

**BIOREACTORS USED FOR THE RAPID ASSESSMENT OF
SYNTHETIC-BASE MATERIAL USED IN HIGH PERFORMANCE FLUIDS**

Kayli Clements*

John Candler

M-I SWACO, A Schlumberger Company

5950 North Course Drive

Houston, TX 77072

Voice: 281-561-1446

Fax: 281-561-1375

klements@miswaco.slb.com

Base fluids are a large component that drives the toxicity and biodegradability of non-aqueous drilling fluids and associated cuttings from drilling operations. The industry has come to recognize that certain synthetic materials are superior in environmental performance to both diesel and mineral oils and have been substituted into many fluid formulations to improve HSE performance while providing more options for treatment, disposal and even beneficial reuse of these drilling residuals.

In order to assess bases fluids with slightly differing hydrocarbon content and structure, a rapid test for aerobic biodegradation was developed.

Bioreactors were used to create optimal conditions to support large bacterial colonies that would use the hydrocarbons as a food source. Rather than focusing on biodegradation rate that tends to be subject to testing artifacts, this test procedure is focuses on the residue of hydrocarbons after the active phase of biodegradation has achieved a plateau. The results show that fluids of certain chemistries will biodegrade to very low levels, achieving greater performance than traditional base fluids. These base fluids can be interchanged into the drilling fluid formulation to usher in the next generation of high performance fluids.

###