From: Vidrine, Don J
Sent: Fri Apr 16 11:23:42 2010
To: Kaluza, Robert
Subject: FW: Production Casing Proposal and OptiCem Report
Importance: Normal
Attachments: Macondo_MC 252_ 9 78 X 7 Prod Casing_v4_CustomerCopy.pdf; 9.875 X 7 Prod Casing Design Report - 21 Cent.pdf

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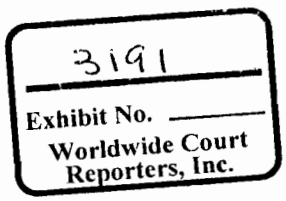
From: Jesse Gagliano [mailto:Jesse.Gagliano@Halliburton.com]
Sent: Thursday, April 15, 2010 10:47 PM
To: Anthony Cupit; Cocales, Brett W; Christopher Haire; Danny Mooney; Vidrine, Don J; Lee, Earl P (Oper Svcs Dril); Deepwater Horizon, Formen; Deepwater Horizon Performance Coordinator; Jason Fleming; Guide, John; Mike Stidham; Sepulvado, Murry R; Sepulvado, Ronald W; Vincent Tabler; Walz, Gregory S
Cc: Nathaniel Chaisson; Quang Nguyen; Morris Gosserand; Paul Anderson; Robert Yount
Subject: Production Casing Proposal and OptiCem Report

Attached is the updated proposal and OptiCem report. Please review and let me know if you have any questions. Thanks!!!

Jesse Gagliano
Halliburton Energy Services
Account Representative - Cementing
Office - 281-366-6106
Cell - 281-635-4798
Fax - 713-583-9700
E-mail - jesse.gagliano@halliburton.com



HALLIBURTON

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

Macondo 1
MISSISSIPPI CANYON Blk: 252

United States of America

9 7/8" X 7" Production Casing

Prepared for: Brian Morel

April 15, 2010
Version: 4

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

HALLIBURTON

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

Foreword

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

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 - 18300 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	5.426 in
Linear Weight	32.67 lbm/ft
9 7/8" Casing	5067 - 12600 ft (MD)
Outer Diameter	9.875 in
Inner Diameter	8.625 in
Linear Weight	62.80 lbm/ft
7" Production Casing	12600 - 18300 ft (MD)
Outer Diameter	7.000 in
Inner Diameter	6.094 in
Linear Weight	32 lbm/ft

Water Depth	4992 feet
Air Gap	75 feet
Mud Type	Synthetic
Mud Weight	14 lbm/gal
BHST	210 degF
BHCT	135 degF

Mud: (110.00 ft fill)

110.00 ft * 0.3585 ft^3/ft * 0 %	= 39.43 ft^3
Total Mud	= 39.30 ft^3
	= 7.00 bbl

Spacer:

88.00 ft * 0.3585 ft^3/ft * 0 %	= 31.55 ft^3
310.00 ft * 0.1385 ft^3/ft * 0 %	= 42.93 ft^3
2050.00 ft * 0.1385 ft^3/ft * 0 %	= 283.89 ft^3
137.00 ft * 0.3341 ft^3/ft * 0 %	= 45.77 ft^3
Total Spacer	= 404.25 ft^3
	= 72.00 bbl

Cement : (100.00 ft fill)

100.00 ft * 0.3341 ft^3/ft * 0 %	= 33.41 ft^3
Total Lead Cement	= 33.41 ft^3
	= 5.95 bbl
Sacks of Cement	= 24 sks

Cement : (900.00 ft fill)

730.00 ft * 0.3341 ft^3/ft * 0 %	= 243.87 ft^3
170.00 ft * 0.1628 ft^3/ft * 0 %	= 27.68 ft^3
Foamed Tail Cement	= 271.55 ft^3
	= 48.36 bbl

Shoe Joint Volume: (200.00 ft fill)

200.00 ft * 0.2026 ft^3/ft	= 40.51 ft^3
	= 7.22 bbl
Tail plus shoe joint	= 312.06 ft^3
	= 55.58 bbl
Total Tail	= 192 sks

Total Pipe Capacity:

5067.00 ft * 0.1606 ft^3/ft	= 813.65 ft^3
7533.00 ft * 0.4057 ft^3/ft	= 3056.42 ft^3
5700.00 ft * 0.2026 ft^3/ft	= 1154.54 ft^3
	= 894.92 bbl

Displacement Volume to Shoe Joint:

