

Appendix E:
Cement Program and CBLs

HALLIBURTON

**DCP Midstream
370 17th Street Suite 2500
Denver, Colorado 80202**

DCP Linam AGI 1

Lea County, New Mexico
United States of America
S:30 T:18S R:37E

Cementing Proposal

Prepared for: Russell Bentley
July 30, 2007
Version: 1

Submitted by:
Dick Mocksfield

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

Foreword

Halliburton Energy Services is pleased to have this opportunity to present this proposal for your consideration. We earnestly request the service work to be performed on this well.

These Service Coordinators can be reached in our District, at the following phone numbers:

MIDLAND SALES OFFICE

1-800-844-8451

ODESSA DISTRICT

1-800-417-5096

CEMENTING:

Scott Kerby / Joe Briseno
BJ Wheeler

STIMULATION:

Mel Holt / Larry Staples
Basil Hacker

LOGGING & PERFORATING

Allen Avera / Keith Drake
Daryl Nations

COILED TUBING & NITROGEN

Michael Ybaben

TOOLS & TESTING, PROD. SVCS., TCP, COMPL. PRODUCTS

Steve Engleman

BAROID

Fernando Arizpe

HOBBS DISTRICT

1-800-416-6081

CEMENTING

Pete Garza / Ronald Arnold
Jaime Gonzales

STIMULATION:

Freddy Casillas / Jerry Thurman
Travis Laman

LOGGING & PERFORATING

Darrell Merrell / Vernon Reeve

TOOLS & TESTING, PROD. SVCS., TCP, COMPL. PRODUCTS

Mike McWilliams

BAROID

Freddy Redmon

PREPARED BY: Bruce Day

We look forward to working with you to provide the very best quality services available in the Permian Basin.

Dick Mocksfield, Technical Supervisor

Cementing Best Practices

1. **Cement quality and weight:** You must choose cement slurry that is designed to solve the problems specific to each string of pipe.
2. **Waiting time:** You must hold the cement slurry in place and under pressure until it hardens. A cement slurry is a time-dependent liquid and must be allowed to undergo a hydration reaction to produce a competent cement sheath. A fresh cement slurry can be worked (thickening or pump time) as long as it is plastic, and the initial set of cement occurs during the rapid reaction stage. If the cement is not allowed to hydrate; it will be subject to changes in density, dilution, settling, water separation, and gas cutting that can lead to lack of zonal isolation with resultant bridging in the annulus.
3. **Pipe movement:** Pipe movement may be one of the single most influential factors in mud removal. Reciprocation and/or rotation mechanically breaks up gelled mud and constantly changes the flow patterns in the annulus for better cement bonding.
4. **Mud properties:** Plastic viscosity (PV) should be less than 15 centipoise (cp), and less than 10 cp, if possible, yield point (YP) should be less than 10 pound/100-square feet (lb/100ft²) decreasing down to about 5 lb/100 ft².
5. **Mud gel strength:** A nonthixotropic mud is desirable for good mud removal. Mud left in the hole prior to running casing should have 10-second/10-minute/30-minute gel strength such that the 10-minute is less than double the 10-second and the 30-minute is less than 20 lb/100 ft²). Sufficient shear strength may not be achieved on a primary cement job to remove mud left in the hole should the mud develop more than 25 lb/100 ft².
6. **Mud fluid loss:** Decreasing the filtrate loss into a permeable zone enhances the creation of a thin filter cake. This increases the fluid mud in the hole, which is more easily removed. Generally, an API fluid loss of 7 or 8 milliliter (ml) is sufficient with high-temperature/high-pressure fluid loss (HTHP) no more than double this amount.
7. **Circulation:** Circulate bottoms up twice, or until well conditioned mud is being returned to the surface. There should be no cutting in the mud returns. An annular velocity of 260 feet per minute is optimum (SPE/IADC 18617), if possible.
8. **Flow rate:** Turbulent flow is more desirable flow regime for mud removal. If turbulence cannot be achieved, better mud removal is found when maximum flow energy is used. The maximum pump rate should be determined to obtain the best flow regime.
9. **Hole size:** The optimum hole size recommended for good mud removal is 1.5 to 2 inches larger than the casing or liner size. Hole sizes larger than 2 inches annular space can be dealt with, but those that are smaller than 1.5 inches present difficult problems.
10. **Pipe Centralization:** This helps to create a uniform flow area perpendicular to flow direction. Cement will take the path of least resistance so that centralization is important in keeping the pipe off the walls of the hole. At least a 70 percent standoff should be achieved for centralization.
11. **Rat hole:** When applicable, a weighted viscous pill in the rat hole prevents cement from swapping with lighter weight mud when displacement stops.
12. **Shoe joint:** A shoe joint is recommended on all primary casings and liners. The length of the shoe joint will vary, although the absolute minimum length is one joint of pipe. If conditions exist, such as not running a bottom plus, two joints should be the minimum lengths.

