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## Deepwater Reservoir Learnings from the Zafiro Field, Equatorial Guinea

Deepwater reservoirs continue to provide many new technical challenges for hydrocarbon development and production, where complex environments of deposition and reservoir architectures must be understood to ensure optimal resource development and hydrocarbon recovery.

Recent technology advances including higher resolution 4D seismic data coupled with the application of sequence stratigraphic concepts in deepwater reservoir settings has resulted in breakthrough improvement in the understanding of deepwater reservoirs. In the Zafiro Field, such technology-driven learnings have provided a greatly improved understanding of deepwater slope channel systems that can be applied as a production analogue.

The Zafiro Field, Equatorial Guinea, was discovered in 1995 and is composed of stacked Pliocene deepwater slope channel deposits that record large-scale clastic input into the Gulf of Guinea following partial collapse of the paleo-Niger delta. High-resolution 3D and 4D seismic datasets are calibrated by over 70 well penetrations, with >3500 ft of conventional core and 8 years of production data. In this paper we explore the linkage between physical stratigraphy, environments of deposition, reservoir architecture and resulting production performance found in the deepwater slope channel systems of the Zafiro Field. The Pliocene canyon fill is organized into three compensationally stacked fining-upward successions (composite sequences) that each of which show a succession from traction-dominated to

suspension-dominated deposits. Each fining-upward succession contains a predictable stacking pattern from confined, sinuous, amalgamated to semi-amalgamated channel systems to weakly confined, highly sinuous, non-amalgamated and leveed channel systems.

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A detailed stratigraphic understanding of such slope channel systems is critical to successfully explore, develop and produce these resources. ■

### Biographical Sketch

JOHN ARDILL currently works for ExxonMobil Production Company in Houston as the Geoscience supervisor responsible for the ExxonMobil-operated Zafiro Field in Equatorial Guinea. Over the past 8 years with ExxonMobil, John has worked in Exploration, Development, Production and Research with the last 6 years focused on deepwater reservoirs in West Africa. John joined ExxonMobil in 1996 after completing a PhD at the University of Liverpool in England under the guidance of Dr. Stephen Flint and a Bachelor of Science at the University of Edinburgh in Scotland under the guidance of Dr. John Underhill.

