

**From:** Deepwater Horizon, Formen  
**Sent:** Tue Apr 20 11:36:55 2010  
**To:** Kaluza, Robert  
**Subject:** FW: Updated Info for Prod Casing job  
**Importance:** Normal  
**Attachments:** image001.jpg; Macondo\_MC 252\_ 9 78 X 7 Prod Casing\_v6\_CustomerCopy.pdf; 9.875 X 7 Prod Casing Design Report - 6 Cent.pdf; Location Blend 9 GPHS SCR-100L BC18-73909.2.pdf

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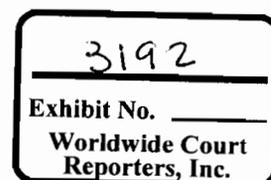
**From:** Jesse Gagliano [mailto:Jesse.Gagliano@Halliburton.com]  
**Sent:** Sunday, April 18, 2010 8:58 PM  
**To:** Anthony Cupit; Coteles, Brett W; Christopher Haire; Danny Mooney; Vidrine, Don J; Lee, Earl P (Oper Svcs Dril); Deepwater Horizon, Formen; Deepwater Horizon Performance Coordinator; Jason Fleming; Guide, John; Mike Stidham; Sepulvado, Murry R; Sepulvado, Ronald W; Vincent Tabler; Morel, Brian P; Hafle, Mark E; Walz, Gregory S  
**Cc:** Paul Anderson; Nathaniel Chaisson; Quang Nguyen  
**Subject:** Updated Info for Prod Casing job

Attached it the revised information for the upcoming 9 7/8" X 7" Prod Casing job. The compressive strength is not completed yet, it currently has 34 hours. The chart of the progress is below. Let me know if you have any questions. Thanks!!

**Jesse Gagliano**  
Halliburton Energy Services  
Account Representative - Cementing  
Office - 281-366-6106  
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Fax - 713-583-9700  
E-mail - jesse.gagliano@halliburton.com

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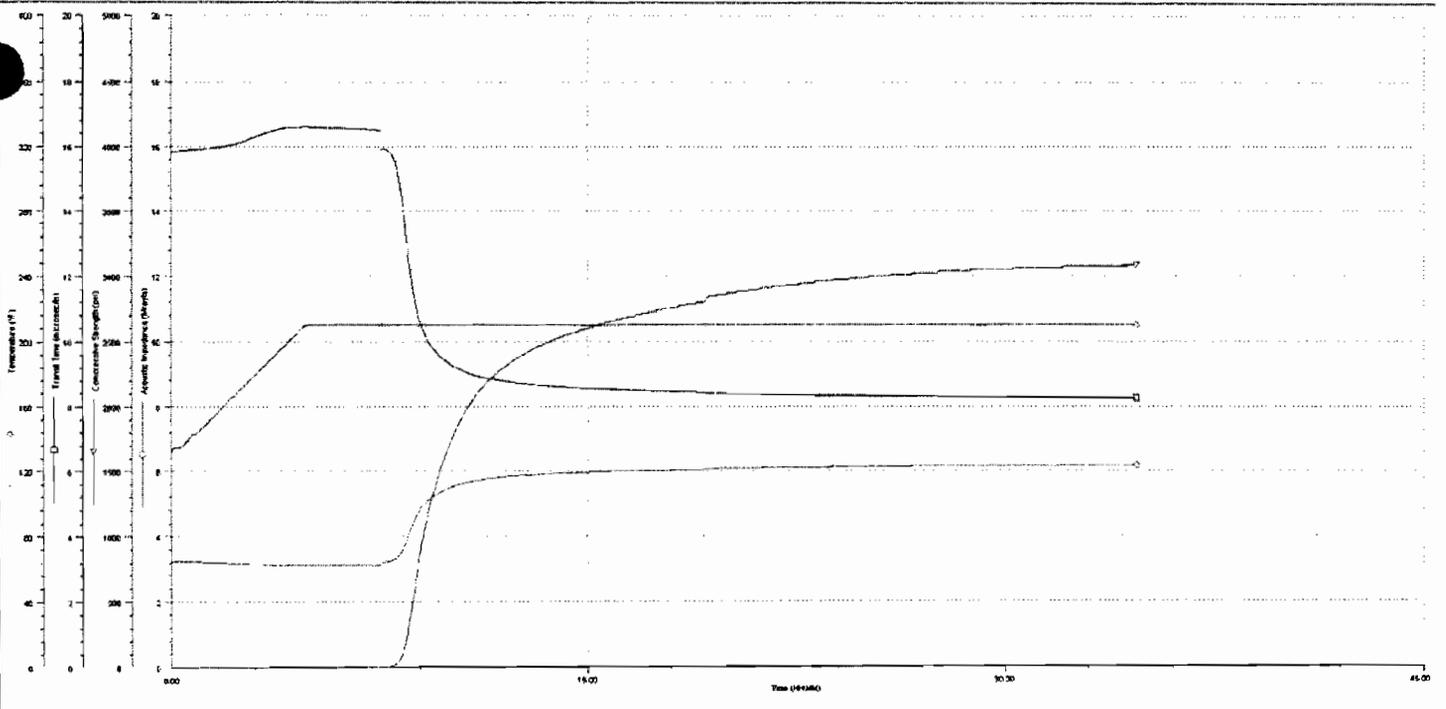
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File ID  
Temperature: 218 °F  
Transducer: 8.25 microstrain

Cutback  
Strain: 3000 psi  
Compressive strength type: 2 (more than 11 MPa)

50 psi @ 8:10:30  
500 psi @ 9:10:30



# HALLIBURTON

***Bp America Prod Co-sorac/gom Ebiz  
PO Box 22024 - Do Not Mail  
Tulsa, Oklahoma 74121-2024***

Macondo 1  
MISSISSIPPI CANYON BIK: 252

United States of America

## **9 7/8" X 7" Production Casing**

Prepared for: Brian Morel

April 18, 2010  
Version: 6

Submitted by:  
Jesse Gagliano  
Halliburton  
10200 Bellaire Blvd  
Houston, Texas 77072-5299

**HALLIBURTON**

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*Halliburton appreciates the opportunity to present  
this proposal and looks forward to being of service to you.*

## **Foreword**

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Enclosed is our recommended procedure for cementing the casing strings in the referenced well. The information in this proposal includes well data, calculations, materials requirements, and cost estimates. This proposal is based on information from our field personnel and previous cementing services in the area.

Halliburton Energy Services recognizes the importance of meeting society's needs for health, safety, and protection of the environment. It is our intention to proactively work with employees, customers, the public, governments, and others to use natural resources in an environmentally sound manner while protecting the health, safety, and environmental processes while supplying high quality products and services to our customers.

We appreciate the opportunity to present this proposal for your consideration and we look forward to being of service to you. Our Services for your well will be coordinated through the Service Center listed below. If you require any additional information or additional designs, please feel free to contact myself or our field representative listed below.

Prepared and Submitted by: \_\_\_\_\_  
Jesse Gagliano  
Technical Advisor

SERVICE CENTER: Lafayette, La

SERVICE COORDINATOR: Danny Mooney  
OPER. ENGINEER: Yarigsa Aviles  
PHONE NUMBER: 1-800-444-7830

# HALLIBURTON

## Job Information

## 9 7/8" X 7" Production Casing

Well Name: Macondo	Well #: 1
Riser	0 - 5067 ft (MD)
Outer Diameter	24.000 in
Inner Diameter	19.500 in
16" Casing	5067 - 11585 ft (MD)
Outer Diameter	16.000 in
Inner Diameter	14.920 in
Linear Weight	97 lbm/ft
13 5/8" Liner	11185 - 13100 ft (MD)
Outer Diameter	13.625 in
Inner Diameter	12.375 in
Linear Weight	88.20 lbm/ft
11 7/8" Liner	12816 - 15113 ft (MD)
Outer Diameter	11.875 in
Inner Diameter	10.711 in
Linear Weight	71.80 lbm/ft
9 7/8" Liner	14803 - 17163 ft (MD)
Outer Diameter	9.875 in
Inner Diameter	8.625 in
Linear Weight	62.80 lbm/ft
10 1/2" Average Hole Size	17163 - 18130 ft (MD)
Inner Diameter	10.500 in
Job Excess	0 %
8.88" Average Hole Size	18130 - 18304 ft (MD)
Inner Diameter	8.880 in
Job Excess	0 %
6 5/8" Drill Pipe	0 - 5067 ft (MD)
Outer Diameter	6.625 in
Inner Diameter	5.291 in
Linear Weight	40.01 lbm/ft
9 7/8" Casing	5067 - 12485 ft (MD)
Outer Diameter	9.875 in
Inner Diameter	8.598 in
Linear Weight	62.80 lbm/ft
7" Production Casing	12485 - 18304 ft (MD)
Outer Diameter	7.000 in
Inner Diameter	6.143 in
Linear Weight	32 lbm/ft

# HALLIBURTON

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Water Depth 4992 feet  
Air Gap 75 feet

Mud Type Synthetic  
Mud Weight 14 lbm/gal  
BHST 210 degF  
BHCT 210 degF

# HALLIBURTON

## Calculations

## 9 7/8" X 7" Production Casing

Mud: (110.00 ft fill)	
110.00 ft * 0.3585 ft <sup>3</sup> /ft * 0 %	= 39.43 ft <sup>3</sup>
Total Mud	= 39.30 ft <sup>3</sup>
	= 7.00 bbl
Spacer:	
88.00 ft * 0.3585 ft <sup>3</sup> /ft * 0 %	= 31.55 ft <sup>3</sup>
310.00 ft * 0.1385 ft <sup>3</sup> /ft * 0 %	= 42.93 ft <sup>3</sup>
2050.00 ft * 0.1385 ft <sup>3</sup> /ft * 0 %	= 283.89 ft <sup>3</sup>
137.00 ft * 0.3341 ft <sup>3</sup> /ft * 0 %	= 45.77 ft <sup>3</sup>
Total Spacer	= 404.25 ft <sup>3</sup>
	= 72.00 bbl
Cement : (100.00 ft fill)	
100.00 ft * 0.3341 ft <sup>3</sup> /ft * 0 %	= 33.41 ft <sup>3</sup>
Total Lead Cement	= 33.41 ft <sup>3</sup>
	= 5.95 bbl
Sacks of Cement	= 24 sks
Cement : (904.00 ft fill)	
730.00 ft * 0.3341 ft <sup>3</sup> /ft * 0 %	= 243.87 ft <sup>3</sup>
174.00 ft * 0.1628 ft <sup>3</sup> /ft * 0 %	= 28.33 ft <sup>3</sup>
Foamed Tail Cement	= 272.20 ft <sup>3</sup>
	= 48.48 bbl
Shoe Joint Volume: (189.00 ft fill)	
189.00 ft * 0.2058 ft <sup>3</sup> /ft	= 38.90 ft <sup>3</sup>
	= 6.93 bbl
Tail plus shoe joint	= 311.10 ft <sup>3</sup>
	= 55.41 bbl
Total Tail	= 191 sks
Total Pipe Capacity:	
5067.00 ft * 0.1527 ft <sup>3</sup> /ft	= 773.67 ft <sup>3</sup>
7418.00 ft * 0.4032 ft <sup>3</sup> /ft	= 2990.95 ft <sup>3</sup>
5819.00 ft * 0.2058 ft <sup>3</sup> /ft	= 1197.67 ft <sup>3</sup>
	= 883.82 bbl
Displacement Volume to Shoe Joint:	
Capacity of Pipe - Shoe Joint	= 883.82 bbl - 6.93 bbl
	= 876.89 bbl

## Job Recommendation

## 9 7/8" X 7" Production Casing

### Fluid Instructions

Fluid 1: Mud

Base Oil

Fluid Density: 6.70 lbm/gal  
Volume Behind: 7 bbl

### Fluid 2: Water Based Spacer

TUNED SPACER III

0.6 gal/bbl Dual Spacer Surfactant A (Additive Material)  
0.6 gal/bbl Dual Spacer Surfactant B (Additive Material)  
0.6 gal/bbl SEM-8 (Additive Material)  
1 lbm/bbl WellLife 734 (Additive Material)

