

***BP AMERICA PRODUCTION
COMPANY***

Macondo #1

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

For: Brian Morel
Date: April 14, 2010

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HALLIBURTON

| | |
|-----------|-----|
| EXHIBIT # | 727 |
| WIT: | |

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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 | Monday, April 12, 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 | 14260 | psi |
| Reservoir Measured Depth | 17700.0 | ft |
| Reservoir Pore Pressure | 12873 | psi |
| Reservoir Zone Gradient | 0.727 | psi/ft |
| Reservoir Zone Density | 14.00 | 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 |
| Entered Standoff | 70.00 | % |
| 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*in ²) |
| Use Coupling Information | No | |

1.3 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 |

1.4 Wellbore Geometry

☐ Deviated Well
☐ Linker Logging Information
☒ Offshore
 Well Depth: 4932.0 ft
 Air Gap: 75.0 ft
 Sea Water Density: 8.54 lb/gal
 Wellbore Volume:
 Surface: 0.41 bbl
 Casing: 1894.52 bbl
 Annulus: 2970.99 bbl

Column Filter: Required Data

| Type | Top MD | Bottom MD | Start | End | Length | Num In Parallel | Volume | Elevation Change | Fluid Friction Factor | Contact Friction Factor | Injects | Description (Tubular, Formations, etc) | OD | Weight | Grade | ID | Int Upset Diameter | Data Source | Errors |
|--------------------|---------|-----------|-------|-------|--------|-----------------|--------|------------------|-----------------------|-------------------------|---------|--|--------|--------|-------|--------|--------------------|-------------|--------|
| | ft | ft | ft | ft | ft | | bbl | ft | | | | | in | lb/ft | | in | in | | % |
| Surface Lines (pu) | -120.0 | 0.0 | 0.0 | 120.0 | 120.0 | 1 | 0.41 | 45.0 | 1.00 | | Liquid | 2" 15,000 psi Discharge Iron | 2.620 | | | 1.870 | | User | |
| Casing | 0.0 | 5067.0 | | | 5067.0 | | | | 0.25 | | | 24.000 in Casing | 24.000 | | None | 19.000 | | User | |
| Drill Pipe | 0.0 | 5067.0 | | | 5067.0 | | | | 0.25 | | | 6.525 in Drill Pipe | 6.525 | 32.000 | | 5.426 | | User | |
| Casing | 5067.0 | 6069.0 | | | 1002.0 | | | | 0.25 | | | 14.300 in Casing | 14.300 | 62.800 | | 8.625 | | User | |
| Casing | 5067.0 | 11185.0 | | | 6118.0 | | | | 0.25 | | | 16.300 in Casing | 16.300 | 62.800 | | 14.920 | | User | |
| Casing | 5069.0 | 12600.0 | | | 7512.0 | | | | 0.25 | | | 9.875 in Casing | 9.875 | 62.800 | | 8.625 | | User | |
| Liner | 11185.0 | 12610.0 | | | 1125.0 | | | | 0.25 | | | 11.075 in Liner | 11.075 | 66.710 | | 10.711 | | User | |
| Liner | 12600.0 | 15200.0 | | | 2600.0 | | | | 0.25 | | | 11.075 in Liner | 11.075 | 71.230 | | 10.711 | | User | |
| Liner | 14603.0 | 17168.0 | | | 2565.0 | | | | 0.25 | | | 6.375 in Liner | 6.375 | 62.800 | | 6.094 | | User | |
| Open Hole | 17168.0 | 18130.0 | | | 962.0 | | | | 0.30 | | | 6.375 in Open Hole | | | | 6.375 | | | 0.00 |
| Open Hole | 18130.0 | 18300.0 | | | 170.0 | | | | 0.30 | | | 6.500 in Open Hole | | | | 6.500 | | | 0.00 |
| Casing | 19620.0 | 18300.0 | | | 1320.0 | | | | 0.25 | | | 7.300 in Casing | 7.300 | 62.800 | | 6.094 | | User | |

| 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 |
| 18130.0 | 0.00 | 9.875 | 7.000 | 6.094 | 32.000 |
| 18300.0 | 0.00 | 8.500 | 7.000 | 6.094 | 32.000 |

1.5 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 | 4.71 | 1.18 |
| 5-1 | Macondo Foamed Slurry - 16.74 ppg | 16.74 | 2.00 | 12.60 | 6.30 |
| 5-2 | Macondo Foamed Slurry - 16.74 ppg | 16.74 | 4.00 | 18.61 | 4.65 |
| 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 | | | 1009.85 | 255.61 |

1.6 Fluid Rheology - Generalized Herschel Bulkley

| Fluid | Temp. | Foam Densit y | 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 |
| | | | | | | | 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 |

