

1. **Well Name:** BD-A1
2. **Field/Block Name:** BD
3. **State & Country:** Indonesia
4. **Onshore or Offshore:** Offshore east Java/appraisal well
5. **Hole Sizes, Intervals where Liquid Casing-Coarse used:** 8½" Hole Section: 9280-9410 ftMD
6. **Rates of Losses before spotting the Liquid Casing Pill:** Total losses
7. **Operator Name:** Husky-CNOOC Madura Limited (HCML)
8. **Mud Company name:** COSL Indo
9. **In which Mud System Liquid Casing-Coarse is used:** High Performance WBM
10. **Date of the using the LCM Pill:** March 2016
11. **Dosage of Liquid Casing in the pill:** 20 ppb Liquid Casing F and 20 ppb Liquid Casing C
12. **Mud Density:** 15.5+ ppg

#### **Brief Description of the Job Performed:**

Loss of circulation first occurred during drilling at interval 9280-9410 ftMD with loss rate of 60 bbl/hr. Started controlling the losses while drilling by pumping several LCM pills formulated with conventional LCMs, unsuccessful.

While controlling the losses, observed volume gain, increased MW from 15.5+ to 15.8 ppg to control gain, the losses re-occurred; dropped the MW back to 15.6 ppg. It took approximately 23 hours working on controlling the losses using conventional LCMs with no success.

Started preparing 55 bbl Liquid Casing® pill formulated with 20 ppb Liquid Casing® F, 20 ppb LIQUID CASING™ C, 8 ppb Bentonite in based mud volume being used. Ran in BHA to the estimated loss section at 9470 ftMD, spotted 45 bbl LC pill, circulated with 250 gpm, displaced LC pill to annulus, kept approximately 5 bbl inside string. Pulled up BHA 7 stands while maintaining back pressure with MPD at 240 psi and 180 psi while breaking out and racking back stands, well static. Applied back pressure 185 psi with MPD, rotated string at 15 rpm, well static. Circulated and monitored loss rate.

During circulation, increased pump rate every 15-20 started from 270 gpm and gradually increased to 300 gpm - 350 gpm - 400 gpm - 450 gpm - 480 gpm - 500 gpm – 550 gpm without losses. Decreased to 450 gpm, no losses.

- Ran in 7 stands, maintained back pressure with MPD at 180 psi while RIH and made connection. Circulated bottom up with 450 gpm, no losses. Liquid Casing pill returned to surface and directed into active system. Resumed drilling with 450 gpm from 9476 ftMD without losses until 9500 ftMD where losses re-occurred. Partial losses persisted during drilling; repeated pumping different Liquid Casing formulations of 20-30 ppb Liquid Casing F, 20-30 ppb Liquid Casing C and 8-15 ppb Bentonite until drilling reached TD at 9747 ftMD.
- This was the first time Liquid Casing® products were used in Indonesia.