

From: Deepwater Horizon, Formen
Sent: Tue Apr 20 11:36:55 2010
To: Kaluza, Robert
Subject: FW: Updated Info for Prod Casing job
Importance: Normal
Attachments: image001.jpg; Macondo_MC 252_ 9 78 X 7 Prod Casing_v6_CustomerCopy.pdf; 9.875 X 7 Prod Casing Design Report - 6 Cent.pdf; Location Blend 9 GPHS SCR-100L BC18-73909.2.pdf

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

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

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Halliburton Energy Services
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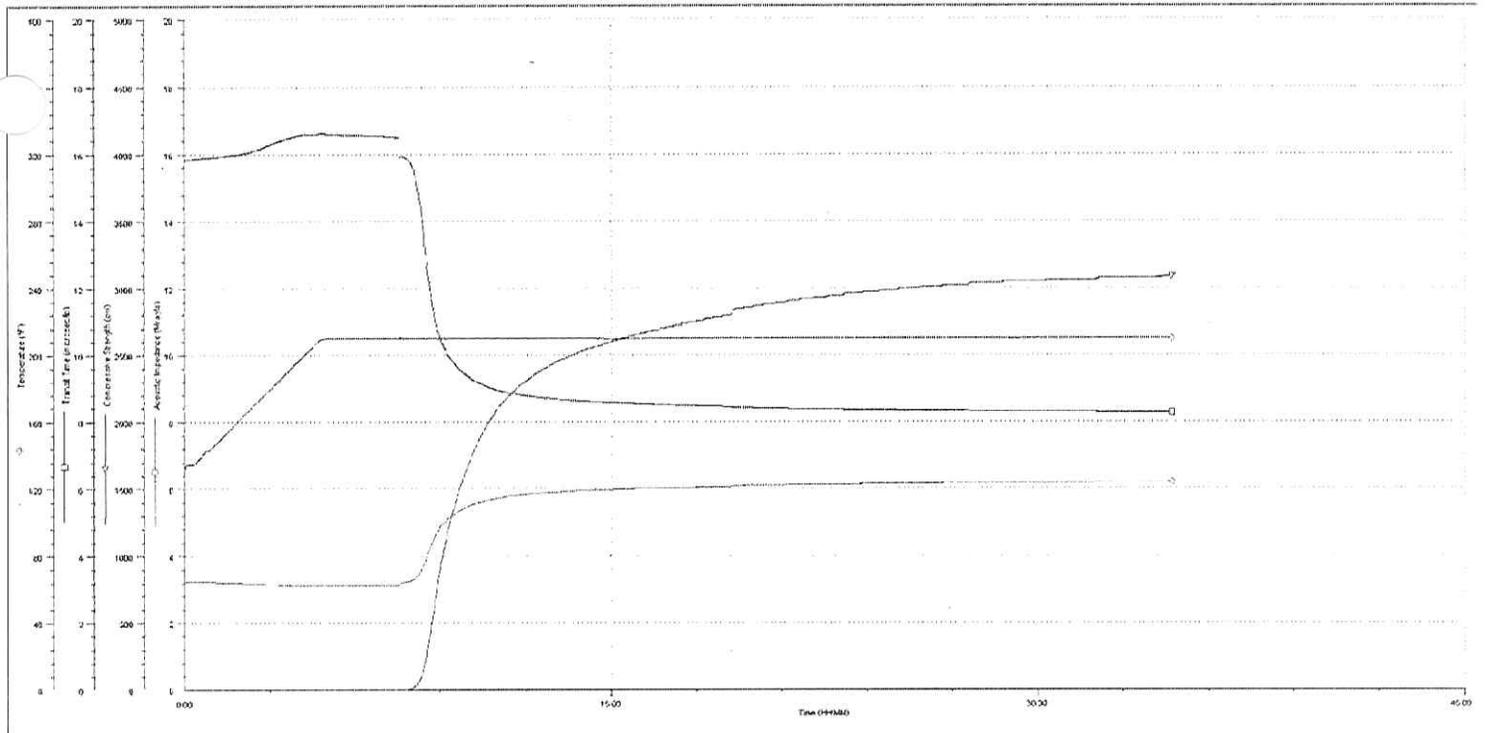
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| | |
|-----------|-----|
| EXHIBIT # | 741 |
| WIT: | |

Well ID
Temperature 218 °F
Transit Time 0.25 microseconds

Customer
Strength 3010 psi
Compressive strength type 0 (more than 14 days)

42 psi @ 0.12 06
500 psi @ 0.10 30



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***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 18, 2010
Version: 6

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

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*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:

Jessc Gagliano
Technical Advisor

SERVICE CENTER:

Lafayette, La

SERVICE COORDINATOR:

Danny Mooney

OPER. ENGINEER:

Yarigsa Aviles

PHONE NUMBER:

1-800-444-7830

Job Information**9 7/8" X 7" Production Casing**

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

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

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

| | |
|---|---------------------------|
| 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 : (904.00 ft fill) | |
| 730.00 ft * 0.3341 ft ³ /ft * 0 % | = 243.87 ft ³ |
| 174.00 ft * 0.1628 ft ³ /ft * 0 % | = 28.33 ft ³ |
| Foamed Tail Cement | = 272.20 ft ³ |
| | = 48.48 bbl |
| Shoe Joint Volume: (189.00 ft fill) | |
| 189.00 ft * 0.2058 ft ³ /ft | = 38.90 ft ³ |
| | = 6.93 bbl |
| Tail plus shoe joint | = 311.10 ft ³ |
| | = 55.41 bbl |
| Total Tail | = 191 sks |
| Total Pipe Capacity: | |
| 5067.00 ft * 0.1527 ft ³ /ft | = 773.67 ft ³ |
| 7418.00 ft * 0.4032 ft ³ /ft | = 2990.95 ft ³ |
| 5819.00 ft * 0.2058 ft ³ /ft | = 1197.67 ft ³ |
| | = 883.82 bbl |
| Displacement Volume to Shoe Joint: | |
| Capacity of Pipe - Shoe Joint | = 883.82 bbl - 6.93 bbl |
| | = 876.89 bbl |