Fluid Density: 14.30 lbm/gal  
Fluid Volume: 72 bbl

### Fluid 3: Lead Cement – Un-foamed

Premium Cement

94 lbm/sk Premium Cement (Cement)  
0.07 % Halliburton EZ-FLO (Bulk Flow Enhancer)  
0.25 % D-AIR 3000 (Defoamer)  
1.88 lbm/sk KCL (Additive Material)  
20 % SSA-1 (Additive Material)  
15 % Common White-100 Mesh, SSA-2  
0.2 lbm/sk SA-541 (Additive Material)  
0.11 Gal/sk Zonesealant 2000 (Foamer)  
0.09 Gal/sk SCR-100L (Retarder)  
1 lbm/bbl WellLife 734 (Additive Material) – added by hand to down hole side

Fluid Weight 16.74 lbm/gal  
Slurry Yield: 1.37 ft<sup>3</sup>/sk  
Total Mixing Fluid: 5.04 Gal/sk  
Top of Fluid: 17300 ft  
Calculated Fill: 100 ft  
Volume: 5.95 bbl  
Calculated Sacks: 24.37 sks  
Proposed Sacks: 30 sks

### Fluid 4: Foamed Tail Cement – Foamed to average density of 14.5 ppg

Premium Cement

94 lbm/sk Premium Cement (Cement)  
0.07 % Halliburton EZ-FLO (Bulk Flow Enhancer)  
0.25 % D-AIR 3000 (Defoamer)  
1.88 lbm/sk KCL (Additive Material)  
20 % SSA-1 (Additive Material)  
15 % Common White-100 Mesh, SSA-2  
0.2 lbm/sk SA-541 (Additive Material)  
0.11 Gal/sk Zonesealant 2000 (Foamer)  
0.09 Gal/sk SCR-100L (Retarder)  
1 lbm/bbl WellLife 734 (Additive Material) – added by hand to down hole side

Fluid Weight 16.74 lbm/gal  
Slurry Yield: 1.37 ft<sup>3</sup>/sk  
Total Mixing Fluid: 5.04 Gal/sk  
Top of Fluid: 17400 ft  
Calculated Fill: 904 ft  
Volume: 55.41 bbl  
Calculated Sacks: 191.44 sks  
Proposed Sacks: 200 sks

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Fluid 5: Water Based Spacer  
TUNED SPACER III

0.6 gal/bbl Dual Spacer Surfactant A (Additive Material)  
0.6 gal/bbl Dual Spacer Surfactant B (Additive Material)  
0.6 gal/bbl SEM-8 (Additive Material)

Fluid Density: 14.30 lbm/gal  
Fluid Volume: 20 bbl

Fluid 6: Mud  
Mud

Fluid Density: 14 lbm/gal  
Fluid Volume: 856.89 bbl

# HALLIBURTON

## Job Procedure

## 9 7/8" X 7" Production Casing

### Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	Mud	Base Oil	6.7	4.0	7 bbl
2	Spacer	TUNED SPACER III	14.3	4.0	72 bbl
3	Cement	Cap Cement	16.7	2.0	30 sks
4	Cement	Foamed Tail	16.7	2.0	200 sks
5	Spacer	TUNED SPACER III	14.3	4.0	20 bbl
6	Mud	Mud	14.0	4.0	856.89 bbl

### Foam Output Parameter Summary:

Fluid #	Fluid Name	Un-foamed Liquid Volume	Beginning Density lbm/gal	Ending Density lbm/gal	Beginning Rate scf/bbl	Ending Rate scf/bbl
<b>Stage 1</b>						
4	Foamed Tail	39.82bbl	14.5	14.5	521.1	521.1

### Foam Design Specifications:

Foam Calculation Method: Constant Gas Flow  
Backpressure: 14.70 psig  
Bottom Hole Circulating Temp: 210 degF  
Mud Outlet Temperature: 150 degF

Calculated Gas = 20748.4 scf  
Additional Gas = 50000 scf  
Total Gas = 70748.4 scf

Hold Safety Meeting with all personnel to discuss foam cementing operations and possible hazards.

1. ONCE LANDED OUT WITH 9.875" x 7" CASING RIG UP HALLIBURTON AND NITROGEN LINES TO CEMENT STAND.
2. WITH RIG PUMPS, PUMP AND CIRCULATE 111 BBLs @ 1 BPM. NEXT, CIRCULATE 150 BBLs @ 4 BPM AS PER CO.MAN.
3. WHILE CIRCULATING, NITROGEN UNIT SHOULD BE COOLED DOWN, AND NITROGEN LINES WILL BE TESTED TO 5000 PSI.
4. ONCE CIRCULATING IS COMPLETE, CLOSE TOP TIW AND PUT 500 PSI ON TOP DRIVE. MAKE SURE THAT BOTTOM TIW VALVE IS OPEN.
5. WITH HALLIBURTON UNIT PUMP 7 BBLs OF 6.7 PPG BASE OIL @ 4 BPM.
6. WITH HALLIBURTON UNIT PUMP 10 BBLs OF 14.3 PPG TUNED SPACER @ 4 BPM.
7. CLOSE THE 2" LO-TORC VALVE ON THE CEMENT STAND. MAKE SURE RIG FLOOR IS CLEAR OF ALL PERSONAL. TEST CEMENT LINES TO 5000 PSI.

## HALLIBURTON

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8. ONCE ALL TEST ARE COMPLETE MAKE SURE PRESSURE HAS BEEN RELEASED AND OPEN THE 2" LO-TORC VALVE.
9. PUMP 62 BBLs OF 14.3 PPG TUNED SPACER AT 4 BPM.
10. SHUT DOWN, WASH OUT MEASURING TANKS ON CEMENT UNIT, AND WEIGH UP CEMENT.
11. MIX AND PUMP 4 BBLs OF UNFOAMED LEAD CEMENT AT 16.74 PPG. PUMP RATE OF 2 BPM.
12. DROP DART TO RELEASE BOTTOM PLUG.
13. MIX AND PUMP 4 BBLs OF UNFOAMED LEAD CEMENT AT 16.74 PPG. PUMP RATE OF 4 BPM.
14. BRING NITROGEN ONLINE
15. MIX AND PUMP 39 BBLs OF FOAMED TAIL CEMENT AT 14.5 PPG AFTER FOAMING. PUMP RATE OF 2 BPM. (FOAM VOLUME OF 48 BBLs).
16. BRING NITROGEN OFF LINE
17. MIX AND PUMP 4 BBLs OF UNFOAMED SHOE CEMENT AT 16.74 PPG. PUMP RATE OF 2 BPM.
18. PUMP 3 BBLs OF 14.3 PPG TUNED SPACER @ 2 BPM.
19. DROP DART TO RELEASE TOP PLUG.
20. PUMP 17 BBLs OF 14.3 PPG TUNED SPACER AT 4 BPM.
21. WITH HALLIBURTON PUMPS DISPLACE CEMENT WITH 130 BBLs OF 14.0 PPG MUD @ 4 BPM.
22. REZERO, AND PUMP 727 BBLs OF 14.0 PPG MUD WITH RIG PUMPS @ 4 BPM. IF PLUG DOES NOT BUMP, PUMP NO MORE THAN AN ADDITIONAL 17 BBLs FOR A TOTAL OF 744 BBLs WITH RIG PUMPS.
23. BUMP PLUG AND PRESSURE UP TO 500 PSI ABOVE CIRCULATING PRESSURE. CHECK FLOATS AND BLEED BACK NO MORE THAN 6 BBLs. IF 6 BBLs ARE BLED BACK TO THE UNIT, PUMP AN ADDITIONAL 6 BLS OF 14.0 PPG MUD AND HOLD PRESSURE. TIME TO BE DECIDED BY BP COMPANY REPS AND ENGINEERS.
24. SET SEAL ASSEMBLY AND RELEASE RUNNING TOOL FROM HANGER.
25. PULL 2 STDS AND DROP DRILL PIPE NERF BALL. PUMP 1 ½ DRILL PIPE VOLUME (+/- 207 BBLs).
26. POOH.

# HALLIBURTON

## Cost Estimate

## 9 7/8" X 7" Production Casing

### SAP Quote # 0

<b>Mtrl Nbr</b>	<b>Description</b>	<b>Qty</b>	<b>U/M</b>	<b>Unit Price</b>	<b>Net Amt</b>
7523	CMT PRODUCTION CASING BOM	1	JOB		0.00
	<b>***Spacer Material***</b>				
483826	TUNED SPACER III	92	BBL	122.28	11,249.76
100003664	DUAL SPACER SURFACTANT A	56	GAL	91.32	5,113.92
100003665	DUAL SPACER SURF. B	56	GAL	42.88	2,401.28
101235090	SEM-8	56	GAL	47.45	2,657.20
101492086	WELLIFE <sub>2</sub> 734	118	LB	4.10	483.80
	<b>***Cement Material***</b>				
100003687	PREMIUM CEMENT	230	SK	14.72	3,385.60
101002314	EZ-FLO	16	LB	10.57	169.12
101007446	D-AIR 3000	55	LB	4.31	237.05
100001585	KCL POTASSIUM CHLORIDE	433	LB	0.55	238.15
100003691	SAND-200 MESH SILICA FLOUR SSA-1	4324	LB	0.24	1,037.76
100003676	SAND-COMMON WHITE-100 MESH, SSA-2	33	SK	24.28	801.24
100009911	SA-541 SUSPENDING AID -	46	LB	13.20	607.20
101207218	ZONESEALANT 2000	26	GAL	77.25	2,008.50
100012238	SCR-100 L	21	GAL	76.65	1,609.65
	<b>***Personnel***</b>				
130443	ZONESEAL CERTIFIED SPECIALIST H/DAY/MO TOTAL NUMBER	1 96	H	145.24	13,943.04
	HR/DAY/WEEK/MTH/YEAR/JOB/RUN				
576784	CMT, Offshore Engineer, per hr HOURS	1 96	EA	134.32	12,894.72
	<b>***Equipment***</b>				
583768	CMT,Foam Cmt Base Rate(3-day)-SORAC	1	EA	24,295.68	24,295.68
583769	CMT,Addl Day Foam Cmt Day Rate-SORAC	5	DAY	3,100.45	15,502.25
	<b>Total</b>		<b>USD</b>		<b>98,635.92</b>

# HALLIBURTON

## SAP Quote # 0

<u>Mtrl Nbr</u>	<u>Description</u>	<u>Qty</u>	<u>U/M</u>	<u>Unit Price</u>	<u>Net Amt</u>
342210	N2 BOM-Foam Cementing w/o CT	1	JOB		0.00
13459	Nitrogen Charge	70748	SCF	6.60	4,669.37
	<b>***Personnel***</b>				
576758	CMT, Equipment Optr, per hr HOURS	2 96	EA	46.62	8,951.04
	<b>***Equipment***</b>				
583772	CMT,N2 Base Rate(3day)Foam Cmt Job-SORAC	1	EA	31,745.54	31,745.54
583773	CMT,Addl N2 Day Rate Foam Cmt Job-SORAC	5	DAY	8,056.40	40,282.00
583837	CMT,Addl 100ft N2 Iron, ZI Foamed-SORAC	8	DAY	300.00	2,400.00
	<b>Total</b>		<b>USD</b>		<b>88,047.95</b>

# HALLIBURTON

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## Conditions

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### NOTE

The cost in this analysis is good for the materials and/or services outlined within and shall be valid for 30 days from the date of this proposal. In order to meet your needs under this proposal with a high quality of service and responsive timing, Halliburton will be allocating limited resources and committing valuable equipment and materials to your area of operations. Accordingly, the discounts reflected in this proposal are available only for materials and services awarded on a first-call basis. Alternate pricing may apply in the event that Halliburton is awarded work on any basis other than as a first-call provider.

The unit prices stated in the proposal are based on our current published prices. The projected equipment, personnel, and material needs are only estimates based on information about the work presently available to us. At the time the work is actually performed, conditions then existing may require an increase or decrease in the equipment, personnel, and/or material needs. Charges will be based upon unit prices in effect at the time the work is performed and the amount of equipment, personnel, and/or material actually utilized in the work. Taxes, if any, are not included. Applicable taxes, if any, will be added to the actual invoice.

