

# **RICKEY MORGAN**

**HESI EMPLOYEE ID: CEMZ301**

## **PAPER COLLECTION**

**LAB RESULTS APRIL 12, 2010**

**& CEMENT LAB WEIGH UP SHEET DTD MAY 20, 2010**

**IN THE MATTER OF THE FIRE & EXPLOSION ON THE DEEPWATER HORIZON**

**APRIL 20, 2010**

# HALLIBURTON

Cementing Gulf of Mexico, Broussard

## LAB RESULTS - Primary

### Job Information

Request/Slurry	73909/2	Rig Name	TRANSOCEAN HORIZON	Date	April 12th 2010
Submitted By	Jesse Gagliano	Job Type	9 7/8" X 7" Prod Casing	Bulk Plant	Fourchon-C-Pon 1, La, USA
Customer	BP	Location	Mississippi Cny	Well	Mississippi Canyon 252 OCS-G-32306 Macondo #1

### Well Information

Casing/Liner Size	7"	Depth MD	18360 ft	BHST	210 F
Hole Size	9 7/8"	Depth TVD	18360 ft	BHCT	135 F

### Drilling Fluid Information

Mud Company	MI	Type	SOBM	Density	14.1 PPG	PV/YP
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### Cement Information - Primary Design

Conc	UOM	Cement/Additive	Sample Type	Sample Date	Lot No.	Cement Properties
100.00	% BWOC	Lafarge Class H	Rig	Apr 05, 2010	Tank # 8	Slurry Density 16.741 PPG
0.07	% BWOC	EZ-FLO	Rig	Apr 05, 2010		Slurry Yield 1.37 FT3
0.25	% BWOC	D-Air 3000	Rig	Apr 05, 2010		Water Requirement 4.93 GPG
1.68	lb/sk	KCI (Potassium Chloride) Salt	Rig	Apr 05, 2010		Total Mix Fluid 5.02 GPG
20.00	% BWOC	SSA-1 (Silica Flour) PB	Rig	Apr 05, 2010		Foam Density 14.496 PPG
15.00	% BWOC	SSA-2 (100 Mesh) PB	Rig	Apr 05, 2010		Foam Quality 12.00 %
0.11	gpg	Zone Sealant 2000	Lab	Mar 15, 2009		Water Source Fresh Water
0.09	gpg	SCR-100L	Lab	Oct 22, 2009	6264	Water Chloride N/A ppm
4.93	gpg	Fresh Water	Lab	Apr 12, 2010	FRESH WATER	

### Operation Test Results Request ID 73909/2

#### Thickening Time Request Test ID: 812338

Temp (°F)	Pressure (psi)	Reached in (min)	Start BC	30 Bc (hh:mm)	40 Bc (hh:mm)	50 Bc (hh:mm)	70 Bc (hh:mm)
135	14,458	83	14	07:25	07:34	07:36	07:37

#### Mud Balance Density Request Test ID: 811529

Density (ppg)  
16.7  
from part 1

#### Mixability (0-5) 0 is not mixable Request Test ID: 811524

Mixability rating (0-5)  
4

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**UCA Comp. Strength, Request Test ID: 811522**

End Temp (°F)	Pressure (psi)	50 psi (hh:mm)	500 psi (hh:mm)	12 hr CS (psi)	24 hr CS (psi)	48 hr CS (psi)
210	14,458	08:12	08:40	2,301	2,966	3,099

Circulate before pouring C.S. for 3 Hrs

**Operation Test Results Request ID 73909/1****Crush Compressive Strength, Request Test ID: 806069**

Curing Temp (°F)	Time 1 (hrs)	Strength 1	Time 2 (hrs)	Strength 2	Time 3 (hrs)	Strength 3	Foam quality
180	12	0	24	0	48	1,590	0

Condition for 1.5 hrs

**FYSA Viscosity Profile & Gel Strength, Request Test ID: 806074**

Test Temp (°F)