Capacity of Pipe - Shoe Joint	= 894.92 bbl - 7.22 bbl
	= 887.70 bbl

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

		Fluid Density:	14.30 lbm/gal
0.6 gal/bbl	Dual Spacer Surfactant A (Additive Material)	Fluid Volume:	72 bbl
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 3: Lead Cement – **Un-foamed**
Premium Cement

Fluid Weight	16.74 lbm/gal	
Slurry Yield:	1.37 ft^3/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	

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) – Add by hand on the down hole side

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

Fluid Weight	16.74 lbm/gal	
Slurry Yield:	1.37 ft^3/sk	
Total Mixing Fluid:	5.04 Gal/sk	
Top of Fluid:	17400 ft	
Calculated Fill:	900 ft	
Volume:	55.58 bbl	
Calculated Sacks:	192.23 sks	
Proposed Sacks:	200 sks	

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) – Add by hand on the down hole side

Fluid 5: Water Based Spacer
TUNED SPACER III

		Fluid Density:	14.30 lbm/gal
0.6 gal/bbl	Dual Spacer Surfactant A (Additive Material)	Fluid Volume:	20 bbl
0.6 gal/bbl	Dual Spacer Surfactant B (Additive Material)		
0.6 gal/bbl	SEM-8 (Additive Material)		

Fluid 6: Mud
Mud

Fluid Density:	14 lbm/gal
Fluid Volume	867.70 bbl

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	4.0	200 sks
5	Spacer	TUNED SPACER III	14.3	4.0	20 bbl
6	Mud	Mud	14.0	4.0	867.70 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
Stage 1						
4	Foamed Tail	39.72bbl	14.5	14.5	521.0	521.0

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 = 20697.9 scf
Additional Gas = 50000 scf
Total Gas = 70697.9 scf

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

1. Run the 9 7/8" X 7" casing as per procedures.
2. Rig up lines for the cementing and nitrogen units while casing is being run, this should be out of the critical path.
3. When casing lands, have chicksen lines ready to be picked up. Follow proper HSE and JSA requirements for personnel in riding harness. Assure all personnel are away from rig floor and monitoring hand in riding belt while hammering union between chicksen and valve.
4. Assure Lo-Torc Valve on side door sub is open and top TIW is closed, bottom TIW to be open.
5. Once personnel are on deck contact cementer and have cementer break circulation.
6. Assure that returns are identified.
7. Assure all lines are filled with mud and then have lo-torc valve closed on side door sub.

8. Once hand has identified closed lo-torc, all personnel must clear rig floor while testing commences.
9. Make announcement to rig concerning high pressure testing.
10. Test should be performed to 5000 psi and held for at least 3 minutes.
11. Once pressure is on, Zone Seal Specialist should walk line and assure no leaks.
12. Only Zone Seal specialist may bleed line pressure off.
13. Once cement line is tested, Cementer may commence pumping of 72 bbls of 14.3 ppg Tuned Spacer III @ **4 bpm**. While pumping of spacer, test of nitrogen line can be performed.
14. Clear all personnel from rig floor.
15. Make announcement of test of nitrogen unit.
16. Zone seal specialist must close N2 valve, after cool down Zone seal specialist gives Nitrogen operator permission to test.
17. All personnel must clear area while testing.
18. After test is complete, Zone Seal specialist must walk line to assure no leaks.
19. After test is complete Zone Seal specialist must bleed lines.
20. Cementing may commence once spacer has been pumped.
21. Weight cement up to proper weight as per lab results.
22. Start pumping cement at a rate of **2 bpm**, once surfactant injection is started into cement slurry pump **15 bbls** then slowly bring cement rate up to **4 bpm. Do not exceed 4 bpm during cementing operations.**
23. Once 10 bbls of cement has been pumped drop dart to launch bottom plug. Assure indication is seen and reported. This can be done on the fly.
24. Once foamed cement is complete, bring off line nitrogen unit first.
25. Pump shoe slurry, continuing injection of all additives.
26. Drop Dart to launch top plug. Assure indication is seen and reported.
27. Pump 20 bbls of 14.3 ppg Tuned Spacer III behind the cement.
28. Begin pumping displacement with Halliburton unit at **4 bpm**.
29. Halliburton unit will displace until indication of Top plug has launched (+/- 145 bbls).
30. Once top plug has launched turn displacement over to the rig. Rig to displace at **4 bpm.**
31. Look for top plug to land. Pump calculated plus 16 bbls for compressibility.
32. Zone Seal specialist to be on rig floor to bleed off pressure and check floats.
33. Release running tool and P/U one stand. Upon breaking connection place wiper ball in connection and pump through landing string.