It is understood and agreed between the parties that with the exception of the subject discounts, all services performed and equipment and materials sold are provided subject to Halliburton's General Terms and Conditions contained in our current price list, (which include LIMITATION OF LIABILITY and WARRANTY provisions), and pursuant to the applicable Halliburton Work Order Contract (whether or not executed by you), unless a Master Service and/or Sales Contract applicable to the services, equipment, or materials supplied exists between your company and Halliburton, in which case the negotiated Master Contract shall govern the relationship between the parties. A copy of the latest version of our General Terms and Conditions is available from your Halliburton representative or at:

<http://www.halliburton.com/terms> for your convenient review, and we would appreciate receiving any questions you may have about them. Should your company be interested in negotiating a Master Contract with Halliburton, our Law Department would be pleased to work with you to finalize a mutually agreeable contract. In this connection, it is also understood and agreed that Customer will continue to execute Halliburton usual field work orders and/or tickets customarily required by Halliburton in connection with the furnishing of said services, equipment, and materials.

Any terms and conditions contained in purchase orders or other documents issued by the customer shall be of no effect except to confirm the type and quantity of services, equipment, and materials to be supplied to the customer.

If customer does not have an approved open account with Halliburton or a mutually executed written contract with Halliburton, which dictates payment terms different than those set forth in this clause, all sums due are payable in cash at the time of performance of services or delivery of equipment, products, or materials. If customer has an approved open account, invoices are payable on the twentieth day after date of invoice.

Customer agrees to pay interest on any unpaid balance from the date payable until paid at the highest lawful contract rate applicable, but never to exceed 18% per annum. In the event Halliburton employs an attorney for collection of any account, customer agrees to pay attorney fees of 20% of the unpaid account, plus all collection and court costs.

**BP AMERICA PRODUCTION  
COMPANY  
PO Box 22024  
Tulsa, OK 74121-2024**

Macondo #1

**9 7/8" X 7" Production Casing  
Design Report**

For: Brian Morel  
Date: April 18, 2010

Notice: Although the information contained in this report is based on sound engineering practices, the copyright owner(s) does (do) not accept any responsibility whatsoever, in negligence or otherwise, for any loss or damage arising from the possession or use of the report whether in terms of correctness or otherwise. The application, therefore, by the user of this report or any part thereof, is solely at the user's own risk.

**HALLIBURTON**

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**1.0 DESIGN**

**1.1 Customer Information**

Customer	BP AMERICA PRODUCTION COMPANY
Sales Order	
Job Configuration	N2 Foamed Cement
Well Name	Macondo
Well Number	#1
Start Time	Thursday, April 15, 2010
County	
State	Louisiana
UWI/API	
Country	United States of America
H2S Present	Unknown
CO2 Present	Unknown
Customer Representative	Brian Morel
Service Representative	Jesse Gagliano
Design Name	Macondo Prospect MC 252 #1 - 9.875 X 7 - with 7 bbls Base Oil
Comment	
Injection Path	Casing

**1.2 Parameters**

Fracture Zone Measured Depth	18305.0	ft
Fracture Zone Gradient	0.779	psi/ft
Fracture Zone Density	15.00	lb/gal
Fracture Zone Pressure	14255	psi
Reservoir Measured Depth	18200.0	ft
Reservoir Pore Pressure	13197	psi
Reservoir Zone Gradient	0.726	psi/ft
Reservoir Zone Density	13.97	lb/gal
Back Pressure	0	psi
Height - Mud Line to Mean Sea Level	4992.0	ft
Height - Mean Sea Level to Rotary Kelly Bushing	75.0	ft
Sea Water Density	8.54	lb/gal
Returns To Surface		
Simulator Volume Increment	5.00	bbl
Surface Iron Displacement	0.41	bbl
Shoe Track Length	189.0	ft
Additional Pressure to Seat Plug	500	psi
Eccentricity Enhanced Calculations	No	
Erodibility Enhanced Calculations	Yes	
Mud Erodibility Measured Depth	17168.0	ft
Mud Erodibility Number	20.69	
Mud Required Shear Stress	29.00	lbf/(100*ft <sup>2</sup> )
Use Coupling Information	No	

**1.3 Wellbore Orientation**

Measured Depth	True Vertical Depth	Deviation	Build Angle	Azimuth
ft	ft	°	°/(100*ft)	°
0.0	0.0	0.0		0.0
5067.0	5067.0	0.0	0.00	0.0
5526.0	5525.9	2.0	0.43	101.4
5621.0	5620.9	1.6	-0.33	97.2
5719.0	5718.8	1.3	-0.32	96.8
5815.0	5814.8	1.1	-0.22	91.4
5908.0	5907.8	0.9	-0.20	93.4
6004.0	6003.8	0.9	-0.08	92.6
6099.0	6098.8	0.7	-0.15	89.3
6195.0	6194.8	0.6	-0.11	86.6
6304.0	6303.8	0.5	-0.11	83.3
6401.0	6400.8	0.1	-0.41	82.2
6495.0	6494.8	0.0	-0.06	119.7
6590.0	6589.8	0.0	0.00	211.6
6685.0	6684.8	0.0	0.00	318.1
6780.0	6779.8	0.1	0.06	42.6
6873.0	6872.8	0.1	0.01	268.0
6971.0	6970.8	0.1	0.02	300.4
7057.0	7056.8	0.0	-0.10	100.6
7159.0	7158.8	0.0	0.01	240.7
7254.0	7253.8	0.0	-0.01	220.7
7350.0	7349.8	0.0	0.01	273.7
7443.0	7442.8	0.1	0.02	135.0
7538.0	7537.8	0.1	0.00	171.6
7633.0	7632.8	0.0	-0.02	333.4
7727.0	7726.8	0.0	-0.04	359.8
7821.0	7820.8	0.0	0.03	335.2
7921.0	7920.8	0.1	0.09	181.0
8000.0	7999.8	1.1	1.19	20.0
8096.0	8095.7	0.9	-0.13	17.0
8192.0	8191.7	0.0	-0.95	16.1
8289.0	8288.7	0.2	0.21	225.8
8382.0	8381.7	0.1	-0.18	34.1
8477.0	8476.7	0.1	0.00	324.5
8573.0	8572.7	0.1	0.03	9.4
8667.0	8666.7	0.1	0.00	46.6
8762.0	8761.7	0.1	-0.03	86.7
8854.0	8853.7	0.1	0.03	9.4
8917.0	8916.7	0.1	-0.05	46.6
9187.0	9186.6	2.5	0.89	106.3
9327.0	9326.6	0.4	-1.45	96.0
9463.0	9462.6	0.4	-0.04	90.8
9603.0	9602.6	0.5	0.05	125.7
9736.0	9735.6	0.4	-0.05	154.0
9874.0	9873.6	0.4	0.01	141.0
10004.0	10003.6	0.3	-0.11	157.9
10150.0	10149.6	0.4	0.08	162.3
10285.0	10284.6	0.4	0.06	184.5

# HALLIBURTON

BP AMERICA PRODUCTION COMPANY

Macondo #1

Macondo Prospect MC 252 #1 - 9.875 X 7 prod Casing

Measured Depth	True Vertical Depth	Deviation	Build Angle	Azimuth
ft	ft	°	°/(100*ft)	°
10424.0	10423.6	0.5	0.02	182.7
10563.0	10562.6	0.5	0.00	210.6
10701.0	10700.6	0.5	0.00	205.5
10839.0	10838.6	0.5	0.00	208.5
10977.0	10976.6	0.6	0.07	204.1
11114.0	11113.5	0.7	0.08	205.5
11252.0	11251.5	0.6	-0.04	216.2
11390.0	11389.5	0.5	-0.08	220.5
11528.0	11527.5	0.5	-0.04	191.9
11665.0	11664.5	0.4	-0.05	185.2
11796.0	11795.5	3.1	2.11	267.9
11934.0	11933.0	5.6	1.79	264.1
12070.0	12067.9	9.1	2.58	264.3
12209.0	12205.0	9.9	0.58	262.3
12347.0	12341.0	9.2	-0.52	262.5
12484.0	12476.4	8.6	-0.44	263.4
12622.0	12613.1	7.3	-0.99	261.1
12760.0	12750.1	6.0	-0.91	261.6
12896.0	12885.6	4.3	-1.22	262.0
13034.0	13023.4	1.3	-2.20	264.7
13112.0	13101.4	0.7	-0.79	257.8
13172.0	13161.4	0.6	-0.08	261.4
13310.0	13299.4	0.9	0.20	272.4
13448.0	13437.4	0.6	-0.18	276.6
13585.0	13574.4	0.6	-0.01	274.8
13721.0	13710.3	0.7	0.04	267.5
13859.0	13848.3	0.7	0.01	273.8
13998.0	13987.3	0.8	0.08	265.3
14133.0	14122.3	0.6	-0.18	274.2
14273.0	14262.3	0.8	0.17	262.4
14549.0	14538.3	0.5	-0.12	291.1
14684.0	14673.3	0.3	-0.12	268.7
14816.0	14805.3	0.7	0.27	235.4
14950.0	14939.3	0.7	0.03	230.4
15081.0	15070.3	0.6	-0.05	241.4
15264.0	15253.3	0.7	0.02	214.5
15406.0	15395.2	0.7	0.05	228.4
15540.0	15529.2	0.7	-0.04	223.8
15673.0	15662.2	0.6	-0.09	242.8
15805.0	15794.2	0.6	0.02	234.9
15939.0	15928.2	0.8	0.12	246.9
16072.0	16061.2	0.9	0.09	240.6
16204.0	16193.2	0.7	-0.13	235.1
16333.0	16322.2	0.7	-0.02	229.1
16470.0	16459.2	0.8	0.07	235.1
16604.0	16593.1	0.9	0.07	222.2
16729.0	16718.1	0.8	-0.07	224.2
16870.0	16859.1	0.8	0.02	233.9
17004.0	16993.1	0.7	-0.10	206.2

# HALLIBURTON

BP AMERICA PRODUCTION COMPANY  
Macondo #1  
Macondo Prospect MC 252 #1 - 9.875 X 7 prod Casing

Measured Depth	True Vertical Depth	Deviation	Build Angle	Azimuth
ft	ft	°	°/(100*ft)	°
17136.0	17125.1	0.9	0.19	219.9
17318.0	17307.1	0.6	-0.15	175.5
17455.0	17444.1	0.4	-0.20	187.9
17592.0	17581.1	0.3	-0.04	157.7
17728.0	17717.1	0.4	0.05	70.5
17867.0	17856.1	0.4	0.00	32.2
18003.0	17992.1	0.6	0.18	19.3
18138.0	18127.1	0.7	0.09	35.9
18305.0	18294.0	0.4	-0.22	38.2

## 1.4 Surface Lines

Equipment	Length	Elev. Change	OD	ID	Friction Factor	Num In Parallel
	ft	ft	in	in		
2" 15,000 psi Discharge Iron	120.0	45.0	2.620	1.870	1.00	1

**1.5 Wellbore Geometry**

MD	Hole Ex.	Hole Dia.	Casing OD	Casing ID	Casing Weight
ft	%	in	in	in	lb/ft
5067.0	0.00	19.500	6.625	5.291	40.000
5069.0	0.00	14.920	14.300	8.625	62.800
11185.0	0.00	14.920	9.875	8.598	62.800
12485.0	0.00	12.375	9.875	8.598	62.800
12800.0	0.00	12.375	7.000	6.143	32.000
14803.0	0.00	10.711	7.000	6.143	32.000
17168.0	0.00	8.625	7.000	6.143	32.000
17284.5	0.00	9.700	7.000	6.143	32.000
17352.0	0.00	10.139	7.000	6.143	32.000
17579.5	0.00	10.176	7.000	6.143	32.000
17619.5	0.00	10.555	7.000	6.143	32.000
17639.0	0.00	10.660	7.000	6.143	32.000
17680.5	0.00	10.901	7.000	6.143	32.000
17686.0	0.00	11.578	7.000	6.143	32.000
17719.5	0.00	10.601	7.000	6.143	32.000
17774.0	0.00	10.417	7.000	6.143	32.000
17787.0	0.00	11.140	7.000	6.143	32.000
17803.5	0.00	11.180	7.000	6.143	32.000
17810.5	0.00	10.167	7.000	6.143	32.000
17829.5	0.00	11.469	7.000	6.143	32.000
17848.5	0.00	11.474	7.000	6.143	32.000
17864.0	0.00	10.642	7.000	6.143	32.000
17890.5	0.00	10.740	7.000	6.143	32.000
17910.5	0.00	10.601	7.000	6.143	32.000
17935.0	0.00	10.688	7.000	6.143	32.000
18061.0	0.00	10.550	7.000	6.143	32.000
18105.0	0.00	9.502	7.000	6.143	32.000
18107.5	0.00	11.215	7.000	6.143	32.000
18191.5	0.00	8.755	7.000	6.143	32.000
18305.0	0.00	8.998	7.000	6.143	32.000

