FORM 4 Rev 12/05

Page 1

01720166

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303)894-2100 Fax:(303)894-2109

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COGCC

SUNDRY NOTICE

Submit original plus one copy. This form is to be used for general, technical and environmental sundry Information. For proposed or completed operations, describe in full on Technical Information Page (Page 2 of this form.) Identify well or other facility by API Number or by OGCC Facility ID. Operator shall send an informational copy of all sundry notices for wells located in High Density Areas to the Local Government Designee (Rule 603b.)

1. OGCC Operator Number: 96155
2. Name of Operator: Whiting Oil and Gas Corporation
3. Address: 1700 Broadway, Suite 2300
   City: Denver State: CO Zip: 80290-2300
4. Contact Name: Scott Webb
   Phone: 303-390-4095
   Fax: 303-390-4960

Complete the Attachment Checklist

	OP	OGCC
Survey Plat		
Directional Survey		
Surface Eqpmt Diagram		
Technical Info Page	X	
Other	X	

5. API Number 05- 103-11814-00
6. Well/Facility Name: WRD
7. Well/Facility Number 23-33
8. Location (QtrQtr, Sec, Twp, Rng, Meridian): NESW Section 33-T2N-R97W, 6th PM
9. County: Rio Blanco
10. Field Name: White River #92800
11. Federal, Indian or State Lease Number: COC-45291

OGCC Facility ID Number

General Notice

☐ **CHANGE OF LOCATION:** **Attach New Survey Plat** (a change of surface qtr/qtr is substantive and requires a new permit)

	FNL/FSL		FEL/FWL	
Change of **Surface** Footage **from** Exterior Section Lines:				
Change of **Surface** Footage **to** Exterior Section Lines:				
Change of **Bottomhole** Footage **from** Exterior Section Lines:				
Change of **Bottomhole** Footage **to** Exterior Section Lines:				attach directional survey

Bottomhole location Qtr/Qtr, Sec, Twp, Rng, Mer

Latitude
Longitude
Ground Elevation

Distance to nearest property line
Distance to nearest lease line
Distance to nearest well same formation

Distance to nearest bldg, public rd, utility or RR
Is location in a High Density Area (rule 603b)? Yes/No
Surface owner consultation date:

GPS DATA:
Date of Measurement PDOP Reading Instrument Operator's Name

☐ **CHANGE SPACING UNIT**

Formation	Formation Code	Spacing order number	Unit Acreage	Unit configuration

☐ **Remove from surface bond**
Signed surface use agreement attached

☐ **CHANGE OF OPERATOR (prior to drilling):**
Effective Date:
Plugging Bond: ☐ Blanket ☐ Individual

☐ **CHANGE WELL NAME** **NUMBER**
From:
To:
Effective Date:

☐ **ABANDONED LOCATION:**
Was location ever built? ☐ Yes ☐ No
Is site ready for Inspection? ☐ Yes ☐ No
Date Ready for Inspection:

☐ **NOTICE OF CONTINUED SHUT IN STATUS**
Date well shut in or temporarily abandoned:
Has Production Equipment been removed from site? ☐ Yes ☐ No
MIT required if shut in longer than two years. Date of last MIT

☐ **SPUD DATE:**

☐ **REQUEST FOR CONFIDENTIAL STATUS** (6 mos from date casing set)

☐ **SUBSEQUENT REPORT OF STAGE, SQUEEZE OR REMEDIAL CEMENT WORK** *submit cbl and cement job summaries

Method used	Cementing tool setting/perf depth	Cement volume	Cement top	Cement bottom	Date

☐ **RECLAMATION:** Attach technical page describing final reclamation procedures per Rule 1004.
Final reclamation will commence on approximately ☐ Final reclamation is completed and site is ready for inspection.

Technical Engineering/Environmental Notice

☐ Notice of Intent
Approximate Start Date:

☐ Report of Work Done
Date Work Completed:

Details of work must be described in full on Technical Information Page (Page 2 must be submitted.)

