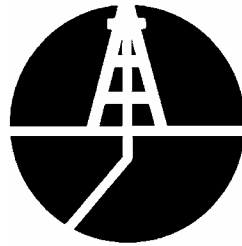


Drilling Technologies

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**PPT Testing of A
Synthetic-Based Drilling Fluid
With NER PipeRubber**

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**PPT Testing of A
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Introduction

At the request of Robert Wood (President, NER Corporation), the Westport Technology Center International Drilling Fluids Lab conducted a series of tests on a synthetic-based drilling fluid. This synthetic-based drilling fluid was treated with three lost-circulation additives (NER PipeRubber, a commercially available synthetic graphite, and a synthetic fiber), then tested on a PPT Fluid Loss Tester at 200°F and 2000 psi.

Conclusions

In this synthetic-based drilling fluid, PPT testing showed that the base mud had a fluid loss value of 6.8 mls, while the base mud, treated with the lost-circulation additives had fluid losses from 3.5 to 4.0 mls. NER's PipeRubber product did very well in these tests (4.0 ml PPT value), although it did cause an increase in the rheological properties of the mud. This product also had the least effect on electrical stability values, with a 613 volt ES after hot-rolling, compared to a 609 volt ES for the base mud, and ES readings of 405 to 459 for the two other products.

Test Results

Test Procedure

1. Mix sufficient quantities of synthetic-based drilling fluid for testing.
2. After mixing, prepare four, 2-barrel equivalent samples.
3. Treat fluids with lost-circulation material. Finish mixing with a Silverson mixer, to 125°F.
4. Hot-roll samples for 16 hours at 150°F.
5. After hot-rolling, run rheologies, ES, HTHP, and PPT tests.

Base Formulation and Mix Times

<u>Formulation</u>	<u>Conc.</u>	<u>Mix Time</u>
IO 16-18 Base Oil, bbl	0.598	-
Water, bbl	0.1829	5
Organophillic clay, lb/bbl	2	15
Primary emulsifier, lb/bbl	4	-
Secondary Emulsifier, lb/bbl	4	5
Lime, lb/bbl	5	5
Amine-Treated Lignite, lb/bbl	6	10
Barite, lb/bbl	297.3	15
CaCl ₂ , lb/bbl	22.47	15
Polymeric Viscosifier, lb/bbl	1	10

Table #1 – Properties of Synthetic Drilling Fluid and Lost-Circulation Additives after Hot-Rolling 16 hours at 150°F.

Sample #	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Synthetic Fiber, lb/bbl	Base	15	-	-
Synthetic Graphite, lb/bbl	Mud	-	15	-
NER Pipe-rubber, lb/bbl	-	-	-	15
HR 16 hrs at 150°F				
600 rpm at 120°F	50	53	54	76
300 rpm	31	31	32	47
200 rpm	23	24	25	38
100 rpm	16	16	17	26
6 rpm	6	6	6	9
3 rpm	6	5	6	8
Plastic Viscosity, cP	19	22	22	29
Yield Point, lbs/100 ft ²	12	9	10	18
Gels, initial/10 min.	6/8	6/8	6/8	9/11
ES	609	405	459	613
HTHP at 200°F, ml.	0.3	0.8	0.8	0.8
PPT Tests*				
Spurt loss, ml	5.0	3.1	3.3	3.2
Filtrate, ml	0.9	0.2	0.2	0.4
PPT Value, ml	6.8	3.5	3.7	4.0

* - 2000 psi, 200°F,
2 darcy / 10 micron
aloxite disk.