SAP Quote # 0

Mtrl Nbr	Description	Qty	U/M	Unit Price	Net Amt
7523	CMT PRODUCTION CASING BOM	1	JOB		0.00
	Spacer Material				
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	WELLLIFE¿ 734	118	LB	4.10	483.80
	Cement Material				
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
	Personnel				
130443	ZONESEAL CERTIFIED SPECIALIST H/DAY/MO TOTAL NUMBER HR/DAY/WEEK/MTH/YEAR/JOB/RUN	1 96	H	145.24	13,943.04
576784	CMT, Offshore Engineer, per hr HOURS	1 96	EA	134.32	12,894.72
	Equipment				
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
	Total	**USD**			**98,635.92**

SAP Quote # 0

Mtrl Nbr	Description	Qty	U/M	Unit Price	Net Amt
342210	N2 BOM-Foam Cementing w/o CT	1	JOB		0.00
13459	Nitrogen Charge	70698	SCF	6.60	4,666.07
	Personnel				
576758	CMT, Equipment Optr, per hr HOURS	2 96	EA	46.62	8,951.04
	Equipment				
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
	Total	**USD**			**88,044.65**

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 15, 2010

HALLIBURTON

Table of Contents

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	18300.0	ft
Fracture Zone Gradient	0.779	psi/ft
Fracture Zone Density	15.00	lb/gal
Fracture Zone Pressure	14251	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	200.0	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*ft²)
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

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

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
18300.0	18289.0	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	5.426	32.000
5069.0	0.00	14.920	14.300	8.625	62.800
11185.0	0.00	14.920	9.875	8.625	62.800
12600.0	0.00	12.375	9.875	8.625	62.800
12800.0	0.00	12.375	7.000	6.094	32.000
14803.0	0.00	10.711	7.000	6.094	32.000
17168.0	0.00	8.625	7.000	6.094	32.000
17284.5	0.00	9.700	7.000	6.094	32.000
17352.0	0.00	10.139	7.000	6.094	32.000
17579.5	0.00	10.176	7.000	6.094	32.000
17619.5	0.00	10.555	7.000	6.094	32.000
17639.0	0.00	10.660	7.000	6.094	32.000
17680.5	0.00	10.901	7.000	6.094	32.000
17686.0	0.00	11.578	7.000	6.094	32.000
17719.5	0.00	10.601	7.000	6.094	32.000
17774.0	0.00	10.417	7.000	6.094	32.000
17787.0	0.00	11.140	7.000	6.094	32.000
17803.5	0.00	11.180	7.000	6.094	32.000
17810.5	0.00	10.167	7.000	6.094	32.000
17829.5	0.00	11.469	7.000	6.094	32.000
17848.5	0.00	11.474	7.000	6.094	32.000
17864.0	0.00	10.642	7.000	6.094	32.000
17890.5	0.00	10.740	7.000	6.094	32.000
17910.5	0.00	10.601	7.000	6.094	32.000
17935.0	0.00	10.688	7.000	6.094	32.000
18061.0	0.00	10.550	7.000	6.094	32.000
18105.0	0.00	9.502	7.000	6.094	32.000
18107.5	0.00	11.215	7.000	6.094	32.000
18191.5	0.00	8.755	7.000	6.094	32.000
18300.0	0.00	8.998	7.000	6.094	32.000

1.6 Pumping Schedule

No.	Description	Density	Rate	Volume	Duration
		lb/gal	bpm	bbl	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	4.00	5.26	1.32
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	4.00	23.61	5.90
5-3	Macondo Foamed Slurry - 16.74 ppg	16.74	4.00	7.22	1.80
	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	867.71	216.93
	Total			1018.27	258.44

1.7 Fluid Rheology - Generalized Herschel Bulkley

Fluid	Temp.	Foam Density	m	n	Tau0	MuInf	Speed	Dial
	°F	lb/gal			lbf/(100*ft²)	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
							3	9.00
	100		0.57	0.57	5.25	33.85	600	97.00
							300	57.00
							200	41.00
							100	27.00
							6	8.00
							3	7.00
	150		1.00	0.89	7.22	25.87	600	62.00
							300	37.00
							200	27.00
							100	18.00
							6	8.00
							3	7.00
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
							3	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
							3	1.00
	150		1.00	1.00	0.66	2.30	600	4.00
							300	2.00
							200	2.00
							100	1.00
							6	2.00
							3	2.00
Macondo Foamed Slurry - 16.74 ppg (Class H)	80	14.50	1.00	1.00	0.38	117.01	600	22.00
							300	8.00
							200	5.00
							100	3.00

