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APPLICATIONS OF SEISMIC EXPLORATION TECHNIQUES IN IMAGING COMPLEX GEOLOGY OFFSHORE TRINIDAD: A CASE HISTORY

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ABSTRACT

In August 1989, a 2019 Km speculative seismic data survey was acquired offshore Trinidad in support of an upcoming Government lease sale. The areas covered are known as Blocks 89-2, 89 -3, 89 -4, and 89 -5.

Despite previous seismic surveys, there were still several geological uncertainties in these Blocks which had to be resolved. The geologic objectives of the 1989 survey included:

1. The acquisition of data in what appeared to be 'no data' areas, which may have been indicative of basement;
2. The proper imaging of steep dips in both shallow and deep horizons;
3. The imaging of faulting types and trends;
4. Imaging into the Mesozoic - in particular the Cretaceous where the source rock is known to exist; and
5. To delineate reservoir facies using sequence stratigraphy.

To accomplish these objectives, the following general specifications were employed:

ACQUISITION
- High volume - 131,281cc (8026 cu. in), wide - 58.5m, high pressure- 29300 atm (2000 psi), tuned air gun array.
- Long hydrophone cable (3600m) with a large number of channels (144), plus short group offset (25m).
- High Fold (7200%)
- Short near offset (167m)
- Longer recording times (8 to 10 sec)

PROCESSING
- Dip Move Out (DMO)
- Same high nominal fold as in the acquisition (7200%)
- F/K filtering
- Steep Dip Migration
- Retention of very low frequencies.

In addition stringent quality control was maintained throughout the acquisition and processing phases with the aid of a micro-computer based system.

The net result of these quality control measures is a data set of improved quality which made it possible for the original objectives to be achieved.