HALLIBURTON

BP AMERICA PRODUCTION COMPANY

Macondo #1

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

| Fluid | Temp. °F | Foam Densit y lb/gal | m | n | Tau0 lbf/(100*ft²) | Mulnf cp | Speed rpm | Dial |
|---|-------------|-------------------------------|------|------|-----------------------|-------------|--------------|--------|
| | | | | | | | 60 | 2.00 |
| | | | | | | | 30 | 2.00 |
| | | | | | | | 6 | 2.00 |
| | | | | | | | 3 | 1.00 |
| | 80 | | 1.00 | 1.00 | 0.01 | 58.54 | 600 | 120.00 |
| | | | | | | | 300 | 58.00 |
| | | | | | | | 200 | 36.00 |
| | | | | | | | 100 | 16.00 |
| | | | | | | | 60 | 8.00 |
| | | | | | | | 30 | 4.00 |
| | | | | | | | 20 | 2.00 |
| | | | | | | | 10 | 2.00 |
| | | | | | | | 6 | 2.00 |
| | | | | | | | 3 | 2.00 |
| | 130 | | 1.00 | 1.00 | 0.15 | 27.59 | 600 | 56.00 |
| | | | | | | | 300 | 28.00 |
| | | | | | | | 200 | 18.00 |
| | | | | | | | 100 | 8.00 |
| | | | | | | | 60 | 4.00 |
| | | | | | | | 30 | 2.00 |
| | | | | | | | 20 | 2.00 |
| | | | | | | | 10 | 2.00 |
| | | | | | | | 6 | 2.00 |
| | | | | | | | 3 | 2.00 |
| | 190 | | 1.00 | 0.95 | 0.01 | 100.73 | 600 | 192.00 |
| | | | | | | | 300 | 108.00 |
| | | | | | | | 200 | 66.00 |
| | | | | | | | 100 | 34.00 |
| | | | | | | | 60 | 20.00 |
| | | | | | | | 30 | 10.00 |
| | | | | | | | 20 | 6.00 |
| | | | | | | | 10 | 2.00 |
| | | | | | | | 6 | 2.00 |
| | | | | | | | 3 | 2.00 |
| Macondo Foamed Slurry - 16.74 ppg (Class H) | 80 | 15.00 | 1.00 | 1.00 | 0.38 | 117.01 | 600 | 22.00 |
| | | | | | | | 300 | 8.00 |
| | | | | | | | 200 | 5.00 |
| | | | | | | | 100 | 3.00 |
| | | | | | | | 60 | 2.00 |
| | | | | | | | 30 | 2.00 |
| | | | | | | | 6 | 2.00 |
| | | | | | | | 3 | 1.00 |
| | 80 | | 1.00 | 1.00 | 0.01 | 58.54 | 600 | 120.00 |
| | | | | | | | 300 | 58.00 |
| | | | | | | | 200 | 36.00 |

HALLIBURTON

BP AMERICA PRODUCTION COMPANY

Macondo #1

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

| Fluid | Temp. °F | Foam Density lb/gal | m | n | Tau0 lbf/(100*ft²) | Mulnf cp | Speed rpm | Dial |
|-------|-------------|---------------------------|------|------|-----------------------|-------------|--------------|--------|
| | | | | | | | 100 | 16.00 |
| | | | | | | | 60 | 8.00 |
| | | | | | | | 30 | 4.00 |
| | | | | | | | 20 | 2.00 |
| | | | | | | | 10 | 2.00 |
| | | | | | | | 6 | 2.00 |
| | | | | | | | 3 | 2.00 |
| | 130 | | 1.00 | 1.00 | 0.15 | 27.59 | 600 | 56.00 |
| | | | | | | | 300 | 28.00 |
| | | | | | | | 200 | 18.00 |
| | | | | | | | 100 | 8.00 |
| | | | | | | | 60 | 4.00 |
| | | | | | | | 30 | 2.00 |
| | | | | | | | 20 | 2.00 |
| | | | | | | | 10 | 2.00 |
| | | | | | | | 6 | 2.00 |
| | | | | | | | 3 | 2.00 |
| | 190 | | 1.00 | 0.95 | 0.01 | 100.73 | 600 | 192.00 |
| | | | | | | | 300 | 108.00 |
| | | | | | | | 200 | 66.00 |
| | | | | | | | 100 | 34.00 |
| | | | | | | | 60 | 20.00 |
| | | | | | | | 30 | 10.00 |
| | | | | | | | 20 | 6.00 |
| | | | | | | | 10 | 2.00 |
| | | | | | | | 6 | 2.00 |
| | | | | | | | 3 | 2.00 |

1.7 Fluid Rheology - Bingham Plastic

| Fluid | Temp. °F | PV cp | YP lbf/(100*ft²) | Speed rpm | Dial |
|--|-------------|----------|---------------------|--------------|------|
| Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III | 80 | 36.76 | 20.00 | | |

1.8 Temperature Input

Entered BHCT Method

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

1.9 Temperature Profile, Temperature Profile 1

| Measured Depth ft | Casing Circulating Temperature °F | Annulus Circulating Temperature °F |
|----------------------|---|--|
| 0.0 | 80 | 120 |
| 18300.0 | 135 | 135 |