Fluid	Temp.	Foam Density	m	n	Tau0	MuInf	Speed	Dial
	°F	lb/gal			lbf/(100*ft²)	cp	rpm	
							60	2.00
							30	2.00
							6	2.00
							3	1.00
	80		1.00	1.00	0.56	87.92	600	180.00
							300	84.00
							200	56.00
							100	28.00
							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

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
18300.0	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	0.753	14.50	12920
17700.0	17689.1	12873	0.728	14.01			
18200.0	18189.1				0.753	14.50	13701
18300.0	18289.0	13262	0.725	13.96	0.779	15.00	14251

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 18300.0 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	3560.97
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	3046.45
Macondo Foamed Slurry - 16.74 ppg	11.56	6.20	3046.45
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	3560.97

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*ft²)
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*ft²)
Density	14.17	lb/gal
PV	23.83	cp
YP	6.27	lbf/(100*ft²)
Laboratory Volume	600.00	cm³
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.		
Simulated Downhole Rate	3.99	bpm
Simulated Downhole MD	18300.0	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*ft²)
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*ft²)
Density	14.17	lb/gal
PV	23.83	cp
YP	6.27	lbf/(100*ft²)
Laboratory Volume	600.00	cm³
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.		
Simulated Downhole Rate		bpm
Simulated Downhole MD	18300.0	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	18300.0	ft
Fracture Pressure	14251	psi
Fracture Gradient	0.779	psi/ft
Fracture Density	15.00	lb/gal
Calculated Hydrostatic Pressure	13480	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	4.00	5.26	5.26	2.54	2.54	0.0	0.0	0.0
5-1	21.07	2.00	15.48	15.48	7.46	7.46	0.6	4.7	4.7
5-2	28.80	4.00	23.61	39.09	11.38	18.84	1.2	7.2	11.9
5-3	34.71	4.00	7.22	46.31	3.48	22.32	0.0	0.0	11.9
6	36.51	4.00	20.00	20.00	0.00	0.00	0.0	0.0	11.9
7	41.51	4.00	867.71	867.71	0.00	0.00	0.0	0.0	11.9

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	4.00	0.000	0	0.0	1.00
5-1	21.07	2.00	583.406	1167	9.0	1.23
5-2	28.80	4.00	583.406	2334	22.8	1.22
5-3	34.71	4.00	0.000	0	22.8	1.00
6	36.51	4.00	0.000	0	22.8	1.00
7	41.51	4.00	0.000	0	22.8	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	ft³/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		23.61	28.91	97	4.940	1.3700
5-3		7.22	7.22	30	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	867.71	867.71			

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	No	
Top of Centralized Interval Standoff	70.00	%

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	
Macondo	BS	7.000	9.875	10.125	8.125	1034	719	485	4
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
17400.0	18030.0	Macondo		45.0
18030.0	18300.0	8.5		45.0

4.4 Centralizer Placement

Centralizer Number	Measured Depth	Deviation	Azimuth	Restoring Force	Tension	Centralizer
	ft	°	°	lbf	lbf	
1	18300.0	0.4	38.2	4	0	8.5
2	18255.0	0.5	37.4	13	1271	8.5
3	18210.0	0.6	36.7	17	2543	8.5
4	18165.0	0.7	36.1	20	3814	8.5
5	18120.0	0.7	34.0	16	5086	8.5
6	18075.0	0.7	28.8	12	6357	8.5
7	18030.0	0.6	23.0	9	7463	Macondo
8	17985.0	0.6	20.6	1	8569	Macondo
9	17940.0	0.5	23.9	7	9674	Macondo
10	17895.0	0.4	28.4	10	10780	Macondo
11	17850.0	0.4	36.6	14	11886	Macondo
12	17805.0	0.4	49.2	19	12991	Macondo
13	17760.0	0.4	61.8	22	14097	Macondo
14	17715.0	0.3	75.8	33	15203	Macondo
15	17670.0	0.3	101.8	41	16311	Macondo
16	17625.0	0.3	136.4	42	17420	Macondo
17	17580.0	0.3	160.6	34	18528	Macondo
18	17535.0	0.3	170.4	23	19637	Macondo
19	17490.0	0.3	180.3	24	20736	Macondo
20	17445.0	0.4	186.9	31	21836	Macondo
21	17400.0	0.5	182.3	1389	22935	Macondo

6/1 TJNVMBUJPO

5.1 Volume and Pressure Results

Annulus fluid is heavier than casing fluid by 18 psi. Apply appropriate back pressure on casing if floating equipment does not hold properly.

