



Drilling Fluids

Advancing Reservoir Performance

**KUALA LUMPUR TECHNICAL SERVICES
LABORATORY REPORT**

**Linear Swellmeter Testing Of a Shale Sample
From Central Petroleum, Australia**

**Ooraminna-1
Sample taken from 2700-2706ft Fig1 and 2
Pertatataka Formation**

TSR-10686

August 15, 2009

Summary:

At the request of Frank Almassi (BHDF Technical Sales/Marketing Engineer, Perth, Australia), the Kuala Lumpur Drilling Fluids Laboratory conducted Baroid Linear Swellmeter tests on a small sample of shale. This material was submitted from Central Petroleum, Australia.

Linear Swellmeter test results indicate that 6% KCl/Polymer has a more inhibitive effect on the shale than 3% KCl/Polymer. Deionized water had 9.28% swelling, while 3% KCl/Polymer had 8.60% swelling. 6% KCl/Polymer had 6.19% swelling.

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Date: August 15, 2009

Approved By: John Touns

Date: August 15, 2009

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Linear Swellmeter Testing Of a Shale Sample From Central Petroleum, Australia

Introduction:

At the request of Frank Almassi (BHDF Technical Sales/Marketing Engineer, Perth, Australia), the Kuala Lumpur Drilling Fluids Laboratory conducted Baroid Linear Swellmeter tests on a small sample of shale. This material was submitted from Central Petroleum, Australia.

Summary of Results:

Linear Swellmeter test results indicate that 6% KCl/Polymer has a more inhibitive effect on the shale than 3% KCl/Polymer. Deionized water had 9.28% swelling, while 3% KCl/Polymer had 8.60% swelling. 6% KCl/Polymer had 6.19% swelling.

Due to the small amount of shale submitted for testing, no further work can be conducted with this sample.

**Linear Swellmeter Testing Of a Shale Sample
From Central Petroleum, Australia**

Sample Identification:

081109-01 – small sample of shale, submitted by Central Petroleum, Australia. No depth or well name.

Test Procedure:

1. Prepare wafers for Linear Swellmeter.
2. Measure wafer swelling when exposed to deionized water, a 3% KCl/Polymer fluid, and a 6% KCl/Polymer fluid.
3. Measure CEC of shale sample.

Test Results

Table 1 – Linear Swellmeter Test Results, CEC of Shale

<u>Test Fluid</u>	<u>Wafer Swelling, %</u>	<u>Exposure Time, hrs</u>
Deionized water	9.28	43
3% KCl/Polymer (Sample 1, Table 2)	8.6	43
6% KCl/Polymer (Sample 2, Table 2)	6.19	24
Shale CEC, meq/100 grams	9.5	

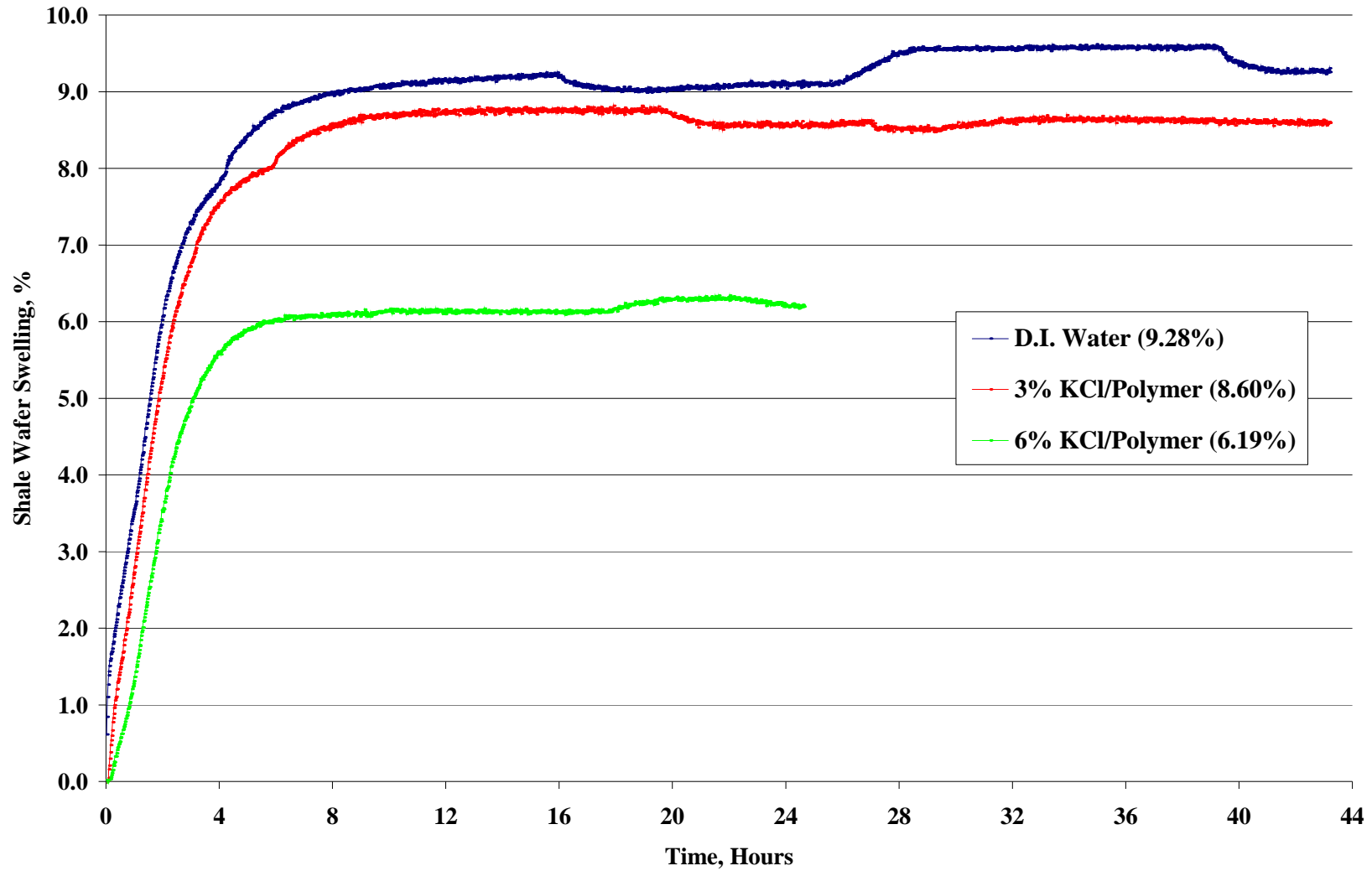
**Linear Swellmeter Testing Of a Shale Sample
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Table 2 – Formulation and Properties of 3% and 6% KCl/Polymer Drilling Fluids

