ABSTRACT

Trinmar Limited acquired two 3D seismic surveys in its Soldado leases, Gulf of Paria, in 1984 (147 km$^2$) and 1992 (500 km$^2$). The 3-D seismic has revealed significant changes in interpretation from previous work, despite having over 700 points of well control and pre-existing 2D seismic coverage. The geometries of the faults and shale diapiric masses have been affected, and more significantly the stratigraphic framework has been better defined using sequence stratigraphic methods.

Fault mapping has re-positioned the prominent Los Bajos and Soldado Wrench Faults and greatly changed field fault patterns. The Los Bajos Wrench may not extend northwest past North Soldado Field as previously believed, but rather may continue to the southwest or die out with the strike-slip movement being translated to another fault(s).

Chronostratigraphic sequence boundaries and maximum flooding surfaces have been found to be reliable surfaces for 3D seismic interpretations and well log correlations through the prolific Neogene age deltaic sediments. Stratigraphic correlations between West and Southwest Soldado Field areas based solely on palaeo biofacies were found to be unreliable. The biofacies were associated with lithologic units which were diachronous with chronostratigraphic markers.

The 3D seismic has allowed mapping of stratigraphic features that were not well defined or recognised in previous work, including turbiditic facies, incised valleys, stratigraphic pinchouts, etc. This has opened up new areas for field development opportunities and will lower risk on exploration plays as the structural and stratigraphic framework is better understood.

INTRODUCTION AND REGIONAL SETTING

Trinmar Ltd. operates offshore leases in the Southern Gulf of Paria (Figure 1) and produces from the Soldado Fields which consist of 5 separate structures, North, East, Main, Southwest and West fields (figure 2) discovered between 1954 and 1982. Over 700 wells have been drilled within Trinmar's lease area with total production to date totaling over 500 million barrels.

As part of an aggressive campaign to fully evaluate Trinmar's leases for hydrocarbon reserves, 3-D seismic data totaling 647 km$^2$ was acquired over all of the current producing field areas and a substantial portion of the remaining acreage (see Figure 2). The extensive 3-D data coverage has allowed Trinmar to better evaluate the five producing field areas for further exploitation opportunities and also to explore for new reserves in the adjacent areas and particularly the deeper Miocene and older section.

The 3-D seismic has revealed significant changes in the area's interpretation from previous work, despite good well control and pre-existing 2-D seismic coverage. This paper highlights some of the changes with most of the discussion and examples being taken from the field mapping work to date. They are outlined as follows:

1) A comparison of field structural interpretations before and after 3D seismic from the Main and North fields.
2) Two seismically mapped stratigraphic features that impact on the field mapping.
3) An example from the Southwest and West Soldado fields comparing chronostratigraphic correlations from seismic and well lithologies with biostratigraphic markers.