

**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  
4000 N. Big Spring, Ste. 400  
Midland, Texas 79705  
+800.844.8451

**HALLIBURTON**

# HALLIBURTON

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

## **Foreword**

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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

PREPARED BY: Bruce Day

**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

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

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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/100ft<sup>2</sup>) decreasing down to about 5 lb/100 ft<sup>2</sup>.
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 ft<sup>2</sup>). 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 ft<sup>2</sup>.
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.

# HALLIBURTON

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## Job Information

## Surface Casing

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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

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

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

## *Job Recommendation*

## *Surface Casing*

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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 ft<sup>3</sup>/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

# HALLIBURTON

## 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
	<b>0% disc. on surcharges</b>				
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
	<b>25% disc. on plug</b>				
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
	<b>Total</b>		<b>USD</b>		<b>41,240.00</b>
	<b>55% Discount</b>		<b>USD</b>		<b>22,018.08</b>
	<b>Discounted Total</b>		<b>USD</b>		<b>19,221.92</b>

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>
	<b>Optional Services if Required or Requested</b>				
	<b>25% Discount</b>				
3	DERRICK CHARGE	1	EA	987.00	987.00
	<b>35% Discount</b>				
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
	<b>Services Discount</b>				
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
	<b>Non-Discounted Items</b>				
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

## 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
	<b>Total</b>	<b>USD</b>			<b>3,804.95</b>
	<b>Discount</b>	<b>USD</b>			<b>1,719.86</b>
	<b>Discounted Total</b>	<b>USD</b>			<b>2,085.09</b>

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## Job Information

## Intermediate Casing

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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

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

## Job Recommendation

## Intermediate Casing

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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 ft<sup>3</sup>/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 ft<sup>3</sup>/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

# HALLIBURTON

## 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
	<b>0% disc. on surcharges</b>				
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
	<b>25% disc. on plug</b>				
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
	<b>Total</b>	<b>USD</b>			<b>76,269.79</b>
	<b>55% Discount</b>	<b>USD</b>			<b>41,298.21</b>
	<b>Discounted Total</b>	<b>USD</b>			<b>34,971.58</b>

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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>
	<b>Optional Services if Required or Requested</b>				
	<b>25% Discount</b>				
3	DERRICK CHARGE	1	EA	987.00	987.00
	<b>35% Discount</b>				
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
	<b>Services Discount</b>				
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
	<b>Non-Discounted Items</b>				
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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# 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
	<b>Total</b>	<b>USD</b>			<b>8,341.80</b>
	<b>Discount</b>	<b>USD</b>			<b>3,753.81</b>
	<b>Discounted Total</b>	<b>USD</b>			<b>4,587.99</b>

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# HALLIBURTON

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## *Job Information*

## *Production Casing*

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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

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### Stage 1

Cement : (1000.00 ft fill)  
 $1000.00 \text{ ft} * 0.1503 \text{ ft}^3/\text{ft} * 50 \% = 225.50 \text{ ft}^3$   
Primary Cement = 225.50 ft<sup>3</sup>  
= 40.16 bbl

Shoe Joint Volume: (40.00 ft fill)  
 $40.00 \text{ ft} * 0.2148 \text{ ft}^3/\text{ft} = 8.59 \text{ ft}^3$   
= 1.53 bbl  
Tail plus shoe joint = 234.09 ft<sup>3</sup>  
= 41.69 bbl  
Total Tail = 203 sks

### Stage 2

Cement : (4500.00 ft fill)  
 $4200.00 \text{ ft} * 0.1585 \text{ ft}^3/\text{ft} * 0 \% = 665.63 \text{ ft}^3$   
 $300.00 \text{ ft} * 0.1503 \text{ ft}^3/\text{ft} * 50 \% = 67.65 \text{ ft}^3$   
Total Second Stage Lead Cement = 733.28 ft<sup>3</sup>  
= 130.60 bbl  
Sacks of Cement = 262 sks

Cement : (3500.00 ft fill)  
 $3500.00 \text{ ft} * 0.1503 \text{ ft}^3/\text{ft} * 50 \% = 789.23 \text{ ft}^3$   
Second Stage Tail Cement = 789.23 ft<sup>3</sup>  
= 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 ft<sup>3</sup>/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 ft<sup>3</sup>/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 ft<sup>3</sup>/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
	<b>0% disc. on surcharges</b>				
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
	<b>Total</b>	<b>USD</b>			<b>92,875.11</b>
	<b>55% Discount</b>	<b>USD</b>			<b>50,573.13</b>
	<b>Discounted Total</b>	<b>USD</b>			<b>42,301.98</b>

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>
	<b>Optional Services if Required or Requested</b>				
	<b>25% Discount</b>				
3	DERRICK CHARGE	1	EA	987.00	987.00
	<b>35% Discount</b>				
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
	<b>Services Discount</b>				
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
	<b>Non-Discounted Items</b>				
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
	<b>Total</b>	<b>USD</b>			<b>18,684.70</b>
	<b>Discount</b>	<b>USD</b>			<b>8,408.12</b>
	<b>Discounted Total</b>	<b>USD</b>			<b>10,276.58</b>

Price Book Ref: 09 Permian Basin

Price Date: 7/30/2007

# HALLIBURTON

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## Conditions

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### 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 2<sup>nd</sup> or 3<sup>rd</sup> 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](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.