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Ram Powell 1998
Significant Challenges Met, Significant Challenges Ahead

Ram Powell is one of the major TLP developments in the eastern deepwater Gulf of Mexico(GOM). Discovery was in 1985 with initial production in September 1997. The three main turbidite reservoirs currently under development are the J, L, and N Sands.

The J Sand, an unconfined fan-lobe sheet-like turbidite, is an oil-rimmed gas reservoir. Current production is from two open-hole, gravel-packed, horizontal wells with horizontal reaches of 2328 and 2607 feet. One of these, Well A-3, claimed the GOM rate record of 41,000 BOEPD. Analysis of pressure information suggests that the reservoir has proven connectivity of at least 8000 feet with predicted connectivity being much larger. The key success in the J Sand is the exceptional production rates. The key challenges for the future are total reservoir connectivity and timing of water influx, given an unknown aquifer strength.

The L Sand is a laminated levee oil-rimmed, gas reservoir. Average lamination thickness is slightly less than one inch, and core plug permeabilities range from 10 to 1000 md. The L Sand is being produced by Well A-1, a single open-hole, gravel-packed, horizontal well with a 2255-foot reach and peak production rates over 100,000,000 CF and 9000 BC per day. Pressure information suggests that the well is draining as many as 4000 acres and that the connected volume has been increasing as a function of time and production. This increase has been attributed to the breaking down of intrareservoir barriers, which are manifested itself as small pressure increases of four to seven psi, followed by a slight flattening in the pressure decline profile. The main successes for the L Sand lie in the apparent reservoir connectivity and production rates obtained from laminated pay zones. The main risk is the breakdown of the apparent barrier between the laminated hydrocarbon-filled reservoir and the adjacent water-filled channel sand.

The N Sand is an amalgamated channel oil reservoir that has been difficult to develop. Unexpected and unexplained intrareservoir water levels have been penetrated and others may exist. Connectivity is unknown, and unexplainable reservoir pressure data exist. Seismic data have not fully identified reservoir barriers or adequately predicted water-filled sands. The reservoir is currently being produced by two wells, the A-2ST2 and A-5ST2. The A-2ST2 is a high-angle, cased-hole, gravel-packed, conventional well that has peak rates as high as 22,000 BOPD. Pressure information suggests a large, connected, in-place volume of 30 million barrels of oil. However, due to low reservoir energy, the reservoir is below the bubble point and water injection is required for adequate recovery. Injector placement is quite a challenge in view of the poor seismic resolution and unknown reservoir barriers. The second N-Sand well is A-5ST2, an open-hole, gravel-packed, horizontal producer with a 2380-foot reach that has just been completed. Based on initial pressure information, it appears to be in communication with the A-2ST2 well, which further substantiates the need for water injection. Poor seismic resolution has hindered the mapping of reservoir barriers. With unknown reservoir connectivity, injector placement is a significant challenge.

Overall, the Ram Powell development has been a technical and an economic success. From the perspective of well design and well placement, significant challenges have been met in obtaining high production rates. Large drainage areas in the J and L Sands have been confirmed. The remaining challenge lies in planning the development of the N Sand reservoir. ⇨

HGS Dinner Meeting • Monday, October 12 • Westchase Hilton, 9999 Westheimer, Social Hour 5:30 p.m., Dinner 6:30 p.m.

Biographical Sketch

Ken Bramlett was the Shell Deepwater project geologist for the Ram Powell project from 1994 to 1998. His efforts focused on reservoir characterization and development planning. Currently, he is assigned to the Turbidite Systems Group, where he works on solutions to issues related to turbidite reservoirs. Since joining Shell in 1980, he has held various technical and managerial positions in the Rocky Mountains, Permian Basin, and Gulf of Mexico. He holds a B.S. in geology from Clemson University, an M.S. in geology from the University of South Carolina, and a Master of Divinity from the New Orleans Baptist Theological Seminary. □