**1.6 Pumping Schedule**

No.	Description	Density lb/gal	Rate bpm	Volume bbl	Duration min
1	Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	14.17	1.00	0.00	0.00
2	6.7 ppg Base Oil Macondo	6.50	4.00	7.00	1.75
3	Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	14.30	4.00	72.00	18.00
4	Macondo Foamed Slurry - 16.74 ppg	16.74	2.00	5.26	2.63
5-1	Macondo Foamed Slurry - 16.74 ppg	16.74	2.00	15.48	7.74
5-2	Macondo Foamed Slurry - 16.74 ppg	16.74	2.00	23.50	11.75
5-3	Macondo Foamed Slurry - 16.74 ppg	16.74	2.00	0.29	0.14
5-4	Macondo Foamed Slurry - 16.74 ppg	16.74	2.00	6.93	3.46
	Top Plug				
6	Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	14.30	4.00	20.00	5.00
7	Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	14.17	4.00	856.93	214.23
	Total			1007.39	264.71

**1.7 Fluid Rheology - Generalized Herschel Bulkley**

Fluid	Temp.	Foam Densit y	m	n	Tau0	Mulnf	Speed	Dial	
	°F	lb/gal			lbf/(100*ft <sup>2</sup> )	cp	rpm		
Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	40		1.00	0.87	7.38	99.14	600	187.00	
							300	106.00	
							200	76.00	
							100	45.00	
							6	10.00	
	100			0.57	0.57	5.25	33.85	600	97.00
								300	57.00
								200	41.00
								100	27.00
								6	8.00
6.7 ppg Base Oil Macondo	75		1.00	1.00	1.56	3.02	600	8.00	
							300	4.00	
							200	3.00	
							100	2.00	
							6	2.00	
	120			1.00	1.00	0.66	2.30	600	5.00
								300	3.00
								200	2.00
								100	1.00
								6	1.00
Macondo Foamed Slurry - 16.74 ppg (Class H)	80		1.00	1.00	0.56	87.92	600	180.00	
							300	84.00	
							200	56.00	
							100	28.00	
							6	2.00	
	150			1.00	1.00	0.66	2.30	600	4.00
								300	2.00
								200	2.00
								100	1.00
								6	2.00
							600	2.00	
							300	2.00	
							200	2.00	
							100	1.00	
							6	2.00	
							600	2.00	
							300	2.00	
							200	2.00	
							100	1.00	
							6	2.00	

Fluid	Temp.	Foam Densit y	m	n	Tau0	Mulnf	Speed	Dial
	°F	lb/gal			lbf/(100*ft²)	cp	rpm	
							60	26.00
							30	8.00
							20	6.00
							10	4.00
							6	2.00
							3	2.00
	135		1.00	1.00	0.85	62.11	600	130.00
							300	56.00
							200	40.00
							100	20.00
							60	12.00
							30	8.00
							20	6.00
							10	4.00
							6	4.00
							3	4.00
	80	14.50	1.00	1.00	1.30	77.18	600	14.00
							300	7.00
							200	5.00
							100	3.00
							60	1.00
							30	1.00
							6	1.00
							3	1.00

**1.8 Fluid Rheology - Bingham Plastic**

Fluid	Temp.	PV	YP	Speed	Dial
	°F	cp	lbf/(100*ft²)	rpm	
Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	80	51.98	30.00		

**1.9 Temperature Input**

Entered BHCT Method

Surface	80 °F
Outlet	120 °F
BHCT	135 °F
BHST	°F

**1.10 Temperature Profile, Temperature Profile 1**

Measured Depth	Casing Circulating Temperature	Annulus Circulating Temperature
ft	°F	°F
0.0	80	120
18305.0	135	135

**1.11 Fracture Gradient/Pore Pressure Profile**

Measured Depth	True Vertical Depth	Pore Pressure	Reservoir Gradient	Reservoir Density	Fracture Gradient	Fracture Density	Fracture Pressure
ft	ft	psi	psi/ft	lb/gal	psi/ft	lb/gal	psi
17163.0	17152.1	12304	0.717	13.81	0.754	14.51	12928
17700.0	17689.1	12873	0.728	14.01			
18200.0	18189.1				0.754	14.51	13709
18305.0	18294.0	13265	0.725	13.96	0.779	15.00	14255

**1.12 Critical Velocity - Fracture Zone**

Stage Description	Critical Rate	Critical Velocity	GHB Effective Reynold's Number
	bpm	ft/s	
Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	9.89	5.31	3561.21
6.7 ppg Base Oil Macondo	3.01	1.62	3852.90
Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	18.70	10.04	3563.65
Macondo Foamed Slurry - 16.74 ppg	11.55	6.20	3046.64
Macondo Foamed Slurry - 16.74 ppg	11.55	6.20	3046.64
Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	18.70	10.04	3563.65
Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	9.89	5.31	3561.21

Based on annular segment at fracture zone MD of 18305.0 ft.

**1.13 Critical Velocity - Reservoir Zone**

Stage Description	Critical Rate	Critical Velocity	GHB Effective Reynold's Number
	bpm	ft/s	
Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	9.89	5.31	3561.00
6.7 ppg Base Oil Macondo	3.01	1.62	3852.89
Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	18.70	10.04	3563.65
Macondo Foamed Slurry - 16.74 ppg	11.56	6.20	3046.36
Macondo Foamed Slurry - 16.74 ppg	11.56	6.20	3046.36
Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	18.70	10.04	3563.65
Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	9.89	5.31	3561.00

Based on annular segment at reservoir zone MD of 18200.0 ft.

**2.0 TUNED SPACER**

**2.1 Tuned Spacer Parameters, 3. Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg  
 TS III, Bingham Plastic**

Density	14.30	lb/gal
Calculated YP	30.00	lbf/(100*ft <sup>2</sup> )
Calculated PV	51.98	cp
Temperature	190	°F
Use Job Design	Yes	
Zone of Interest		
Measured Depth	18300.0	ft
Displacement Efficiency	100.00	
Hole Dia.	8.998	in
Standoff	80.73	%
Pipe OD	7.000	in
Rate	4.00	bpm
Mud		
Erodibility Number	20.69	
Required Shear Stress	29.00	lbf/(100*ft <sup>2</sup> )
Density	14.17	lb/gal
PV	23.83	cp
YP	6.27	lbf/(100*ft <sup>2</sup> )
Laboratory Volume	600.00	cm <sup>3</sup>
<p><b>This Tuned Spacer was designed to meet the above conditions. Check pipe OD, hole dia., standoff, rate, erodibility number, density, PV, and YP for any differences in the final job design and simulation.</b></p>		
Simulated Downhole Rate	3.99	bpm
Simulated Downhole MD	18305.0	ft

**2.2 Tuned Spacer Parameters, 6. Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg**  
**TS III, Bingham Plastic**

Density	14.30	lb/gal
Calculated YP	30.00	lbf/(100*ft <sup>2</sup> )
Calculated PV	51.98	cp
Temperature	190	°F
Use Job Design	Yes	
Zone of Interest		
Measured Depth	18300.0	ft
Displacement Efficiency	100.00	
Hole Dia.	8.998	in
Standoff	80.73	%
Pipe OD	7.000	in
Rate	4.00	bpm
Mud		
Erodibility Number	20.69	
Required Shear Stress	29.00	lbf/(100*ft <sup>2</sup> )
Density	14.17	lb/gal
PV	23.83	cp
YP	6.27	lbf/(100*ft <sup>2</sup> )
Laboratory Volume	600.00	cm <sup>3</sup>
<b>This Tuned Spacer was designed to meet the above conditions. Check pipe OD, hole dia., standoff, rate, erodibility number, density, PV, and YP for any differences in the final job design and simulation.</b>		
Simulated Downhole Rate		bpm
Simulated Downhole MD	18305.0	ft

4/1 GPBN

**3.1 Foam Design Parameters**

Constant or Stages Gas Flow Calculation Method

Foaming Agents in Mix Water (volume based)

Surfactant 1.50 %  
 Stabilizer 0.00 %

Fracture Zone

Measured Depth 18305.0 ft  
 Fracture Pressure 14255 psi  
 Fracture Gradient 0.779 psi/ft  
 Fracture Density 15.00 lb/gal  
 Calculated Hydrostatic Pressure 13485 psi  
 Calculated Hydrostatic Pressure Gradient 0.737 psi/ft  
 Calculated Hydrostatic Density 14.19 lb/gal

Reservoir Zone

Measured Depth 18200.0 ft  
 Pore Pressure 13197 psi  
 Reservoir Gradient 0.726 psi/ft  
 Reservoir Density 13.97 lb/gal  
 Calculated Hydrostatic Pressure 13405 psi  
 Calculated Hydrostatic Pressure Gradient 0.737 psi/ft  
 Calculated Hydrostatic Density 14.19 lb/gal

**3.2 Foam Pumping Schedule for Liquids**

Stg	Start Time	Pump Rate	Base Slurry Vol.	Cum. Base Slurry Vol.	Cem. Mix Water Vol.	Cum. Cem. Mix Water Vol.	Foam Agents Rate	Foam Agents Vol.	Foaming Agents Cum. Job Volume
	min	bpm	bbl	bbl	bbl	bbl	gpm	gal	gal
1	0.00	1.00	0.00	0.00	0.00	0.00		0.0	0.0
2	0.00	4.00	7.00	7.00	0.00	0.00	0.0	0.0	0.0
3	1.75	4.00	72.00	72.00	0.00	0.00	0.0	0.0	0.0
4	19.75	2.00	5.26	5.26	2.54	2.54	0.0	0.0	0.0
5-1	22.38	2.00	15.48	15.48	7.46	7.46	0.6	4.7	4.7
5-2	30.12	2.00	23.50	38.98	11.33	18.79	0.6	7.1	11.8
5-3	41.87	2.00	0.29	39.27	0.14	18.93	0.0	0.0	11.8
5-4	42.02	2.00	6.93	46.20	3.34	22.27	0.0	0.0	11.8
6	45.48	4.00	20.00	20.00	0.00	0.00	0.0	0.0	11.8
7	50.48	4.00	856.93	856.93	0.00	0.00	0.0	0.0	11.8

**3.3 Foam Pumping Schedule for Gas**

Stg	Start Time	Pump Rate	Starting Gas Conc.	Starting Gas Rate	Cum. Job Gas Vol.	Exp. Factor
	min	bpm	scf/bbl	scfm	Mscf	
1	0.00	1.00	0.000	0	0.0	1.00
2	0.00	4.00	0.000	0	0.0	1.00
3	1.75	4.00	0.000	0	0.0	1.00
4	19.75	2.00	0.000	0	0.0	1.00
5-1	22.38	2.00	583.381	1167	9.0	1.23
5-2	30.12	2.00	583.381	1167	22.7	1.22
5-3	41.87	2.00	0.000	0	22.7	1.00
5-4	42.02	2.00	0.000	0	22.7	1.00
6	45.48	4.00	0.000	0	22.7	1.00
7	50.48	4.00	0.000	0	22.7	1.00