1.10 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 | 17163.0 | 12304 | 0.717 | 13.80 | 0.753 | 14.50 | 12928 |
| 17700.0 | 17700.0 | 12873 | 0.727 | 14.00 | | | |
| 18200.0 | 18200.0 | | | | 0.753 | 14.50 | 13709 |
| 18300.0 | 18300.0 | 13262 | 0.725 | 13.95 | 0.779 | 15.00 | 14260 |

1.11 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 | 8.21 | 6.06 | 3467.89 |
| 6.7 ppg Base Oil Macondo | 2.36 | 1.74 | 3741.58 |
| Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III | 11.91 | 8.79 | 3516.40 |
| Macondo Foamed Slurry - 16.74 ppg | 5.05 | 3.73 | 2962.52 |
| Macondo Foamed Slurry - 16.74 ppg | 5.05 | 3.73 | 2962.52 |
| Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III | 11.91 | 8.79 | 3516.40 |
| Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg | 8.21 | 6.06 | 3467.89 |

Based on annular segment at fracture zone MD of 18300.0 ft.

1.12 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 | 13.00 | 4.60 | 3687.75 |
| 6.7 ppg Base Oil Macondo | 4.28 | 1.51 | 4005.42 |
| Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III | 19.16 | 6.77 | 3744.31 |
| Macondo Foamed Slurry - 16.74 ppg | 5.84 | 2.07 | 3106.09 |
| Macondo Foamed Slurry - 16.74 ppg | 5.84 | 2.07 | 3106.09 |
| Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III | 19.16 | 6.77 | 3744.31 |
| Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg | 13.00 | 4.60 | 3687.75 |

Based on annular segment at reservoir zone MD of 17700.0 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 | 20.00 | lbf/(100*ft ²) |
| Calculated PV | 36.76 | cp |
| Temperature | 190 | °F |
| Use Job Design | Yes | |
| Zone of Interest | | |
| Measured Depth | 18360.0 | ft |
| Displacement Efficiency | 100.00 | |
| Hole Dia. | 8.636 | in |
| Standoff | 70.00 | % |
| Pipe OD | 7.000 | in |
| Rate | 4.00 | bpm |
| Mud | | |
| Erodibility Number | 20.69 | |
| Required Shear Stress | 29.00 | lbf/(100*ft ²) |
| Density | 14.00 | 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 | 4.01 | 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 | 20.00 | lbf/(100*ft ²) |
| Calculated PV | 36.76 | cp |
| Temperature | 190 | °F |
| Use Job Design | Yes | |
| Zone of Interest | | |
| Measured Depth | 18360.0 | ft |
| Displacement Efficiency | 100.00 | |
| Hole Dia. | 8.636 | in |
| Standoff | 70.00 | % |
| Pipe OD | 7.000 | in |
| Rate | 4.00 | bpm |
| Mud | | |
| Erodibility Number | 20.69 | |
| Required Shear Stress | 29.00 | lbf/(100*ft ²) |
| Density | 14.00 | 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 | 18300.0 | 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 | 18300.0 | ft |
| Fracture Pressure | 14260 | psi |
| Fracture Gradient | 0.779 | psi/ft |
| Fracture Density | 15.00 | lb/gal |
| Calculated Hydrostatic Pressure | 13488 | psi |
| Calculated Hydrostatic Pressure Gradient | 0.737 | psi/ft |
| Calculated Hydrostatic Density | 14.19 | lb/gal |

Reservoir Zone

| | | |
|--|---------|--------|
| Measured Depth | 17700.0 | ft |
| Pore Pressure | 12873 | psi |
| Reservoir Gradient | 0.727 | psi/ft |
| Reservoir Density | 14.00 | lb/gal |
| Calculated Hydrostatic Pressure | 13036 | psi |
| Calculated Hydrostatic Pressure Gradient | 0.736 | psi/ft |
| Calculated Hydrostatic Density | 14.18 | 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 | 4.71 | 4.71 | 2.23 | 2.23 | 0.0 | 0.0 | 0.0 |
| 5-1 | 20.93 | 2.00 | 12.60 | 12.60 | 5.95 | 5.95 | 0.6 | 3.8 | 3.8 |
| 5-2 | 27.23 | 4.00 | 18.61 | 31.22 | 8.79 | 14.74 | 1.2 | 5.5 | 9.3 |
| 5-3 | 31.88 | 4.00 | 7.22 | 38.43 | 3.41 | 18.15 | 0.0 | 0.0 | 9.3 |
| 6 | 33.69 | 4.00 | 20.00 | 20.00 | 0.00 | 0.00 | 0.0 | 0.0 | 9.3 |
| 7 | 38.69 | 4.00 | 867.71 | 867.71 | 0.00 | 0.00 | 0.0 | 0.0 | 9.3 |

