Obstacles and Pitfalls of the Everyday Interpreter: The Role of Geophysics in Resource Plays*

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Search and Discovery Article #41131 (2013)**
Posted June 21, 2013

*Adapted from poster presentation given at AAPG Southwest Section meeting in Fredericksburg, Texas, April 6-8, 2013
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Abstract

With the advent of resource plays dominating current drilling programs, geophysics has gone from the driver of selecting drilling locations into a secondary role as engineers and landman attempt to modify the drilling process into an assembly line structure. While to a certain extent the drilling and completion procedures can be duplicated over numerous wells over a significant area, seismic data helps in differentiating geologic changes across the basin. Staying in zone, drilling the sweet spots first and avoiding geohazards is priceless when comparing the costs for acquisition of a new 3-D survey or reprocessing and inversion of existing 3-D seismic data in comparison to drilling a well that encounters those problems as mentioned above. In order to assist the drilling department in the design of the horizontal well path and to circumvent geohazards, today’s geophysicist must not only use traditional data sets but also incorporate techniques like bandwidth extension, inversions both poststack and prestack where several rock property volumes are generated and coherency applied either on a surface or upon a volume. Converting horizon surfaces to depth using multiple techniques that render the same answer is also critical. This poster will demonstrate how an interpreter can utilize these techniques in order to provide benefits in drilling resource plays.
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Outline
- WHERE ARE WE-karst basin Wolfberry Play
- Going about (choosing the "right" interpretation)
  volume and attributes
- INTERPRETING FAULTS AND HORIZONS
- CONVERTING TO DEPTH AND WELL PATHS
- INTERGRATION OF MICROSCAPE AND 3-D DATA

Economics
- 25-50 K / Sq Mile 3-D acquisition
- 1.3 X / Sq Mile Inversion, Pick Inversion,
  Reprocessing 2d-3d seismic attribute post of 1 x 1 x 1 rep
  processing
- Depth: 3.5 Hz 5000-5000 Sq Mile
- DRILL COSTS
  - 24 wells/55 Ml/day at 1.8 M/kw (42 T M vertical)
  - Multiphasing 14 T 9 kHz (240 Hz)
- Staying in zone, Drilling best locations, NOT drill into a
gas/hazard PRICELESS

Critical for Volume and Horizon Time to Depth Conversion
Select the right volume to begin with (sometimes 2 data sets)
and look at smoothing time before converting to depth

Determine your depth conversions by various methods (1 layer, several layers)
and compare them to see whether they are reasonable

Incorporate additional data in order to intelligently vary your extrapolation data

Selecting to pick volume on inversion data and to bring inversion data into the depthing process as soft data
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