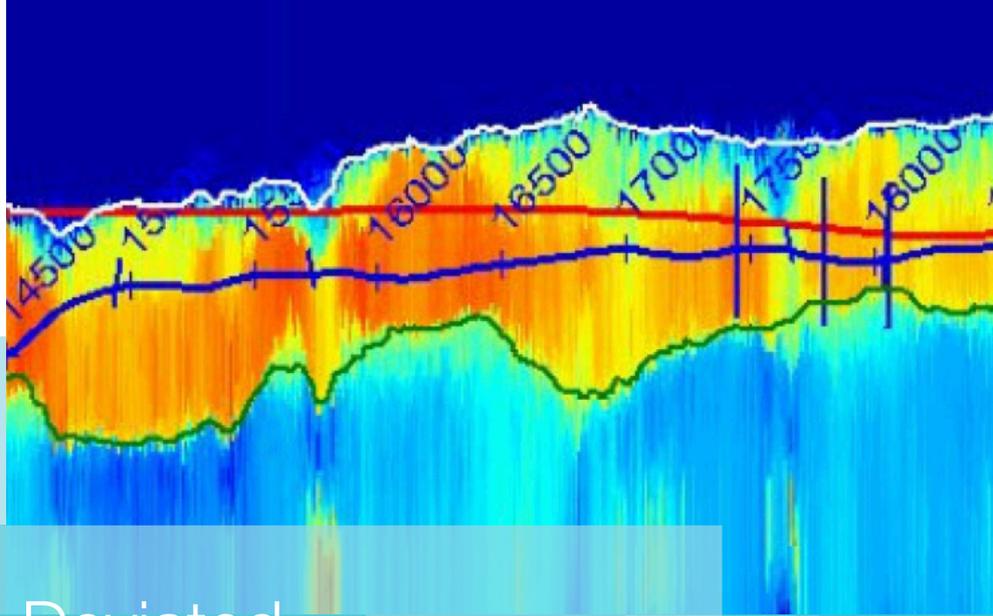


2019 COURSES

Kuala Lumpur 19 – 23 AUG
Aberdeen 9 – 13 SEP
Oman 7 – 11 OCT
Houston 28 OCT – 1 NOV
Calgary 4 – 8 NOV
Jakarta 18 – 22 NOV



Horizontal and Deviated Well Geosteering

Course overview

In theory, theory and practice are the same, in practice, they are not. During this course theory is brought to life by applying it to real-life examples and creating an “on-the-job” environment.

With simulation as close to reality as possible you will practice the everyday decisions a geosteerer will face at work by geosteering a well that is drilled at a speed of 250 feet per hour. By being exposed to time pressure, presented with “unclear” real-time data and challenged by ambiguity of the steering direction, you will experience the feeling of being a geosteerer.

The course covers all possible geosteering challenges, with the complexities of the decision-making process explained step by step. To create a comprehensive experience for participants we use the world-class - user friendly software - StarSteer® by ROGII, which is a fundamental tool for any professional geosteerer.

You will be immersed in the course, shaping the content with other participants, as you discuss, observe and make decisions and are encouraged to participate in discussion as much as the course instructor.

Course objectives

To introduce, understand and apply the concept of geological well placement, provide knowledge of the processes and techniques to successfully place horizontal and deviated wells using geological and petrophysical data in real time, by:

- Learning step by step every aspect of decision-making process that geosteering teams face on a daily basis.
- Practice of various geosteering techniques and rules involved in directional drilling, calculations, and formation evaluation while drilling.
- Applying Geosteer Well On Paper concept, a new step in the well delivery process which involves the due diligence of all steering activity.

The course is designed for

Geosteerers
Operations Geologists
Wellsite Geologists
Operations Petrophysicist
Operations Team Leads Drilling Engineers

Anyone who aspires to become a member of an operational team that drills deviated and horizontal wells.

Anyone who would like to understand or improve the understanding of the geosteering science.

Knowledge of drilling process and MWD/LWD tools is required for full benefit of the course.

