BLACKBIRD FOR TRAINING

Well Site & Basic Operation Geology

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Well Site & Basic Operation Geology

Introduction

The Well Site & Basic Operation Geology course provides a comprehensive understanding of the geological principles and operational practices required to support drilling and wellsite activities within the oil and gas industry. Geological information plays a critical role in well planning, drilling execution, reservoir evaluation, and operational decision-making. Accurate interpretation of geological data enables organizations to optimize drilling performance, reduce operational risks, and improve hydrocarbon recovery.

This course focuses on the relationship between geology and drilling operations, providing participants with a practical understanding of subsurface formations, stratigraphy, lithology, structural geology, drilling data interpretation, and wellsite geological monitoring. Participants will learn how geological information is gathered, analyzed, and utilized during drilling operations to support operational objectives and improve decision-making.

The program also examines the responsibilities of wellsite geologists, geological reporting requirements, formation evaluation processes, mud logging operations, and the integration of geological information with drilling activities. By understanding the geological factors that influence well performance and operational outcomes, participants will be better equipped to contribute effectively to exploration, development, and production projects.

This course combines geological fundamentals, operational awareness, drilling support activities, and formation evaluation concepts into a structured framework suitable for professionals involved in drilling, geology, exploration, production, and field operations.

Course Objectives

By the end of this course, participants will be able to:

- Understand the fundamentals of petroleum geology and wellsite operations.
- Identify geological formations and subsurface structures encountered during drilling.
- Interpret basic geological maps, cross-sections, and subsurface data.
- Understand stratigraphy, sedimentology, and structural geology concepts.
- Recognize the role of geology in drilling and well planning activities.
- Understand the responsibilities and functions of wellsite geologists.
- Interpret lithological descriptions and geological samples.
- Understand mud logging operations and geological monitoring processes.
- Identify hydrocarbon indicators during drilling operations.
- Analyze drilling data from a geological perspective.

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- Understand formation evaluation principles and well correlation techniques.
- Support operational decision-making using geological information.
- Improve communication between geology and drilling teams.
- Recognize geological risks and uncertainties during drilling operations.
- Understand geological reporting and documentation requirements.
- Apply geological knowledge to improve drilling efficiency and operational performance.

Course Outlines

Day 1: Fundamentals of Petroleum Geology and Wellsite Operations

- Introduction to petroleum geology.
- Geological processes and rock formation.
- Types of rocks and their characteristics.
- Fundamentals of sedimentary basins.
- Petroleum systems and hydrocarbon generation.
- Geological terminology used in drilling operations.
- Introduction to wellsite geology.
- Relationship between geology and drilling operations.

Day 2: Stratigraphy and Sedimentology

- Principles of stratigraphy.
- Geological time scale and stratigraphic correlation.
- Sedimentary environments and depositional systems.
- Lithology identification and classification.
- Reservoir rocks and sealing formations.
- Facies analysis concepts.
- Sedimentary structures and interpretation.
- Applications of stratigraphy in drilling operations.

Day 3: Structural Geology and Subsurface Interpretation

- Fundamentals of structural geology.
- Faults, folds, and fractures.
- Structural traps and hydrocarbon accumulation.
- Geological maps and structural interpretation.
- Cross-sections and subsurface models.
- Understanding geological uncertainties.
- Structural influences on drilling activities.
- Geological risk assessment.

Day 4: Wellsite Geology and Geological Monitoring

- Roles and responsibilities of the wellsite geologist.
- Geological support during drilling operations.
- Sample collection and handling procedures.
- Cuttings analysis and interpretation.
- Geological monitoring techniques.
- Real-time geological observations.
- Reporting geological information.
- Coordination with drilling teams.

Day 5: Mud Logging Operations and Hydrocarbon Detection

- Introduction to mud logging operations.
- Mud logging equipment and systems.
- Monitoring drilling parameters.
- Gas detection and hydrocarbon shows.
- Cuttings description and analysis.
- Identification of formation changes.
- Wellsite data acquisition.

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- Geological interpretation of mud logging data.

Day 6: Formation Evaluation Fundamentals

- Principles of formation evaluation.
- Reservoir characterization basics.
- Porosity and permeability concepts.
- Fluid saturation fundamentals.
- Formation pressure concepts.
- Core analysis overview.
- Geological inputs for formation evaluation.
- Integration of geological and petrophysical data.

