APPLICATION OF STRUCTURAL GEOLOGY IN SEISMIC INTERPRETATION

16 – 20 November 2015  |  Kuala Lumpur  |  Malaysia

Expert Course Trainer:
Dr James Willis

James has been the editor and publisher (both volunteer efforts) for the Lafayette Geological Society since 2002. He developed a 4D quantitative well bore guidance theory, including the concept of positive versus negative thickness (sign indicating direction of drilling section), that predated availability of key real-time data. He is now an independent consultant for Baker Hughes INTEQ.

Hear what our past learners have to say about this training:
“...a very good course covered structural analysis in great details. Best structural course I have done and also a very good description of seismic attributes” Pangaea Resources

“Applicable for complicated tectonic areas” Statoil

“Informative and interactive” PETRONAS Carigali

“Great instil into my knowledge gaps” Shell Sarawak Berhad

“Well constructed and information compacted course” Pangaea Resources

“Great course” PETRONAS Carigali

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Course objectives
Seismic interpretation requires understanding of structural development and its interrelation with the stratigraphic system. Bias and misunderstanding have unfortunately resulted in countless dry holes. So go beyond tracing horizons and understand their context within the structural system by extracting key information from seismic surveys and other datasets.

You will learn a variety of modern structural concepts and techniques and their role in the interpretation of seismic data. Using an applied “hands-on” approach, participants will be exposed to a diversity of worldwide case examples with complementary exercises, both of an individual and group nature.

Course is designed from an applied standpoint, with numerous examples and hands-on exercises from the petroleum industry. This session is now in its 8th run in Asia!

By the end of this 3 day course, delegates will be able to:

- Go beyond tracing horizons and marking faults and truly understand the structural and stratigraphic system
- Understand the role of tectonics and deformation in the formation of various types and orientations of geologic structures.
- Understand the interaction of the structural system with the stratigraphic and sedimentologic environment for better prediction of reservoir formation.
- Integrate data from the large seismic scale to subseismic scale, including seismic anisotropy, to understand better the overall petroleum system.
- Be aware of the common pitfalls of interpretation.

Who should attend?
Geologists, Petrophysicists, Geophysicists, Reservoir Engineers, and Exploration & Production Managers

About the Expert Course Trainer
James J. Willis received his B.S. and M.S. degrees in Geology from the now University of Louisiana-Lafayette in 1989 and 1990, respectively, and his Ph.D. as a National Science Foundation fellow at Baylor University, Waco, Texas, in 1993.

From 1994-1996, he studied planetary tectonics as a NASA-funded postdoctoral fellow at Southern Methodist University. In 1996, he returned to UL-Lafayette, where he was awarded in 1997 the Hensarling-Chapman Endowed Professorship in Geology. He began independent consulting activities in 1991, and in 2001 he left academia for fulltime consulting for clients ranging with international contractors and supermajors. He is a Professional Geologist, registered with the Texas Board of Professional Geoscientists.

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Past of participants of James Willis’s training courses in Asia include the following organizations:
Offshore Surveys * Petronas Carigali * Pearl Energy (Nam Conson) * Tately N.V. * Petronas Carigali
Kebabangan Petroleum Operating Co. * PETRONAS Carigali (Vietnam) * NetSeis * Geo Solutions Consultancy
TL Geohydrographics * Carigali Hess Operation * Eaglewood Energy (BVI) * Mitsui Oil Exploration Company
Newfield Sarawak * CGG Veritas * Pangaea Resources Pty Ltd * Statoil Indonesia Karama AS * PTTEP Siam Limited *
Chevron Australia * CNOOC SES * PTTEP Oman Company * PVEP Overseas (Cuba Project)
Sabah Shell Petroleum Company and many more!
# Application of Structural Geology In Seismic Interpretation

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## Course Outline in Details

### DAY 1

**Welcome and Introduction**

Pre-Training Interpretation Exercises

### STRAIN CONCEPTS

- Understanding the deformation environment
- Force, Stress, and Strain/Deformation
- Strain ellipse concepts
  - Exploration example
- Rock mechanics
- Modes of failure

### GENERAL SEISMIC INTERPRETATION

- General principles of seismic acquisition, processing, and interpretation
- Seismic versus well resolution
- 2D interpretation techniques and pitfalls
- 3D interpretation techniques and pitfalls
  - Fault plane mapping, including automated fault picking; horizon mapping; strata slicing; zero vs. 90 degree phase; texture analysis
- Velocity analysis and reprocessing

Exercises and case studies

### DAY 2

**SEISMIC ATTRIBUTES FOR STRUCTURAL ANALYSIS**

- Amplitude analysis
- Dominant attributes for structural interpretation
  - Coherency; edge displays; derivative maps; residual analysis; curvature analysis

### FAULTS

- Fracturing and Faulting
- Slip vs. separation and their quantification
- Normal faults and associated tectonic/nontectonic environments
- Reverse faults and associated tectonic/nontectonic environments
- Strike-slip faults and associated tectonic/nontectonic environments
- Displacement analysis
- Subseismic fault prediction
- Fault restoration
- Seismic pitfalls

Exercises and case studies

### DAY 3

**FOLDS**

- General fold concepts
- Modes/styles of folding
- Folds and associated tectonic/nontectonic environments
- Closure mapping and quantification
- Fold restoration

### FRACTURE ID

- Seismic anisotropy analysis
- Fracture mapping
- Well data integration

Exercises and case studies

### DAY 4

**BOREHOLE SEISMOLOGY**

A review of borehole seismic measurements and techniques

- Acoustic logs, wellbore seismic (e.g., VSP, cross-well, seismic MWD, bit-noise seismic)

### GROWTH ANALYSIS

- Understanding and quantifying syndeformational growth sedimentation
- Growth in extensional, compressional, and other structural regimes

Exercises and case studies

### DAY 5

**FAULT SEAL ANALYSIS**

Understanding and quantifying aspects of fault seal

### BALANCING AND RESTORATION

Balancing techniques, structural modeling, and restoration

Exercises and case studies

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Registration begins at 0830hr daily.

The course will commence at 9am on each day and end by 5pm.

Morning and afternoon refreshment breaks will be served at *10:30am and *3:30pm respectively. Light snacks will be provided.

Lunch will be served daily from *12:30pm to 1:30pm.

*Stipulated timing is subject to change.
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