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 | 20.93 | 2.00 | 583.653 | 1167 | 7.4 | 1.23 |
| 5-2 | 27.23 | 4.00 | 583.653 | 2335 | 18.2 | 1.22 |
| 5-3 | 31.88 | 4.00 | 0.000 | 0 | 18.2 | 1.00 |
| 6 | 33.69 | 4.00 | 0.000 | 0 | 18.2 | 1.00 |
| 7 | 38.69 | 4.00 | 0.000 | 0 | 18.2 | 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 | 4.71 | 4.71 | 19 | 4.840 | 1.3700 |
| 5-1 | Macondo Foamed Slurry - 16.74 ppg | 12.60 | 15.46 | 52 | 4.840 | 1.3700 |
| 5-2 | | 18.61 | 22.78 | 76 | 4.840 | 1.3700 |
| 5-3 | | 7.22 | 7.22 | 30 | 4.840 | 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 TJN VMBUJO

4.1 Volume and Pressure Results

Annulus fluid is heavier than casing fluid by 29 psi. Apply appropriate back pressure on casing if floating equipment does not hold properly.

4.2 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 |
| 20.50 | 4 | 1 | 82.00 | 82.00 | 4.00 | 4.00 |
| 25.07 | 5 | 1 | 92.00 | 106.39 | 2.00 | 4.71 |
| 31.65 | 5 | 1 | 114.00 | 144.89 | 4.00 | 6.61 |
| 33.69 | 5 | 1 | 122.14 | 154.32 | 4.00 | 3.07 |
| 40.65 | 7 | 1 | 150.00 | 174.55 | 4.00 | 3.08 |
| 53.15 | 7 | 1 | 200.00 | 216.98 | 4.00 | 3.58 |
| 65.65 | 7 | 1 | 250.00 | 263.75 | 4.00 | 3.86 |
| 78.15 | 7 | 1 | 300.00 | 312.65 | 4.00 | 3.93 |
| 90.65 | 7 | 1 | 350.00 | 361.81 | 4.00 | 3.94 |
| 103.15 | 7 | 1 | 400.00 | 411.13 | 4.00 | 3.95 |
| 115.65 | 7 | 1 | 450.00 | 460.57 | 4.00 | 3.96 |
| 128.15 | 7 | 1 | 500.00 | 510.10 | 4.00 | 3.96 |
| 140.65 | 7 | 1 | 550.00 | 559.70 | 4.00 | 3.97 |
| 153.15 | 7 | 1 | 600.00 | 609.35 | 4.00 | 3.97 |
| 165.65 | 7 | 1 | 650.00 | 659.05 | 4.00 | 3.98 |
| 178.15 | 7 | 1 | 700.00 | 708.76 | 4.00 | 3.98 |
| 190.65 | 7 | 1 | 750.00 | 758.53 | 4.00 | 3.98 |
| 203.15 | 7 | 1 | 800.00 | 808.27 | 4.00 | 3.97 |
| 215.65 | 7 | 1 | 850.00 | 857.92 | 4.00 | 3.97 |
| 228.15 | 7 | 1 | 900.00 | 907.68 | 4.00 | 3.97 |
| 240.65 | 7 | 1 | 950.00 | 957.42 | 4.00 | 3.98 |
| 253.15 | 7 | 1 | 1000.00 | 1007.24 | 4.00 | 4.01 |
| 255.73 | 7 | 1 | 1010.26 | 1017.57 | 0.00 | 1.81 |

4.3 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 | 51.9 | 515 | 0 | 14.51 | 14.51 | 0.0 |
| 3.75 | 15.00 | 55.3 | 550 | 0 | 14.44 | 14.44 | 0.0 |
| 16.25 | 65.00 | 55.7 | 553 | 0 | 14.44 | 14.44 | 0.0 |
| 20.50 | 82.00 | 58.7 | 584 | 0 | 14.44 | 14.44 | 0.0 |
| 25.07 | 92.00 | 46.0 | 923 | 0 | 14.45 | 14.45 | 0.0 |
| 31.65 | 114.00 | 144.6 | 1461 | 0 | 14.50 | 14.50 | 0.0 |
| 33.69 | 122.14 | 107.3 | 1080 | 0 | 14.40 | 14.40 | 0.0 |
| 40.65 | 150.00 | 84.5 | 848 | 0 | 14.40 | 14.40 | 0.0 |
| 53.15 | 200.00 | 66.9 | 668 | 0 | 14.41 | 14.41 | 0.0 |
| 65.65 | 250.00 | 52.9 | 526 | 0 | 14.42 | 14.42 | 0.0 |
| 78.15 | 300.00 | 51.3 | 509 | 0 | 14.42 | 14.42 | 0.0 |
| 90.65 | 350.00 | 50.6 | 502 | 0 | 14.42 | 14.42 | 0.0 |
| 103.15 | 400.00 | 50.0 | 495 | 0 | 14.42 | 14.42 | 0.0 |
| 115.65 | 450.00 | 49.4 | 490 | 0 | 14.42 | 14.42 | 0.0 |
| 128.15 | 500.00 | 49.0 | 485 | 0 | 14.43 | 14.43 | 0.0 |
| 140.65 | 550.00 | 48.5 | 481 | 0 | 14.42 | 14.42 | 0.0 |
| 153.15 | 600.00 | 48.2 | 477 | 0 | 14.43 | 14.43 | 0.0 |
| 165.65 | 650.00 | 47.9 | 474 | 0 | 14.42 | 14.42 | 0.0 |
| 178.15 | 700.00 | 51.4 | 510 | 0 | 14.42 | 14.42 | 0.0 |
| 190.65 | 750.00 | 51.5 | 511 | 0 | 14.42 | 14.42 | 0.0 |
| 203.15 | 800.00 | 51.1 | 507 | 0 | 14.42 | 14.42 | 0.0 |
| 215.65 | 850.00 | 49.4 | 489 | 0 | 14.42 | 14.42 | 0.0 |
| 228.15 | 900.00 | 33.8 | 330 | 0 | 14.34 | 14.34 | 0.0 |
| 240.65 | 950.00 | 35.6 | 348 | 0 | 14.37 | 14.37 | 0.0 |
| 253.15 | 1000.00 | 59.4 | 591 | 0 | 14.61 | 14.61 | 0.0 |
| 255.73 | 1010.26 | 0.0 | 1103 | 0 | 14.45 | 14.45 | 0.0 |