**3.4 Foam Slurry Data**

No.	Description	Base Slurry Vol.	Foam Slurry Vol.	Bulk Cem.	Water Req.	Yield
		bbl	bbl	sk94	gal/sk94	ft <sup>3</sup> /sk94
1	Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	0.00	0.00			
2	6.7 ppg Base Oil Macondo	7.00	7.00			
3	Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	72.00	72.00			
4	Macondo Foamed Slurry - 16.74 ppg	5.26	5.26	22	4.940	1.3700
5-1	Macondo Foamed Slurry - 16.74 ppg	15.48	18.98	63	4.940	1.3700
5-2		23.50	28.77	96	4.940	1.3700
5-3		0.29	0.29	1	4.940	1.3700
5-4		6.93	6.93	28	4.940	1.3700
6	Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	20.00	20.00			
7	Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	856.93	856.93			

7

**HALLIBURTON**

**BP AMERICA PRODUCTION COMPANY**  
**Macondo #1**  
**Macondo Prospect MC 252 #1 - 9.875 X 7 prod Casing**

5/1 DFOUSBMJ FST

**4.1 Centralizer Parameters**

Calculated Standoff/Spacing Profile  
 Use Average Joint Lengths No  
 Torque and Drag Calculations No  
 Fluid Profile As Top of Plug Lands  
 Maximum Distance between Centralizers 183.0 ft  
 Minimum Distance between Centralizers 20.0 ft  
 Calculate Standoff Above Yes

**4.2 Centralizer Specifications**

Part Number	Type*	COD	Hole Dia.	Nom. Dia.	Min. Dia.	Start Force	Run Force	Rest. Force	Bows
		in	in	in	in	lbf	lbf	lbf	
8.5	BS	7.000	8.500	8.622	7.625	1094	774	1191	4

\*BS - Bow Spring, R(S) - Rigid Solid, R(PB) - Rigid Positive Bar

**4.3 Constant Spacing/Standoff Centralizer Intervals**

Top MD	Bottom MD	Cent. A	Required Standoff	Spacing
ft	ft		%	ft
18035.0	18305.0	8.5		45.0

**4.4 Centralizer Placement**

Centralizer Number	Measured Depth	Deviation	Azimuth	Restoring Force	Tension	Centralizer
	ft	°	°	lbf	lbf	
1	18305.0	0.4	38.2	4	0	8.5
2	18260.0	0.5	37.5	12	1071	8.5
3	18215.0	0.6	36.7	17	2343	8.5
4	18170.0	0.7	36.1	20	3614	8.5
5	18125.0	0.7	34.5	17	4885	8.5
6	18080.0	0.7	29.4	12	6157	8.5
7	18035.0	0.6	23.7	2456	7263	8.5

6/1 TJNVBUPO

**5.1 Volume and Pressure Results**

Annulus fluid is heavier than casing fluid by 38 psi. Apply appropriate back pressure on casing if floating equipment does not hold properly.

**5.2 Volume and Rate Calculations**

Time min	Surface Stage In	Surface Stage Out	Liquid Volume In bbl	Total Volume Out bbl	Liquid Rate In bpm	Total Rate Out bpm
0.02	1	1	0.07	0.07	4.00	4.00
3.75	3	1	15.00	15.00	4.00	4.00
16.25	3	1	65.00	65.00	4.00	4.00
22.38	4	1	84.26	84.26	2.00	2.00
32.75	5	1	105.00	129.60	2.00	3.40
42.75	5	1	125.00	162.60	2.00	2.33
47.87	6	1	140.00	172.39	4.00	2.61
57.87	7	1	180.00	203.39	4.00	3.34
70.37	7	1	230.00	248.00	4.00	3.74
82.87	7	1	280.00	296.09	4.00	3.90
95.37	7	1	330.00	344.99	4.00	3.92
107.87	7	1	380.00	394.09	4.00	3.94
120.37	7	1	430.00	443.35	4.00	3.95
132.87	7	1	480.00	492.74	4.00	3.95
145.37	7	1	530.00	542.22	4.00	3.96
157.87	7	1	580.00	591.77	4.00	3.97
170.37	7	1	630.00	641.38	4.00	3.97
182.87	7	1	680.00	691.01	4.00	3.97
195.37	7	1	730.00	740.70	4.00	3.98
207.87	7	1	780.00	790.39	4.00	3.97
220.37	7	1	830.00	839.96	4.00	3.97
232.87	7	1	880.00	889.65	4.00	4.01
245.37	7	1	930.00	939.30	4.00	3.97
257.87	7	1	980.00	988.99	4.00	3.99
264.83	7	1	1007.80	1016.95	0.00	2.74

**5.3 Horsepower, Pressure, Freefall**

Time	Liquid Volume In	Pump Output	Surface Pressure In	Surface Pressure Out	ECD @ TD	ECD @ Frac Zone	Free Fall Height
min	bbl	hp	psi	psi	lb/gal	lb/gal	ft
0.02	0.07	48.4	479	0	14.47	14.47	0.0
3.75	15.00	58.6	583	0	14.45	14.45	0.0
16.25	65.00	60.5	602	0	14.45	14.45	0.0
22.38	84.26	23.2	459	0	14.38	14.38	0.0
32.75	105.00	62.2	1255	0	14.43	14.43	0.0
42.75	125.00	59.1	1190	0	14.39	14.39	0.0
47.87	140.00	108.6	1093	0	14.40	14.40	0.0
57.87	180.00	87.5	878	0	14.43	14.43	0.0
70.37	230.00	67.2	671	0	14.44	14.44	0.0
82.87	280.00	56.7	564	0	14.45	14.45	0.0
95.37	330.00	55.3	550	0	14.45	14.45	0.0
107.87	380.00	54.4	541	0	14.45	14.45	0.0
120.37	430.00	53.8	534	0	14.45	14.45	0.0
132.87	480.00	53.1	528	0	14.45	14.45	0.0
145.37	530.00	52.6	522	0	14.45	14.45	0.0
157.87	580.00	52.1	517	0	14.45	14.45	0.0
170.37	630.00	51.7	513	0	14.45	14.45	0.0
182.87	680.00	55.1	547	0	14.45	14.45	0.0
195.37	730.00	55.7	554	0	14.45	14.45	0.0
207.87	780.00	55.4	551	0	14.45	14.45	0.0
220.37	830.00	54.0	536	0	14.45	14.45	0.0
232.87	880.00	40.1	394	0	14.37	14.37	0.0
245.37	930.00	48.8	484	0	14.50	14.50	0.0
257.87	980.00	77.1	772	0	14.80	14.80	0.0
264.83	1007.80	0.0	1433	0	14.69	14.69	0.0

**5.4 Gas Flow Potential**

Gas Flow Potential 10.29  
 at Reservoir Zone Measured Depth 18200.0 ft

Based on analysis of the above outlined well conditions, this well is considered to have a SEVERE gas flow problem. Wells in this category fall into flow condition 3.

**5.5 Pressure to Break Circulation - Hydrostatic Pressures**

Total Depth 13466 psi  
 Fracture Zone 13466 psi

**5.6 Pressure to Break Circulation**

Gel Strength	Surface Pressure	Total Depth Additional Pressure	Fracture Zone Additional Pressure
lbf/(100*ft <sup>2</sup> )	psi	psi	psi
25.00	644	408	408
50.00	1288	816	816
75.00	1932	1224	1224
100.00	2576	1632	1632
200.00	5153	3264	3264

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## 5.7 Final Position of Stages

Stage Description	Annular Length ft	Casing Length ft	Annular Top MD ft	Casing Top MD ft
Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	14075.5		0.0	
6.7 ppg Base Oil Macondo	109.6		14075.5	
Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	1954.4		14185.2	
Macondo Foamed Slurry - 16.74 ppg	213.3		16139.6	
Macondo Foamed Slurry - 16.74 ppg	1952.1	189.0	16352.9	18116.0
Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III		545.6		17570.4
Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg		17570.4		0.0

**5.8 Final Annular Fluid Density**

Measured Depth ft	Density lb/gal	Quality %	Hydrostatic Gradient lb/gal
-0.0	14.17	0.00	14.17
101.8	14.17	0.00	14.17
212.9	14.17	0.00	14.17
324.0	14.17	0.00	14.17
435.1	14.17	0.00	14.17
546.3	14.17	0.00	14.17
657.4	14.17	0.00	14.17
768.5	14.17	0.00	14.17
879.6	14.17	0.00	14.17
990.7	14.17	0.00	14.17
1101.8	14.17	0.00	14.17
1212.9	14.17	0.00	14.17
1324.1	14.17	0.00	14.17
1435.2	14.17	0.00	14.17
1546.3	14.17	0.00	14.17
1657.4	14.17	0.00	14.17
1768.5	14.17	0.00	14.17
1879.6	14.17	0.00	14.17
1990.8	14.17	0.00	14.17
2101.9	14.17	0.00	14.17
2213.0	14.17	0.00	14.17
2324.1	14.17	0.00	14.17
2435.2	14.17	0.00	14.17
2546.3	14.17	0.00	14.17
2657.4	14.17	0.00	14.17
2768.6	14.17	0.00	14.17
2879.7	14.17	0.00	14.17
2990.8	14.17	0.00	14.17
3101.9	14.17	0.00	14.17
3213.0	14.17	0.00	14.17
3324.1	14.17	0.00	14.17
3435.3	14.17	0.00	14.17
3546.4	14.17	0.00	14.17
3657.5	14.17	0.00	14.17
3768.6	14.17	0.00	14.17
3879.7	14.17	0.00	14.17
3990.8	14.17	0.00	14.17
4101.9	14.17	0.00	14.17
4213.1	14.17	0.00	14.17
4324.2	14.17	0.00	14.17
4435.3	14.17	0.00	14.17
4546.4	14.17	0.00	14.17
4657.5	14.17	0.00	14.17
4768.6	14.17	0.00	14.17
4879.8	14.17	0.00	14.17
4990.9	14.17	0.00	14.17
5069.0	14.17	0.00	14.17
5250.4	14.17	0.00	14.17
5381.2	14.17	0.00	14.17

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Measured Depth ft	Density lb/gal	Quality %	Hydrostatic Gradient lb/gal
5617.6	14.17	0.00	14.17
5796.8	14.17	0.00	14.17
5976.1	14.17	0.00	14.17
6159.9	14.17	0.00	14.17
6339.2	14.17	0.00	14.17
6518.5	14.17	0.00	14.17
6697.7	14.17	0.00	14.17
6877.0	14.17	0.00	14.17
7057.0	14.17	0.00	14.17
7254.0	14.17	0.00	14.17
7443.0	14.17	0.00	14.17
7633.0	14.17	0.00	14.17
7821.0	14.17	0.00	14.17
8000.0	14.17	0.00	14.17
8191.6	14.17	0.00	14.17
8370.9	14.17	0.00	14.17
8550.2	14.17	0.00	14.17
8729.4	14.17	0.00	14.17
8908.7	14.17	0.00	14.17
9088.0	14.17	0.00	14.17
9327.0	14.17	0.00	14.17
9506.3	14.17	0.00	14.17
9736.0	14.17	0.00	14.17
9924.6	14.17	0.00	14.17
10150.0	14.17	0.00	14.17
10342.9	14.17	0.00	14.17
10563.0	14.17	0.00	14.17
10761.2	14.17	0.00	14.17
10977.0	14.17	0.00	14.17
11179.4	14.17	0.00	14.17
11441.3	14.17	0.00	14.17
11796.0	14.17	0.00	14.17
12113.2	14.17	0.00	14.17
12484.0	14.17	0.00	14.17
12645.3	14.17	0.00	14.17
12896.0	14.17	0.00	14.17
13123.5	14.17	0.00	14.17
13448.0	14.17	0.00	14.17
13721.0	14.17	0.00	14.17
13998.0	14.17	0.00	14.17
14123.2	6.50	0.00	14.14
14185.9	14.30	0.00	14.11
14396.0	14.30	0.00	14.11
14684.0	14.30	0.00	14.12
14950.0	14.30	0.00	14.12
15371.1	14.30	0.00	14.13
15776.5	14.30	0.00	14.13
16141.4	16.74	0.00	14.13
16263.0	16.74	0.00	14.15
16356.4	14.29	19.50	14.17