Job Information

Surface Casing

| | |
|----------------|-----------------|
| DCP Linam AGI | 1 |
| 17-1/2" Hole | 0 - 530 ft (MD) |
| Inner Diameter | 17.500 in |
| Job Excess | 100 % |
| Surface Casing | 0 - 530 ft (MD) |
| Outer Diameter | 13.375 in |
| Inner Diameter | 12.715 in |
| Linear Weight | 48 lbm/ft |
| Thread | STC |
| Casing Grade | H-40 |

Calculations

Cement : (530.00 ft fill)
 $530.00 \text{ ft} * 0.6946 \text{ ft}^3/\text{ft} * 100 \%$ = 736.32 ft³
 Primary Cement = 736.32 ft³
 = 131.14 bbl

Shoe Joint Volume: (40.00 ft fill)
 $40.00 \text{ ft} * 0.8818 \text{ ft}^3/\text{ft}$ = 35.27 ft³
 = 6.28 bbl
 Tail plus shoe joint = 771.59 ft³
 = 137.43 bbl
 Total Tail = 573 sks

Job Recommendation

Surface Casing

Install floating equipment, run casing to bottom, and circulate a minimum of 2-3 hole volumes prior to cementing as follows:

Fluid Instructions

Fluid 1: Precede cement with 20 bbl
Fresh Water

Fluid Volume: 20 bbl

Fluid 2: Mix and pump 575 sks
Premium Plus Cement
2 % Calcium Chloride (Accelerator)

Fluid Weight 14.80 lbm/gal
Slurry Yield: 1.35 ft³/sk
Total Mixing Fluid: 6.39 Gal/sk
Top of Fluid: 0 ft
Calculated Fill: 530 ft
Volume: 137.43 bbl
Calculated Sacks: 572.82 sks
Proposed Sacks: 575 sks

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Cost Estimate

Surface Casing

| <u>Mtrl Nbr</u> | <u>Description</u> | <u>Qty</u> | <u>U/M</u> | <u>Unit Price</u> | <u>Gross Amt</u> |
|-----------------|---|----------------|------------|-------------------|------------------|
| 1 | MILEAGE FOR CEMENTING EQUIPMENT NUMBER OF UNITS | 15 1 | MI | 9.79 | 146.85 |
| 2 | MILEAGE FOR CEMENTING CREW NUMBER OF UNITS | 15 1 | MI | 5.76 | 86.40 |
| 11941 | FIELD STORAGE BIN DELIVERY NUMBER OF UNITS | 15 1 | MI | 9.79 | 146.85 |
| | 0% disc. on surcharges | | | | |
| 7 | ENVIRONMENTAL SURCHARGE | 1 | JOB | 134.00 | 134.00 |
| 86955 | FUEL SURCHG-HEAVY TRKS NUMBER OF UNITS | 15 2 | MI | 0.45 | 13.50 |
| 86954 | FUEL SURCHG-CARS/PICKUPS NUMBER OF UNITS | 15 1 | MI | 0.15 | 2.25 |
| 87605 | FUEL SURCHG-CMT & CMT ADDITIVES NUMBER OF TONS | 7.5 27.57 | TNM | 0.15 | 31.02 |
| 372867 | DOT VEHICLE CHARGE | 2 | EA | 241.00 | 482.00 |
| 16091 | PUMPING CHARGE DEPTH FEET/METERS (FT/M) | 1 530 FT | EA | 4,028.00 | 4,028.00 |
| 141 | RCM w/ RA DENSOMETER NUMBER OF UNITS | 1 1 | JOB | 1,990.00 | 1,990.00 |
| 16115 | FIELD STORAGE BIN ON SITE DAYS OR PARTIAL DAY(WHOLE NO.) | 1 1 | EA | 1,344.00 | 1,344.00 |
| 361922 | LO TORC@VLV 2", W/HES TOTAL NUMBER HR/DAY/WEEK/MTH/YEAR/JOB/RUN | 1 1 DAY | EA | 83.40 | 83.40 |
| 381901 | STEEL HOSE 2", W/HES TOTAL NUMBER HR/DAY/WEEK/MTH/YEAR/JOB/RUN | 4 1 DAY | EA | 87.00 | 348.00 |
| 361923 | LEAD-OFF SWING, 2", W/HES TOTAL NUMBER HR/DAY/WEEK/MTH/YEAR/JOB/RUN | 4 1 DAY | EA | 48.60 | 194.40 |
| 74038 | PLUG CONTAINER RENTAL DAYS OR FRACTION (MIN1) | 1 1 | EA | 0.00 | 1,322.00 |
| | 25% disc. on plug | | | | |
| 101235693 | PLUG, TOP, 13 3/8, HWE, 11.79 MIN/12.72 | 1 | EA | 998.00 | 998.00 |
| 100012205 | PREMIUM PLUS CEMENT | 575 | SK | 39.69 | 22,821.75 |
| 100005053 | CALCIUM CHLORIDE | 14 | SK | 223.20 | 3,124.80 |
| 76400 | MILEAGE, CMT MTLs DEL/RET NUMBER OF TONS | 7.5 27.57 | MI | 3.35 | 692.70 |
| 3965 | SVC CHRg, CMT & ADDITIVES NUMBER OF EACH | 592 1 | CF | 5.49 | 3,250.08 |
| | Total | USD | | | 41,240.00 |
| | 55% Discount | USD | | | 22,018.08 |
| | Discounted Total | USD | | | 19,221.92 |