5.2 Volume and Rate Calculations

Time	Surface Stage In	Surface Stage Out	Liquid Volume In	Total Volume Out	Liquid Rate In	Total Rate Out
min			bbl	bbl	bpm	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
21.07	4	1	84.26	84.26	4.00	4.00
30.12	5	1	105.00	128.88	4.00	5.68
35.87	5	1	128.00	165.10	4.00	3.65
41.51	6	1	150.57	181.25	4.00	2.92
52.62	7	1	195.00	217.19	4.00	3.44
65.12	7	1	245.00	262.68	4.00	3.78
77.62	7	1	295.00	311.04	4.00	3.90
90.12	7	1	345.00	359.96	4.00	3.92
102.62	7	1	395.00	409.08	4.00	3.94
115.12	7	1	445.00	458.35	4.00	3.95
127.62	7	1	495.00	507.75	4.00	3.96
140.12	7	1	545.00	557.23	4.00	3.96
152.62	7	1	595.00	606.79	4.00	3.97
165.12	7	1	645.00	656.40	4.00	3.97
177.62	7	1	695.00	706.03	4.00	3.97
190.12	7	1	745.00	755.73	4.00	3.98
202.62	7	1	795.00	805.42	4.00	3.97
215.12	7	1	845.00	854.99	4.00	3.97
227.62	7	1	895.00	904.68	4.00	3.99
240.12	7	1	945.00	954.35	4.00	3.97
252.62	7	1	995.00	1004.05	4.00	3.98
258.56	7	1	1018.68	1027.79	0.00	1.81

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	47.9	474	0	14.47	14.47	0.0
3.75	15.00	55.0	546	0	14.42	14.42	0.0
16.25	65.00	56.7	564	0	14.42	14.42	0.0
21.07	84.26	58.6	583	0	14.42	14.42	0.0
30.12	105.00	148.0	1495	0	14.46	14.46	0.0
35.87	128.00	122.7	1238	0	14.41	14.41	0.0
41.51	150.57	98.7	992	0	14.39	14.39	0.0
52.62	195.00	78.1	782	0	14.40	14.40	0.0
65.12	245.00	59.8	596	0	14.41	14.41	0.0
77.62	295.00	52.5	521	0	14.41	14.41	0.0
90.12	345.00	51.4	510	0	14.41	14.41	0.0
102.62	395.00	50.6	501	0	14.41	14.41	0.0
115.12	445.00	49.8	494	0	14.41	14.41	0.0
127.62	495.00	49.2	488	0	14.41	14.41	0.0
140.12	545.00	48.7	482	0	14.41	14.41	0.0
152.62	595.00	48.3	478	0	14.41	14.41	0.0
165.12	645.00	47.8	473	0	14.41	14.41	0.0
177.62	695.00	51.3	509	0	14.41	14.41	0.0
190.12	745.00	52.0	516	0	14.41	14.41	0.0
202.62	795.00	51.9	515	0	14.41	14.41	0.0
215.12	845.00	50.5	501	0	14.41	14.41	0.0
227.62	895.00	33.8	330	0	14.32	14.32	0.0
240.12	945.00	34.8	340	0	14.36	14.36	0.0
252.62	995.00	61.7	615	0	14.63	14.63	0.0
258.56	1018.68	0.0	1148	0	14.52	14.52	0.0

5.4 Gas Flow Potential

Gas Flow Potential	2.56	
at Reservoir Zone Measured Depth	18200.0	ft

Based on analysis of the above outlined well conditions, this well is considered to have a MINOR gas flow problem. Wells in this category fall into flow condition 1.

