

# BaraBlend®-665/BaraLock®-666 LCM Pills Help Stop Losses in Deep Fractured Carbonate, Save USD 600K

LIBRA FIELD, SANTOS BASIN, BRAZIL

## CHALLENGE

Stop severe losses in highly fractured carbonate formation:

- » High volumes of non-aqueous fluid lost at 5,900 meters (19,357 feet)
- » Cement plugs cause delay and increase well control risks

## SOLUTION

Spot an engineered combo LCM pill in the loss zone:

- » BaraBlend®-665 LCM to seal small natural and induced fractures
- » BaraLock®-666 LCM as a supplement to seal large fractures (1–8 mm wide)

## RESULTS

- » Dual LCM pills stopped losses completely
- » Avoided cement plug operation, saving 12 hours of rig time valued at USD 600,000
- » Eliminated well control risks associated with high-rate losses and cement plug issues

## OPERATOR NEEDS ALTERNATIVE TO CEMENT PLUGS TO STOP SEVERE LOSSES

While drilling the 12-1/4-inch section of an ultra-deepwater well in Brazil’s Santos Basin, the operator encountered loss rates ranging from 150 bbl/hr to 250 bbl/hr. The highly fractured carbonate formation had caused similar severe lost circulation incidents on other wells in the field.

The recovery of a formation core revealed fractures of various sizes that had proven difficult to control with conventional lost circulation materials (LCM).



*This core sample shows variable fracture widths in the carbonate formation.*

On previous wells, the operator found it necessary to pump one or more cement plugs to seal the loss zones – a contingency operation that created potential well control risks and much higher costs related to delays and lost non-aqueous fluid.

## BARABLEND®-665/BARALOCK®-666 LCM SEALS MULTIPLE FRACTURE WIDTHS

To eliminate the need for a cement plug on the current well, the Baroid team recommended spotting a pill formulated with BaraBlend-665 and BaraLock-666 LCM. Pre-mixed BaraBlend-665 composite LCM is designed to reduce or stop severe lost circulation caused by small natural or induced fractures. Sized BaraLock-666 LCM, known to be effective in large and/or multiple fractures (1–8 mm wide), was proposed to supplement the BaraBlend-665 LCM treatment. Using both LCM types in a single pill would address the uncertainty related to the fracture sizes, lengths, and widths.

The recommended formulation (shown below) was tested in the customer’s laboratories to validate its effectiveness.

Product	Concentration
Fresh Water, bbl/bbl	0.90
BaraBlend-665, ppb	100.0
BaraLock-666 F, ppb	0.25
BaraLock-666 M, ppb	0.25

After obtaining approval for use, the Baroid team provided specific instructions on how to pump and apply the solution at the rigsite. The BaraBlend-665 LCM was mixed with fresh water in the rig pits and then transferred to a batch mixer where the fine and medium BaraLock-666 LCM were added. The bypass valve (PBL) installed on the bottomhole assembly (BHA) was activated so the pill could be pumped through the drillstring and spotted in the open hole loss zone.



Lab testing was conducted to validate the plugging effectiveness of the LCM pill prior to pumping downhole. BaraBlend 665/BaraLock 666 LCM effectively sealed an 8-mm slotted disk, forming a solid mass of plug.



High filtration was obtained under very low differential pressures.

**COMBO LCM PILLS STOP LOSSES, ENABLING DRILLING TO RESUME**

The combo LCM approach sealed the naturally fractured carbonate formation, enabling the operator to resume drilling. After drilling a few meters below the first loss zone, a second loss zone was exposed. The same LCM treatment was applied, and, again, losses stopped completely.

The operator saved 12 hours of rig time by avoiding a cement plug operation, resulting in a savings of USD 600,000 in rig time.

This effective LCM treatment also helped eliminate well control risks associated with high-rate losses and cement plug issues.

**Combo LMC Treatment**  
**SAVES**  
**USD 600K**  
**of rig time in**  
**ultra-deepwater well**

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