Price Book Ref: 09 Permian Basin

Price Date: 7/30/2007

Cost Estimate

Optional Services

| <u>Mtrl Nbr</u> | <u>Description</u> | <u>Qty</u> | <u>U/M</u> | <u>Unit Price</u> | <u>Gross Amt</u> |
|-----------------|---|----------------|------------|-------------------|------------------|
| | Optional Services if Required or Requested | | | | |
| | 25% Discount | | | | |
| 3 | DERRICK CHARGE | 1 | EA | 987.00 | 987.00 |
| | 35% Discount | | | | |
| 16092 | ADDITIONAL HOURS - PUMP TRUCK HOURS | 1 1 | EA | 927.00 | 927.00 |
| 464256 | ADDITIONAL HOURS - BULK TRUCK HOURS | 1 1 | EA | 196.00 | 196.00 |
| 13 | CSG PUMPING,STANDBY UNIT,/6HRS HOUR IN RANGE OF 6 HOURS | 1 6 | UN | 5,564.00 | 5,564.00 |
| 16094 | PLUG BACK/SPOT CEMENT OR MUD DEPTH FEET/METERS (FT/M) | 1 530 FT | EA | 4,635.00 | 4,635.00 |
| 16096 | PLUGGING ADDITIONAL HOURS HOURS | 1 1 | EA | 927.00 | 927.00 |
| | Services Discount | | | | |
| 4020 | ADDITIONAL HOURS - TRANSPORT NUMBER OF UNITS | 1 1 | H | 320.56 | 320.56 |
| 1 | MILEAGE - STANDBY PUMP TRUCK NUMBER OF UNITS | 15 1 | MI | 9.79 | 146.85 |
| 2 | MILEAGE FOR STANDBY CREW NUMBER OF UNITS | 15 1 | MI | 5.76 | 86.40 |
| 116 | BOOSTER PUMP-SKID,/DAY NUMBER OF DAYS | 1 1 | EA | 1,362.00 | 1,362.00 |
| 16118 | LAB TESTING PER HOUR HOURS OR FRACTION (MIN4) | 1 4 | EA | 0.00 | 1,236.00 |
| | Non-Discounted Items | | | | |
| 45 | DRILL PIPE PIN | 1 | EA | 150.00 | 150.00 |
| 45 | CIRCULATING IRON | 1 | EA | 1,500.00 | 1,500.00 |
| 86955 | FUEL SURCHARGE-STANDBY PUMP NUMBER OF UNITS | 15 1 | MI | 0.45 | 6.75 |
| 86954 | FUEL SURCHARGE-STANDBY CREW NUMBER OF UNITS | 15 1 | MI | 0.15 | 2.25 |

Price Book Ref: 09 Permian Basin

Price Date: 7/30/2007

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Casing/Sales Equipment

Surface Casing

| <u>Mtrl Nbr</u> | <u>Description</u> | <u>Qty</u> | <u>U/M</u> | <u>Unit Price</u> | <u>Gross Amt</u> |
|-----------------|--|------------|------------|-------------------|------------------|
| 2 | FLOAT EQUIPMENT DELIVERY CHARGE | 15 | MI | 5.76 | 86.40 |
| 86954 | FUEL SURCHG-CARS/PICKUPS | 15 | MI | 0.15 | 2.25 |
| 100004730 | SHOE,GID,13 3/8 8RD,CEM | 1 | EA | 1,004.00 | 1,004.00 |
| 100004705 | V ASSY,INSR FLOAT,13 3/8,8RD | 1 | EA | 1,426.00 | 1,426.00 |
| 100004487 | CENTRALIZER-13 3/8"-CSG-17 1/2"-HINGED | 4 | EA | 283.00 | 1,132.00 |
| 100004631 | CLAMP - LIMIT - 13-3/8 - HINGED - | 1 | EA | 80.00 | 80.00 |
| 100005045 | KIT,HALL WELD-A | 1 | EA | 74.30 | 74.30 |
| | Total | USD | | | 3,804.95 |
| | Discount | USD | | | 1,719.86 |
| | Discounted Total | USD | | | 2,085.09 |