80

600=14, 300=7, 200=5, 100=3, 60=1, 30=1, 6=1, 3=1.... 6D=1, 3D=1

**Non-API Rheology, Request Test ID: 806075**

Test temp (°F)	600	300	200	100	60	30	20	10	6	3
80	180	84	56	28	26	8	6	4	2	2

PV 84 YP-0

**Non-API Rheology, Request Test ID: 806076**

Test temp (°F)	600	300	200	100	60	30	20	10	6	3
135	130	56	40	20	12	8	6	4	4	2

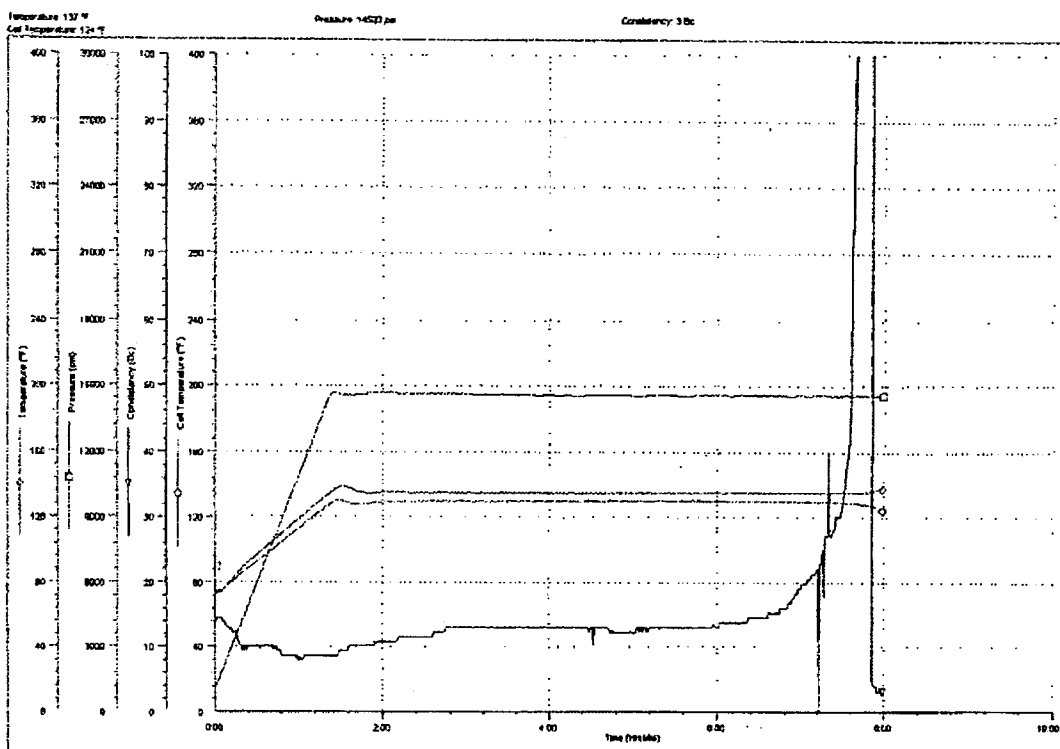
PV 54 YP-2

**Foam Mix and Stability, Request Test ID: 813603**

Time to Foam [Sec]	SG top	SG bot.	Conditioning time (hrs:min)
8	1.8	1.8	03:00

14.99

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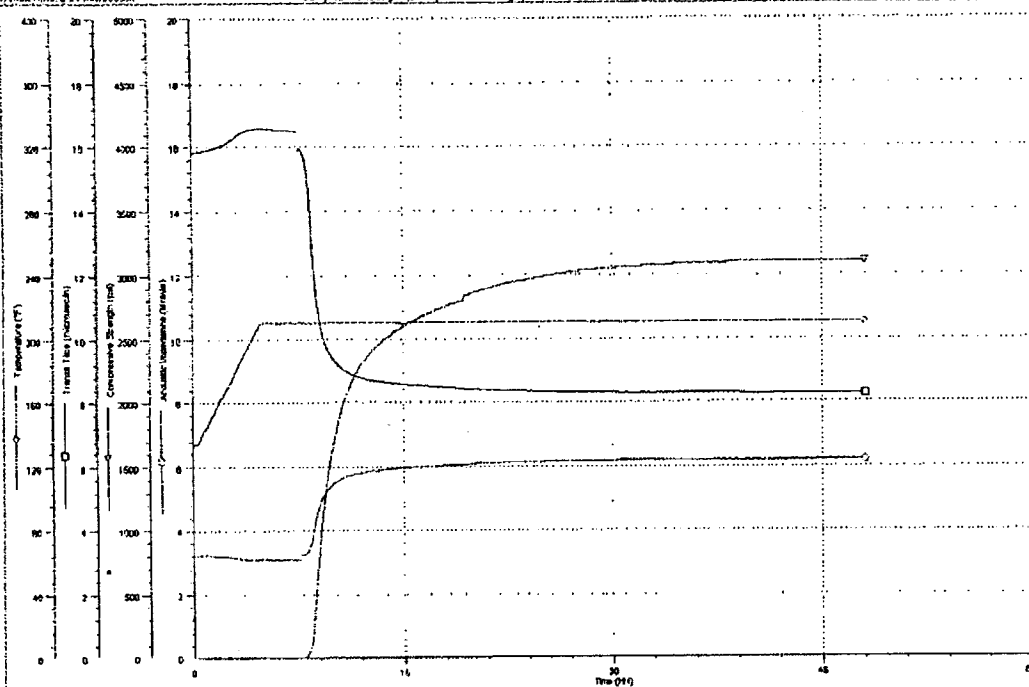


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Well ID  
Temperature: 210 °F  
Transit Time: 8.24 m/sec (sec)

Customer  
Density: 2000 g/cc  
Compressive strength type B (more than 14 days)

10 psi @ 6:12:00  
100 psi @ 8:40:30



