QUANTITATIVE SEISMIC INTERPRETATION
Dr. Sigit Sukmono (Institute Technology Bandung, Dept. Geophysical Engineering)
Santika Hotel Bali
October 25-29, 2010

WHO SHOULD ATTEND?
Geophysicists, geologists, petroleum/reservoir engineers or managers who need strong knowledge on the quantitative seismic interpretation for effective hydrocarbon exploration and field development

COURSE DESCRIPTION
Objective of this course is to provide a thorough understanding of quantitative seismic interpretation used in hydrocarbon exploration and development. The participants will learn how to build an effective workflow to cope with the complex geology model, increasing data volumes, as well as the increasing complexity in the data itself. The topics range from calibration of seismic data using well logs to quantitative interpretation, the principles of volumetric interpretation and visualization techniques to reveal geological features inside a 2D or 3D volume of seismic data. By attending this course, participants will understand the following key works in seismic interpretation:

- Concepts and key elements related to seismic interpretation
- Complete procedure of the entire interpretation process: from acquisition, processing, interpretation to reservoir characterization
- How to integrate seismic, log, rock-physics and petrophysics data
- How to apply the latest principles of quantitative interpretation, volumetric seismic interpretation and visualization
- How to increase the success ratio of hydrocarbon exploration, optimize reservoir development, save cost and capitalize more profits.

COURSE AGENDA

Day 1-2
- **Seismic Acquisition Overview**: acquisition parameters (folds, offset, etc), land-TZ-marine acquisition, survey/navigation, field QC and early stages of processing, Nyquist & filtering, phase
- **Seismic Processing Overview**: wavelet, Fourier transform, processing work-flow, seismic velocities & its usage, offset dependent tuning, NMO stretch, seismic gather & stack, examples

Day 2-3
- **Basic Seismic Interpretation & Modeling**: Reflection of Seismic Wave, Acoustic Impedance, Reflection Coefficient, Polarity and Phase, Seismic Resolution, Well-Seismic Tie (check-shot, synthetic seismogram, Vertical Seismic Profile), Direct Hydrocarbon Indicator (DHI), Seismic Stratigraphy analysis. Exercises: Integration of rock physics, petrophysics and amplitude response modeling for reservoir geometry delineation, physical properties description and time-lapse reservoir monitoring, Seismic stratigraphy of clastics & carbonate deposits, Time Depth Conversion, seismic synthetic construction.
- **Seismic Attributes Analysis**: Definition & Classification, Amplitude Attributes, Complex Attributes, Similarity/Coherency, Curvature, Spectral Decomposition, Neural Network Multi-attributes, Visualization of attributes. Exercises: Integration of rock physics, petrophysics and
seismic attribute analysis for seismic facies analysis, lithology & porosity mapping, DHI analysis and bypassed oil identification and time-lapse reservoir monitoring.

Day 4-5

- **Post Stack Acoustic Impedance Inversion**: Definition, AI and Reservoir Characterization, Seismic Trace Convolutional Model, Type of Inversion Methods, Exercises: Integration of rock physics, petrophysics and AI inversion analysis for lithology, net to gross, porosity & fluid saturation mapping, compaction monitoring and well trajectory selection.

- **Pre-Stack AVO Inversion & Modeling**: Mathematical Foundation (Zoeppritz, Aki-Richard, Shuey equations), Reflection Coefficient at different incidence angle, Offset to Angle Transformation, The Prediction of AVO Response, AVO Class 1, 2 and 3, AVO Anomaly Class 4, AVO Gradient and Intercept, AVO Cross-Plot (seismic background, fluid factor, application), AVO Attributes, Lambda Mu Rho inversion, EI Inversion, Simultaneous Inversion, AVO Pitfalls. Exercises: Integration of rock physics, petrophysics and AVO inversion analysis for fluid type identification, fluid saturation determination, fluid movement monitoring, rock calculator in Excel and model different classes of AVO.

Day 5

- **Time Lapse (4D) Seismic**: Definition, 4D seismic modeling, Acquisition & Processing aspect, Use of normal seismic, attributes, AI and AVO inversion for fluid monitoring. Exercise: 4D seismic modeling, fluid saturation determination & fluid movement monitoring using normal seismic, attributes, AI and AVO.

- **Miscellaneous**: Stages of Hydrocarbon Development (exploration, drilling, appraisal, production), Multicomponent seismic, Pore-Pressure Analysis using seismic, Visualization techniques.

**ABOUT THE INSTRUCTOR**

Sigit Sukmono has been in the oil industry for over 20 years. He has a MSc from Asian Institute of Technology and DR in Applied Geophysics from Institute of Technology Bandung. His main expertise is in the field of petroleum geophysics. Currently he works as an Associate Professor in Reservoir Geophysics, Institute of Technology Bandung. In the last 5 years he has been managing and involved in more than 50 GGR (Geology, Geophysics and Reservoir) studies for major oil companies. In the last 5 years he has been also teaching more than 50 seismic reservoir classes for oil community in various locations in the world (Tokyo, Moscow, Bangkok, Palma-Spain, Dubai, Abu-Dhabi, Cairo, Hong Kong, Beijing, Kuala Lumpur, Mumbai, Luanda, Nigeria, Tripoli, Saudi-Aramco, Algier, Bali, Jakarta, etc). He is a Member of Society of Exploration Geophysicists, American Association of Petroleum Geologists, Indonesian Petroleum Association, Indonesian Association of Geophysicists and Indonesian Association of Geologists. He was awarded Best Research Award by Minister of Research & Technology in 2002 and by Toray Science and Technology Foundation in 1988, and International Scientific Publication Award from the Minister of Education and Culture in Indonesia in 1988. He has authored more than 10 course manuals in reservoir geophysics topics and has published many papers in international journals/seminars.

**ENROLLMENT**

In order to allow sufficient time for arranging travel plans, early enrollment is recommended. Registration will be closed on October 14, 2010. Late enrollment may result in course cancellation.

**CERTIFICATES**

A Certificate of Participation will be awarded to each person completing this course.

**CANCELLATION, SUBSTITUTION & REFUND**

The tuition fee will be refunded (less US$ 100 registration fee) only if notification of cancellation is received at least 10 days prior to the commencement.

Non payment of tuition fee does not constitute automatic cancellation of participation. Substitution may be made at any time for those enrolled.
TUITION FEE
Tuition fee at USD 2,250.00 + 10% VAT per delegate is due and payable upon confirmation of enrollment. Accommodation is excluded. Payment should be settled at the latest on October 14, 2010. Any bank charges in connection with payment in US Dollars must be added to payment. Tuition fee includes admittance to the course, course materials, daily refreshments and full lunch.

Payment can be made to PT. Geoservices (Ltd)
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