Day 7: Geological Correlation and Well Planning Support

- Well correlation principles.
- Correlating geological formations between wells.
- Geological markers and reference horizons.
- Supporting drilling decisions through geological analysis.
- Predicting formation tops and changes.
- Geological planning considerations.
- Managing geological uncertainties.
- Wellsite decision support techniques.

Day 8: Drilling Operations and Geological Integration

- Overview of drilling operations.
- Geological factors affecting drilling performance.
- Formation pressures and drilling challenges.
- Lost circulation and formation instability.
- Geological hazards during drilling.

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- Communication between geology and drilling personnel.
- Operational reporting requirements.
- Geological support for drilling optimization.

Day 9: Reservoir Geology and Field Development Concepts

- Reservoir geology fundamentals.
- Reservoir architecture and continuity.
- Hydrocarbon distribution patterns.
- Reservoir compartmentalization.
- Geological support for field development.
- Production-related geological considerations.
- Reservoir uncertainty management.
- Geological contribution to reservoir performance.

Day 10: Geological Reporting, Operational Review and Best Practices

- Geological reporting standards.
- Daily geological reports and documentation.
- Data quality management.
- Geological databases and information management.
- Operational review and lessons learned.
- Geological best practices at the wellsite.
- Continuous improvement in geological operations.
- Integration of geology into field development and operational planning.

Why Attend This Course: Wins & Losses!

Wins

- Develop a strong foundation in wellsite and operational geology.
- Improve understanding of subsurface formations and geological structures.

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- Strengthen geological interpretation skills.
- Enhance understanding of drilling operations from a geological perspective.
- Improve wellsite geological monitoring capabilities.
- Develop knowledge of mud logging and hydrocarbon detection processes.
- Strengthen formation evaluation awareness.
- Improve communication between geology and drilling teams.
- Enhance geological reporting and documentation skills.
- Support safer and more efficient drilling operations.
- Improve geological decision-making capabilities.
- Contribute more effectively to exploration and production activities.

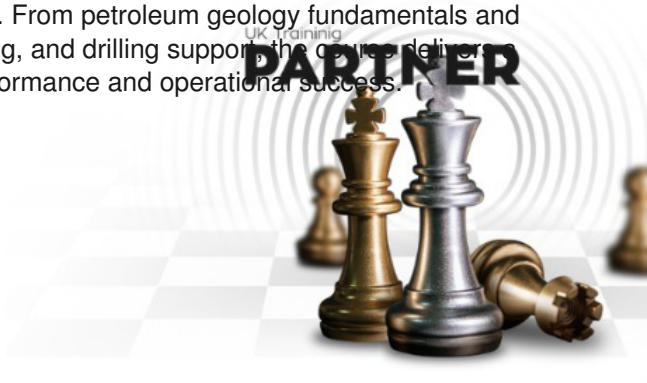
Losses / Challenges

- Poor geological interpretation may increase drilling uncertainty.
- Limited understanding of formations may affect operational decisions.
- Weak geological monitoring can delay identification of drilling risks.
- Inadequate formation evaluation may impact reservoir understanding.
- Poor communication between technical disciplines may affect performance.
- Geological risks may remain unidentified without proper analysis.
- Operational efficiency may decrease when geological data is not utilized effectively.
- Inaccurate reporting may impact future drilling and development decisions.

Conclusion

Geology remains one of the most important disciplines supporting successful drilling, exploration, and production activities within the oil and gas industry. Understanding subsurface conditions, geological structures, reservoir characteristics, and formation behavior enables organizations to make informed operational decisions while minimizing risks and improving drilling performance.

The Well Site & Basic Operation Geology course provides participants with a structured understanding of geological principles and their application within wellsite environments. From petroleum geology fundamentals and stratigraphy to mud logging, formation evaluation, geological monitoring, and drilling support, the course delivers a complete overview of the geological processes that influence well performance and operational success.



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Participants completing this program will possess a stronger understanding of how geological information supports drilling operations, reservoir evaluation, and field development activities. They will be better equipped to interpret geological data, support operational decisions, communicate effectively with multidisciplinary teams, and contribute to safer, more efficient, and more productive drilling operations.

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