4.4 Gas Flow Potential

Gas Flow Potential 3.62
at Reservoir Zone Measured Depth 17700.0 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.

4.5 Pressure to Break Circulation - Hydrostatic Pressures

Total Depth 13471 psi
Fracture Zone 13471 psi

4.6 Pressure to Break Circulation

| Gel Strength | Surface Pressure | Total Depth Additional Pressure | Fracture Zone Additional Pressure |
|---|------------------|---------------------------------|-----------------------------------|
| lb/(100* ³ ft ²) | psi | psi | psi |
| 25.00 | 622 | 388 | 388 |
| 50.00 | 1244 | 776 | 776 |
| 75.00 | 1866 | 1164 | 1164 |
| 100.00 | 2487 | 1552 | 1552 |
| 200.00 | 4975 | 3104 | 3104 |

4.7 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 | 14375.8 | | 0.0 | |
| 6.7 ppg Base Oil Macondo | 109.6 | | 14375.8 | |
| Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III | 2414.6 | | 14485.4 | |
| Macondo Foamed Slurry - 16.74 ppg | 191.1 | | 16900.0 | |
| Macondo Foamed Slurry - 16.74 ppg | 1208.9 | 200.0 | 17091.1 | 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 |

4.8 Time of Events

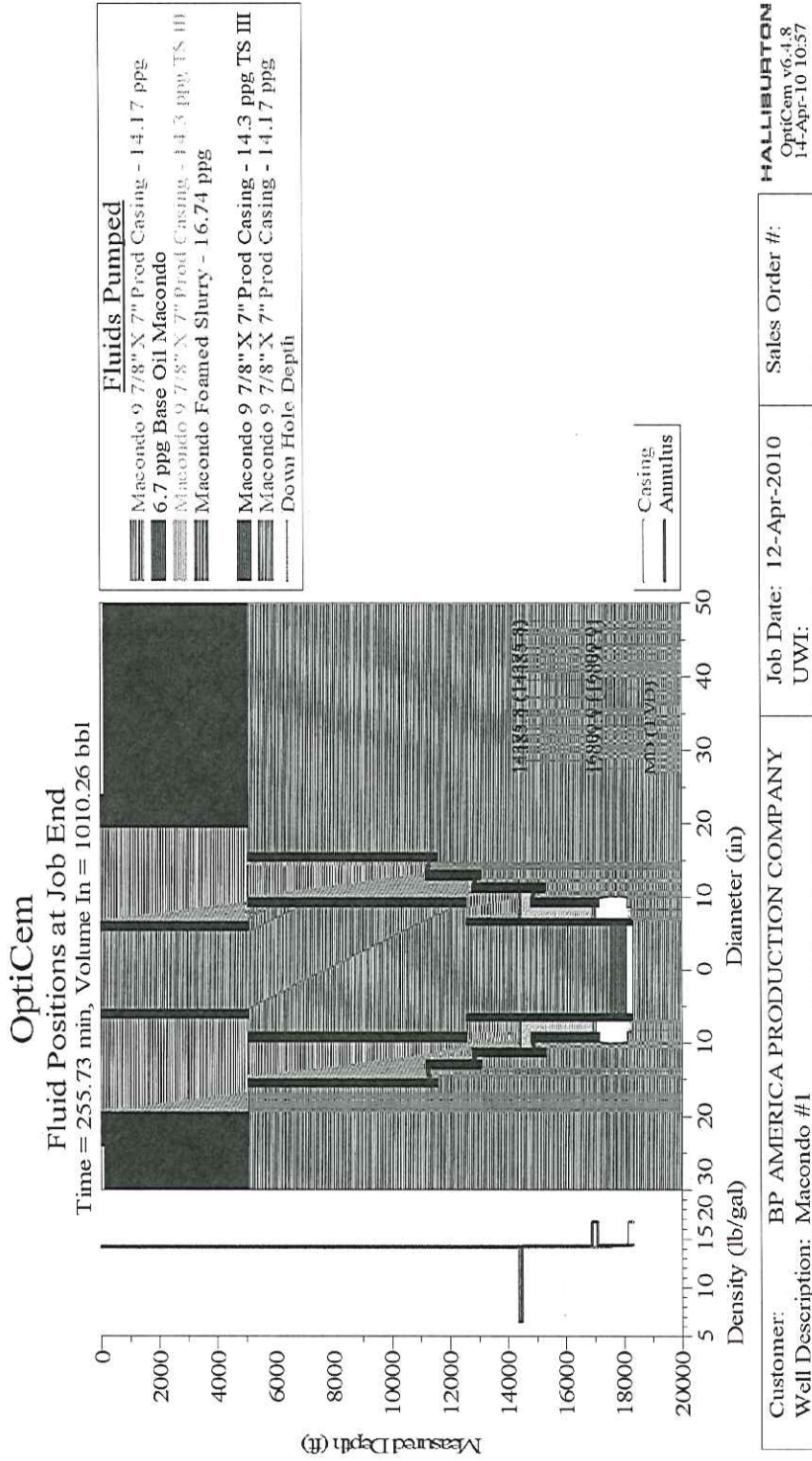