5.5 Pressure to Break Circulation - Hydrostatic Pressures

Total Depth	13463	psi
Fracture Zone	13463	psi

5.6 Pressure to Break Circulation

Gel Strength	Surface Pressure	Total Depth Additional Pressure	Fracture Zone Additional Pressure
lbf/(100*ft²)	psi	psi	psi
25.00	617	383	383
50.00	1234	767	767
75.00	1851	1150	1150
100.00	2469	1533	1533
200.00	4937	3066	3066

5.7 Final Position of Stages

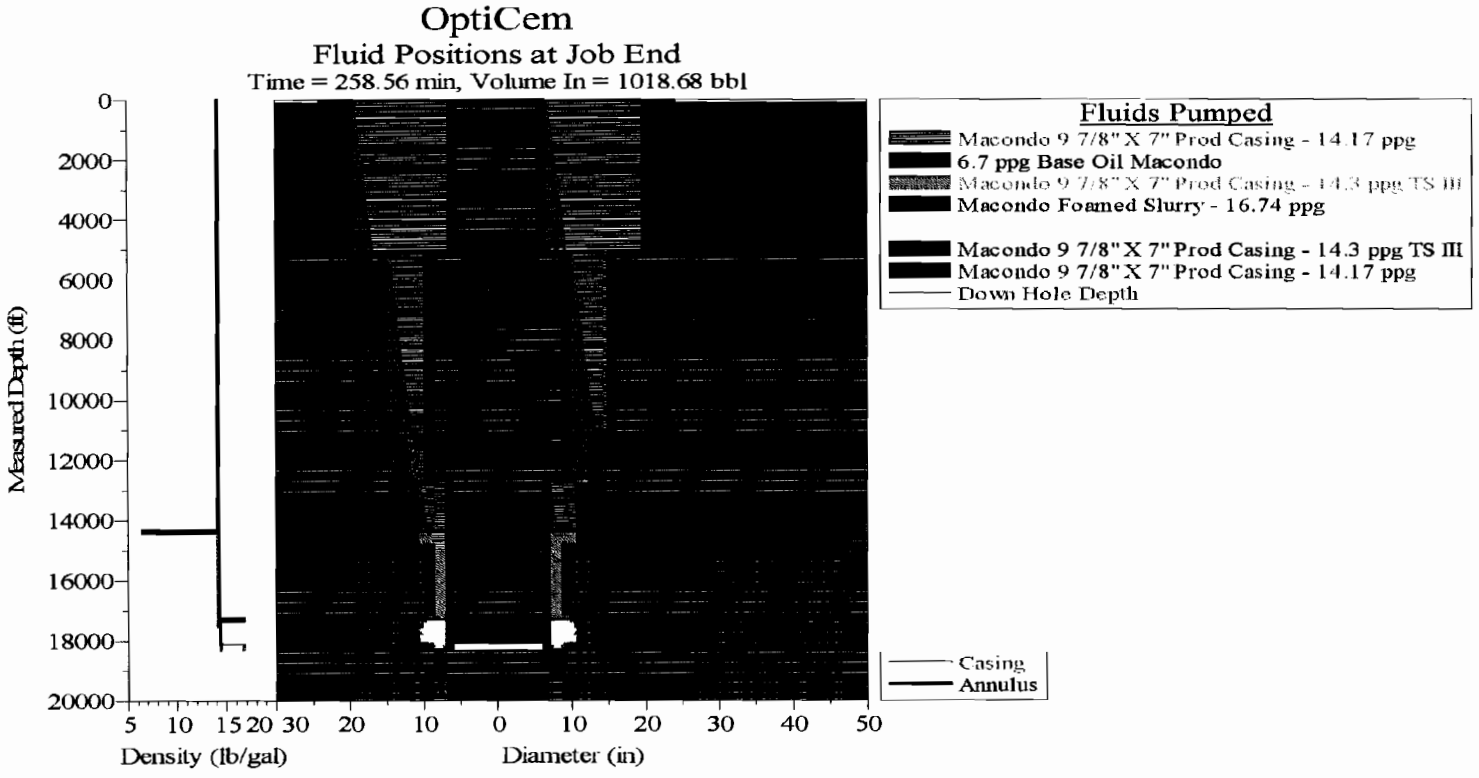
Stage Description	Annular Length	Casing Length	Annular Top MD	Casing Top MD
	ft	ft	ft	ft
Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	14338.4		0.0	
6.7 ppg Base Oil Macondo	109.6		14338.4	
Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	2810.3		14448.0	
Macondo Foamed Slurry - 16.74 ppg	112.4		17258.3	
Macondo Foamed Slurry - 16.74 ppg	929.4	200.0	17370.6	18100.0
Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III		554.4		17545.6
Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg		17545.6		0.0

