

Norphlet Geology and 3-D Geophysics of Fairway Field, Mobile Bay, Alabama

Chip Story

CAEX Services Inc., Houston, Texas

The exploration and exploitation of the area south of Dauphin Island, Alabama, has been based primarily on the geophysical evaluation of a high quality 3-D seismic survey shot by an industry consortium in 1986 to image the eolian Norphlet Formation at depths between 21,000 ft and 22,000 ft. An analog bay cable was used to acquire data over 49 state and federal offshore blocks in a 250 sq mile area at the mouth of Mobile Bay.

The 3-D imaging of the lenticular Norphlet dune trends in this area is significantly better than with 2-D data. The 3-D data have led to a much better regional understanding of the Norphlet and consequently a much-improved interpretation of the Shell-BP Amoco Fairway Field. The Norphlet isopach has been mapped with confidence in areas where the sandstone lenses are thick, and has revealed a series of northwest-southeast-trending linear

dune forms across the survey area. Post-3-D exploration and development has targeted these thick, paleogeomorphic features where they have been enhanced by subjacent salt structure.

Reservoir decline had averaged about 9% per year starting from a maximum production rate of about 200 MMCFG per day in the fall of 1992. Recently, the volumetric decline has become more exponential at about 12%, and some of the wells have begun to demonstrate production characteristics that may be associated with internal dune heterogeneity and water coning. The ultimate recoverability for Fairway Field is projected to be about 65 percent of the approximately 800 BCFG in place with low abandonment pressures due to the high mechanical strength of the dune reservoir matrix.