Job Recommendation

9 7/8" X 7" Production Casing

Fluid Instructions

Fluid 1: Mud

Base Oil

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

Fluid 2: Water Based Spacer

TUNED SPACER III

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

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

Fluid 3: Lead Cement – Un-foamed

Premium Cement

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

Fluid Weight 16.74 lbm/gal
Slurry Yield: 1.37 ft³/sk
Total Mixing Fluid: 5.04 Gal/sk
Top of Fluid: 17300 ft
Calculated Fill: 100 ft
Volume: 5.95 bbl
Calculated Sacks: 24.37 sks
Proposed Sacks: 30 sks

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

Premium Cement

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

Fluid Weight 16.74 lbm/gal
Slurry Yield: 1.37 ft³/sk
Total Mixing Fluid: 5.04 Gal/sk
Top of Fluid: 17400 ft
Calculated Fill: 904 ft
Volume: 55.41 bbl
Calculated Sacks: 191.44 sks
Proposed Sacks: 200 sks

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Fluid 5: Water Based Spacer

TUNED SPACER III

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

Fluid Density: 14.30 lbm/gal

Fluid Volume: 20 bbl

Fluid 6: Mud

Mud

Fluid Density: 14 lbm/gal

Fluid Volume: 856.89 bbl

Detailed Pumping Schedule

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

Foam Output Parameter Summary:

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

Foam Design Specifications:

| | | | |
|-------------------------------|-------------------|------------------|-------------|
| Foam Calculation Method: | Constant Gas Flow | Calculated Gas = | 20748.4 scf |
| Backpressure: | 14.70 psig | Additional Gas = | 50000 scf |
| Bottom Hole Circulating Temp: | 210 degF | Total Gas = | 70748.4 scf |
| Mud Outlet Temperature: | 150 degF | | |

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

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

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

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Cost Estimate

9 7/8" X 7" Production Casing

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 | WELLIFE _i 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 | 1 96 | H | 145.24 | 13,943.04 |
| | HR/DAY/WEEK/MTH/YEAR/JOB/RUN | | | | |
| 576784 | CMT, Offshore Engineer, per hr HOURS | 1 96 | EA | 134.32 | 12,894.72 |
| | ***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 |

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SAP Quote # 0

| <u>Mtrl Nbr</u> | <u>Description</u> | <u>Qty</u> | <u>U/M</u> | <u>Unit Price</u> | <u>Net Amt</u> |
|-----------------|--|------------|------------|-------------------|------------------|
| 342210 | N2 BOM-Foam Cementing w/o CT | 1 | JOB | | 0.00 |
| 13459 | Nitrogen Charge | 70748 | SCF | 6.60 | 4,669.37 |
| | ***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 | | 88,047.95 |