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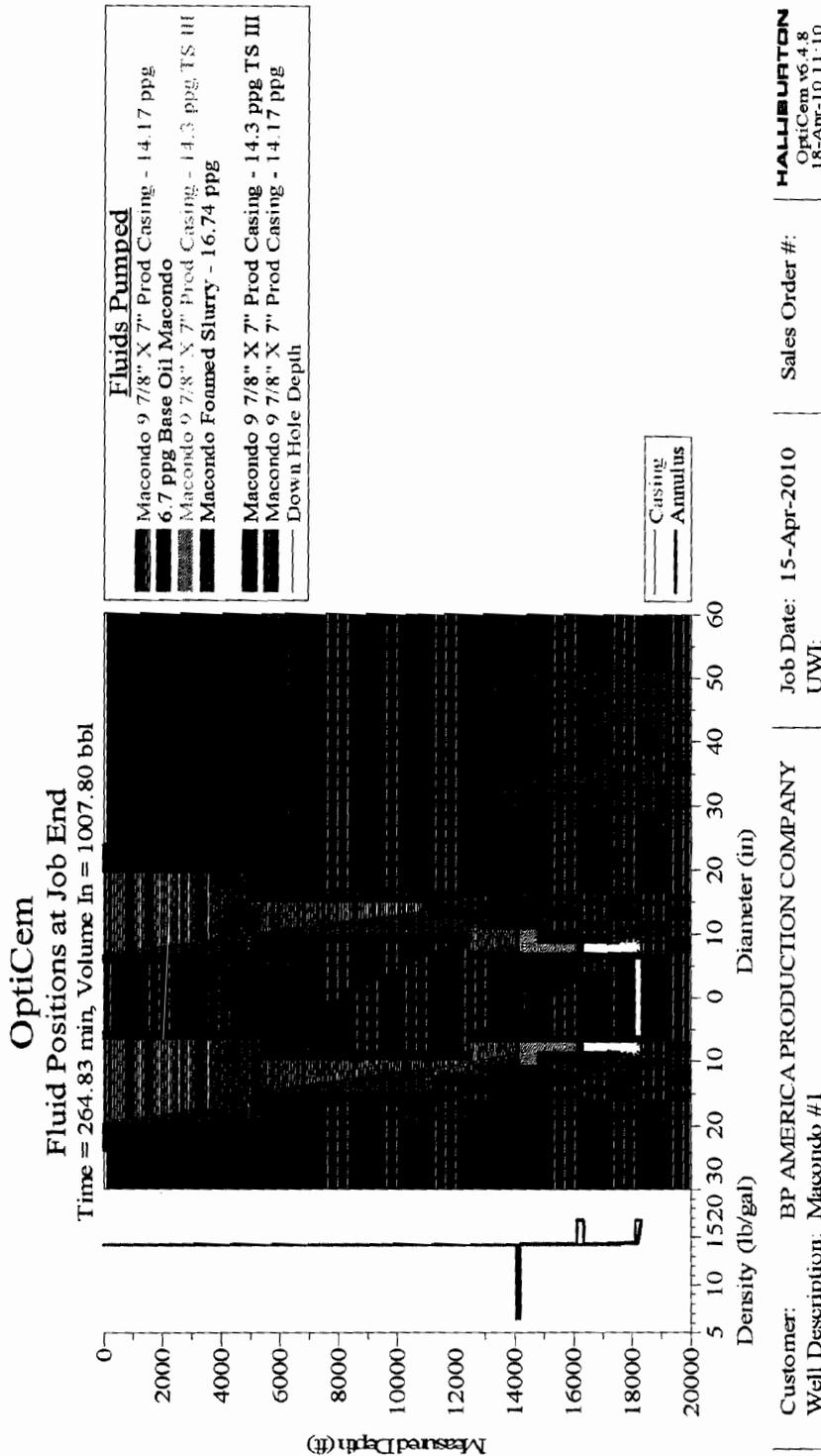
Measured Depth ft	Density lb/gal	Quality %	Hydrostatic Gradient lb/gal
16729.0	14.32	19.30	14.17
17109.3	14.36	19.10	14.17
17168.0	14.36	19.07	14.18
17469.9	14.39	18.90	14.18
17680.5	14.41	18.80	14.18
17774.0	14.42	18.75	14.18
17848.5	14.42	18.72	14.18
17932.5	14.43	18.69	14.18
18043.5	14.44	18.64	14.19
18107.5	14.44	18.61	14.19
18296.8	16.74	0.00	14.19
18304.5	16.74	0.00	14.19

# HALLIBURTON

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 Macondo #1  
 Macondo Prospect MC 252 #1 - 9.875 X 7 prod Casing

## 6.0 ATTACHMENTS

### 6.1 Fluid Positions (graph)



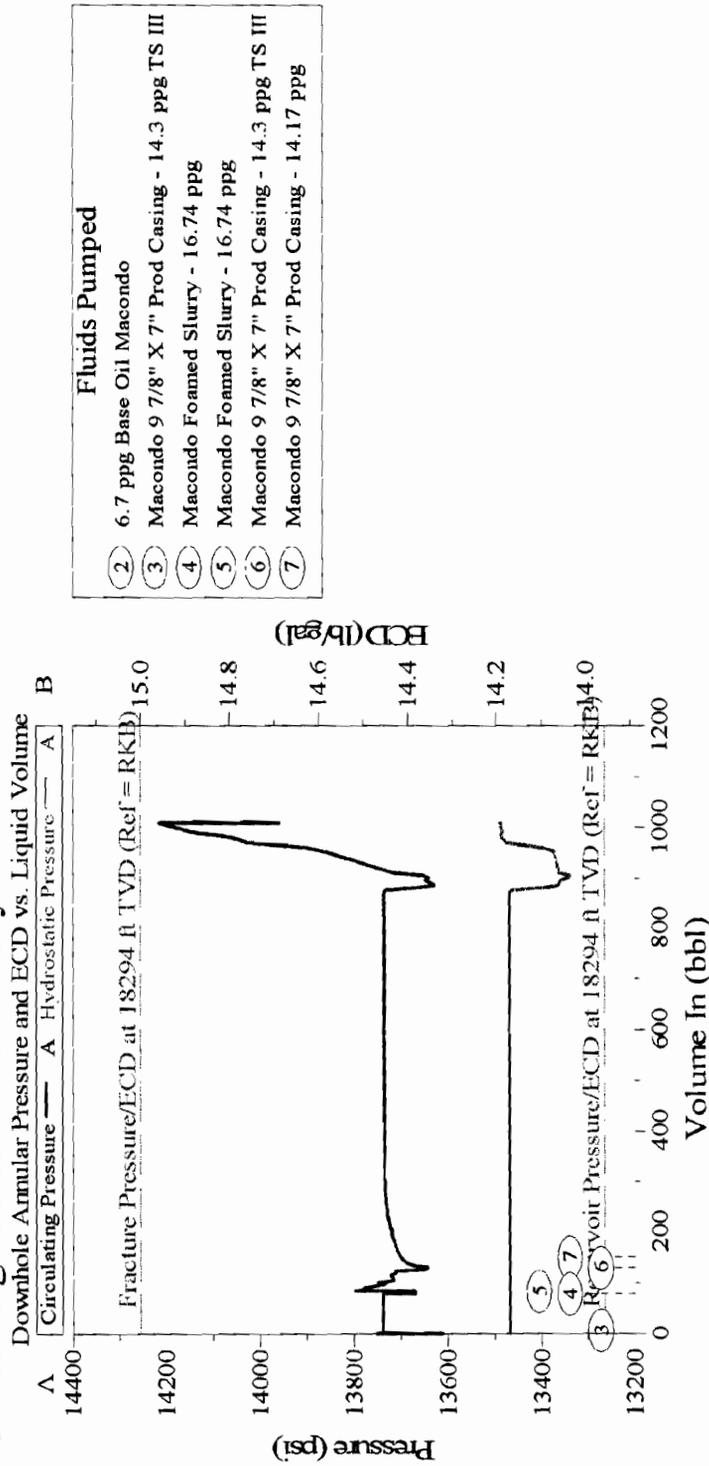
# HALLIBURTON

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 Macondo #1  
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## 6.2 Circ Pressure & Density - Frac Zone (graph)

### OptiCem

#### Circulating Pressure and Density at Fracture Zone



Customer: BP AMERICA PRODUCTION COMPANY	Job Date: 15-Apr-2010	Sales Order #:
Well Description: Macondo #1	UWI:	

HALLIBURTON  
 OptiCem v6.4.8  
 18-Apr-10 11:10

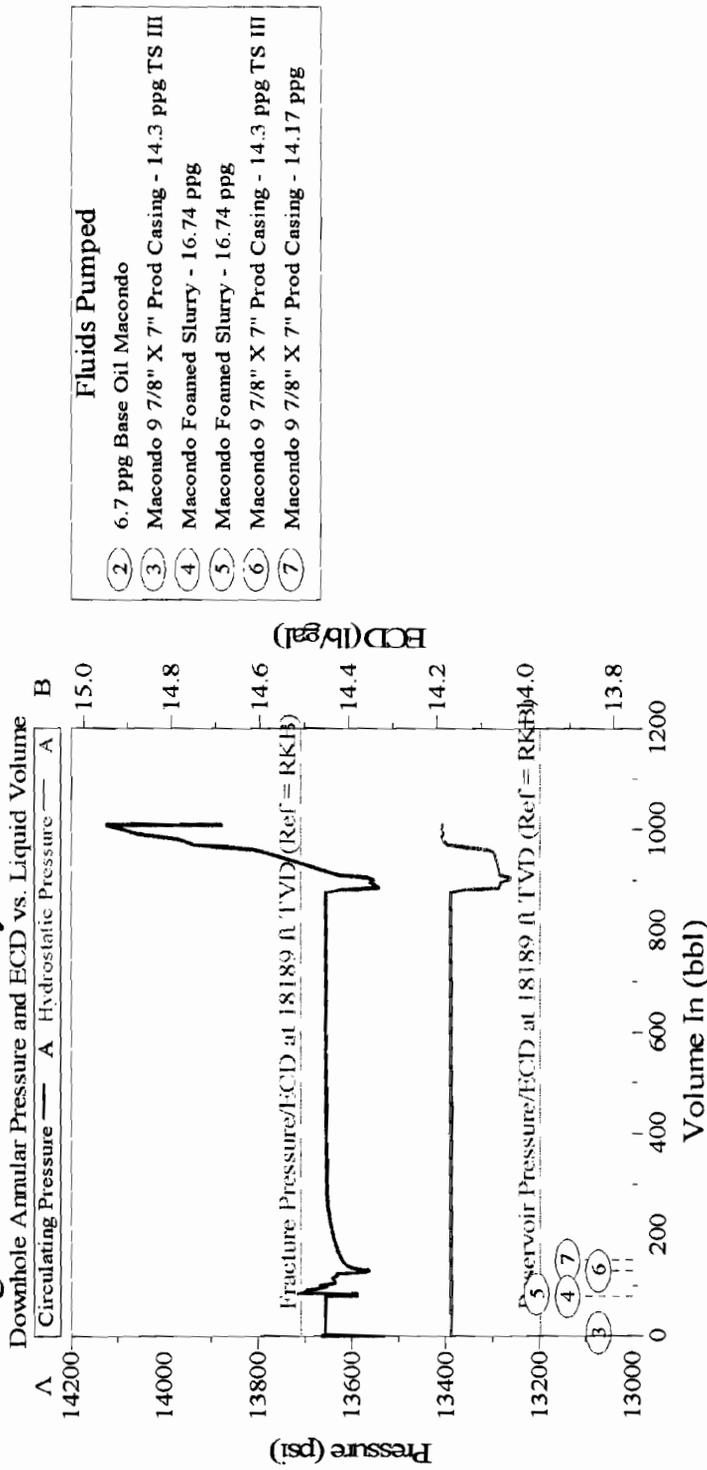
# HALLIBURTON

BP AMERICA PRODUCTION COMPANY  
 Macondo #1  
 Macondo Prospect MC 252 #1 - 9.875 X 7 prod Casing

