
Limitations of 3-D Seismic to Meet its Objectives: A Case History

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Objectives:

A 3D seismic survey was acquired in 1992 over a Carbonate field in the Arabian Gulf area with parameters that were considered adequate at that time. The fold of this vibroseis data is 32. The data set suffered from multiples, statics and low signal to noise ratio. Imaging of the subsurface fault patterns and improving the data quality to allow for confident interpretation of the sedimentary section for exploration and field-development purposes were of great importance.

Procedures: In recent reprocessing careful attention was given to horizon-based stacking velocity picking and the selection of accurate refraction static model. This resulted in data with good lateral continuity. The reprocessed and interpreted seismic data were used for the new generation of reservoir model for the field. It helped in the selection of new wells. Detection of the internal geometry within the reservoirs using seismic amplitudes was necessary.

Results and Conclusions:

Although reprocessing of this seismic data has shown improvements in horizon tracking and fault imaging but it was not enough. Reprocessing of the data has been taken to its technical limit and can not produce the needed high resolution image to meet the team objectives. The mapping of many reservoir units was not possible with this data due to its poor vertical resolution. Deterministic and statistical studies clearly indicated the value gained from acquiring new high resolution 3D seismic far exceed the cost of acquisition.

Acknowledgments The Authors would like to thank ADCO and ADNOC for their permission to publish this material.