☐ Intent to Recomplete (submit form 2)	☐ Request to Vent or Flare	☐ E&P Waste Disposal
☒ Change Drilling Plans	☐ Repair Well	☐ Beneficial Reuse of E&P Waste
☐ Gross Interval Changed?	☐ Rule 502 variance requested	☐ Status Update/Change of Remediation Plans
☒ Casing/Cementing Program Change	☐ Other:	for Spills and Releases

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.

Signed: S. Webb Date: 8/1/11 Email: scottw@whiting.com

Print Name: Scott M. Webb Title: Regulatory Coordinator

COGCC Approved: Title NWA Engineer Date: 10/17/11

CONDITIONS OF APPROVAL, IF ANY:

FORM 4 Rev 12/05

TECHNICAL INFORMATION PAGE

FOR OGCC USE ONLY

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1. OGCC Operator Number: 96155 API Number: 05-103-11814-00
2. Name of Operator: Whiting Oil and Gas Corp. OGCC Facility ID #
3. Well/Facility Name: WRD Well/Facility Number: 23-33
4. Location (QtrQtr, Sec, Twp, Rng, Meridian): NESW Sec 33-T2N-R97W, 6th PM

This form is to be completed whenever a Sundry Notice is submitted requiring detailed report of work to be performed or completed. This form shall be transmitted within 30 days of work completed as a "subsequent" report and must accompany Form 4, page 1.

5. **DESCRIBE PROPOSED OR COMPLETED OPERATIONS**

Whiting Oil and Gas Corporation is requesting to drill the subject well deeper than the permitted depth of 14,861' to to 15,104' MD & TVD.
The surface casing string depth will remain as permitted; 13-3/8" = 500' MD & TVD.

The 1st intermediate string 9-5/8" will be adjusted to 4,200' MD & TVD and cemented with 790 sx cement.

The 2nd intermediate string 7 " will be adjusted to 12,600' MD & TVD and cemented with 820 sx cement.

The 4-1/2" Production liner will be ran from 12,400' MD & TVD to 15,104' MD & TVD and cemented with 175 sx cement.

Total depth for the well will be 15,104' MD and TVD.

A revised drilling plan and detailed cementing plan are attached for those changes.

HALLIBURTON

Whiting Oil & Gas Corp Ebusiness
Do Not Mail - 1700 Broadway Ste2300
Denver, Colorado 80290

WRD 23-33

Rio Blanco County, Colorado
United States of America
S:33 T:2N R:97W

Multi-String Cement Cost Estimate

Prepared for: Mr. Dana Greathouse

July 29, 2011
Version: 3

Submitted by:
Matt Collins
Halliburton
1125 17th Street #1900
Denver, Colorado 80202
+3038994702

HALLIBURTON

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

Foreword

Enclosed is our cost estimate for cementing the casing strings in the referenced well. The information in this cost estimate includes well data, calculations, materials requirements, and cost estimates. This cost estimate is based on information from our field personnel and previous cementing services in the area.

The selection and use of non-Halliburton plugs and casing attachments often compromises the holistic approach and may jeopardize the overall objective for effective zonal isolation. Furthermore, Halliburton is not involved in the design, manufacture or use of plugs and casing attachments supplied by other manufacturers and assumes no liability for their installation and operation. For this reason we recommend Halliburton plugs and casing attachments be used when Halliburton performs any zonal isolation operation.

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 cost estimate 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: _____

Matt Collins
Technical Advisor

SERVICE CENTER:	Vernal, UT
PSL DISTRICT MANAGER:	Christopher Jerez
SERVICE COORDINATOR:	Weston Spencer, Cody Slaugh
SALES MANAGER:	Jake Royster
CEMENT ENGINEERS:	Josh Anglin, Isaac Whorl, Kyle King, Patrick Butterfield, Simukayl Mulasa
PHONE NUMBER:	435.789.2550

Cementing Best Practices

1. Cement quality and weight: You must choose a cement slurry that is designed to solve the problems specific to each casing string.

