



**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

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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 ²)
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
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	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	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 Density	m	n	Tau0	Mulnf	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
	100		0.57	0.57	5.25	33.85	3	9.00
							600	97.00
							300	57.00
							200	41.00
							100	27.00
	150		1.00	0.89	7.22	25.87	6	8.00
							3	7.00
							600	62.00
							300	37.00
							200	27.00
6.7 ppg Base Oil Macondo	75		1.00	1.00	1.56	3.02	100	18.00
							6	8.00
							3	7.00
							600	62.00
							300	37.00
	120		1.00	1.00	0.66	2.30	200	27.00
							100	18.00
							6	8.00
							3	7.00
							600	62.00
	150		1.00	1.00	0.66	2.30	300	57.00
							200	41.00
							100	27.00
							6	8.00
							3	7.00
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

Fluid	Temp.	Foam Density lb/gal	m	n	Tau0 lbf/(100*ft ²)	Mulnf cp	Speed rpm	Dial
	°F							
							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. °F	PV cp	YP lbf/(100*ft ²)	Speed rpm	Dial
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 ft	Casing Circulating Temperature °F	Annulus Circulating Temperature °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 ²)
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 ²)
Density	14.17	lb/gal
PV	23.83	cp
YP	6.27	lbf/(100*ft ²)
Laboratory Volume	600.00	cm ³
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	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 ²)
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 ²)
Density	14.17	lb/gal
PV	23.83	cp
YP	6.27	lbf/(100*ft ²)
Laboratory Volume	600.00	cm ³
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	18305.0	ft

3.0 FOAM**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 ³ /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			

4.0 CENTRALIZERS**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

5.0 SIMULATION**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	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
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
lb/(100*ft ²)	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

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	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

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

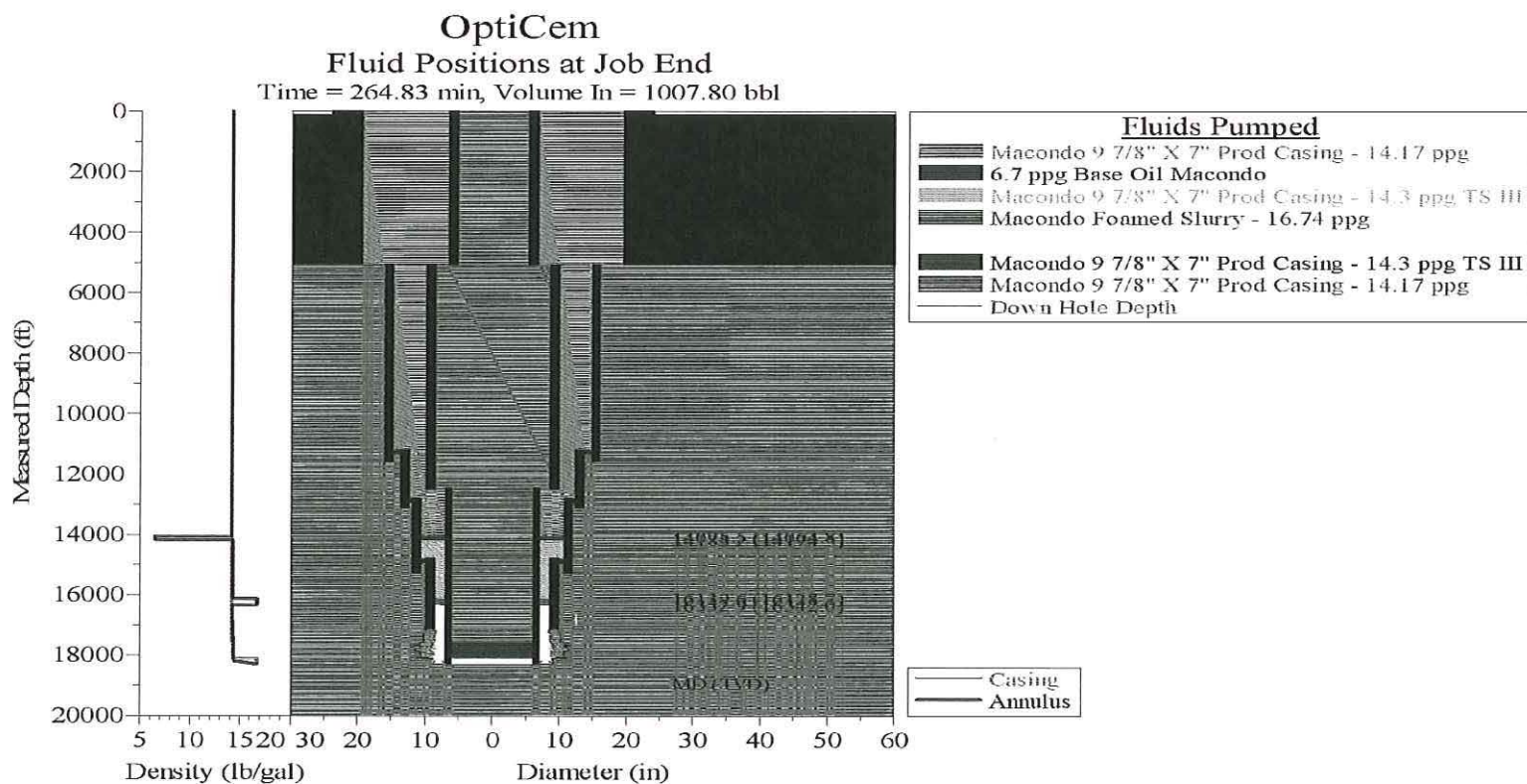
Measured Depth ft	Density lb/gal	Quality %	Hydrostatic Gradient lb/gal
16729.0	14.32	19.30	14.17
17109.3	14.36	19.10	14.17
17168.0	14.36	19.07	14.18
17469.9	14.39	18.90	14.18
17680.5	14.41	18.80	14.18
17774.0	14.42	18.75	14.18
17848.5	14.42	18.72	14.18
17932.5	14.43	18.69	14.18
18043.5	14.44	18.64	14.19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

