

**BASE FLUID CHANGE FOR CANADA LAND DRILLING OPERATIONS LEADS TO  
IMPROVED DRILLING PERFORMANCE AND BETTER HEALTH AND SAFETY PROFILE**

**Jim Friedheim\***

**John Lee**

**Kayli Clements**

M-I SWACO

5950 N. Course Drive

Houston, TX 77072

Voice: 281-561-1679

Fax: 281-568-0827

[jfriedheim@miswaco.com](mailto:jfriedheim@miswaco.com)

**Eric van Oort**

Shell

Houston, TX

Drilling operations in Western Canada use non-aqueous drilling fluids in order to address challenging drilling conditions. These non-aqueous fluids generally provide good rates of penetration, a stable wellbore, and fluid properties that are reliable and relatively easy to maintain. Traditionally, mineral base oils have been used to formulate these non-aqueous drilling fluids. Recently a major operator in Canada requested a replacement of the currently used base fluid to reduce the rheological profile and improve downhole pressure management after a recent well failed to meet its desired objectives in terms of ECD control and ability to log. In addition to improve drilling and logging performance, the replacement base fluid was expected to deliver environmental benefits because of the elimination or reduction of certain components in the new base fluid and its linear structure, which promotes more rapid biodegradation.

A synthetic C-14 Internal Olefin (IO) system was selected both the basis of its rheological profile and environmental fingerprint. Lab testing indicated that an IO C-14 based synthetic fluid gave desired rheological properties and fluid loss control after some adjustments in the fluid formulation. The field trial of this IO C-14 based drilling fluid was conducted by mixing un-weighted mud at the mixing plant and sending out the fluid to the rig to be weighted up while drilling. Due to the lower kinematic viscosity of the base fluid, a high-yield grade organoclay was used to provide the required initial rheology at the mixing plant. Once the drilling operation commenced, the fluid properties were easily maintained within specs and no problems were encountered. The overall fluid performance was better than the typical mineral oil based system as evidenced by lower ECD's, improved ROP and the ability to log without problems. Furthermore, testing indicated a reduction in environmental impact would be expected from use of this IO C-14 base fluid to formulate the drilling fluid than those using the previous base oil.

This paper will review the fluid formulation issues, drilling performance issues and review the potential environmental advantages of IO C-14 base fluids.

###