## 6.3 Circ Pressure & Density - Res Zone (graph)

### OptiCem

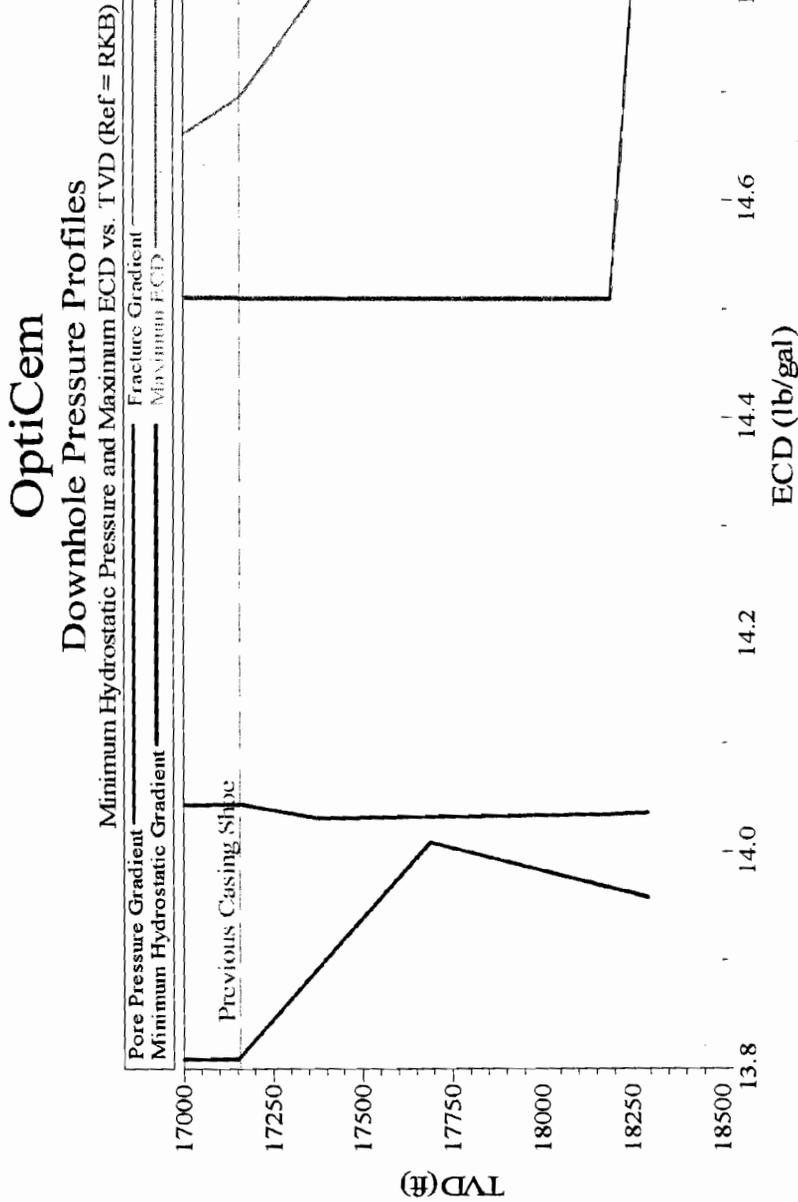
#### Circulating Pressure and Density at Reservoir Zone



Customer: BP AMERICA PRODUCTION COMPANY	Job Date: 15-Apr-2010	Sales Order #:
Well Description: Macondo #1	UWI:	

HALLIBURTON  
 OptiCem v6.4.8  
 18-Apr-10 11:10

6.4 Downhole Pressure Profiles (graph)



Customer:	BP AMERICA PRODUCTION COMPANY	Job Date:	15-Apr-2010	Sales Order #:	
Well Description:	Macondo #1	UWI:			

**HALLIBURTON**  
 OptiCem v6.4.8  
 18-Apr-10 11:10

6.5 MC252#1\_BP01\_Svy\_Rec\_NO\_4\_10\_10.txt (text)

```

#VERS.                1.20:  Halliburton Ascii file
#WRAP.                NO:   One line per depth step
~Well Information Block
#MNEM.UNIT           Data Type      Information
#-----
STRT.F              5067.0000:  START DEPTH
STOP.F             18360.0000:  STOP DEPTH
STEP.F              0.0000:   STEP DEPTH
NULL.              -999.2500:  NULL VALUE
WN .                WELL NAME:   OCS-G 32306 001 ST00BP01
CN .                CUSTOMER NAME: BP Exploration and Production
RIG .               RIG NAME:    Deepwater Horizon
FN .                FIELD NAME:   Mississippi Canyon Blk. 252
CNTY.              COUNTY NAME:
STAT.              STATE NAME:   Louisiana
CTRY.              COUNTRY NAME: U.S.A/Offshore LA
SRVC.              CONTRACTOR:
LEAS.              LEASE NAME:   Macondo Prospect
DCON.              DIRECTNL CONTR: Sperry
SECT.              SECTION:
TOWN.              TOWNSHIP:
RANG.              RANGE:
SON .              JOB NUMBER:  LA-MM-0007026939
APIN.              API S/N:    608174116900
DOE .              DOE NUMBER:
LUNO.              UNIT NUMBER: 82418
COLG.              COMPANY LOGO:
CULG.              CUSTOMER LOGO:
REGN.              REGION:     Central
DIST.              DISTRICT:   Broussard, LA
JOBN.              JOB TICKET NUMB: 7026939
MWDS.              MWD SHOP:    South
Plat.              PLATFORM:
Pad .              PAD:
Slot.              SLOT:
Bloc.              BLOCK:     252
Sub .              SUB BLOCK:
SPUD.              SPUD DATE:   16:14:56 06-Oct-09
GCDE.              GEO COORD DESC:
GPMT.              GEO PROJ METHOD:
GREF.              GEO REFERENCE:
GGSY.              GEO GRID SYS:
LLGR.              LLGROUP:
CCDE.              CART COORD DESC:
CPJM.              CART PROJ METHD:
CREF.              CART REFERENCE:
CGSY.              CART GRID SYS:
XYGR.              XYGROUP:
MDS .              MAG DATA SOURCE: Operator Entered
MMDL.              MAGNETIC MODEL:
Mag .              MAG DATA DATE:
DFWT.              DIST FWL TEXT:
DFST.              DIST FSL TEXT:
    
```

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PDAT.	PERMANENT DATUM:	Mean Sea Level
LMF .	LOG MEAS FROM:	Drill Floor
DMF .	DRILL MEAS FROM:	Drill Floor
RC .	START TIME:	16:14:56 06-Oct-09
ETIM.	END TIME:	10:59:12 12-Apr-10
DMOD.	DRILL MOD DESC:	Drill Model
SVYD.	SURVEY DESC:	Survey
ILTD.	INTERP LTH DESC:	Lithology
FTOP.	FORM TOPS DESC:	Formation Tops
RCST.\$/da	RIG COST:	0.000000
AGAP.ft	AIR GAP:	75.000000
CMER.deg	CENTRL MERIDIAN:	0.000000
VSNS.ft	VERT SEC N/S:	0.000000
VSEW.ft	VERT SEC E/W:	0.000000
LATI.deg	LATITUDE:	28.738138
LONG.deg	LONGITUDE:	-88.365944
EKB .ft	KB ELEV:	0.000000
EDF .ft	DF ELEV:	75.000000
TVDS.ft	TVDSS CORRECTN:	75.000000
EGL .ft	GL ELEV:	0.000000
WDMS.ft	WD ELEV:	4992.000000
WHNS.ft	WELL HEAD N/S:	0.000000
WHEW.ft	WELL HEAD E/W:	0.000000
UTMX.m	UTM X:	366612.937500
UTMY.m	UTM Y:	3179557.750000
DFWL.ft	DISTANCE FWL:	0.000000
DFSL.ft	DISTANCE FSL:	0.000000
EPD .ft	ELEVATION:	0.000000
APD .ft	DEPTH ABOVE PD:	75.000000
STRD.ft	START DEPTH:	5067.000000
EDEP.ft	END DEPTH:	18260.000000
VSDR.deg	VERT SEC DIRECT:	256.640015
MFLD.nT	MAGNETIC FIELD:	47321.000000
MDIP.deg	MAGNETIC DIP:	58.613998
GVFD.g	GRAVITY FIELD:	1.000000
MDEC.deg	MAGNETIC DECL:	-0.945000
GRDC.deg	GRID CORRECTION:	-0.656900
AZTC.deg	AZM TOTAL CORR:	-0.288100
WTYP.	WELL TYPE:	0
VSC .	VS TO CLOSURE:	0
MAGU.	MAGUTM CHECKSUM:	1710684
NREF.	NORTH REFERENCE:	2
HPTY.	HOLE POS TYPE:	0

#----- ~OTHER INFORMATION SECTION -----  
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 missingascii = "" >  
 # <curve name = "Depth" wellname = "" run = "" record = "" description  
 = "" unit = "ft" unitttype = "Depth" format = "F" size = "8" specialbits = ""  
 decimalplaces = "3" optionliststring = "false" > </curve>  
 # <curve name = "Inclination" wellname = "MC252 BP01" run =  
 "Descriptor\_run" record = "Survey" description = "Descriptor\_data" unit =  
 "deg" unitttype = "Hole angle" format = "F" size = "4" specialbits = "C"  
 decimalplaces = "2" optionliststring = "false" > </curve>  
 # <curve name = "Azimuth" wellname = "MC252 BP01" run =  
 "Descriptor\_run" record = "Survey" description = "Descriptor\_data" unit =