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

6.0 ATTACHMENTS

6.1 Fluid Positions (graph)



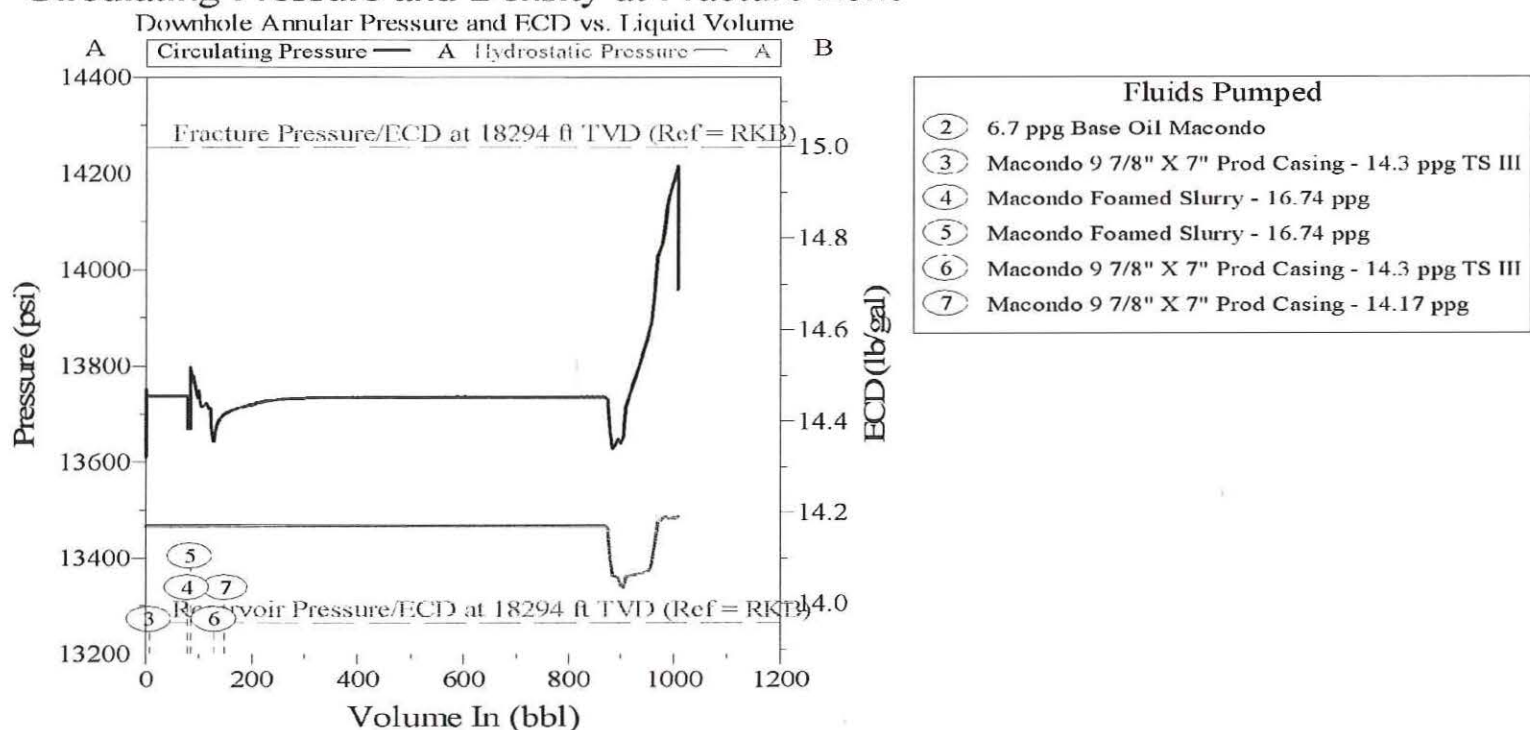
Customer: BP AMERICA PRODUCTION COMPANY	Job Date: 15-Apr-2010	Sales Order #:	HALLIBURTON
Well Description: Macondo #1	UWI:		OptiCem v6.4.8 18-Apr-10 11:10

HALLIBURTON

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

6.2 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 #:	HALLIBURTON
Well Description: Macondo #1	UWI:		OptiCem v6.4.8 18-Apr-10 11:10

