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DEEP WATER KUTEI BASIN UPDATE – RECENT GANAL PSC DISCOVERIES, INDONESIA

Exploration on the Ganal PSC shows an aspect of Unocal's SX philosophy that extends beyond drilling practices. SX, or Saturation Exploration, is a concept that focuses on saving costs at all levels of exploration for the purpose of drilling more exploration wells. Specifically, with regard to Ganal exploration, SX meant understanding what quantity and quality of data were sufficient to drive a successful exploration program. For example, did we really have to have 3D data over a prospect before we could drill it?

At Unocal, we concluded that we could explore the Ganal PSC without attempting to cover the entire 5050 sq.km. block with 3D data. Our initial work focused on interpretation of a 2 x 2 km. grid of 2D seismic data. This coarse grid revealed numerous large anticlines at 4500' to 7000' water depth. Since it was known that abundant Pliocene and Miocene sand existed on the Kutei shelf, it was interpreted that significant sand should have been deposited in the basin during Miocene lowstands, prior to Pliocene structural growth.

We did not need 3D data to interpret presence of reservoir. Hydrocarbon charge was predicted along deep-penetrating faults, sourced from terrestrial kerogen carried into the basin by turbidity currents, with top seals formed by thick hemipelagic claystone sections. All the elements of a working hydrocarbon system were present, and well locations were chosen directly from the 2D grid. Our exploration philosophy was that if sands were present in the closures, then 3D would be acquired to delineate and develop the discoveries.

In fact, excellent reservoir-quality gas sands were discovered in several Ganal anticlines. 3D seismic data subsequently acquired over the Gendalo discovery shows a large unconfined submarine fan covering at least 20000 acres, with an internal architecture of broad laterally continuous overlapping fan lobes. Additional gas discoveries were also made in the Gandang, Gula, and Gada structures, and reserves are estimated to be in the multiple TCF range. We did not need a 3D-structural/stratigraphic seismic interpretation to drill these structures. Our 2D grid was adequate for the purpose.

Did we really need 3D to drill structures that would have been drilled 50 years ago if they were onshore? Of course not; but we do acknowledge that 3D data will be invaluable for planning our development program.