

Lessons Learned from By-Passed Plays: Mississippian Mission Canyon Play, North Dakota, USA; Shongaloo Field, Louisiana, USA; Salawati Basin, Indonesia

By-passed pays and plays are more common in petroleum exploration than most geoscientists might think. Pay can be missed for myriad reasons—lack of data integration, drilling problems, shaley sands, dual porosity in carbonates, inappropriate completion practices or incorrect R_w , to name a few. A field's true size can be under-estimated after discovery when assumptions made early in the process prove wrong. Fields can also be condemned as uneconomic if early, low estimated ultimate recovery (EUR) wells are interpreted as representative of the mean (EUR), and not as part of a log-normal distribution of EUR. Plays are by-passed if the risk is underestimated and too few wells are drilled to sufficiently test the play concept. Case studies provide instructive models to avoid future by-passed pays and plays.

The Mississippian "Mission Canyon" play (cum: 352 BCFG, 259 MMBO) provides classic examples of both missed pays and a missed play. In the 1960s, Shell Oil Company drilled a dozen dry holes specifically targeting stratigraphic traps of the now-prolific Mission Canyon formation. Many of the now-known Mission Canyon fields have Shell wells offsetting them, or Shell "dry holes" drilled in them. Shell's stratigraphic model of prograding sabhka deposits was decades ahead of the rest of industry. Shell's 1950s seismic data defined the Billings Nose—a now-prolific anticlinal structure. Unfortunately, by underestimating the play's risk, Shell drilled too few wells to adequately test their stratigraphic-structural concept.

Shongaloo Field (cum: 159 BCFG; 19.7 MMBO) is a 10-mile long anticline located in the State Line Graben. Reservoirs include Jurassic Smackover "B" carbonates and the siliciclastic "C" sand. Marathon discovered the field in 1988 after drilling two dry

holes along the crest in 1954 and 1972. Integrated well, core and seismic data (and drilling 50 wells) revealed that the field's true size extended beyond and included early "dry" holes.

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Shell Oil Company quit the Salawati Basin of Irian Jaya, Indonesia in 1960 after drilling 30 wells in the basin over 25 years, and finding only the Klamono Field (33 MMBOE MMBOE) and two sub-economic, one-well fields. In the late 1960's Trend Exploration entered the basin and found an additional 430 MMBOE. Trend Exploration used sample cuttings analysis from Shell dry holes to define a pinnacle reef fairway. Trend Exploration also found that some of Shell's seismic data was specifically shot around steeply-sloped hills on the otherwise flat coastal plain of Salawati Bay. The hills were the geomorphic expression of compaction drape above the pinnacle reefs at depth. ■

Biographical Sketch

WILLIAM DEMIS is a geologist for the North American New Venture team at Marathon Oil Company. At Marathon, he has had both domestic and international assignments, and worked in Denver, Houston, Midland and Cody, Wyoming. Mr. DeMis earned a BS in Geology from the University of Wisconsin-Madison and an MA from the University of Texas at Austin. He



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