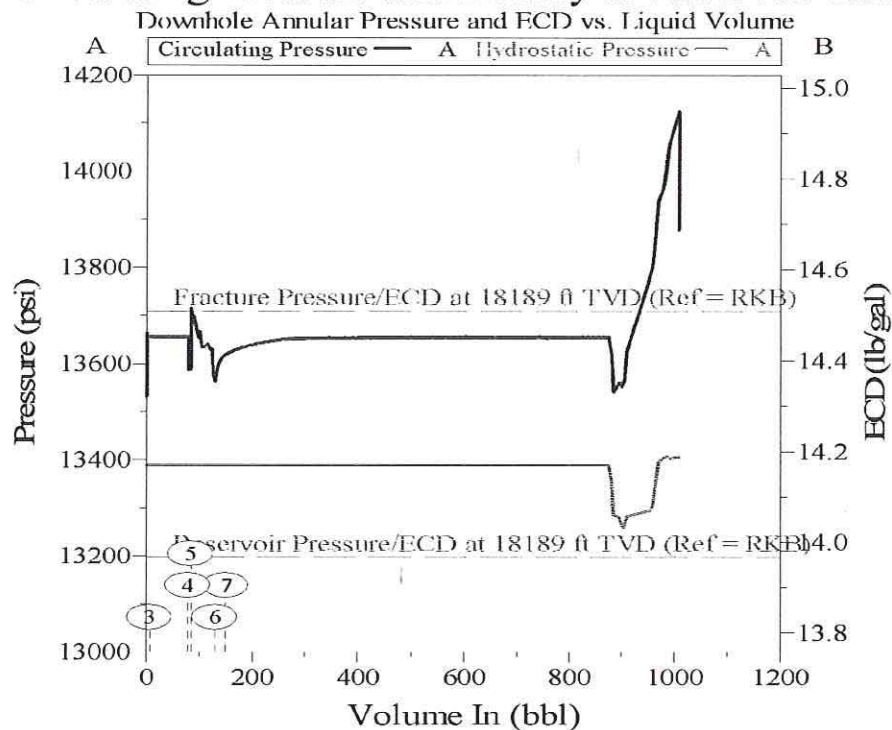
HALLIBURTON

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



Fluids Pumped	
②	6.7 ppg Base Oil Macondo
③	Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III
④	Macondo Foamed Slurry - 16.74 ppg
⑤	Macondo Foamed Slurry - 16.74 ppg