Course instructor: Piotr Przybylo

Globally experienced passionate geosteerer, operations geologist, project manager and geostrategist. Piotr studied and worked in countries such as Denmark, Brazil, USA, UK, Angola and Spain. He currently holds two M.Sc. degrees (Geology and Exploration & Production of Hydrocarbons) and an MBA. Throughout his rewarding career, he has been exposed to various offshore and onshore working environments like deep-water, pre-salt or HPHT. He has acquired crucial technical and business skills to develop strategies to drill some of the deepest and longest wells in the world. With his experience, Piotr bridges the gap between the technical and commercial sides of the upstream oil and gas industry

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Course outline

DAY 1

Geological Well Placement and Reservoir Geology

- Basic concepts and application
- Essential elements of reservoir geology
- Structural features
- Steering systems
- BHA steering tendencies
- BHA orientation and tool face
- Real time data transfer

The first half of the day will focus on basic concepts and application of well placement. Participants will be presented with reservoir geology and structural features review that imply the need for horizontal well placement. The day will continue with an evaluation of the steering systems and their geometrical features that influence the steering. The main concepts of how wells are geosteered will also be presented. At the end of the day attendees will learn about real time versus memory mode data transfers and communication ways with the BHA tool downhole.

DAY 2

MWD directional drilling, surveys and position uncertainties

- MWD directional surveys
- Survey calculation methods
- Survey spacing
- Static and instantaneous surveys
- Surveying instruments
- The ellipsoid of uncertainty
- Collision avoidance
- Structural uncertainty

Day two will cover directional drilling and MWD surveys. Participants will learn about surveys calculation methods and the technologies and techniques involved in controlling the location of a wellbore. Survey spacing and static and instantaneous surveys will be presented. The day will continue with a discussion

about the concept of ellipsoid of uncertainty. Collision avoidance and collision risk visualization will also be covered. Survey uncertainties and structural uncertainty will wrap up the day.

DAY 3

Well trajectory

- Geological and drilling targets
- Dog leg severity DLS limitations
- Build rate
- BHA tool building capabilities
- Steering modes and steering ratios
- Well trajectory planning
- Sidetracks and obstacles avoidance trajectories
- Practical examples of geosteering limitations imposed by different trajectory type

Creating geological and drilling targets will be the focus of the first part of the day. Participants will also learn the process of planning an optimal well trajectory with respect to DLS limitations, build rates and BHA tool building capabilities. These topics will be followed by covering the topics of steering modes and rates. Sidetracks and avoiding various obstacles while steering will also be discussed. Towards the end of the day practical examples will be given to review the geosteering limitations imposed by certain well trajectories.

DAY 4

Application of LWD measurements for geosteering

- Azimuthal borehole images
- Image patterns and their interpretation
- Deep directional electromagnetic measurements (remote boundary detection)
- Proactive and reactive geosteering
- Cross sections displays (distortions and projections)
- Overview of available LWD technologies free of vendor bias

During the fourth day LWD geosteering solutions will be evaluated with azimuthal borehole images for reactive and remote boundary detection for proactive geosteering techniques. Participants will learn how to interpret the image patterns and what additional information they provide. Some case studies, illustrating the use of the three cross section displays where distortion and projection of the well trajectories, will also be discussed. The day will end with an overview of the available LWD technologies with a main focus on choosing the right LWD tools for fulfilling various well objectives.

DAY 5

Geosteering Methods

- Geosteering principles
- Bed dip, bed thickness and incident angle calculations
- True dip versus apparent dip measurements and usage
- Well landing strategy
- Geosteering using true stratigraphic thickness
- Drop rate and inclination changes
- Horizontal trajectory management
- Target change techniques

On the last day, practical geosteering principles will be discussed. Examples of how to incorporate real-time dip analysis, bed dip and bed thickness calculations into well placement will be given. Attendees will also get an introduction to well landing strategies and will be familiarized with the true stratigraphic thickness geosteering method. Horizontal trajectory management will be discussed during the second half of the day. Critical target change techniques including various drop rates will also be covered.

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