Conditions

NOTE

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

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

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

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

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

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

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

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

Macondo #1

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

For: Brian Morel
Date: April 18, 2010

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

HALLIBURTON

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1.0 DESIGN

1.1 Customer Information

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

1.2 Parameters

| | | |
|---|---------|----------------------------|
| Fracture Zone Measured Depth | 18305.0 | ft |
| Fracture Zone Gradient | 0.779 | psi/ft |
| Fracture Zone Density | 15.00 | lb/gal |
| Fracture Zone Pressure | 14255 | psi |
| Reservoir Measured Depth | 18200.0 | ft |
| Reservoir Pore Pressure | 13197 | psi |
| Reservoir Zone Gradient | 0.726 | psi/ft |
| Reservoir Zone Density | 13.97 | lb/gal |
| Back Pressure | 0 | psi |
| Height - Mud Line to Mean Sea Level | 4992.0 | ft |
| Height - Mean Sea Level to Rotary Kelly Bushing | 75.0 | ft |
| Sea Water Density | 8.54 | lb/gal |
| Returns To Surface | | |
| Simulator Volume Increment | 5.00 | bbl |
| Surface Iron Displacement | 0.41 | bbl |
| Shoe Track Length | 189.0 | ft |
| Additional Pressure to Seat Plug | 500 | psi |
| Eccentricity Enhanced Calculations | No | |
| Erodibility Enhanced Calculations | Yes | |
| Mud Erodibility Measured Depth | 17168.0 | ft |
| Mud Erodibility Number | 20.69 | |
| Mud Required Shear Stress | 29.00 | lbf/(100*ft 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 Densit y | m | n | Tau0 | Mulnf | Speed | Dial | |
|---|-------|---------------------|------|------|----------------------------|-------|-------|--------|-------|
| | °F | lb/gal | | | lbf/(100*ft ²) | cp | rpm | | |
| Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg | 40 | | 1.00 | 0.87 | 7.38 | 99.14 | 600 | 187.00 | |
| | | | | | | | 300 | 106.00 | |
| | | | | | | | 200 | 76.00 | |
| | | | | | | | 100 | 45.00 | |
| | | | | | | | 6 | 10.00 | |
| | 100 | | | 0.57 | 0.57 | 5.25 | 33.85 | 600 | 97.00 |
| | | | | | | | | 300 | 57.00 |
| | | | | | | | | 200 | 41.00 |
| | | | | | | | | 100 | 27.00 |
| | | | | | | | | 6 | 8.00 |
| 150 | | | 1.00 | 0.89 | 7.22 | 25.87 | 600 | 62.00 | |
| | | | | | | | 300 | 37.00 | |
| | | | | | | | 200 | 27.00 | |
| | | | | | | | 100 | 18.00 | |
| | | | | | | | 6 | 8.00 | |
| | 75 | | | 1.00 | 1.00 | 1.56 | 3.02 | 600 | 8.00 |
| | | | | | | | | 300 | 4.00 |
| | | | | | | | | 200 | 3.00 |
| | | | | | | | | 100 | 2.00 |
| | | | | | | | | 6 | 2.00 |
| 120 | | | 1.00 | 1.00 | 0.66 | 2.30 | 600 | 5.00 | |
| | | | | | | | 300 | 3.00 | |
| | | | | | | | 200 | 2.00 | |
| | | | | | | | 100 | 1.00 | |
| | | | | | | | 6 | 1.00 | |
| | 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 | |
| | | | | | | | 6 | 2.00 | |
| | | | | | | | 100 | 1.00 | |
| | | | | | | | 200 | 2.00 | |
| | | | | | | | 300 | 2.00 | |
| 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 | m | n | Tau0 | Mulnf | Speed | Dial |
|-------|-------|--------------|------|------|---------------|-------|-------|--------|
| | °F | lb/gal | | | lbf/(100*ft²) | cp | rpm | |
| | | | | | | | 60 | 26.00 |
| | | | | | | | 30 | 8.00 |
| | | | | | | | 20 | 6.00 |
| | | | | | | | 10 | 4.00 |
| | | | | | | | 6 | 2.00 |
| | | | | | | | 3 | 2.00 |
| | 135 | | 1.00 | 1.00 | 0.85 | 62.11 | 600 | 130.00 |
| | | | | | | | 300 | 56.00 |
| | | | | | | | 200 | 40.00 |
| | | | | | | | 100 | 20.00 |
| | | | | | | | 60 | 12.00 |
| | | | | | | | 30 | 8.00 |
| | | | | | | | 20 | 6.00 |
| | | | | | | | 10 | 4.00 |
| | | | | | | | 6 | 4.00 |
| | | | | | | | 3 | 4.00 |
| | 80 | 14.50 | 1.00 | 1.00 | 1.30 | 77.18 | 600 | 14.00 |
| | | | | | | | 300 | 7.00 |
| | | | | | | | 200 | 5.00 |
| | | | | | | | 100 | 3.00 |
| | | | | | | | 60 | 1.00 |
| | | | | | | | 30 | 1.00 |
| | | | | | | | 6 | 1.00 |
| | | | | | | | 3 | 1.00 |

1.8 Fluid Rheology - Bingham Plastic

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

1.9 Temperature Input

Entered BHCT Method

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

1.10 Temperature Profile, Temperature Profile 1

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

1.11 Fracture Gradient/Pore Pressure Profile

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

1.12 Critical Velocity - Fracture Zone

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

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

1.13 Critical Velocity - Reservoir Zone

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

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

2.0 TUNED SPACER

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

| | | |
|---|---------|----------------------------|
| Density | 14.30 | lb/gal |
| Calculated YP | 30.00 | lbf/(100*ft 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 |
| <p>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.</p> | | |
| Simulated Downhole Rate | 3.99 | bpm |
| Simulated Downhole MD | 18305.0 | ft |

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

| | | |
|---|---------|----------------------------|
| Density | 14.30 | lb/gal |
| Calculated YP | 30.00 | lbf/(100*ft 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 |
| <p>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.</p> | | |
| Simulated Downhole Rate | | bpm |
| Simulated Downhole MD | 18305.0 | ft |

4/1 GPBN

3.1 Foam Design Parameters

Constant or Stages Gas Flow Calculation Method

Foaming Agents in Mix Water (volume based)

Surfactant 1.50 %
 Stabilizer 0.00 %

Fracture Zone

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

Reservoir Zone

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

3.2 Foam Pumping Schedule for Liquids

| Stg | Start Time | Pump Rate | Base Slurry Vol. | Cum. Base Slurry Vol. | Cem. Mix Water Vol. | Cum. Cem. Mix Water Vol. | Foam Agents Rate | Foam Agents Vol. | Foaming Agents Cum. Job Volume |
|-----|------------|-----------|------------------|-----------------------|---------------------|--------------------------|------------------|------------------|--------------------------------|
| | min | bpm | bbbl | bbbl | bbbl | bbbl | 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 | | | |