Price Book Ref: 09 Permian Basin

Price Date: 7/30/2007

Job Information**Intermediate Casing**

| | |
|---------------------|--------------------|
| DCP Linam AGI | 1 |
| Surface Casing | 0 - 530 ft (MD) |
| Outer Diameter | 13.375 in |
| Inner Diameter | 12.715 in |
| Linear Weight | 48 lbm/ft |
| Thread | STC |
| Casing Grade | H-40 |
| 12-1/4" Hole | 530 - 4200 ft (MD) |
| Inner Diameter | 12.250 in |
| Job Excess | 125 % |
| Intermediate Casing | 0 - 4200 ft (MD) |
| Outer Diameter | 9.625 in |
| Inner Diameter | 8.835 in |
| Linear Weight | 40 lbm/ft |
| Thread | LTC |
| Casing Grade | J-55 |

Calculations**Intermediate Casing**

| | |
|---|---------------------------|
| Cement : (3700.00 ft fill) | |
| 530.00 ft * 0.3765 ft ³ /ft * 10 % | = 219.50 ft ³ |
| 3170.00 ft * 0.3132 ft ³ /ft * 125 % | = 2233.81 ft ³ |
| Total Lead Cement | = 2453.31 ft ³ |
| | = 436.95 bbl |
| Sacks of Cement | = 935 sks |
| Cement : (500.00 ft fill) | |
| 500.00 ft * 0.3132 ft ³ /ft * 125 % | = 352.34 ft ³ |
| Tail Cement | = 352.34 ft ³ |
| | = 62.75 bbl |
| Shoe Joint Volume: (40.00 ft fill) | |
| 40.00 ft * 0.4257 ft ³ /ft | = 17.03 ft ³ |
| | = 3.03 bbl |
| Tail plus shoe joint | = 369.37 ft ³ |
| | = 65.79 bbl |
| Total Tail | = 278 sks |

Job Recommendation

Intermediate Casing

Install floating equipment, run casing to bottom, and circulate a minimum of 2-3 hole volumes prior to cementing as follows:

Fluid Instructions

Fluid 1: Precede cement with 20 bbl
Fresh Water

Fluid Volume: 20 bbl

Fluid 2: Lead with 940 sks
Interfill C

1 lbm/sk

Pheno Seal - Blend (Lost Circulation Additive)

Fluid Weight 11.70 lbm/gal

Slurry Yield: 2.62 ft³/sk

Total Mixing Fluid: 15.39 Gal/sk

Top of Fluid: 0 ft

Calculated Fill: 3700 ft

Volume: 436.95 bbl

Calculated Sacks: 935.31 sks

Proposed Sacks: 940 sks

Fluid 3: Tail-in with 280 sks

Premium Plus Cement

0.6 %

Halad®-9 (Low Fluid Loss Control)