# HALLIBURTON

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```
"deg" unittype = "Hole angle" format = "F" size = "4" specialbits = "C"
decimalplaces = "2" optionliststring = "false" > </curve>
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record = "Survey" description = "Descriptor_data" unit = "ft" unittype =
"Depth" format = "F" size = "4" specialbits = "C" decimalplaces = "2"
optionliststring = "false" > </curve>
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decimalplaces = "2" optionliststring = "false" > </curve>
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"ft" unittype = "Depth" format = "F" size = "4" specialbits = "C"
decimalplaces = "2" optionliststring = "false" > </curve>
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"ft" unittype = "Depth" format = "F" size = "4" specialbits = "C"
decimalplaces = "2" optionliststring = "false" > </curve>
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"Descriptor_run" record = "Survey" description = "Descriptor_data" unit =
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specialbits = "C" decimalplaces = "4" optionliststring = "false" > </curve>
#</xml>
#-END CURVE INFORMATION XML-
#
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#----- CURVES MNEMONICS -----#
# DEPT Inclinatio Azimuth TVD
Latitude Departure VerticalSe DogLeg
#----- CURVES UNITS -----#
# ft ft deg ft deg °/100' ft
ft 5067.0000 0.00 0.00 0.00 0.00 5067.00
0.00 5526.0000 0.00 1.96 101.40 0.00 5525.91
-1.55 5621.0000 7.70 -7.13 97.18 0.43 5620.86
-2.04 5719.0000 10.64 -9.88 96.79 0.35 5718.83
-2.36 5815.0000 13.18 -12.28 91.44 0.32 5814.81
-2.51 5908.0000 15.24 -14.25 93.43 0.25 5907.79
-2.58 6004.0000 16.92 -15.87 92.56 0.21 6003.78
-2.66 6099.0000 18.43 -17.31 89.32 0.08 6098.77
-2.68 6195.0000 19.74 -18.58 86.62 0.15 6194.76
-2.65 6304.0000 20.85 -19.67 83.25 0.12 6303.76
-2.56 6401.0000 21.89 -20.71 82.22 0.11 6400.76
-2.50 6495.0000 22.38 -21.20 119.73 0.41 6494.76
-2.50 22.47 -21.29 0.07
```

# HALLIBURTON

**BP AMERICA PRODUCTION COMPANY**  
**Macondo #1**  
**Macondo Prospect MC 252 #1 - 9.875 X 7 prod Casing**

	6590.0000		0.03	211.60		6589.76
-2.54	22.48		-21.29		0.05	
	6685.0000		0.03	318.07		6684.76
-2.54	22.45		-21.26		0.05	
	6780.0000		0.09	42.64		6779.76
-2.46	22.49		-21.31		0.10	
	6873.0000		0.10	268.01		6872.76
-2.41	22.45		-21.29		0.19	
	6971.0000		0.12	300.37		6970.76
-2.36	22.28		-21.13		0.07	
	7057.0000		0.03	100.60		7056.76
-2.32	22.23		-21.09		0.17	
	7159.0000		0.04	240.74		7158.76
-2.35	22.22		-21.08		0.06	
	7254.0000		0.03	220.74		7253.76
-2.38	22.18		-21.03		0.02	
	7350.0000		0.04	273.74		7349.76
-2.40	22.13		-20.97		0.03	
	7443.0000		0.06	135.02		7442.76
-2.43	22.13		-20.97		0.10	
	7538.0000		0.06	171.62		7537.76
-2.51	22.17		-20.99		0.04	
	7633.0000		0.04	333.42		7632.76
-2.53	22.16		-20.98		0.10	
	7727.0000		0.00	359.77		7726.76
-2.50	22.15		-20.97		0.04	
	7821.0000		0.03	335.23		7820.76
-2.48	22.14		-20.96		0.03	
	7921.0000		0.12	180.97		7920.76
-2.56	22.12		-20.93		0.15	
	8000.0000		1.06	19.95		7999.75
-1.96	22.37		-21.31		1.49	
	8096.0000		0.94	17.01		8095.74
-0.37	22.91		-22.20		0.14	
	8192.0000		0.03	16.08		8191.73
0.41	23.14		-22.61		0.95	
	8289.0000		0.23	225.81		8288.73
0.29	23.01		-22.46		0.26	
	8382.0000		0.06	34.14		8381.73
0.20	22.90		-22.33		0.31	
	8477.0000		0.06	324.47		8476.73
0.29	22.90		-22.35		0.07	
	8573.0000		0.09	9.44		8572.73
0.40	22.89		-22.36		0.07	
	8667.0000		0.09	46.61		8666.73
0.53	22.95		-22.45		0.06	
	8762.0000		0.06	86.68		8761.73
0.58	23.06		-22.57		0.06	
	8854.0000		0.09	9.44		8853.73
0.65	23.12		-22.64		0.10	
	8917.0000		0.06	46.61		8916.73
0.73	23.15		-22.69		0.09	
	9187.0000		2.47	106.30		9186.65
-0.81	28.84		-27.87		0.90	
	9327.0000		0.44	96.00		9326.60
-1.71	32.27		-31.00		1.46	

# HALLIBURTON

**BP AMERICA PRODUCTION COMPANY**  
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-1.78	9463.0000	33.24	0.38	90.85	0.05	9462.59
-2.10	9603.0000	34.15	0.45	125.67	0.18	9602.59
-2.80	9736.0000	34.76	0.38	153.99	0.16	9735.59
-3.58	9874.0000	35.26	0.39	141.03	0.06	9873.58
-4.19	10004.0000	35.65	0.25	157.87	0.13	10003.58
-4.92	10150.0000	35.91	0.36	162.34	0.08	10149.58
-5.84	10285.0000	35.99	0.44	184.50	0.13	10284.58
-6.94	10424.0000	35.92	0.47	182.69	0.02	10423.57
-8.00	10563.0000	35.61	0.47	210.58	0.16	10562.57
-9.00	10701.0000	35.08	0.47	205.53	0.03	10700.56
-10.01	10839.0000	34.56	0.47	208.48	0.02	10838.56
-11.12	10977.0000	34.02	0.56	204.08	0.07	10976.55
-12.46	11114.0000	33.40	0.67	205.50	0.08	11113.54
-13.78	11252.0000	32.62	0.61	216.24	0.10	11251.54
-14.83	11390.0000	31.79	0.50	220.53	0.09	11389.53
-15.81	11528.0000	31.29	0.45	191.93	0.17	11527.52
-16.79	11665.0000	31.14	0.38	185.19	0.06	11664.52
-17.36	11796.0000	27.50	3.15	267.85	2.38	11795.45
-18.20	11934.0000	16.99	5.62	264.12	1.80	11933.04
-19.95	12070.0000	-0.38	9.13	264.29	2.58	12067.89
-22.67	12209.0000	-23.24	9.94	262.27	0.63	12204.97
-25.70	12347.0000	-46.01	9.22	262.55	0.52	12341.04
-28.30	12484.0000	-67.09	8.62	263.43	0.45	12476.39
-30.83	12622.0000	-85.96	7.25	261.10	1.02	12613.06
-33.23	12760.0000	-101.69	5.99	261.62	0.91	12750.14
-34.98	12896.0000	-113.80	4.33	261.99	1.22	12885.58
-35.85	13034.0000	-120.51	1.29	264.67	2.21	13023.40
-36.03	13112.0000	-121.83	0.67	257.80	0.81	13101.39

# HALLIBURTON

## BP AMERICA PRODUCTION COMPANY

Macondo #1

Macondo Prospect MC 252 #1 - 9.875 X 7 prod Casing

	13172.0000		0.62	261.38		13161.39
-36.15	-122.49		127.53		0.11	
	13310.0000		0.89	272.39		13299.38
-36.21	-124.30		129.30		0.22	
	13448.0000		0.64	276.61		13437.36
-36.08	-126.14		131.06		0.18	
	13585.0000		0.62	274.81		13574.35
-35.93	-127.64		132.49		0.02	
	13721.0000		0.68	267.45		13710.35
-35.90	-129.19		133.99		0.08	
	13859.0000		0.69	273.76		13848.34
-35.89	-130.84		135.59		0.06	
	13998.0000		0.80	265.26		13987.32
-35.91	-132.65		137.35		0.11	
	14133.0000		0.56	274.17		14122.31
-35.94	-134.25		138.92		0.20	
	14273.0000		0.80	262.37		14262.30
-36.02	-135.90		140.55		0.20	
	14549.0000		0.47	291.13		14538.29
-35.87	-138.88		143.41		0.16	
	14684.0000		0.31	268.69		14673.28
-35.68	-139.76		144.22		0.16	
	14816.0000		0.66	235.39		14805.28
-36.12	-140.74		145.28		0.33	
	14950.0000		0.70	230.44		14939.27
-37.08	-142.00		146.73		0.06	
	15081.0000		0.64	241.45		15070.26
-37.94	-143.27		148.16		0.11	
	15264.0000		0.67	214.46		15253.25
-39.31	-144.78		149.95		0.17	
	15406.0000		0.74	228.41		15395.24
-40.61	-145.94		151.37		0.13	
	15540.0000		0.69	223.80		15529.23
-41.77	-147.14		152.81		0.06	
	15673.0000		0.57	242.79		15662.22
-42.65	-148.28		154.13		0.18	
	15805.0000		0.59	234.90		15794.21
-43.33	-149.42		155.39		0.06	
	15939.0000		0.75	246.89		15928.21
-44.07	-150.78		156.89		0.16	
	16072.0000		0.87	240.57		16061.19
-44.91	-152.47		158.72		0.11	
	16204.0000		0.70	235.12		16193.18
-45.87	-154.01		160.44		0.14	
	16333.0000		0.68	229.09		16322.17
-46.82	-155.23		161.85		0.06	
	16470.0000		0.78	235.12		16459.16
-47.88	-156.61		163.44		0.09	
	16604.0000		0.87	222.16		16593.14
-49.16	-158.05		165.13		0.16	
	16729.0000		0.78	224.22		16718.13
-50.48	-159.28		166.63		0.08	
	16870.0000		0.81	233.89		16859.12
-51.76	-160.76		168.36		0.10	
	17004.0000		0.67	206.18		16993.11
-53.01	-161.87		169.74		0.28	

# HALLIBURTON

BP AMERICA PRODUCTION COMPANY  
Macondo #1  
Macondo Prospect MC 252 #1 - 9.875 X 7 prod Casing

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	17136.0000		0.92	219.94		17125.09
-54.51	-162.88		171.07		0.24	
	17318.0000		0.64	175.50		17307.08
-56.65	-163.74		172.40		0.35	
	17455.0000		0.36	187.90		17444.07
-57.84	-163.74		172.67		0.22	
	17592.0000		0.31	157.69		17581.07
-58.62	-163.65		172.77		0.13	
	17728.0000		0.38	70.52		17717.07
-58.82	-163.09		172.27		0.35	
	17867.0000		0.38	32.17		17856.07
-58.28	-162.42		171.49		0.18	
	18003.0000		0.62	19.34		17992.06
-57.21	-161.94		170.77		0.20	
	18138.0000		0.74	35.87		18127.05
-55.81	-161.18		169.72		0.17	
	18348.0000		0.38	38.20		18337.04
-54.16	-159.96		168.15		0.18	
	18360.0000		0.38	38.20		18349.04
-54.10	-159.91		168.08		0.04	

# 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-Port I, 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		
						Slurry Density	16.741	PPG
						Slurry Yield	1.37	FT3
100.00	% BWOC	Lafarge Class H	Rig	Apr 05, 2010	Tank # 8	Water Requirement	4.93	GPS
0.07	% BWOC	EZ-FLO	Rig	Apr 05, 2010		Total Mix Fluid	5.02	GPS
0.25	% BWOC	D-Air 3000	Rig	Apr 05, 2010		Foam Density	14.496	PPG
						Foam Quality	12.98	%
1.88	lb/sk	KCl (Potassium Chloride) Salt	Rig	Apr 05, 2010		Water Source	Fresh Water	
20.00	% BWOC	SSA-1 (Silica Flour) - PB	Rig	Apr 05, 2010		Water Chloride	N/A	ppm
15.00	% BWOC	SSA-2 (100 Mesh) - PB	Rig	Apr 05, 2010				
0.20	% BWOC	SA-541	Rig	Apr 05, 2010				
0.11	gps	ZoneSealant 2000	Lab	Mar 15, 2009				
0.09	gps	SCR-100L	Lab	Oct 22, 2009	6264			
4.93	gps	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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**Operation Test Results Request ID 73909/1**

**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

**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

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

Test Temp (°F)

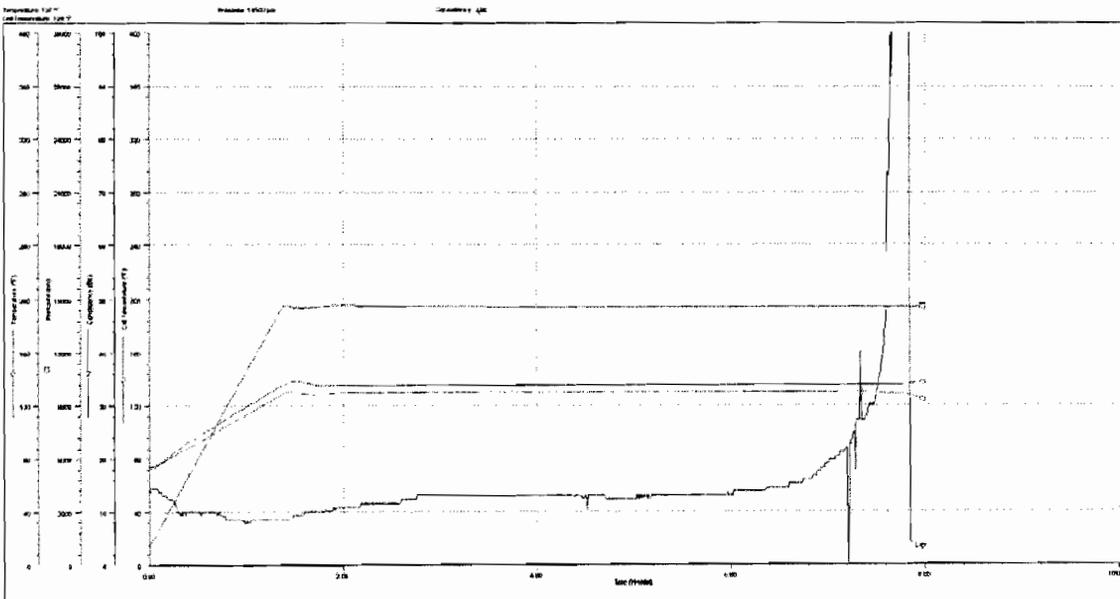
80

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

**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, Foamed to 14.5 ppg



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