⑥	Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III
⑦	Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg

Customer: BP AMERICA PRODUCTION COMPANY
Well Description: Macondo #1

Job Date: 15-Apr-2010
UWI:

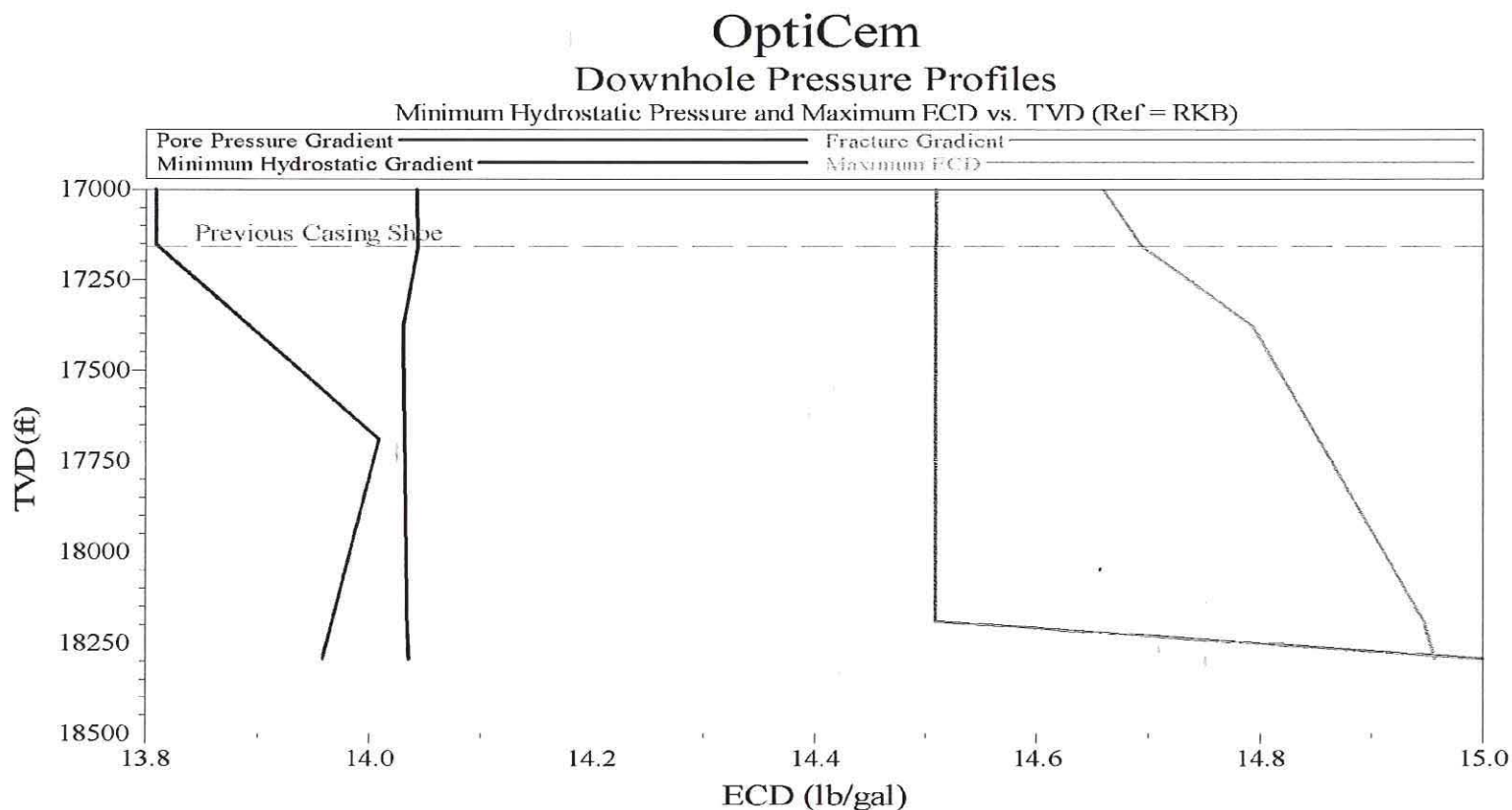
Sales Order #:

