Velocity, Time to Depth Conversion

Learn the practical aspects of modern methodologies of time-to-depth conversion

25th AUGUST 2014 - 29th AUGUST 2014 at KUALA LUMPUR, MALAYSIA

PetroSync Distinguished Instructor:
DR. WOOK B. LEE
Founder, President and CEO, SeisLink Corporation
Founder & Managing Partner, LEED Energy LLC

- Over 30 years international industry experience with proven bottom line results and 30+ successful drilling programs in developing oil field
- Awarded with US Patent No. 7493241 in 2008 - 3D Velocity Modeling with Calibration and Trend fitting using Geosatistical Techniques, particularly for Curved-Ray Pre-stack Time Migration and for such Migration followed by Pre-Stack Depth Migration. He spearheaded this technical innovation for implementing geostatistical procedures in E&P technologies.
- Worked in Unocal for 20 years mainly as Senior Consultant and Technical Service Coordinator for E&P Technology, managing technical projects and developed technologies in seismic imaging, modeling, inversion, prospect evaluation, earth modeling, and 3D visualization
- Founded and managing two companies - SeisLink Corporation, which develops E&P technologies for all cycles of E&P activities, and LEED Energy LLC, which provides E&P consultation services for upstream O&G acquisitions and operational activities
- Active member of Society of Exploration Geophysicists (SEG) and European Association of Geoscientists and Engineers (EAGE)

Course Objectives

- CREATE depth maps from interpreted seismic data which is consistent with well data
- APPLY the techniques and methods in conduction time to depth conversion
- SELECT the methods to be used in time to depth imaging
- EFFECTIVELY design, guide, and quality control depth-imaging projects in a variety of geologic settings
- PERFORM basic quality control in validating the models and methods used
- UNDERSTAND depth conversion methodologies and PERFORM quality control for validity of methods used

Specially Designed for

- Exploration Geologists
- Exploration Geophysicists
- E&P Managers

This course is designed for, but not limited to, geologists, geophysicists, and managers to understand general concept and recent advances in 3D seismic depth interpretation, time-to-depth conversion, and 3D velocity modeling.
The course contributes to better understanding of seismic depth images and maps. Integration of seismic and well data provides us better understand the value of seismic images with respect of hydrocarbon presence and geological feasibility.

The course emphasizes on practical aspect of modern methodologies of time-to-depth conversion. Conventional and geostatistical methods of well calibration of seismic data will be handled. This course will tackle various case studies in converting seismic time to depth. There will be hands-on exercises which will enable participants to use the methodologies to their own problems to E&P process.

## Course Content

### DAY ONE - SEISMIC DEPTH INTERPRETATION
- Nature of Seismic Data, Reflection Seismology
- Hydrocarbon Traps
- Well Data and Check-Shot Data
- The Relationship between Seismic Velocities and Pore Pressure
- Pore Pressure Prediction
- Exercise 1: Case Study on Onshore GOM – The Value of One Check-Shot

### DAY TWO - SEISMIC PROCESSING AND DEPTH IMAGING
- Seismic Velocities and Imaging Process
- Seismic Data Processing and Seismic Migration
- Pre-stack Seismic Imaging in Time and Depth
- Residual Velocity Analysis
- Tomography and Global Velocity Update
- Calibration with Well Data
- Exercise 2: Case Study on Offshore GOM - Calibration of Check-Shots

### DAY THREE - DEPTH IMAGING CASE HISTORIES
- Gulf of Mexico Salt Overhang Imaging
- Gulf of Mexico Salt Imaging under Geo-pressure Zones
- North Sea Salt Imaging
- Well Placement for Developing Fields
- Exercise 3: Case Study on Offshore Brazil - Drilling Decisions

### DAY FOUR - FIELD DEVELOPMENT
- Seismic Attributes
- AVO and Hydrocarbon Indicator
- Geostatistical Methodologies in Earth Modeling
- Exercise 4: Case Study on South China Sea – Decision on Field Development

### DAY FIVE - RECENT DEVELOPMENTS
- Techniques and Methods in Conducting Time-to-Depth Conversion
- Quality Control of Depth Imaging in a Variety of Geologic Settings
- Risk Management
- Case History: Time to Depth Conversion for Brazil Offshore
- Recent Development in Seismic Acquisition and Processing
Wook Lee has 30 years of experience in the industry, with the first 20 years with Unocal mostly as their Senior Consultant and Technical Service Coordinator. He was responsible for various technical and service projects, with project areas including GOM, Canada, South America, Thailand, Gulf of Suez, China, Indonesia, Brazil, North Sea, West Africa, and Caspian Sea.

In the last ten years, he founded two companies -- SeisLink Corporation and LEED Energy LLC. The latter company was founded with his partner, ex-Unocal Spirit Energy President, Mr. John Donohue, to provide consulting services to Korean companies. Aside from this, he is also the CEO & President of SeisLink Corporation, which is an innovative service and software provider of imaging to the global oil and natural gas exploration and production industry.

SeisLink provides services in seismic depth imaging, pore pressure prediction and time-to-depth conversion. SeisLink technologies in geostatistical well calibration and cell-based reflection tomography make differences in time-to-depth conversion, seismic depth imaging and pore pressure prediction, which will reduce risks in exploration and development drilling. SeisLink also provides software solutions in velocity modeling, reflection tomography and migration. He continues to manage this successful seismic service company with the aim to provide a full suite of technical services for successful drilling.

In 2008, he was awarded with US Patent No. 7493241 in 2008 - which is a method of constructing a 3D geologically plausible velocity model for efficient and accurate prestack imaging wherein embodiments of the invention provide: (1) a method of calibrating velocity functions, appropriately and effectively taking into account well (hard) and seismic (soft) data as well as geological features, and trend fitting (“iDEPTHing”) RMS velocities before curved-ray prestack time migration; (2) a method of calibrating and trend fitting (“iDEPTHing”) interval velocities before prestack depth migration, appropriately and effectively taking into account well (hard) and seismic (soft) data as well as geological features; and (3) a method of constructing a geologically plausible velocity model using the previous steps of velocity calibration and trend fitting RMS and interval velocities, for efficient sequential use in prestack time migration followed by prestack depth migration. He spearheaded this technical innovation for implementing geostatistical procedures in E&P technologies.

Wook has received his Ph.D from Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts, his MS in Physics in Indiana University, and his BS in Physics in Seoul National University.

Dr. Lee’s Selected Papers on Seismic Imaging:


Wook B. Lee and Lin Zhang, Residual Shot Profile Migration, Geophysics, Volume 57, Issue 6, pp. 815-822, June 1992

Wook B. Lee, Geology Driven Pre-stack Time Migration, CIS Oil and Gas Journal (Russian), February, 2005

Course Details

Title: VELOCITY, TIME TO DEPTH CONVERSION
Date: 25-29 AUGUST 2014
Location: KUALA LUMPUR, MALAYSIA

INVESTMENT PACKAGES

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<th>Investment Package</th>
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<tr>
<td>Standard Price</td>
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<td>SGD $ 5995</td>
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<td>Group Discount</td>
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<td>10% discount for groups of 3 registering from the same organization at the same time</td>
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