Fluid Weight 14.80 lbm/gal

Slurry Yield: 1.33 ft³/sk

Total Mixing Fluid: 6.30 Gal/sk

Top of Fluid: 3700 ft

Calculated Fill: 500 ft

Volume: 65.79 bbl

Calculated Sacks: 278.14 sks

Proposed Sacks: 280 sks

Cost Estimate

Intermediate Casing

| <u>Mtrl Nbr</u> | <u>Description</u> | <u>Qty</u> | <u>U/M</u> | <u>Unit Price</u> | <u>Gross Amt</u> |
|-----------------|---|-----------------|------------|-------------------|------------------|
| 1 | MILEAGE FOR CEMENTING EQUIPMENT NUMBER OF UNITS | 15 1 | MI | 9.79 | 146.85 |
| 2 | MILEAGE FOR CEMENTING CREW NUMBER OF UNITS | 15 1 | MI | 5.76 | 86.40 |
| 11941 | FIELD STORAGE BIN DELIVERY NUMBER OF UNITS | 15 1 | MI | 9.79 | 146.85 |
| | 0% disc. on surcharges | | | | |
| 7 | ENVIRONMENTAL SURCHARGE | 1 | JOB | 134.00 | 134.00 |
| 86955 | FUEL SURCHG-HEAVY TRKS NUMBER OF UNITS | 15 1 | MI | 0.45 | 6.75 |
| 86954 | FUEL SURCHG-CARS/PICKUPS NUMBER OF UNITS | 15 1 | MI | 0.15 | 2.25 |
| 87605 | FUEL SURCHG-CMT & CMT ADDITIVES NUMBER OF TONS | 7.5 60.9 | TNM | 0.15 | 68.51 |
| 372867 | DOT VEHICLE CHARGE | 3 | EA | 241.00 | 723.00 |
| 16091 | PUMPING CHARGE DEPTH FEET/METERS (FT/M) | 1 4200 FT | EA | 5,392.00 | 5,392.00 |
| 141 | RCM w/ RA DENSOMETER NUMBER OF UNITS | 1 1 | JOB | 1,990.00 | 1,990.00 |
| 16115 | FIELD STORAGE BIN ON SITE DAYS OR PARTIAL DAY(WHOLE NO.) | 1 1 | EA | 1,344.00 | 1,344.00 |
| 361922 | LO TORC@VLV 2", W/HES TOTAL NUMBER HR/DAY/WEEK/MTH/YEAR/JOB/RUN | 1 1 DAY | EA | 83.40 | 83.40 |
| 381901 | STEEL HOSE 2", W/HES TOTAL NUMBER HR/DAY/WEEK/MTH/YEAR/JOB/RUN | 4 1 DAY | EA | 87.00 | 348.00 |
| 361923 | LEAD-OFF SWING, 2", W/HES TOTAL NUMBER HR/DAY/WEEK/MTH/YEAR/JOB/RUN | 4 1 DAY | EA | 48.60 | 194.40 |
| 74038 | PLUG CONTAINER RENTAL DAYS OR FRACTION (MIN1) | 1 1 | EA | 0.00 | 1,322.00 |
| | 25% disc. on plug | | | | |
| 101214575 | PLUG, TOP, 9 5/8, HWE, 8.16 MIN/9.06 MA | 1 | EA | 454.00 | 454.00 |
| 14210 | INTERFILL C - PB | 940 | SK | 37.93 | 35,654.20 |
| 101342230 | PHENO SEAL - BLEND | 940 | LB | 3.49 | 3,280.60 |
| 100012205 | PREMIUM PLUS CEMENT | 280 | SK | 39.69 | 11,113.20 |
| 100001617 | HALAD-9 | 158 | LB | 25.65 | 4,052.70 |
| 76400 | MILEAGE, CMT MTLs DEL/RET MIN NUMBER OF TONS | 7.5 60.9 | MI | 3.35 | 1,530.11 |
| 3965 | SVC CHRg, CMT & ADDITIVES | 1493 | CF | 5.49 | 8,196.57 |
| | Total | USD | | | 76,269.79 |
| | 55% Discount | USD | | | 41,298.21 |
| | Discounted Total | USD | | | 34,971.58 |

Price Book Ref: 09 Permian Basin

Price Date: 7/30/2007

Cost Estimate

Optional Services

| <u>Mtrl Nbr</u> | <u>Description</u> | <u>Qty</u> | <u>U/M</u> | <u>Unit Price</u> | <u>Gross Amt</u> |
|-----------------|---|-----------------|------------|-------------------|------------------|
| | Optional Services if Required or Requested | | | | |
| | 25% Discount | | | | |
| 3 | DERRICK CHARGE | 1 | EA | 987.00 | 987.00 |
| | 35% Discount | | | | |
| 16092 | ADDITIONAL HOURS - PUMP TRUCK HOURS | 1 1 | EA | 927.00 | 927.00 |
| 464256 | ADDITIONAL HOURS - BULK TRUCK HOURS | 1 1 | EA | 196.00 | 196.00 |
| 13 | CSG PUMPING,STANDBY UNIT,/6HRS HOUR IN RANGE OF 6 HOURS | 1 6 | UN | 5,564.00 | 5,564.00 |
| 16094 | PLUG BACK/SPOT CEMENT OR MUD DEPTH FEET/METERS (FT/M) | 1 4200 FT | EA | 5,841.00 | 5,841.00 |
| 16096 | PLUGGING ADDITIONAL HOURS HOURS | 1 1 | EA | 927.00 | 927.00 |
| | Services Discount | | | | |
| 4020 | ADDITIONAL HOURS - TRANSPORT NUMBER OF UNITS | 1 1 | H | 320.56 | 320.56 |
| 1 | MILEAGE - STANDBY PUMP TRUCK NUMBER OF UNITS | 15 1 | MI | 9.79 | 146.85 |
| 2 | MILEAGE FOR STANDBY CREW NUMBER OF UNITS | 15 1 | MI | 5.76 | 86.40 |
| 116 | BOOSTER PUMP-SKID,/DAY NUMBER OF DAYS | 1 1 | EA | 1,362.00 | 1,362.00 |
| 16118 | LAB TESTING PER HOUR HOURS OR FRACTION (MIN4) | 1 4 | EA | 0.00 | 1,236.00 |
| | Non-Discounted Items | | | | |
| 45 | DRILL PIPE PIN | 1 | EA | 150.00 | 150.00 |
| 45 | CIRCULATING IRON | 1 | EA | 1,500.00 | 1,500.00 |
| 86955 | FUEL SURCHARGE-STANDBY PUMP NUMBER OF UNITS | 15 1 | MI | 0.45 | 6.75 |
| 86954 | FUEL SURCHARGE-STANDBY CREW NUMBER OF UNITS | 15 1 | MI | 0.15 | 2.25 |