5.8 Time of Events

Time	Frac Zone ECD	Res Zone ECD	Stage Starts Pumping	Stage Enters Annulus
min	lb/gal	lb/gal		
0.25	14.42	14.42	2. 6.7 ppg Base Oil Macondo	
2.50	14.42	14.42	3. Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	
20.00	14.42	14.42	4. Macondo Foamed Slurry - 16.74 ppg	
22.43	14.46	14.46	5. Macondo Foamed Slurry - 16.74 ppg	
36.87	14.38	14.38	6. Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III	
42.62	14.39	14.39	7. Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg	
226.37	14.35	14.39		2. 6.7 ppg Base Oil Macondo
227.62	14.32	14.33		3. Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III
246.37	14.46	14.44		4. Macondo Foamed Slurry - 16.74 ppg
247.62	14.49	14.47		5. Macondo Foamed Slurry - 16.74 ppg
258.53	14.66	14.65	Prior to plug landing	
258.55	14.52	14.52	Plug Landed	

6.0 ATTACHMENTS

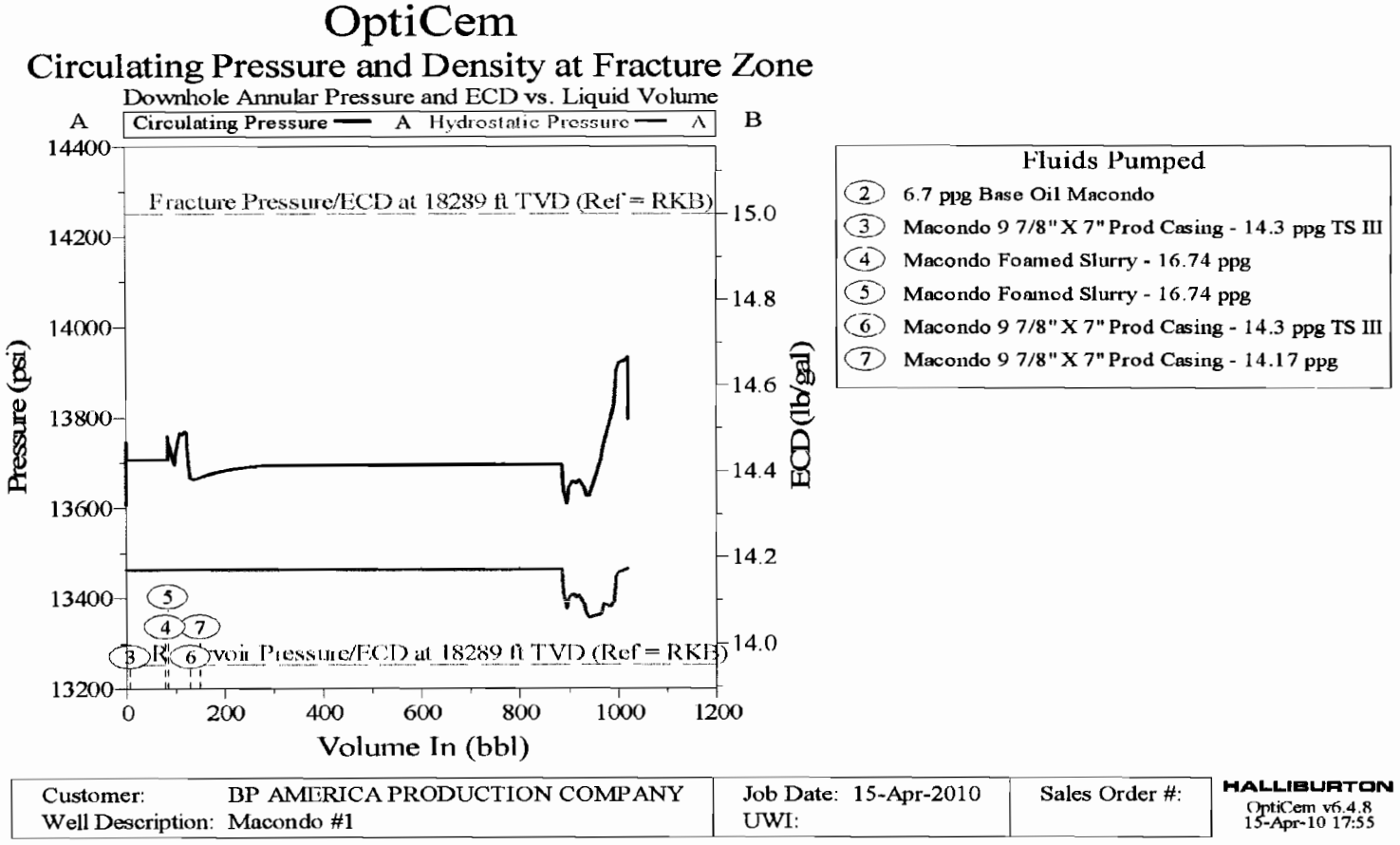
6.1 Fluid Positions (graph)