5/1 DFOUSBMJ FST

4.1 Centralizer Parameters

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

4.2 Centralizer Specifications

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

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

4.3 Constant Spacing/Standoff Centralizer Intervals

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

4.4 Centralizer Placement

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

6/1 T JN VMBUJPO

5.1 Volume and Pressure Results

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

5.2 Volume and Rate Calculations

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

5.3 Horsepower, Pressure, Freefall

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

5.4 Gas Flow Potential

Gas Flow Potential 10.29
 at Reservoir Zone Measured Depth 18200.0 ft

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

5.5 Pressure to Break Circulation - Hydrostatic Pressures

Total Depth 13466 psi
 Fracture Zone 13466 psi

5.6 Pressure to Break Circulation

| Gel Strength | Surface Pressure | Total Depth Additional Pressure | Fracture Zone Additional Pressure |
|----------------------------|------------------|---------------------------------|-----------------------------------|
| lbf/(100*ft 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 ft | Casing Length ft | Annular Top MD ft | Casing Top MD ft |
|---|----------------------|---------------------|----------------------|---------------------|
| Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg | 14075.5 | | 0.0 | |
| 6.7 ppg Base Oil Macondo | 109.6 | | 14075.5 | |
| Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III | 1954.4 | | 14185.2 | |
| Macondo Foamed Slurry - 16.74 ppg | 213.3 | | 16139.6 | |
| Macondo Foamed Slurry - 16.74 ppg | 1952.1 | 189.0 | 16352.9 | 18116.0 |
| Macondo 9 7/8" X 7" Prod Casing - 14.3 ppg TS III | | 545.6 | | 17570.4 |
| Macondo 9 7/8" X 7" Prod Casing - 14.17 ppg | | 17570.4 | | 0.0 |

5.8 Final Annular Fluid Density

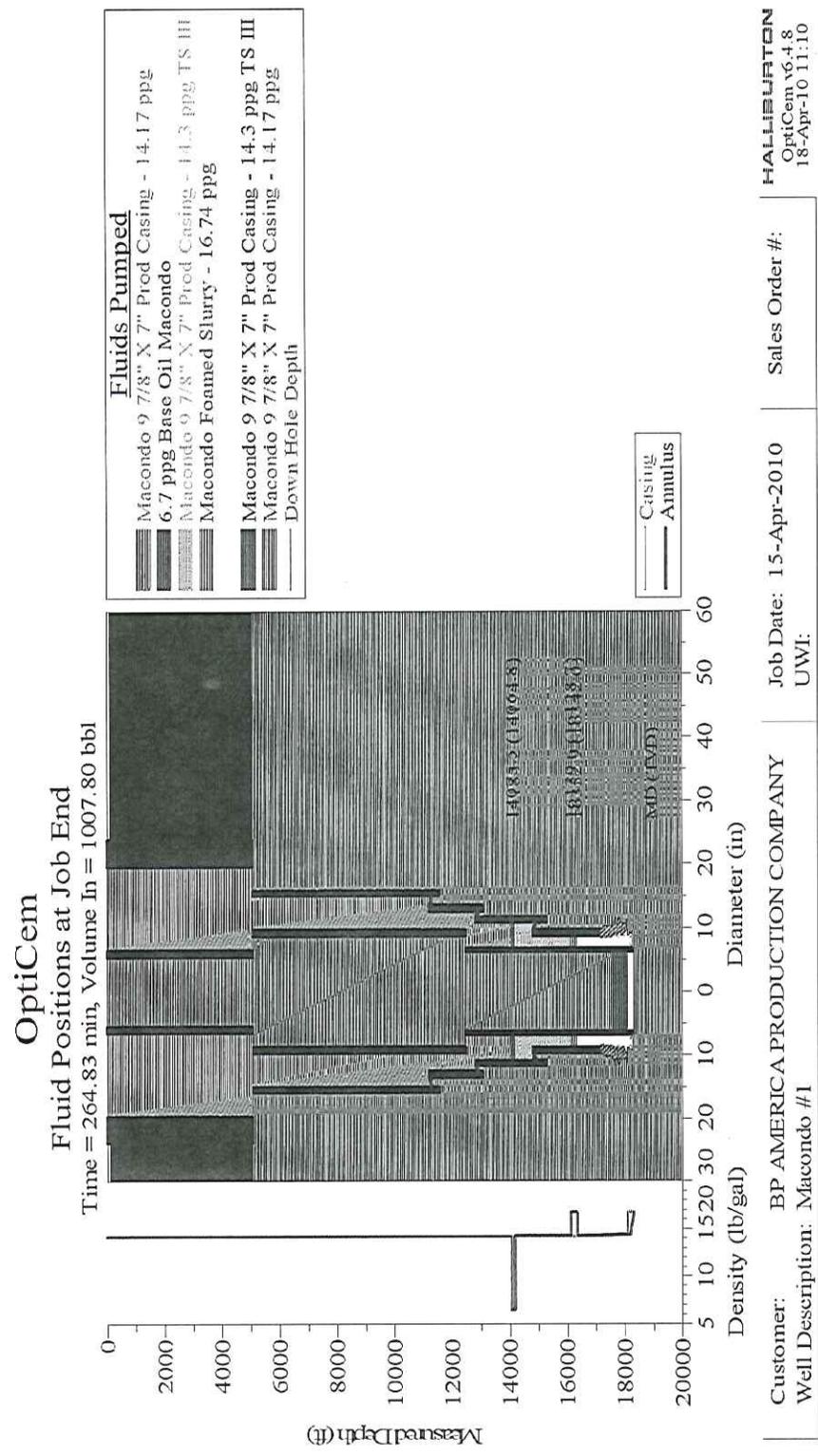
| Measured Depth ft | Density lb/gal | Quality % | Hydrostatic Gradient lb/gal |
|----------------------|-------------------|--------------|--------------------------------|
| -0.0 | 14.17 | 0.00 | 14.17 |
| 101.8 | 14.17 | 0.00 | 14.17 |
| 212.9 | 14.17 | 0.00 | 14.17 |
| 324.0 | 14.17 | 0.00 | 14.17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