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Price Date: 7/30/2007

HALLIBURTON

Casing/Sales Equipment

Intermediate Casing

| <u>Mtrl Nbr</u> | <u>Description</u> | <u>Qty</u> | <u>U/M</u> | <u>Unit Price</u> | <u>Gross Amt</u> |
|-----------------|---------------------------------------|------------|------------|-------------------|------------------|
| 100004955 | SHOE,FLT,9-5/8 8RD,2-3/4 SUPER SEAL | 1 | EA | 1,402.00 | 1,402.00 |
| 100004823 | CLR,FLT,9-5/8 8RD 29.3-40PPF,2-3/4 | 1 | EA | 1,553.00 | 1,553.00 |
| 100004485 | CENTRALIZER-9-5/8"-CSG-12 1/4"-HINGED | 25 | EA | 207.00 | 5,175.00 |
| 100004629 | COLLAR-STOP-9 5/8"-FRICTION-HINGED | 1 | EA | 63.20 | 63.20 |
| 100005045 | KIT,HALL WELD-A | 2 | EA | 74.30 | 148.60 |
| | Total | USD | | | 8,341.80 |
| | Discount | USD | | | 3,753.81 |
| | Discounted Total | USD | | | 4,587.99 |

Price Book Ref: 09 Permian Basin

Price Date: 7/30/2007

Job Information

Production Casing

DCP Linam AGI

1

Intermediate Casing

0 - 4200 ft (MD)

Outer Diameter

9.625 in

Inner Diameter

8.835 in

Linear Weight

40 lbm/ft

Thread

LTC

Casing Grade

J-55

8-3/4" Hole

4200 - 9000 ft (MD)

Inner Diameter

8.750 in

Job Excess

50 %

DV Tool

8000 ft (MD)

Production Casing

0 - 9000 ft (MD)

Outer Diameter

7.000 in

Inner Diameter

6.276 in

Linear Weight

26 lbm/ft

Thread

STC

Casing Grade

L-80

Calculations**Production Casing**

Stage 1

Cement : (1000.00 ft fill)
1000.00 ft * 0.1503 ft³/ft * 50 % = 225.50 ft³
Primary Cement = 225.50 ft³
= 40.16 bbl

Shoe Joint Volume: (40.00 ft fill)
40.00 ft * 0.2148 ft³/ft = 8.59 ft³
= 1.53 bbl
Tail plus shoe joint = 234.09 ft³
= 41.69 bbl
Total Tail = 203 sks

Stage 2

Cement : (4500.00 ft fill)
4200.00 ft * 0.1585 ft³/ft * 0 % = 665.63 ft³
300.00 ft * 0.1503 ft³/ft * 50 % = 67.65 ft³
Total Second Stage Lead Cement = 733.28 ft³
= 130.60 bbl
Sacks of Cement = 262 sks

Cement : (3500.00 ft fill)
3500.00 ft * 0.1503 ft³/ft * 50 % = 789.23 ft³
Second Stage Tail Cement = 789.23 ft³
= 140.57 bbl
Total Tail = 683 sks

Job Recommendation

Production Casing

Install floating equipment, run casing to bottom, and circulate a minimum of 2-3 hole volumes prior to cementing as follows:

Fluid Instructions

Stage 1

Fluid 1: Precede cement with 20 bbl
Fresh Water

Fluid Volume: 20 bbl

Fluid 2: Mix and pump 205 sks

50/50 Poz Premium (No Gel)

1 lbm/sk LAP-1 (Low Fluid Loss Control)

0.5 % CFR-3 (Dispersant)

0.25 lbm/sk D-AIR 3000 (Defoamer)

Fluid Weight 14.80 lbm/gal

Slurry Yield: 1.16 ft³/sk

Total Mixing Fluid: 5.06 Gal/sk

Top of Fluid: 8000 ft

Calculated Fill: 1000 ft

Volume: 41.69 bbl

Calculated Sacks: 202.67 sks

Proposed Sacks: 205 sks

DV Tool @ 8000 ft (MD)

Stage 2

Fluid 1: Precede cement with 20 bbl
Fresh Water

Fluid Volume: 20 bbl

Fluid 2: Lead with 265 sks

Interfill H

1 lbm/sk Pheno Seal - Blend (Lost Circulation Additive)