| Time | Frac Zone ECD | Res Zone ECD | Stage Starts Pumping | Stage Enters Annulus |
|--------|---------------|--------------|--|--|
| min | lb/gal | lb/gal | | |
| 0.25 | 14.44 | 14.42 | 2. 6.7 ppg Base Oil Macondo | |
| 2.50 | 14.44 | 14.42 | 3. Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III | |
| 19.88 | 14.44 | 14.42 | 4. Macondo Foamed Slurry - 16.74 ppg | |
| 21.08 | 14.51 | 14.48 | 5. Macondo Foamed Slurry - 16.74 ppg | |
| 34.15 | 14.39 | 14.38 | 6. Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III | |
| 39.40 | 14.40 | 14.38 | 7. Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg | |
| 225.65 | 14.38 | 14.41 | | 2. 6.7 ppg Base Oil Macondo |
| 226.90 | 14.31 | 14.41 | | 3. Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III |
| 245.65 | 14.42 | 14.37 | | 4. Macondo Foamed Slurry - 16.74 ppg |
| 246.90 | 14.47 | 14.38 | | 5. Macondo Foamed Slurry - 16.74 ppg |
| 255.72 | 14.62 | 14.54 | Prior to plug landing | |
| 255.73 | 14.45 | 14.44 | Plug Landed | |

HALLIBURTON

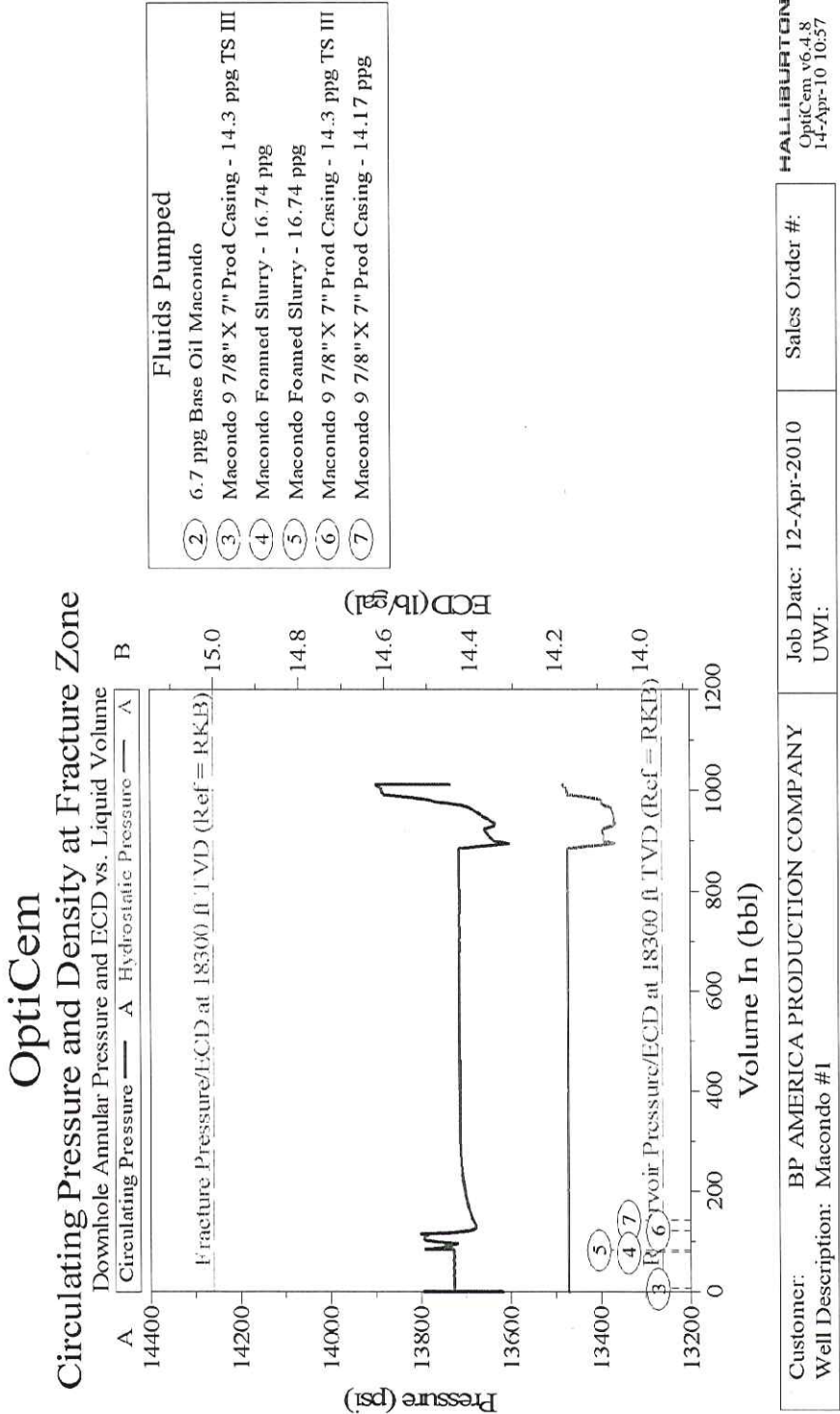
BP AMERICA PRODUCTION COMPANY
Macondo #1
Macondo Prospect MC 252 #1 - 9.875 X 7 prod Casing