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

6.4 Downhole Pressure Profiles (graph)



Customer: BP AMERICA PRODUCTION COMPANY	Job Date: 15-Apr-2010	Sales Order #:	HALLIBURTON
Well Description: Macondo #1	UWI:		OptiCem v6.4.8 18-Apr-10 11:10

6.5 MC252#1_BP01_Svy_Rec_NO_4_10_10.txt (text)

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#VERS.                1.20:  Halliburton Ascii file
#WRAP.                NO:   One line per depth step
~Well Information Block
#MNEM.UNIT            Data Type      Information
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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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HALLIBURTON

BP AMERICA PRODUCTION COMPANY

Macondo #1

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

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
GVED.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 -----

#-START CURVE INFORMATION XML-

#<xml version = "1" missingfloat = "-999.2500" missinginteger = "-999" missingascii = "" >

<curve name = "Depth" wellname = "" run = "" record = "" description = "" unit = "ft" unittype = "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" unittype = "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 =

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```
"deg" unittype = "Hole angle" format = "F" size = "4" specialbits = "C"
decimalplaces = "2" optionliststring = "false" > </curve>
#      <curve name = "TVD" wellname = "MC252 BP01" run = "Descriptor_run"
record = "Survey" description = "Descriptor_data" unit = "ft" unittype =
"Depth" format = "F" size = "4" specialbits = "C" decimalplaces = "2"
optionliststring = "false" > </curve>
#      <curve name = "N/S Departure" wellname = "MC252 BP01" run =
"Descriptor_run" record = "Survey" description = "Descriptor_data" unit =
"ft" unittype = "Depth" format = "F" size = "4" specialbits = "C"
decimalplaces = "2" optionliststring = "false" > </curve>
#      <curve name = "E/W Departure" wellname = "MC252 BP01" run =
"Descriptor_run" record = "Survey" description = "Descriptor_data" unit =
"ft" unittype = "Depth" format = "F" size = "4" specialbits = "C"
decimalplaces = "2" optionliststring = "false" > </curve>
#      <curve name = "Vertical Sec" wellname = "MC252 BP01" run =
"Descriptor_run" record = "Survey" description = "Descriptor_data" unit =
"ft" unittype = "Depth" format = "F" size = "4" specialbits = "C"
decimalplaces = "2" optionliststring = "false" > </curve>
#      <curve name = "DogLeg Severity" wellname = "MC252 BP01" run =
"Descriptor_run" record = "Survey" description = "Descriptor_data" unit =
"&#176;/100&apos;" unittype = "Dogleg severity" format = "F" size = "4"
specialbits = "C" decimalplaces = "4" optionliststring = "false" > </curve>
#</xml>
#-END CURVE INFORMATION XML-
#
```