| 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 |

6.0 ATTACHMENTS

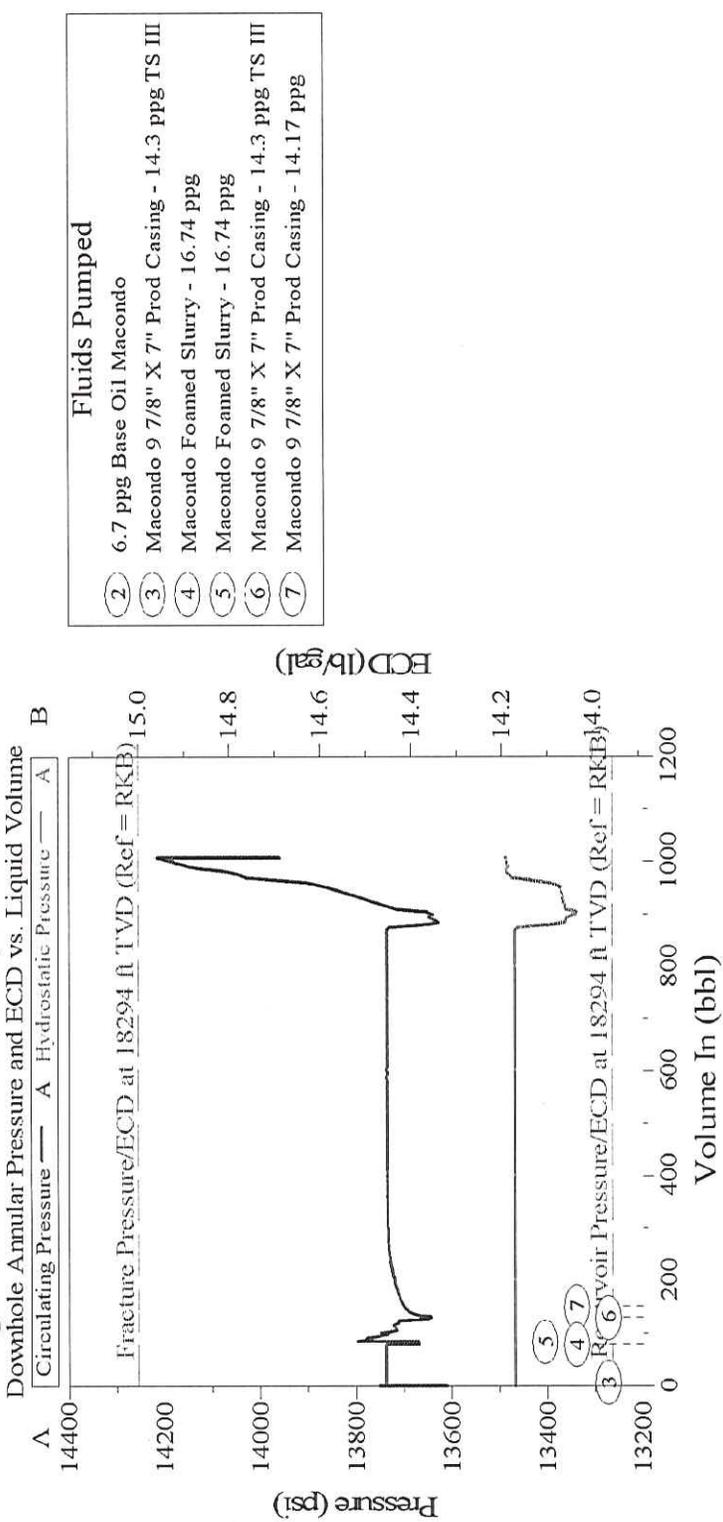
6.1 Fluid Positions (graph)



6.2 Circ Pressure & Density - Frac Zone (graph)

OptiCem

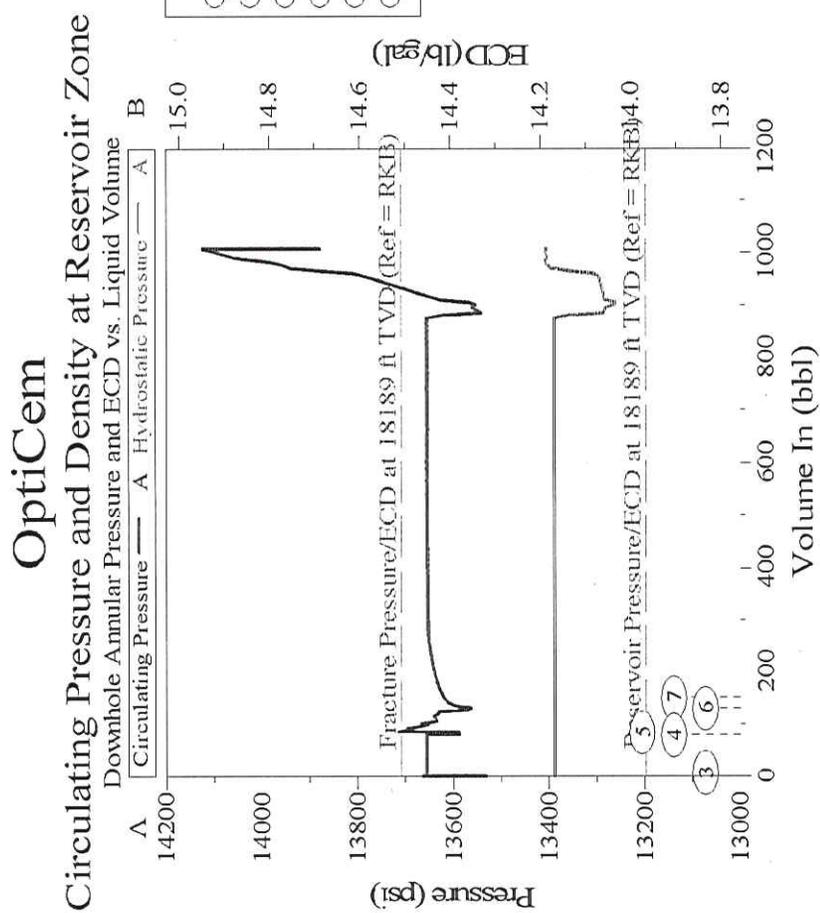
Circulating Pressure and Density at Fracture Zone



