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Mark Chapin¹, Jonathan Hinchey², Martijn Blaauw³, Christopher Varley¹ (1) Shell International Exploration and Production, Houston, TX (2) Shell International Exploration and Production, The Hague, Netherlands (3) Jason Geosystems, Rotterdam, Netherlands

Bonga Field Development, Offshore Nigeria - A Deepwater Giant

The Bonga field development is located in offshore Nigeria, OPL212, in 1000 m water depth. In 1996, the Bonga-1 discovery well discovered high-quality crude oil in unconsolidated, Miocene, deepwater sands, having high porosity and permeability. The development plan includes subsea wells tied to an FPSO, a gas export pipeline tied back to an onshore LNG facility via a shallow water platform, and minimized flaring, Phase 1 developable reserves are approximately 600 MMBbl.

Appraisal and development pre-drill wells confirm good prediction of hydrocarbon-bearing sands from seismic analysis techniques. 3D volume interpretation and seismic inversion aided exploration and appraisal well targeting and estimates of in-place volumes and uncertainty ranges.

The traps for the Bonga reservoirs comprise some updip fault components, and lateral stratigraphic edges. The initial development targets five reservoirs, all of which have channel components. Experience elsewhere has shown that deepwater channel reservoirs are prone to surprises, including perched water and gas levels, and variable connectivity. The final well count and facility size was tested against many possible scenarios of geologic heterogeneity using details from seismic volume interpretation and outcrop analogues for guidance. Effective reservoir properties and connectivity scenarios were modeled during the reservoir simulation phase.

The drilling and development program is phased over nine years, allowing learning to be gained from the reservoirs as they are developed. Additional in-field reservoir targets have been successfully appraised during development drilling, and create the potential to extend the production plateau and mitigate any downside outcomes.