



## NOVAPLUS™ Synthetic Drilling Fluid System

*“This customer was in a difficult situation, having drilled three wells with three instances of stuck liners. They agreed to try our NOVAPLUS system. That ended the problem and saved the company more than \$900,000 in daily rig rates.”*

Paul Broussard – Project Engineer

### Well information

Location:	Green Canyon Area, Gulf of Mexico
Water depth:	2,850 ft
Spud/completion:	November 1994/April 1995
Intervals drilled:	<ul style="list-style-type: none"><li>• 12¼-in. hole for a total of 4,215 ft — from 9,400 to 13,615 ft</li><li>• 8½-in. hole for a total of 2,944 ft — from 13,615 ft to TD at 16,559 ft</li></ul>

### The situation

On the third consecutive well in the Green Canyon area, using water-base systems, hole problems caused the 9%-in. liners to become stuck before

it reached TD. While the operator was attempting to run the liner to the 13,677-ft TD, it stuck at 10,210 ft, just below the 11¾-in. casing shoe.

### The solution

The crew cut the stuck liner at 9,400 ft and pulled it from the well. A cement plug was set, and the well was sidetracked.

The operator then displaced the salt/PHPA deepwater drilling fluid system used to prevent gas hydrates

with our NOVAPLUS synthetic system. It's a lower-viscosity system with an internal olefin base.

Following a clean displacement, re-drilling the interval proceeded without incident.

### The results

- Tight hole and the resulting drag were eliminated. The operator successfully drilled to TD with no occurrences of stuck pipe. The 9%-in. liner was run and cemented with no problems.
- ROP increased significantly. The 12¼-in. interval was drilled in nine days versus 18 for the water-base system. The 8½-in. interval took only three days to drill, four days less than the projected time for the water-base system.
- Improved hole stability and cleaning. NOVAPLUS greatly

reduced the need for short trips and pumping out the riser.

- Minimal fluid losses on the cuttings. Average cuttings retention factors were 0.5 bbl/bbl for the primary shakers and 1.4 bbl/bbl for the linear-motion, secondary shakers.
- Improved formation evaluation. Logs were run and core samples taken with no problems.
- Improved drilling economics. The operator realized a \$900,000 savings in daily rig time.

#### NOVAPLUS benefits:

- Faster drilling rates
- Greater lubricity
- Excellent wellbore, temperature and contamination stability
- Reduced stuck-pipe occurrences
- Minimal fluid loss on cuttings
- Environmentally acceptable



## The details

The 12¼-in. interval was drilled with a 10⅝-in. bit followed by a 12¼-in. underreamer, from 9,400 to 13,615 ft in just nine days. The penetration rates achieved with the NOVAPLUS system were higher than with the water-base system, and fewer short trips were required due to improved hole conditions. The 9⅝-in. liner was run and cemented with no sticking or mud losses.

The 8½-in. interval was drilled from 13,615 ft to TD at 16,559 ft in only three days. Although some mud losses were experienced, wellbore stability was excellent and extensive logging operations were performed without incident.

*The properties of the NOVAPLUS system at the start and completion of the first interval were as follows:*

Properties	9,400 ft	13,615 ft
Mud weight, ppg	12.3	12.8
Funnel viscosity	110	88
Plastic viscosity	29	22
Yield point	37	24
6 rpm	26	15
HTHP @ 200°F	4	2
S/W ratio	72/28	76/24

During transit to the rig, water from the workboat had contaminated the new fluid, but this posed no problem for the M-I system. As drilling progressed, the S/W ratio was easily adjusted with additional synthetic base fluid.

The drilling personnel were very pleased with the NOVAPLUS system. They indicated that it addressed and minimized the problems previously associated with using synthetic systems for deepwater drilling. These had included high funnel viscosities after trips, high downhole ECDs and an inability to adjust the rheological properties to fit the operational procedures as conditions changed.

**Questions?  
We'll be glad to  
answer them.**

If you'd like to know more about NOVAPLUS and how it's performing for our other customers, please call the M-I office nearest you.

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