<u>Sample #</u>	<u>1</u>	<u>2</u>
Water, bbl	0.94	0.9243
Soda Ash, lb/bbl	0.2	0.2
NaOH, lb/bbl	0.1	0.1
KCl, lb/bbl	11.31	22.94
Flowzan, lb/bbl	0.8	0.8
BIO-PAQ [®] , lb/bbl	4	4
MIL-CARB [®] , lb/bbl	35	35
<u>Initial Test Results</u>		
Mud weight, lb/gal	9.0+	9.2
600 rpm @ 120°F	36	36
300 rpm	22	22
200 rpm	18	19
100 rpm	13	14
6 rpm	5	5
3 rpm	4	4
Plastic Viscosity, cP	14	14
Yield Point, lb/100 ft ²	8	8
Gels, 10 sec/10 min.	4/5	4/5
pH	11.44	11.31
API, mL/30min	7.0	6.9
KCl, wt%	3.0	6.0

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Chart 1 – Linear Swellmeter Test Results of Central Petroleum Shale





Drilling Fluids

Page 6 of 5
TSR-10686

**Linear Swellmeter Testing Of a Shale Sample
From Central Petroleum, Australia**

**Linear Swellmeter Testing Of a Shale Sample
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Figure 1

**Linear Swellmeter Testing Of a Shale Sample
From Central Petroleum, Australia**

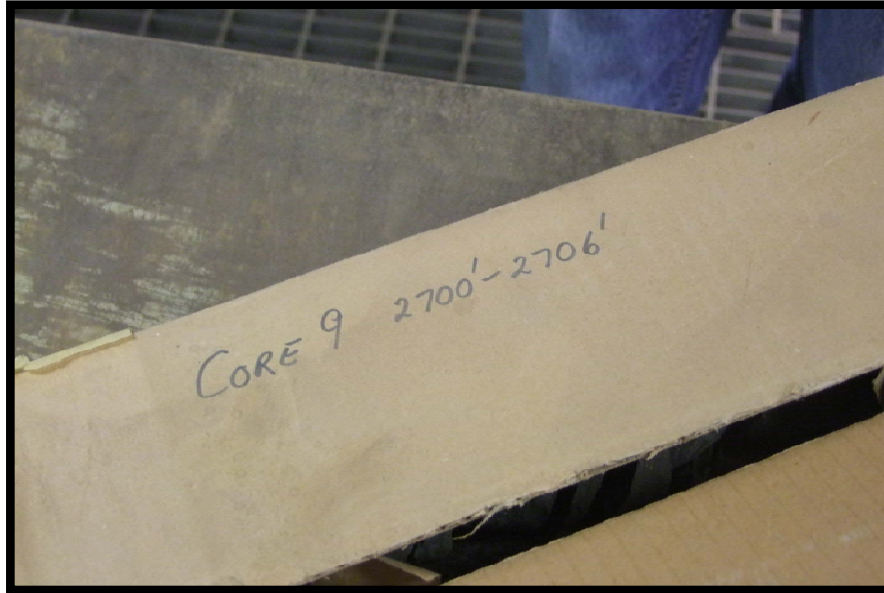


Figure 2