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## Cement Lab Weigh-Up Sheet, May 20, 2010 - Req/Slurry: US-73909/2



Request Id	73909	Rig	TRANSOCEAN HORIZON	Engineer	Jesse Gaglano
Slurry No.	2	Customer	BP	Request Type	Operation
Job	Production Casing	Well	Mississippi Canyon 252	Request Date	12.04.2010
Pipe Size	7	Location	Mississippi Cny	Required By	13.04.2010
Hole Size	9.875	Slurry Type	Primary	TradeMark	
Plant Name	Fourchon-C-Port I, La.			Slurry Name	

## Test Conditions

BHST	99 °C / 210 °F	Batch Mix	0 min	MD	5596 m / 18360	Pressure	997 bar / 14460 psi
BHCT	57 °C / 135 °F	Heating time	83 min	TVD	5596 m / 18360	Mud Density	1.69 SG / 14.1 PPG

## Slurry Details

Density	2.006 S.G.	Water Req.	43.76 L/100kg	Yield	90.79 L/100kg	Total liquid	44.56 L/100kg
	16.741 PPG		4.93 gal/sack		1.37 ft <sup>3</sup> /sack		5.02 gal/sack
Pycnometer	35.000 %	Chloride conc.	N/A	Blend Weight	908.84 g	Sack Weight	94.00 lbs