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

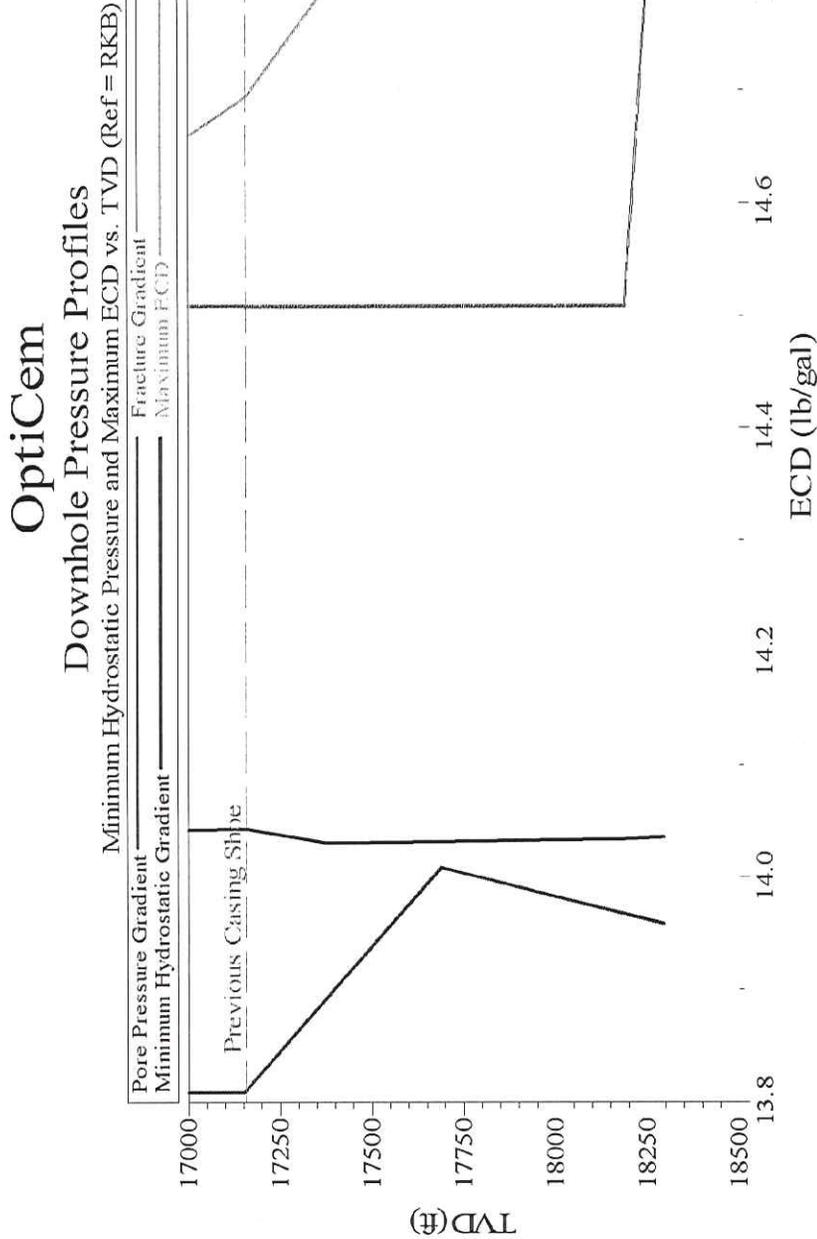
HALLIBURTON
 OptiCem v6.4.8
 18-Apr-10 11:10

6.3 Circ Pressure & Density - Res Zone (graph)



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

6.4 Downhole Pressure Profiles (graph)



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

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

6.5 MC252#1_BP01_Svy_Rec_NO_4_10_10.txt (text)

#VERS. 1.20: Halliburton Ascii file
 #WRAP. NO: One line per depth step

~Well Information Block

| #MNM.UNIT | Data Type | Information |
|-----------|------------------|-------------------------------|
| STR.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: | |