5.0 ATTACHMENTS

5.1 Fluid Positions (graph)



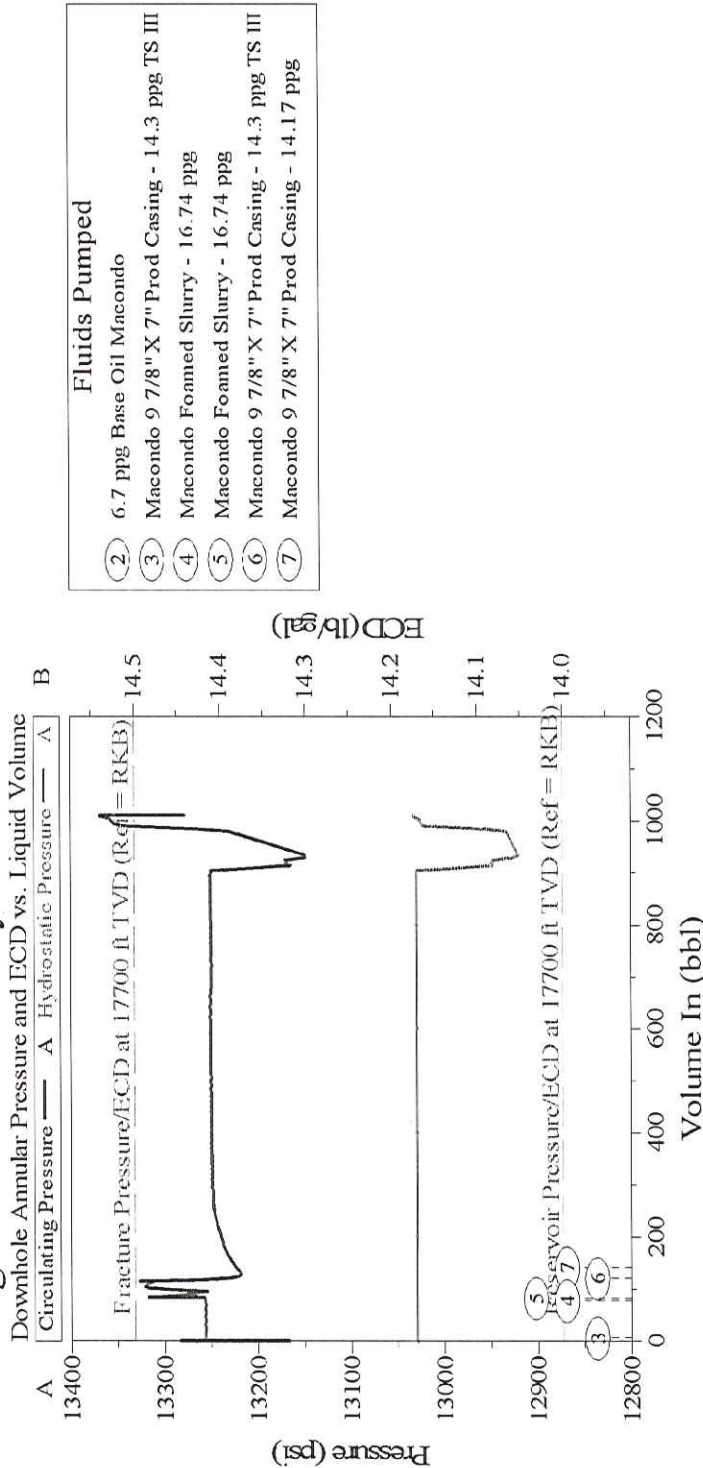
5.2 Circ Pressure & Density - Frac Zone (graph)