## Materials

Concentration	Lab	Material	Test Amount	Source	Lot No.	Date	Sample Id.
100.00 % BWOC	(US-LFT)	Lafarge Class H	680.88 g	TRANSOCEAN	Tank # 8	05.04.10	67314
0.070 % BWOC	(US-LFT)	EZ-FLO	0.46 g	TRANSOCEAN		05.04.10	67314
0.250 % BWOC	(US-LFT)	D-Air 3000	1.65 g	TRANSOCEAN		05.04.10	67314
1.880 lb/sk	(US-LFT)	KCl (Potassium Chloride)	13.22 g	TRANSOCEAN		05.04.10	67314
20.000 % BWOC	(US-LFT)	SSA-1 (Silica Flour) - PB	132.18 g	TRANSOCEAN		05.04.10	67314
15.000 % BWOC	(US-LFT)	SSA-2 (100 Mesh) - PB	99.13 g	TRANSOCEAN		05.04.10	67314
0.200 % BWOC	(US-LFT)	SA-541	1.32 g	TRANSOCEAN		05.04.10	67314
0.110 g/s	(US-LFT)	ZoneSealant 2000	6.88 g	Morgan City, La.		15.03.09	40395
0.090 g/s	(US-LFT)	SCR-100L	6.13 g		6264	22.10.09	54573
4.93 g/s	(US-LFT)	Fresh Water	288.64 g		FRESH	12.04.10	67788

## Foam Details

Final Foam Density	1.737 S.G.	Calc. Downstream Density	1.996 S.G.	Blender volume	1170 ml	Quality	12.98 %
	14.496 PPG		16.657 PPG				
Base Slurry Weight	2020.74 g	Base Slurry Total Weight	2032.29 g				

## Foam Mixing

Lab	Material	Unfoamed Slurry Prep.	Unfoamed Slurry
(US-LFT)	Lafarge Class H	1220.51 g	
(US-LFT)	EZ-FLO	0.85 g	
(US-LFT)	D-Air 3000	3.05 g	
(US-LFT)	KCl (Potassium Chloride) Salt	24.41 g	
(US-LFT)	SSA-1 (Silica Flour) - PB	244.10 g	
(US-LFT)	SSA-2 (100 Mesh) - PB	183.08 g	
(US-LFT)	SA-541	2.44 g	
(US-LFT)	ZoneSealant 2000		11.55 g
(US-LFT)	SCR-100L	11.31 g	
(US-LFT)	Fresh Water	533.06 g	

## Test Results

Mixability (0 - 5): 0 is not mixable	Mud Balance Density	
Mixability rating (0 - 5)	Density (SG)	Density (ppg)
4		16.7

Thickening Time (Pump as is, call with results SCR-100L Lot #6264) at 135 deg F											
Temp (°F)	Pressure	Batch Mix	Reached	Start BC	30 Bc	40 Bc	50 Bc	70 Bc	100 Bc	Termination	Termination
135	14458		83	11	06:48	06:50	06:51	06:52			
Thickening Time (REPEAT Pump as is, call with results SCR-100L Lot #6264) at 135 deg F											
Temp (°F)	Pressure	Batch Mix	Reached	Start BC	30 Bc	40 Bc	50 Bc	70 Bc	100 Bc	Termination	Termination
135	14458		83	14	07:25	07:34	07:36	07:37			
UCA Comp. Strength (Un-foamed UCA for 12, 24, & 48 Hrs. Circulate before pouring C.S. for 3 Hrs @ 14458psf) at 210 deg F											
End Temp	Pressure	50 psi	500 psi	8 hr CS	12 hr CS	16 hr CS	24 hr CS	48 hr CS	End CS	End Time	Crush CS
210	14458	08:12	08:40		2301		2966	3099			
Request/Project Comments											
Use location Blend and Rig water in lab Use SCR-100L LOT# 6264											
Required Tests											
Test Id	Test Type	Test Temp (F)	Conditions / Req. Properties								
811521	Thickening Time	135	Pump as is, call with results SCR-100L Lot #6264								
812338	Thickening Time	135	REPEAT. Pump as is, call with results SCR-100L Lot #6264								
811522	UCA Comp. Strength	210	Un-foamed UCA for 12, 24, & 48 Hrs. Circulate before pouring C.S. for								
811524	Mixability (0 - 5) - 0 is not mixable										
811529	Mud Balance Density										
Slurry Specific Comments											