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 |
| WDSM.ft | WD ELEV: | 4992.000000 |
| WHNS.ft | WELL HEAD N/S: | 0.000000 |
| WHEW.ft | WELL HEAD E/W: | 0.000000 |
| UTMX.m | UTM X: | 366612.937500 |
| UTMY.m | UTM Y: | 3179557.750000 |
| DFWL.ft | DISTANCE FWL: | 0.000000 |
| DFSL.ft | DISTANCE FSL: | 0.000000 |
| EPD .ft | ELEVATION: | 0.000000 |
| APD .ft | DEPTH ABOVE PD: | 75.000000 |
| STRD.ft | START DEPTH: | 5067.000000 |
| EDEP.ft | END DEPTH: | 18260.000000 |
| VSDR.deg | VERT SEC DIRECT: | 256.640015 |
| MFLD.nt | MAGNETIC FIELD: | 47321.000000 |
| MDIP.deg | MAGNETIC DIP: | 58.613998 |
| GVFD.g | GRAVITY FIELD: | 1.000000 |
| MDEC.deg | MAGNETIC DECL: | -0.945000 |
| GRDC.deg | GRID CORRECTION: | -0.656900 |
| AZTC.deg | AZM TOTAL CORR: | -0.288100 |
| WTYP. | WELL TYPE: | 0 |
| VSC . | VS TO CLOSURE: | 0 |
| MAGU. | MAGUTM CHECKSUM: | 1710684 |
| NREF. | NORTH REFERENCE: | 2 |
| HPTY. | HOLE POS TYPE: | 0 |

