

This course is not for trainees still learning rig basics and vertical operations, who are better served by a foundation course on rig operations, nor for readers who need only kick response and shut-in drills, who suit a dedicated well control course.

Competencies You Will Build

- Trajectory Planning: you lay out build, hold and drop sections and check doglegs against casing and completion limits.
- Steering Assembly Selection: you choose between motors, rotary steerable systems and stabilizer placement for each section.
- Torque and Drag Analysis: you predict string loads and buckling in horizontal laterals and adjust the plan.
- Pressure Window Management: you keep bottom-hole pressure between pore and fracture limits through every operation.
- Managed Pressure Operations: you set constant bottom-hole pressure procedures for connections and trips.
- Influx and Loss Response: you tell a kick from ballooning or losses and act on the right signal.

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What You Will Be Able to Do

By the end of the course you will be able to:

- From a target and offset survey data, build a trajectory with the minimum curvature method and check anti-collision spacing.
- Given formation and section data, choose a steering assembly and justify stabilizer and jar placement.
- Using hydraulics data, calculate equivalent circulating density and cuttings transport for a long lateral.
- From pore and fracture gradients, define the operating window and the surface back-pressure schedule for connections.
- Given rig floor and logging signals, classify an event as influx, ballooning or losses and set the response.
- Using a lessons-learned log, assess when underbalanced or managed pressure methods suit a section.

Course Content

Day 1: Trajectory Planning and Surveying

- Build, Hold and Drop Profiles for Deviated and Horizontal Sections
- Minimum Curvature Survey Calculations and Dogleg Severity Limits
- MWD and LWD Surveys for Steering and Geosteering Decisions
- Anti-Collision Spacing on Multi-Well Pads and Platforms
- Multilateral Junction Options and Their Completion Limits

Day 2: Steering Assemblies and String Mechanics

- Steerable Motors Versus Rotary Steerable Systems by Section Type
- Stabilizer, Reamer and Jar Placement for Deviation Control
- Torque and Drag Modeling for Extended Laterals
- Buckling, Vibration and Fatigue Checks on Pipe and Collars
- Bit and Nozzle Selection for Steering Performance

Day 3: Hydraulics and Cuttings Transport

- Equivalent Circulating Density Calculations in Narrow Windows
- Cuttings Bed Formation and Removal in High-Angle Sections
- Stuck Pipe Mechanisms in Deviated Wellbores and Prevention Steps
- Lost Circulation Treatments in Fractured and Depleted Zones
- Gas Analysis and Cuttings Evaluation for Pore Pressure Trends

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Day 4: Managed Pressure and Underbalanced Methods

- Constant Bottom-Hole Pressure Method With Surface Back-Pressure
- Rotating Control Devices, Chokes and Flow Measurement on the Rig
- Connection and Tripping Procedures Under Managed Pressure
- Influx, Ballooning and Losses: Signal Recognition and Response
- Underbalanced Operations: Suitability Screening and Limits

Day 5: Practice Building the Trajectory and Pressure Plan

- Exercise: Trajectory and Anti-Collision Check for a Pad Development
- Exercise: Torque and Drag Review for a Long Horizontal Lateral
- Exercise: Back-Pressure Schedule for a Depleted Carbonate Section
- Exercise: Event Classification From a Pressure and Flow Log
- Completing the Trajectory and Pressure Plan for Your Own Section

Case Studies and Exercises

These are suggested activities.

- Case study: an offshore development platform plans a high-angle producer next to existing slots; you choose the kick-off point and the anti-collision spacing.
- Case study: an onshore unconventional lateral sees rising torque and slow sliding; you decide between a rotary steerable system and hydraulics changes.
- Exercise: a high-pressure gas section shows flow during connections; you separate ballooning from influx and set the response.
- Exercise: a depleted carbonate reservoir loses returns while drilling ahead; you build a managed pressure schedule that keeps the section in its window.

What You Take Back

The Trajectory and Pressure Plan is the document you build for one of your own sections during the course. In your first month back, you use it to review the next directional or narrow-margin section with your team and the service contractors before spud.

- A trajectory with survey checks and anti-collision results.
- A steering assembly and torque and drag summary.
- A pressure window with an equivalent circulating density profile.
- Connection, tripping and event response procedures.

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Quick Answers FAQ

What should I know before directional and managed pressure drilling training?

You should already plan or supervise rig operations and be able to read a casing scheme, survey listing and hydraulics sheet. Earlier exposure to deviated sections helps, since the course starts at that level.

How does advanced directional and managed pressure drilling differ from a foundation drilling course?

It assumes the basics and concentrates on complex trajectories, steering assemblies, torque and drag and pressure window management. Foundation courses cover rig equipment, fluids, bits and conventional operations in vertical sections.

When is managed pressure drilling used instead of conventional methods?

It is used when the margin between pore and fracture pressure is too narrow for a fluid density change alone, as in depleted zones, fractured carbonates and high-pressure sections. Surface back-pressure then adjusts bottom-hole pressure quickly during connections and trips.

What do I take back from the Advanced Directional and Managed Pressure Drilling Course?

You take back the Trajectory and Pressure Plan for one of your sections: trajectory and anti-collision checks, a steering assembly with torque and drag results, a pressure window and response procedures.

For Your Manager

After the course, the team member can plan complex trajectories, select steering assemblies, model torque, drag and circulating density, and set managed pressure procedures. They return with a Trajectory and Pressure Plan for an upcoming section, first used in the pre-spud review with the team and service contractors.