TETRA TECH RPS ENERGY | TRAINING

N690: Stuck Pipe, Design and Operational Practices for Avoidance

Format and Duration
Classroom - 5 Days

Instructor(s): Kevin Gray

Summary

This course addresses the root causes of the poor planning and poor operational procedures that lead to stuck pipe situations at the rigsite. The approach to stuck pipe prevention advocated in this course is a 'Holistic' one where the subject is addressed across disciplines at the planning, execution and evaluation stages of each project. The importance of maintaining focus on the key drivers of stuck pipe during each phase of well construction is highlighted as it the use of techniques and equipment previously only used by the geo-science teams.

Whilst the course covers all the areas of potential stuck pipe in well construction operations the delivery of the course is focused on ensuring that the greatest impact can be delivered both in the planning stages and at the rigsite. The time weighting of each subject area and each stuck pipe mechanism is based on the industry stuck pipe statistics to ensure that the maximum value is delivered. This course can be tailored to the audience at any level from new hire to 'Train the Trainer' level.

This course is delivered in partnership with Black Reiver Consulting Ltd.

Learning Outcomes

Participants will learn to:

1. How to plan wells using the most up to date techniques and input from the geology and Geo-Mechanics teams to prevent avoidable problems in the well.
2. How the 'old' practices and procedures embedded in the industry are not always correct and often lead to stuck pipe situations.
3. How the 'Human Factor' plays a significant part in a lot of stuck pipe situations, why people do not follow the correct practices and procedures.
4. Communication and operational reporting and planning, why we often do not see the obvious risks because of the way we focus our reporting.
5. The definitions, mechanisms and language of stuck pipe.
6. Jars and accelerators, how they work and how to place them correctly but also why these pieces of equipment are not always going to help you.

Training Method

This is a classroom course comprising a mixture of lectures, discussion, case studies, and practical exercises.

- Practical demonstrations of all the key principles using models and simulations in the classroom.
- Mixed, instructor led delivery of theoretical content with blend of PowerPoint overview, whiteboard explanations of detail and class interactive exercises.

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- A narrative that runs through the course where each topic is inter-related and build on the previous learnings.
- Extensive allowance for class led questioning within the course delivery.
- For some deliveries of this course a 'role playing' exercise may be included.

Who Should Attend

Anyone involved with well construction, office based and rig-based staff at all levels. First time introduction to stuck pipe. Refreshing knowledge if it is more than two years since you attended a stuck pipe course.

Course Content

1. Introduction to Stuck Pipe and Risk Management

- Understanding the drilling operation as a process and controlling that process effectively.
- Stuck pipe definitions and statistics: Identifying trends and common pitfalls.
- Offset data review: Recognizing risks of flawed stuck pipe statistics.
- Understanding project risk profiles: Developing a risk register and roadmap.
- The danger of ignoring 'Human factors'.

2. Mechanisms of Stuck Pipe

- Differential sticking: Causes, prevention, and mitigation strategies.
- Geometric sticking: Wellbore geometry, tortuosity impact, and deviation control.
- Solids sticking: Causes, drilling fluid properties, and operational factors.

3. Engineering & Geological Considerations

- Rock mechanics and stresses in the well: Farfield and induced stresses.
- Directional profile and its role in stuck pipe risk: Effects of well geometry, dogleg severity (DLS), and profile optimization.
- Torque and drag as a fundamental component of stuck pipe: Causes, monitoring, and mitigation.
- Geomechanics and using FEWD (LWD) for well stability assessment.

4. Well Planning & Best Drilling Practices

- Engineering modelling of the well: Creating a baseline for wellbore monitoring.
- Hole cleaning theory and practice: Adjusting hole cleaning regimes for different well angles.
- Planning a well to avoid stuck pipe: Key design and operational considerations.
- Tripping and connection practices: Developing robust procedures for each well section.

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5. Rigsite Monitoring and Operational Controls

- Rig site well monitoring: Utilizing all relevant data inputs for proactive detection.
- Building and using the rigsite Torque & Drag (T&D) plot for monitoring wellbore conditions.
- Rigsite practices: Designing procedures and ensuring compliance with best practices.

6. Role of Drilling Fluids in Stuck Pipe Prevention

- The drilling fluid as a prevention tool: Selection, maintenance, and Realtime adjustments.
- Optimizing drilling fluid properties for different formation conditions.

7. Identifying & Responding to Stuck Pipe Incidents

- Identifying the stuck pipe mechanism: Realtime rigsite guidance.
- HSE approach to drilling incidents: Safety measures and incident response protocols.

8. Drillstring & Equipment Considerations

- Drillstring design issues: Factors influencing stuck pipe risk.
- Equipment design and selection: Ensuring compatibility with well conditions.
- Stresses in the drillstring during stuck pipe: Loss of endpoint buoyancy and its implications.

9. Jars and Impact Tools

- Jars, jar placement, accelerators, and intensifiers: Risk vs. reward considerations.
- To run or not to run? That is the question – Jars as a stuck pipe cause.

10. Fishing Operations and Recovery (Optional)

- Fishing equipment and techniques: When and how to attempt fishing operations.
- Determining the optimum fishing time: Cost benefit analysis of recovery vs. sidetracking.

This structured course outline provides a comprehensive approach to managing the stuck pipe risk out of drilling projects. It builds on basic principles that are introduced as practical demonstrations and developed as themes through the course. This course will save operators millions of dollars of NPT on even the smallest of drilling projects.