#----- ~OTHER INFORMATION SECTION -----

#-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 =
```

```
"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 Inclinatio Azimuth TVD
Latitude Departure VerticalSe DogLeg
#----- CURVES UNITS -----
# ft deg ft deg °/100' ft
ft ft deg ft deg °/100' ft
0.00 5067.0000 0.00 0.00 0.00 5067.00
-1.55 5526.0000 7.70 1.96 101.40 5525.91
-2.04 5621.0000 10.64 1.65 97.18 5620.86
-2.36 5719.0000 13.18 1.34 96.79 5718.83
-2.51 5815.0000 15.24 1.13 91.44 5814.81
-2.58 5908.0000 16.92 0.94 93.43 5907.79
-2.66 6004.0000 18.43 0.86 92.56 6003.78
-2.68 6099.0000 19.74 0.72 89.32 6098.77
-2.65 6195.0000 20.85 0.61 86.62 6194.76
-2.56 6304.0000 21.89 0.49 83.25 6303.76
-2.50 6401.0000 22.38 0.09 82.22 6400.76
-2.50 6495.0000 22.47 0.03 119.73 6494.76
```

HALLIBURTON

BP AMERICA PRODUCTION COMPANY

Macondo #1

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

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

HALLIBURTON

BP AMERICA PRODUCTION COMPANY

Macondo #1

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

| | | | | | | |
|--------|------------|---------|--------|--------|------|----------|
| -1.78 | 9463.0000 | 33.24 | 0.38 | 90.85 | 0.05 | 9462.59 |
| -2.10 | 9603.0000 | 34.15 | -31.93 | 125.67 | 0.18 | 9602.59 |
| -2.80 | 9736.0000 | 34.76 | 0.38 | 153.99 | 0.16 | 9735.59 |
| -3.58 | 9874.0000 | 35.26 | -33.18 | 141.03 | 0.06 | 9873.58 |
| -4.19 | 10004.0000 | 35.65 | 0.39 | 157.87 | 0.13 | 10003.58 |
| -4.92 | 10150.0000 | 35.91 | 0.25 | 162.34 | 0.08 | 10149.58 |
| -5.84 | 10285.0000 | 35.99 | -33.71 | 184.50 | 0.13 | 10284.58 |
| -6.94 | 10424.0000 | 35.92 | 0.36 | 182.69 | 0.02 | 10423.57 |
| -8.00 | 10563.0000 | 35.61 | 0.44 | 210.58 | 0.16 | 10562.57 |
| -9.00 | 10701.0000 | 35.08 | 0.47 | 205.53 | 0.03 | 10700.56 |
| -10.01 | 10839.0000 | 34.56 | -32.05 | 208.48 | 0.02 | 10838.56 |
| -11.12 | 10977.0000 | 34.02 | 0.47 | 204.08 | 0.07 | 10976.55 |
| -12.46 | 11114.0000 | 33.40 | -31.31 | 205.50 | 0.08 | 11113.54 |
| -13.78 | 11252.0000 | 32.62 | 0.56 | 216.24 | 0.10 | 11251.54 |
| -14.83 | 11390.0000 | 31.79 | -30.53 | 220.53 | 0.09 | 11389.53 |
| -15.81 | 11528.0000 | 31.29 | 0.67 | 191.93 | 0.17 | 11527.52 |
| -16.79 | 11665.0000 | 31.14 | -29.62 | 185.19 | 0.06 | 11664.52 |
| -17.36 | 11796.0000 | 27.50 | 0.61 | 267.85 | 2.38 | 11795.45 |
| -18.20 | 11934.0000 | 16.99 | -28.55 | 264.12 | 1.80 | 11933.04 |
| -19.95 | 12070.0000 | -0.38 | 0.50 | 264.29 | 2.58 | 12067.89 |
| -22.67 | 12209.0000 | -23.24 | 0.45 | 262.27 | 0.63 | 12204.97 |
| -25.70 | 12347.0000 | -46.01 | 0.38 | 262.55 | 0.52 | 12341.04 |
| -28.30 | 12484.0000 | -67.09 | 0.38 | 263.43 | 0.45 | 12476.39 |
| -30.83 | 12622.0000 | -85.96 | 3.15 | 261.10 | 1.02 | 12613.06 |
| -33.23 | 12760.0000 | -101.69 | 5.62 | 261.62 | 0.91 | 12750.14 |
| -34.98 | 12896.0000 | -113.80 | 9.13 | 261.99 | 1.22 | 12885.58 |
| -35.85 | 13034.0000 | -120.51 | 4.98 | 264.67 | 2.21 | 13023.40 |
| -36.03 | 13112.0000 | -121.83 | 9.94 | 257.80 | 0.81 | 13101.39 |
| | | | 9.22 | | | |
| | | | 50.70 | | | |
| | | | 71.81 | | | |
| | | | 7.25 | | | |
| | | | 90.76 | | | |
| | | | 5.99 | | | |
| | | | 106.62 | | | |
| | | | 4.33 | | | |
| | | | 118.80 | | | |
| | | | 1.29 | | | |
| | | | 125.53 | | | |
| | | | 0.67 | | | |
| | | | 126.86 | | | |

HALLIBURTON

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

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

HALLIBURTON

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

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

HALLIBURTON

Cementing Gulf of Mexico, Broussard

LAB RESULTS - Primary

Job Information

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

Well Information

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

Drilling Fluid Information

| | | | | | | |
|-------------|----|------|------|---------|----------|-------|
| Mud Company | MI | Type | SOBM | Density | 14,1 PPG | PV/YP |
|-------------|----|------|------|---------|----------|-------|

Cement Information - Primary Design

| Conc | UOM | Cement/Additive | Sample Type | Sample Date | Lot No. | Cement Properties | |
|--------|--------|-------------------------------|-------------|--------------|-------------|-------------------|-------------|
| | | | | | | Slurry Density | 16.741 PPG |
| | | | | | | Slurry Yield | 1.37 FT3 |
| 100.00 | % BWOC | Lafarge Class H | Rig | Apr 05, 2010 | Tank # 8 | Water Requirement | 4.93 GPS |
| 0.07 | % BWOC | EZ-FLO | Rig | Apr 05, 2010 | | Total Mix Fluid | 5.02 GPS |
| 0.25 | % BWOC | D-Air 3000 | Rig | Apr 05, 2010 | | Foam Density | 14.496 PPG |
| 1.88 | lb/sk | KCl (Potassium Chloride) Salt | Rig | Apr 05, 2010 | | Foam Quality | 12.98 % |
| 20.00 | % BWOC | SSA-1 (Silica Flour) - PB | Rig | Apr 05, 2010 | | Water Source | Fresh Water |
| 15.00 | % BWOC | SSA-2 (100 Mesh) - PB | Rig | Apr 05, 2010 | | Water Chloride | N/A ppm |
| 0.20 | % BWOC | SA-541 | Rig | Apr 05, 2010 | | | |
| 0.11 | gps | ZoneSealant 2000 | Lab | Mar 15, 2009 | | | |
| 0.09 | gps | SCR-100L | Lab | Oct 22, 2009 | 6264 | | |
| 4.93 | gps | Fresh Water | Lab | Apr 12, 2010 | FRESH WATER | | |

Operation Test Results Request ID 73909/2

Thickening Time, Request Test ID:812338

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

Mud Balance Density, Request Test ID:811529

Density (ppg)
16.7
from part 1

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

Mixability rating (0 - 5)
4

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Operation Test Results Request ID 73909/1

Non API Rheology, Request Test ID:806075

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

Non API Rheology, Request Test ID:806076

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

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

Test Temp (°F)

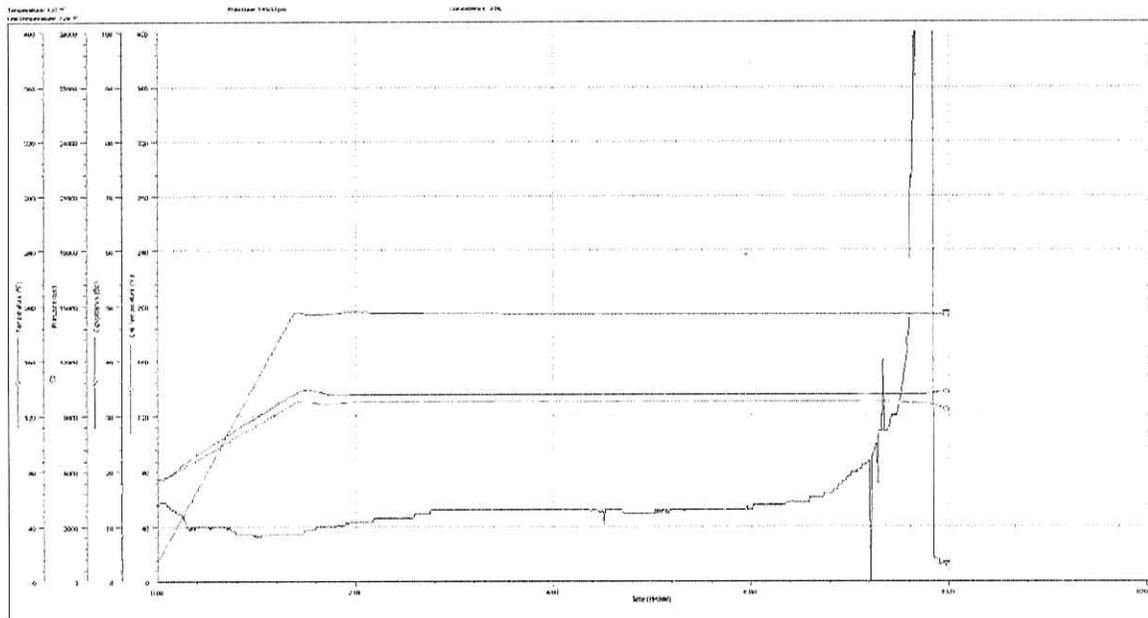
80

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

Crush Compressive Strength, Request Test ID:806069

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

Condition for 1.5 hrs, Foamed to 14.5 ppg



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