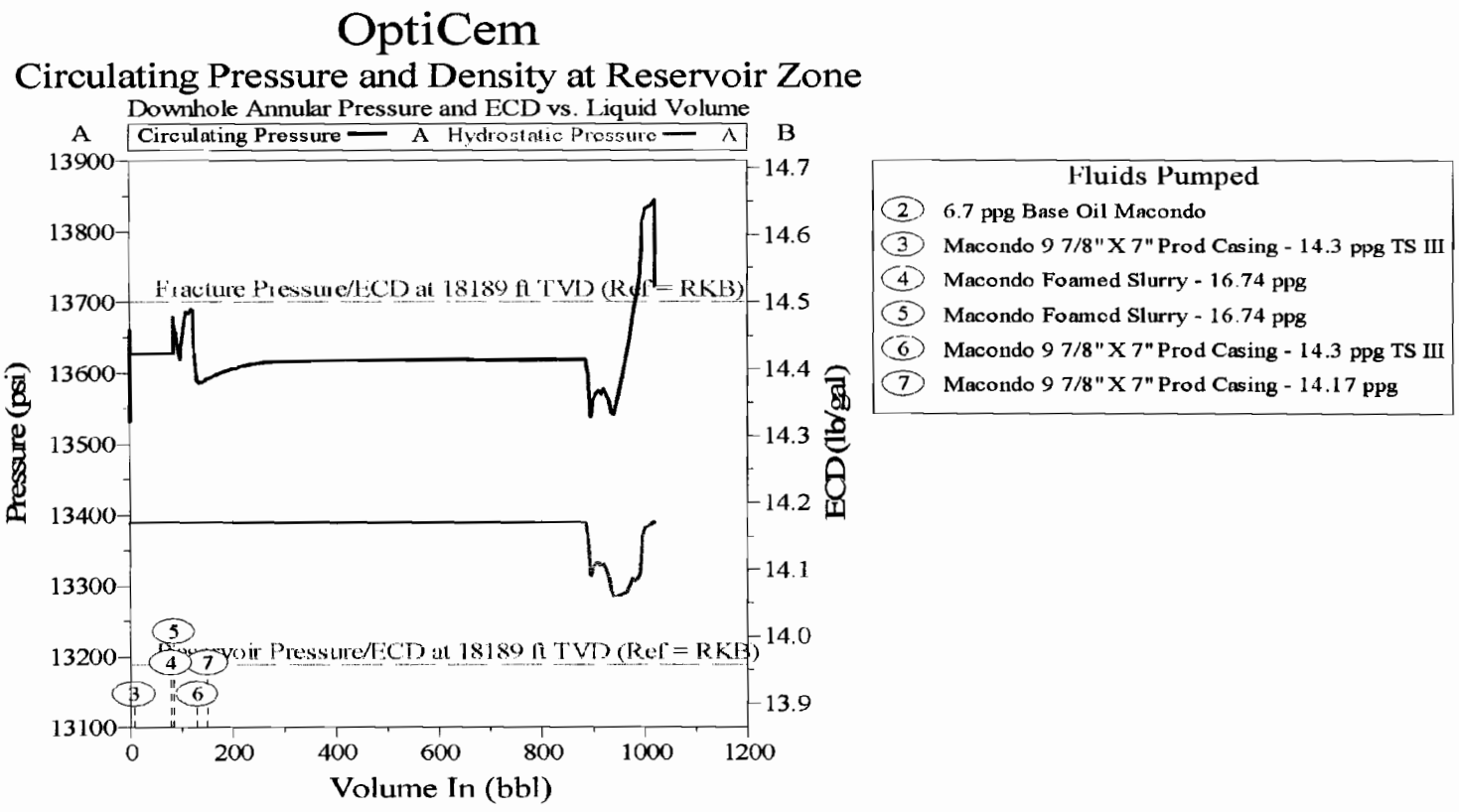
Customer: BP AMERICA PRODUCTION COMPANY		Job Date: 15-Apr-2010	Sales Order #:
Well Description: Macondo #1		UWI:	

HALLIBURTON
OptiCem v6.4.8
15-Apr-10 17:55

6.2 Circ Pressure & Density - Frac Zone (graph)



6.3 Circ Pressure & Density - Res Zone (graph)



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6.4 Downhole Pressure Profiles (graph)