```
#----- CURVES MNEMONICS -----
#      DEPT      Inclination      Azimuth      TVD
Latitude      Departure      VerticalSe      DogLeg
#----- CURVES UNITS -----
#      ft      ft      deg      deg      °/100'      ft
ft      ft      deg      deg      °/100'      ft
0.00      5067.0000      0.00      0.00      0.00      5067.00
-1.55      5526.0000      7.70      -7.13      101.40      5525.91
-2.04      5621.0000      10.64      -9.88      97.18      5620.86
-2.36      5719.0000      13.18      -12.28      96.79      5718.83
-2.51      5815.0000      15.24      -14.25      91.44      5814.81
-2.58      5908.0000      16.92      -15.87      93.43      5907.79
-2.66      6004.0000      18.43      -17.31      92.56      6003.78
-2.68      6099.0000      19.74      -18.58      89.32      6098.77
-2.65      6195.0000      20.85      -19.67      86.62      6194.76
-2.56      6304.0000      21.89      -20.71      83.25      6303.76
-2.50      6401.0000      22.38      -21.20      82.22      6400.76
-2.50      6495.0000      22.47      -21.29      119.73      6494.76
-2.50      6495.0000      22.47      -21.29      0.07
```

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	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	

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	9463.0000	0.38	90.85		9462.59
-1.78	33.24	-31.93	0.05		
	9603.0000	0.45	125.67		9602.59
-2.10	34.15	-32.74	0.18		
	9736.0000	0.38	153.99		9735.59
-2.80	34.76	-33.18	0.16		
	9874.0000	0.39	141.03		9873.58
-3.58	35.26	-33.48	0.06		
	10004.0000	0.25	157.97		10003.58
-4.19	35.65	-33.71	0.13		
	10150.0000	0.36	162.34		10149.58
-4.92	35.91	-33.80	0.08		
	10285.0000	0.44	184.50		10284.58
-5.84	35.99	-33.67	0.13		
	10424.0000	0.47	182.69		10423.57
-6.94	35.92	-33.35	0.02		
	10563.0000	0.47	210.58		10562.57
-8.00	35.61	-32.80	0.16		
	10701.0000	0.47	205.53		10700.56
-9.00	35.08	-32.05	0.03		
	10839.0000	0.47	208.48		10838.56
-10.01	34.56	-31.31	0.02		
	10977.0000	0.56	204.08		10976.55
-11.12	34.02	-30.53	0.07		
	11114.0000	0.67	205.50		11113.54
-12.46	33.40	-29.62	0.08		
	11252.0000	0.61	216.24		11251.54
-13.78	32.62	-28.55	0.10		
	11390.0000	0.50	220.53		11389.53
-14.83	31.79	-27.51	0.09		
	11528.0000	0.45	191.93		11527.52
-15.81	31.29	-26.79	0.17		
	11665.0000	0.38	185.19		11664.52
-16.79	31.14	-26.41	0.06		
	11796.0000	3.15	267.95		11795.45
-17.36	27.50	-22.75	2.38		
	11934.0000	5.62	264.12		11933.04
-18.20	16.99	-12.33	1.80		
	12070.0000	9.13	264.29		12067.89
-19.95	-0.38	4.93	2.58		
	12209.0000	9.94	262.27		12204.97
-22.67	-23.24	27.85	0.63		
	12347.0000	9.22	262.55		12341.04
-25.70	-46.01	50.70	0.52		
	12484.0000	8.62	263.43		12476.39
-28.30	-67.09	71.81	0.45		
	12622.0000	7.25	261.10		12613.06
-30.83	-85.96	90.76	1.02		
	12760.0000	5.99	261.62		12750.14
-33.23	-101.69	106.62	0.91		
	12896.0000	4.33	261.99		12885.58
-34.98	-113.80	118.80	1.22		
	13034.0000	1.29	264.67		13023.40
-35.85	-120.51	125.53	2.21		
	13112.0000	0.67	257.80		13101.39
-36.03	-121.83	126.86	0.81		

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	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		13849.34
-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		

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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	35.97		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		