

# Synthetic drilling mud base fluids provide options

**IN ADDITION TO HAVING** to stay on schedule by maximizing rates of penetration, the drilling contractor must help keep the environment clean for future generations.

This can be a challenge, especially in urban, environmentally sensitive or offshore drilling operations. Achieving a healthy balance between the environment and drill times requires using the appropriate drilling mud fluid.

PureDrill drilling mud base fluid makes meeting the challenge easier.

Manufactured by **Petro-Canada** in Mississauga, Ontario, PureDrill is a completely colorless, odorless and non-toxic drilling mud fluid designed to provide premium performance, improved worker health and safety and minimal impact on the environment.

Petro-Canada currently offers two PureDrill formulations. PureDrill HT-40 is a unique blend of synthetic isoalkane and severely hydrocracked low toxicity mineral oil, currently in use for onshore drilling operations in Western Canada.

PureDrill IA-35 is a fully synthetic drilling mud base fluid primarily designed for use in offshore drilling where regulations require the use of environmentally friendly synthetic products, as well as for use onshore in the U.S. Both fluids provide excellent rates of penetration, improved hole stability, reduced corrosion and are suitable for use in higher-temperature applications. PureDrill has also proven itself in extreme cold temperature deepwater conditions off the coast of Norway.

"PureDrill was developed through a unique patented technology," said Dr **Michael Fefer**, Research and Development, Petro-Canada. "We have developed drilling mud base fluids with unique molecular compositions. Not only do these fluids perform better, they are odorless, readily biodegradable and non-toxic to humans, marine and wildlife."

PureDrill is sold in Canada by Petro-Canada and in the US exclusively through **Integrity Industries Inc.**, a premier drilling mud fluid distributor based in Kingsville, Texas.

## URBAN DRILLING

Drilling in cities and suburban communities is not new. For decades, the petroleum industry has been pushing the boundaries of oil and gas exploration, branching out into urban environments and residential neighborhoods.

But in many communities where oil has been discovered, the arrival of drilling rigs can cause tension between the drilling company and the residents.

That was the case in Greenspoint, a neighborhood suburb of Houston, where a significant discovery was made in January 2001 just 300 ft from a housing development.



**Colorless, odorless, non-toxic synthetic drilling mud base fluid can provide operating benefits.**

To address the concerns of the residents about the odor of the diesel-based drilling mud, the diesel-based mud was replaced with PureDrill-based mud. Its clear, odorless properties effectively resolved the problem of diesel fume emissions while providing added benefits of improved worker health and safety, and an increase in performance.

## GREENSPPOINT OPERATION

**Billy Perimon**, a senior drilling mud engineer with **Zarsky Oilfield Services Inc.**, has tended to favor the use of either diesel or water-based drilling mud in the past. But his experience at Greenspoint has led him to believe that diesel should no longer be considered the drilling mud fluid of choice.

"When we first started drilling at Greenspoint, we knew we would be facing some unusual circumstances," said Perimon. "First of all, we knew we had to drill to at least 16,000 ft. The complex geology of the region was such that it made using a water-based mud impractical, so we knew we were going to have to use a diesel-based drilling mud.

"Secondly, we had the 40,000 residents of Greenspoint to the North and the West of us, some of whom were living within 300 ft of the well site. When the wind was blowing towards the North—as it often did—the fumes from the diesel would blow over into the suburb of Greenspoint."

Over the next 60 days of operation, the company received 25 complaints from local citizens and community leaders, complaining about the diesel fumes. In response to the complaints, the **US Environmental Protection Agency** visited the well site and threatened fines of \$25,000 a day if odors emanating from the well were not reduced.

"When we switched over to PureDrill, all of the problems we were experiencing stopped overnight," says Perimon. "PureDrill is virtually odorless, so we didn't receive a single complaint after we implemented the change. The EPA came by again and informed us that they were more than satisfied with the measures we had taken to reduce emissions.

"Our rig workers were also very happy when we switched to PureDrill," said Perimon.

## INCREASED ROP

Aside from the health, safety and environmental benefits of the synthetic base fluid, it also increased penetration rates compared to diesel. Through the first 12,000 ft of drilling, penetration rates averaged 5-6 ft/hr. When the switch was made to PureDrill, ROP increased significantly.

Over the next 4,000 ft of the hole with the PureDrill fluid, penetration rate reached 14 ft/hr. "We used an 80/20 ratio of PureDrill to water and we drilled over 3,000 ft using a 4½-in. bi-centered drill bit.

The increased ROP resulted in a consid-



**Development of Terra Nova field off the coast of Newfoundland involves both sensitive environment and complex drilling conditions.**

erable cost savings for Zarsky and allowed them to stay ahead of schedule. The company plans to use PureDrill on its next job, a directional well being drilled near a mall in Houston.

### **TERRA NOVA OPERATION**

Offshore rig operators are familiar with the positive properties of PureDrill.

**Mert Hanni**, Terra Nova's Well Construction Team Leader, considers PureDrill's unique properties invaluable when drilling where environmental considerations are a special concern.

At the Terra Nova field off the coast of Newfoundland, Hanni has found PureDrill to be of great benefit in enhancing productivity. The operation at Terra Nova involves drilling directional wells to a reservoir that is about 10,500 ft below sea level.

Hanni ultimately selected PureDrill for the project because of its worker health and safety benefits, environmental friendliness and cost-effective characteristics.

PureDrill was not the first drilling mud fluid choice. Initially, a water-based mud

was used, but it met with little success. "Unfortunately, when you use a water-based mud, the formation tends to wash on you resulting in a large hole cavern that needs to be cleaned out," said Hanni. "We switched over to Petro-Canada's PureDrill for the formation stability of the well since the formation doesn't react to this mud fluid."

PureDrill's agreeable chemistry was also a factor. "Since it's a benign type of fluid, there is no damage to our formations when we're drilling horizontal wells either," said Hanni.

He said that in the long run, using PureDrill-based mud results in an overall cost savings. "Instead of 100 days in a well you could be 80 days in a well.

"When you multiply that by \$350,000 per day, you get a considerable savings."

PureDrill is now being used onshore in Canada and the US for deep and horizontal drilling, as well as offshore in the North Sea, off the East Coast of Canada and in the Gulf of Mexico. ■