

---

## N697: Extended Reach Drilling (ERD) Program

Instructor(s): Kevin Gray

Format and Duration

Classroom - 5 Days

---

### Summary

Extended Reach Drilling (ERD) presents unique engineering and operational challenges that require specialized planning and execution. This course delivers an advanced understanding of high angle well construction, hole cleaning, well monitoring, and directional drilling techniques, ensuring safe and efficient drilling of extended reach and complex wells.

This is an operationally focused course that goes beyond the basics of ERD well planning. Participants will gain a deep understanding of risk factors, operational hazards, and best practices to ensure successful well delivery while minimizing wellbore instability, nonproductive time (NPT), and well cost escalation. The curriculum follows the latest research and addresses the highest risk areas associated with high angle and complex well drilling operations. The course also critically evaluates how proposed tools and techniques may impact project risk, ensuring informed decision making for complex wells. Participants will gain practical knowledge that can be directly applied to ongoing drilling operations or future well planning. This training has been proven to deliver dramatic improvements in drilling performance, reduce costs, and increase operational efficiency. All topics are placed in their operational context, ensuring that each subject is interrelated with the overall ERD drilling process.

This course can be delivered at an Foundation or Skilled level, depending on the audience, including rig crews, drilling engineers, and management teams. The agenda can be tailored to project specific details, integrating client well data into each module. The training can be delivered in a mixed classroom and simulator setting, using a DS5000 type simulator to simulate major ERD operations. Training will be delivered by globally recognized ERD experts with extensive experience working for the largest ERD consulting firms.

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

### Learning Outcomes

Participants will learn how to:

1. Understand and mitigate risks associated with high angle drilling and hole cleaning.
2. Analyse torque and drag issues to extend lateral lengths and improve well performance.
3. Design and optimize Bottom Hole Assemblies (BHA) for ERD wells, ensuring minimal tortuosity.
4. Improve surveying accuracy and reduce positional uncertainty in ERD well placement.
5. Develop ERD specific operational procedures, including tripping, back-reaming, and best practices for managing NPT.
6. Apply geomechanical principles to manage wellbore strength, ECD, and pressure related challenges in ERD wells.
7. Optimize shock & vibration control strategies to enhance tool performance and wellbore stability.
8. Apply advanced ERD techniques to push rig capabilities beyond conventional limits.



---

## N697: Extended Reach Drilling (ERD) Program

Instructor(s): Kevin Gray

Format and Duration

Classroom - 5 Days

---

### Training Method

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

- Instructor led interactive sessions featuring real-world case studies and simulations.
- Step by step guidance on wellbore stability, drilling challenges, and risk mitigation strategies.
- Industry best practices shared through classroom discussions and operational modelling exercises.
- Simulated ERD operations using a DS5000 simulator to reinforce key concepts.
- Extensive Q&A and open discussion sessions to explore real-world ERD challenges.

### Who Should Attend

This course is ideal for:

- Drilling Engineers, Wellsite Supervisors, Tool Pushers, Rig Managers, and Field Support Personnel involved in ERD or complex well projects.
- Geoscientists & Reservoir Engineers optimizing long geo-steered laterals and directional well placements.
- Operations Teams looking to enhance hole cleaning, torque & drag management, and wellbore stability in high angle drilling.
- Anyone focused on improving drilling performance and reducing costs—even on conventional, low step-out wells.

### Course Content

#### 1. High Angle Drilling & Hole Cleaning Challenges

- Understanding High Angle Drilling Risks
- Why increasing hole angle creates significant challenges and NPT.
- How to identify, mitigate, and optimize hole cleaning practices.

#### 2. Torque & Drag (T&D) in ERD Wells

- Origins of T&D and its impact on horizontal lateral lengths.
- Strategies to extend drilling radius from any rig.
- Delivering World Class ERD Wells with Limited Rig Capabilities
- Adapting ERD techniques to work within rig limitations.

#### 3. ERD Bottom Hole Assembly (BHA) & Well Profile Design

- BHA Design for ERD & Complex Wells
- How low angle BHA design must change as inclination increases.

---

## N697: Extended Reach Drilling (ERD) Program

Instructor(s): Kevin Gray

Format and Duration

Classroom - 5 Days

---

- Critical ERD BHA issues and how to overcome them.
- Understanding BHA Tendency & Well Profile Impact
- How BHA tendency (build, drop, hold) affects well trajectory and tortuosity.
- Designing laterals for low tortuosity while maintaining steering control.
- Push vs. Point RSS or Motor – Selecting the right approach for the project.

### 4. Surveying & Wellbore Positioning for ERD Wells

- Key Technologies for Wellbore Surveying
- MWD, Gyro, and multi-station survey techniques.
- Common Errors in ERD Well Positioning & Their Impact
- Operational mistakes that lead to incorrect well placement.
- Improving Surveying Accuracy & Quality Control (QA/QC)
- Advanced survey processing techniques to enhance accuracy.
- Understanding Positional Uncertainty & Anti-collision Strategies
- How uncertainty impacts ERD target sizing and well spacing.

### 5. ERD Operational Best Practices & Risk Mitigation

- Operational Practices for Surveying & Well Position Control
- Connection procedures, tripping, back-reaming, and compliance with ERD protocols.
- Developing rig specific ERD procedures for best results.

### 6. Shock & Vibration in ERD Wells

- Origins, impact, and control strategies to minimize NPT and tool failures.
- Monitoring and measurement systems for S&V.

### 7. Geomechanics for ERD & Wellbore Strength Considerations

- Basics of in situ and induced stresses.
- Measuring or calculating the stresses.
- Implication of out of balance compressive stress around the wellbore.
- Managing wellbore stability.
- Managing ECD, swab & surge pressures, wellbore losses, and stress limits.
- Implementing UBD (Underbalanced Drilling) & MPD (Managed Pressure Drilling) techniques to mitigate risks.
- Wellbore strengthening and alternatives to MPD.

### 8. ERD Project Implementation & RealTime Optimization

- Integrating ERD Techniques into Project Planning
- How to place wells in global, regional, company, field, and rig contexts.
- Ensuring the appropriate level of resources and expertise is allocated.



---

## N697: Extended Reach Drilling (ERD) Program

Instructor(s): Kevin Gray

Format and Duration

Classroom - 5 Days

---

- Monitoring & Compliance in ERD Operations
- Best practices for Realtime monitoring and operational compliance.
- Developing Project Specific ERD Procedures
- How to create custom ERD workflows that optimize drilling efficiency.
- Case Study & Final Simulation Exercise.
- Full project scenario simulation using DS5000.

This course provides a deep, practical understanding of Extended Reach Drilling (ERD) operations. Participants will gain the knowledge and skills needed to plan, execute, and optimize ERD wells while reducing risk, improving performance, and increasing wellbore efficiency. This training can be tailored to fit specific client projects, well conditions, and operational challenges.