Fluid Weight 11.50 lbm/gal

Slurry Yield: 2.80 ft³/sk

Total Mixing Fluid: 16.75 Gal/sk

Top of Fluid: 0 ft

Calculated Fill: 4500 ft

Volume: 130.60 bbl

Calculated Sacks: 261.79 sks

Proposed Sacks: 265 sks

Fluid 3: Tail-in with 685 sks

50/50 Poz Premium (No Gel)

1 lbm/sk LAP-1 (Low Fluid Loss Control)

0.5 % CFR-3 (Dispersant)

0.25 lbm/sk D-AIR 3000 (Defoamer)

Fluid Weight 14.80 lbm/gal

Slurry Yield: 1.16 ft³/sk

Total Mixing Fluid: 5.06 Gal/sk

Top of Fluid: 4500 ft

Calculated Fill: 3500 ft

Volume: 140.57 bbl

Calculated Sacks: 683.32 sks

Proposed Sacks: 685 sks

Warning: ECD calculations need to be made with current wellbore stress data

HALLIBURTON

Cost Estimate

Production Casing

| <u>Mtrl Nbr</u> | <u>Description</u> | <u>Qty</u> | <u>U/M</u> | <u>Unit Price</u> | <u>Gross Amt</u> |
|-----------------|---|--------------|------------|-------------------|------------------|
| 1 | MILEAGE FOR CEMENTING EQUIPMENT NUMBER OF UNITS | 15 1 | MI | 9.79 | 146.85 |
| 2 | MILEAGE FOR CEMENTING CREW NUMBER OF UNITS | 15 1 | MI | 5.76 | 86.40 |
| 11941 | FIELD STORAGE BIN DELIVERY NUMBER OF UNITS | 15 1 | MI | 9.79 | 146.85 |
| | 0% disc. on surcharges | | | | |
| 7 | ENVIRONMENTAL SURCHARGE | 1 | EA | 134.00 | 134.00 |
| 86955 | FUEL SURCHG-HEAVY TRKS NUMBER OF UNITS | 15 1 | MI | 0.45 | 6.75 |
| 86954 | FUEL SURCHG-CARS/PICKUPS NUMBER OF UNITS | 15 1 | MI | 0.15 | 2.25 |
| 87605 | FUEL SURCHG-CMT & CMT ADDITIVES NUMBER OF TONS | 7.5 51.56 | TNM | 0.15 | 58.01 |
| 372867 | DOT VEHICLE CHARGE | 3 | EA | 241.00 | 723.00 |
| 16093 | MSC PUMP CHARGE (1ST STAGE) DEPTH | 1 9000 | EA FT | 8,544.00 | 8,544.00 |
| 16 | MSC CEMENTING (ADD STAGES) NUMBER OF UNITS | 1 1 | STG | 4,635.00 | 4,635.00 |
| 141 | RCM w/RA DENSOMETER | 1 | JOB | 1,990.00 | 1,990.00 |
| 16115 | FIELD STORAGE BIN ON SITE DAYS OR PARTIAL DAY(WHOLE NO.) | 1 1 | EA | 1,344.00 | 1,344.00 |
| 116 | BOOSTER PUMP-SKID,/DAY NUMBER OF DAYS | 1 1 | EA | 1,362.00 | 1,362.00 |
| 361922 | LO TORC@VLV 2",W/HES TOTAL NUMBER | 1 1 | EA DAY | 83.40 | 83.40 |
| 381901 | STL HOSE 2"W/HES TOTAL NUMBER | 4 1 | EA DAY | 87.00 | 348.00 |
| 361923 | LEAD-OFF SWING,2",W/HES TOTAL NUMBER | 4 1 | EA DAY | 48.60 | 194.40 |
| 74038 | PLUG CONTAINER RENTAL-1ST DAY DAYS OR FRACTION (MIN1) | 1 1 | EA | 0.00 | 1,322.00 |
| 14238 | INTERFILL "H" PB | 265 | SK | 37.16 | 9,847.40 |
| 101342230 | PHENO SEAL - BLEND | 265 | LB | 3.49 | 924.85 |
| 12302 | 50-50 POZ (PREMIUM) | 890 | SK | 28.34 | 25,222.60 |
| 100012766 | LAP-1 | 890 | LB | 22.31 | 19,855.90 |
| 100003653 | CFR-3 | 374 | LB | 14.44 | 5,400.56 |
| 101007446 | D-AIR 3000 | 223 | LB | 10.07 | 2,245.61 |
| 76400 | MILEAGE, CMT MTLs DEL/RET NUMBER OF TONS | 7.5 51.56 | MI | 3.35 | 1,295.45 |
| 3965 | SVC CHRg, CMT & ADDITIVES NUMBER OF EACH | 1267 1 | CF | 5.49 | 6,955.83 |
| | Total | USD | | | 92,875.11 |
| | 55% Discount | USD | | | 50,573.13 |
| | Discounted Total | USD | | | 42,301.98 |

