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Exploration and Development Challenges of the Lacustrine Petroleum System in the Songkhla Basin, Thailand

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The Songkhla Basin is an example of an active lacustrine petroleum system in which source rocks, lacustrine fans and seals are all in juxtaposition. Two stacked petroleum systems are present in the Late Eocene and Oligocene and have been penetrated by eight wells and covered by approximately 600 km² of 3D seismic. To date three oil discoveries have been made of which two, Songkhla and Bua Ban, are currently scheduled for development.

The results to date show that good quality reservoirs with darcy range permeability exist in the Songkhla Basin but that reservoir quality varies considerably according to the position within the lake setting. Structural, stratigraphic and combination traps exist in close proximity although many reservoirs are at the limit of current seismic resolution. Correlation of reservoirs is difficult due to lateral reservoir variation and restricted non-marine faunas in the lake sequences. Individual well deliverability is directly affected by this variation in reservoir quality.

The results of exploration to date show that oil fields are present in different settings across the basin however rapidly increasing costs made conventional exploration and development methods uneconomic. The significant challenge faced by Coastal Energy was to cut costs and reduce development time in an environment where resources are scarce and costs continually rising.

The presentation will describe the lacustrine petroleum system of the Songkhla Basin and the data and techniques required to define it. The field characteristics of the Songkhla field will be presented and the technical challenges of a field development containing a lacustrine reservoir will be addressed. It will also show how Coastal completely revised the approach to exploration and development drilling to drastically reduce costs and time for drilling, data acquisition and completion. Finally a new approach to platform engineering was required and a new modular approach to platform design, fabrication and installation had to be found in order to establish field commerciality and reduce cycle time. The results of this work will allow the commercial development of two oil fields previously considered uneconomic and form a production base which will allow any new field discoveries to be quickly tied in for production.