

**Event Description:****Well/location:**

Macondo Prospect, Mississippi Canyon Block 252, Gulf of Mexico, USA:

**Rig:**

TransOcean Marianas

**Event summary:**

While performing a leak-off test at the 22" casing shoe, the well would not either: 1) hold pressure in the wellbore and/or surface equipment, or 2) The formation at the shoe was breaking-down at a pressure significantly less than the predicted/desired leak-off value. Eight total leak-off tests were attempted. Five of which we performed by pumping down combinations of the choke line, kill line, and drill pipe against the upper annulars or pipe rams. A sixth leak-off test was attempted after spotting an LCM pill on bottom. A seventh leak-off test was performed after cutting the surface mud weight from 10.0ppg to 9.7ppg. A final eighth leak-off test was performed after a squeezing the shoe with a cement/stresscage slurry. In the eight leak-off tests that were attempted, the leak-off values were as follows (expressed in ppg downhole mud weight equivalent): minimum – 10.33; maximum – 10.47; mean – 10.38. Prior to the first leak-off test, a 10.7ppg mud weight equivalent was identified as the minimum accepted value for defining a successful leak-off test.

**Current event status:**

After eight attempts at achieving a satisfactory leak-off test, the 18 1/2" x 22" hole was drilled ahead with a less-than-desirable drilling margin. While attempting to maintain a low ECD so as to not breach the fracture envelope, an 11 barrel, 120 psi kick was taken at 8,970' (TVD). The 18" casing was set at 9,056' (TVD) approximately 850' shallow of the 9,900' (TVD) desired casing depth.

**NPT breakdown:**

Event NPT is defined as the time from the completion of the first leak-off test, to drilling ahead in the 18 1/2" x 22" hole. Leak-off tests two through eight, troubleshooting, preparing/spotting LCM, and squeezing the shoe are encompassed in event NPT. *Total event NPT: 86 hours.*

**Delivery plan:**

The delivery plan called for performing a leak-off test at the 22" casing shoe. The test was to be performed at 8,011' (TVD) with a 10.0ppg surface mud weight by pumping down the choke line and drill pipe against the upper annular. A 10.7ppg mud weight equivalent leak-off was desired to reach a planned TD of 9,900' (TVD). The most likely pore-pressure at 9,900' (TVD) was identified pre-drill to be 10.4ppg MW equivalent.

**Impact of delivery:****Good:**

Eight leak-off tests were performed incident-free. Several different methodologies for executing leak-off tests were utilized to identify possible failure mechanisms (i.e. – surface equipment, BOPs, formation, etc...). These tests were all executed according to plan. In general the leak-off test values increased slightly after the LCM application. This may indicate that the stresscage application may have been moderately effective.

**Bad:**

Eight leak-off tests and a cement squeeze took 86 hours of non-productive time. After eight leak-offs a desirable leak-off value was not obtained. The subsequent hole-section had to be drilled with a minimal drilling window. A kick was taken in this hole-section, and casing had to be set approximately 850' short of target depth.

**Corrective actions:**

EXHIBIT #	1961
WIT:	

Performing leak-offs against both the upper annular and pipe rams, pressuring up against combinations of surface equipment, spotting a stresscase LCM pill on bottom, and performing a cement shoe squeeze we're all utilized to identify potential modes of failure.

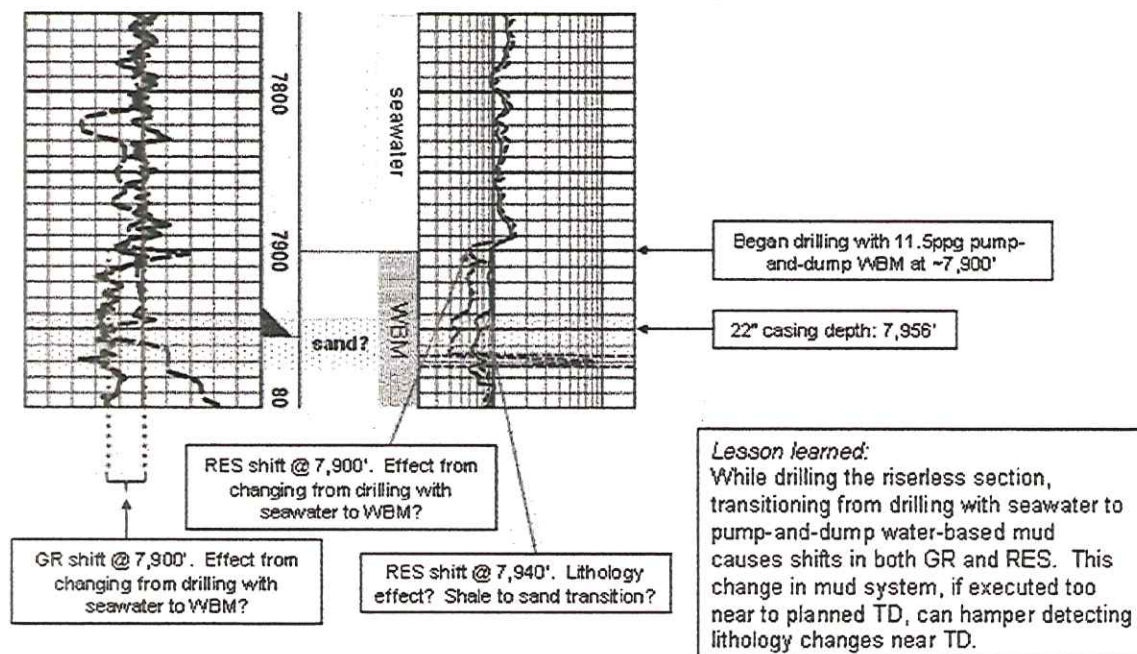
#### Conclusions:

It was concluded that a sand/weak formation was present around 8,000' (TVD) near the 22" casing shoe. The sand fracture gradient of an inferred low-Poisson ratio sand interval was identified to be approximately 10.35 – 10.40ppg MW equivalent.

#### Recommendations:

While drilling the 26" riserless hole-section (22" casing section) with seawater, the well was displaced to pump-and-dump water-based mud while drilling at 7,900' (TVD). The final 100' of hole was drilled with water-based mud. The transition from seawater to water-based mud caused both the real-time gamma ray and resistivity logs to shift towards the left (lower gamma and lower resistivity). At 7,950' (TVD) a second slight negative shift in the resistivity is observed in the recorded data that wasn't immediately apparent in the real-time data. Switching from seawater to water-based pump-and-dump mud proximal to hole-section TD masked a subtle log response that is now being ascribed to the presence of a sand interval at hole-section TD. It is recommended to either drill the entire hole-section with seawater (if possible), or switch to water-based mud sooner than 100' from TD. Switching to water-based mud sooner would allow the establishment of a predictable GR/RES shale baseline that would allow more accurate identification of sand at TD from subtle deviations in the established shale baseline.

It is thought that a sand is exposed near the 22" casing shoe.



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