Price Book Ref: 09 Permian Basin

Price Date: 7/30/2007

HALLIBURTON

Cost Estimate

Optional Services

| <u>Mtrl Nbr</u> | <u>Description</u> | <u>Qty</u> | <u>U/M</u> | <u>Unit Price</u> | <u>Gross Amt</u> |
|-----------------|---|-----------------|------------|-------------------|------------------|
| | Optional Services if Required or Requested | | | | |
| | 25% Discount | | | | |
| 3 | DERRICK CHARGE | 1 | EA | 987.00 | 987.00 |
| | 35% Discount | | | | |
| 16092 | ADDITIONAL HOURS - PUMP TRUCK HOURS | 1 1 | EA | 927.00 | 927.00 |
| 464256 | ADDITIONAL HOURS - BULK TRUCK HOURS | 1 1 | EA | 196.00 | 196.00 |
| 13 | CSG PUMPING,STANDBY UNIT,/6HRS HOUR IN RANGE OF 6 HOURS | 1 6 | UN | 5,564.00 | 5,564.00 |
| 16094 | PLUG BACK/SPOT CEMENT OR MUD DEPTH FEET/METERS (FT/M) | 1 9000 FT | EA | 10,828.00 | 10,828.00 |
| 16096 | PLUGGING ADDITIONAL HOURS HOURS | 1 1 | EA | 927.00 | 927.00 |
| | Services Discount | | | | |
| 4020 | ADDITIONAL HOURS - TRANSPORT NUMBER OF UNITS | 1 1 | H | 320.56 | 320.56 |
| 1 | MILEAGE - STANDBY PUMP TRUCK NUMBER OF UNITS | 15 1 | MI | 9.79 | 146.85 |
| 2 | MILEAGE FOR STANDBY CREW NUMBER OF UNITS | 15 1 | MI | 5.76 | 86.40 |
| 116 | BOOSTER PUMP-SKID,/DAY NUMBER OF DAYS | 1 1 | EA | 1,362.00 | 1,362.00 |
| 16118 | LAB TESTING PER HOUR HOURS OR FRACTION (MIN4) | 1 4 | EA | 0.00 | 1,236.00 |
| | Non-Discounted Items | | | | |
| 45 | DRILL PIPE PIN | 1 | EA | 150.00 | 150.00 |
| 45 | CIRCULATING IRON | 1 | EA | 1,500.00 | 1,500.00 |
| 86955 | FUEL SURCHARGE-STANDBY PUMP NUMBER OF UNITS | 15 1 | MI | 0.45 | 6.75 |
| 86954 | FUEL SURCHARGE-STANDBY CREW NUMBER OF UNITS | 15 1 | MI | 0.15 | 2.25 |

Price Book Ref: 09 Permian Basin

Price Date: 7/30/2007

HALLIBURTON

Casing/Sales Equipment

Production Casing

| <u>Mtrl Nbr</u> | <u>Description</u> | <u>Qty</u> | <u>U/M</u> | <u>Unit Price</u> | <u>Gross Amt</u> |
|-----------------|----------------------------------|------------|------------|-------------------|------------------|
| 100004908 | SHOE,FLT,7 8RD,2-3/4 SS II VLV | 1 | EA | 868.00 | 868.00 |
| 100004781 | CLR,FLT,7 8RD 17-26PPF,2-3/4SSII | 1 | EA | 1,071.00 | 1,071.00 |
| 100004479 | CTRZR ASSY,7 CSG X 8 3/4 HOLE | 30 | EA | 161.00 | 4,830.00 |
| 100013920 | CMTR,TYP ES,7 IN 8RD,20-26 LB/FT | 1 | EA | 9,835.00 | 9,835.00 |
| 100004673 | PLUG SET-FREE FALL-7"-8RD | 1 | EA | 1,700.00 | 1,700.00 |
| 100004626 | CLAMP - LIMIT - 7 - HINGED - | 3 | EA | 52.60 | 157.80 |
| 100005045 | KIT,HALL WELD-A | 3 | EA | 74.30 | 222.90 |
| | Total | USD | | | 18,684.70 |
| | Discount | USD | | | 8,408.12 |
| | Discounted Total | USD | | | 10,276.58 |

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Price Date: 7/30/2007

Conditions

NOTE

The cost in this analysis is good for the materials and/or services outlined within. These prices are based on Halliburton being awarded the work on a first call basis. Prices will be reviewed for adjustments if awarded on 2nd or 3rd call basis and/or after 30 days of this written analysis. This is in an effort to schedule our work and maintain a high quality of performance for our customers.

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/hes/general_terms_conditions.pdf 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.