AAPG International Conference: October 24-27, 2004; Cancun, Mexico

# The Princess Discovery - Sub Salt Gulf of Mexico: Challenges of Sub Salt Imaging in a Fast Paced Sub-Sea Development

***Aafke E. Bouma**, Bret D. Hampton, and Ben M. Hewett, III. Shell Exploration and Production Company, P.O. Box 61933, New Orleans, LA 70161, phone: (504) 728-6161, aafke.bouma@shell.com*

The Princess discovery is located in 3700' of water on the northern flank of the Mars Basin on blocks MC765 and 766 adjacent to the Ursa field. Shell is the operator for BP, ExxonMobil and ConocoPhillips. Drilled in a poorly imaged subsalt truncation trap, the discovery well penetrated stacked Upper Miocene turbidite reservoirs.

The Princess discovery is hidden completely underneath the East Antares salt body. At the time of discovery in 2000, there was no 3D image of the field, and the well was targeted on a limited depth migrated long cable 2D image. A large range in the discovery volumes reflected the uncertainty associated with the limitations of seismic imaging below salt and the upside potential in untested stratigraphy and a possible waterflood. To support initial appraisal and development activities the first 3D image was obtained through pre-stack depth migrating an existing 1988 survey. This survey proved to be in a reasonable orientation to illuminate sub-salt, but lacked the offset range to provide more than a localized image of the field. Consequently a 3D PSDM survey tailored to the specific sub-salt setting was acquired. Evaluation of this survey, integrated with well results and borehole seismic data has provided a step change in the further characterization of the field.

A staged development concept was chosen to simultaneously appraise and develop the field with very challenging wells. First production from a sub-sea tie-back system to Ursa TLP, that has the flexibility to cater for many different outcomes, was established 3½ years after discovery.