5.3 Circ Pressure & Density - Res Zone (graph)

OptiCem

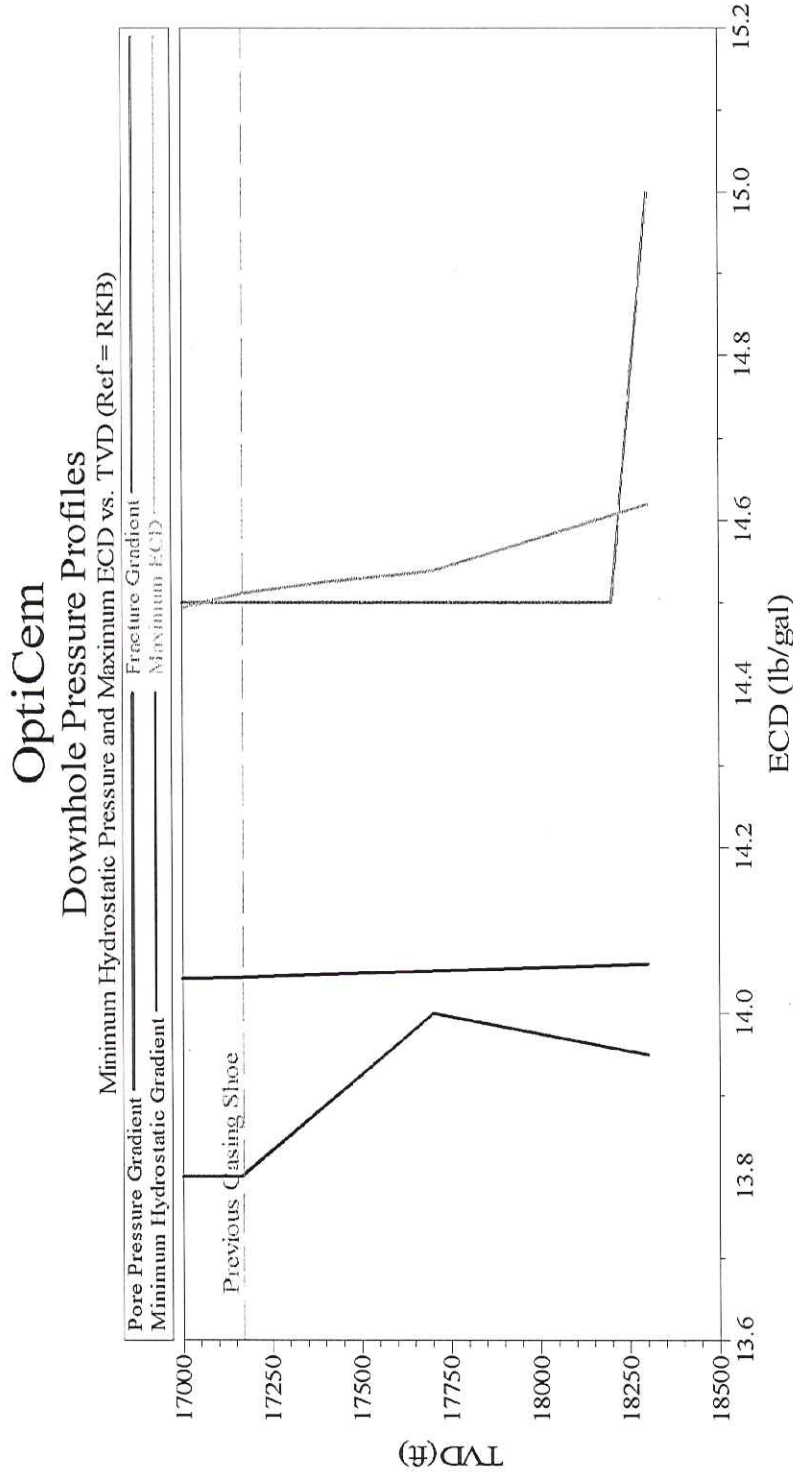
Circulating Pressure and Density at Reservoir Zone



| | | |
|---|-----------------------|----------------|
| Customer: BP AMERICA PRODUCTION COMPANY | Job Date: 12-Apr-2010 | Sales Order #: |
| Well Description: Macondo #1 | UWI: | |

HALLIBURTON
OptiCem v6.4.8
14-Apr-10 10:57

5.4 Downhole Pressure Profiles (graph)



Customer: **BP AMERICA PRODUCTION COMPANY** Job Date: 12-Apr-2010 Sales Order #: **HALLIBURTON**
 Well Description: **Macondo #1** UWI: **OptiCem v6.4.8**
 14-Apr-10 10:57