2. Waiting time: You must hold the cement slurry in place and under pressure until it reaches its' initial set without disturbing it. 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 in a plastic state and before going through its' transition phase. If the cement slurry is not allowed to set up — this could lead to → gas cutting that may lead to a lack of zonal isolation and possible 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 changes the flow patterns in the annulus to improve displacement efficiency.

4. Mud properties (for cementing):

Rheology:

Plastic Viscosity (PV) < 15 centipoise (cp)
Yield Point (YP) < 10 lb/100 ft2
These properties should be reviewed with the Mud Engineer, Drilling Engineer, and Company Representative(s) to ensure no hole problems are created.

Gel Strength:

The 10-second/10-minute gel strength values should be such that the 10-second and 10-minute readings are close together or flat (i.e., 5/6). The 30-minute reading should be less than 20 lb/100 ft². Sufficient shear stress may not be achieved on a primary cement job to remove mud left in the hole if the mud were to develop more than 25 lb/100 ft² of gel strength.

Fluid Loss:

Decreasing the filtrate loss into a permeable zone enhances the creation of a thin, competent filter cake. A thin, competent filter cake created by a low fluid loss mud system is desirable over a thick, partially gelled filter cake. A mud system created with a low fluid loss will be more easily displaced. The fluid loss value should be < 15 cc's (ideal would be 5 cc's).

5. Circulation: Prior to cementing circulate full hole volume 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.

6. Flow rate: Turbulent flow is the most desirable flow regime for mud removal. If turbulence cannot be achieved pump at as high a flow rate that can practically and safely be used to create the maximum flow energy. The highest mud removal is achieved when the maximum flow energy is obtained.

7. Pipe Centralization: This Cement will take the path of least resistance, therefore proper centralization is important to help prevent the casing from contacting the borehole wall. A minimum standoff of 70% should be targeted for optimum displacement efficiency.

8. Rat hole: A weighted viscous pill placed in the rat hole prior to cementing will minimize the risk of higher density cement mixing with lower density mud when the well is static.

9. Top and Bottom plugs: A top and bottom plug are recommended to be run on all primary casing jobs. The bottom plug should be run after the spacer and ahead of the first cement slurry.

10. Spacers and flushes: Spacers and/or flushes should be used to prevent contamination between the cement slurry and the drilling fluid. They are also used to clean the wellbore and aid with bonding. To determine the volume, either a minimum of 10 minutes contact time or 1000 ft. of annular fill, whichever is greater, is recommended.

Job Information — *13 3/8" Surface Casing*

Well Name: WRD	Well #: 23-33
20" Conductor	0 - 60 ft (MD)
Outer Diameter	20.000 in
Inner Diameter	19.124 in
Linear Weight	94 lbm/ft
17 1/2" Open Hole	60 - 500 ft (MD)
Inner Diameter	17.500 in
Job Excess	100 %
13 3/8" Surface Casing	0 - 500 ft (MD)
Outer Diameter	13.375 in
Inner Diameter	12.615 in
Linear Weight	54.50 lbm/ft
Thread	STC
Casing Grade	J-55
Mud Type	Spud Mud
Mud Weight	8.50 lbm/gal

Spacer:

Total Spacer	= 112.29 ft^3
	= 20.00 bbl

Cement : (500.00 ft fill)

60.00 ft * 1.019 ft^3/ft * 0 %	= 61.14 ft^3
440.00 ft * 0.6946 ft^3/ft * 100 %	= 611.28 ft^3
Tail Cement	= 672.42 ft^3
	= 119.76 bbl

Shoe Joint Volume: (42.00 ft fill)

42.00 ft * 0.868 ft^3/ft	= 36.45 ft^3
	= 6.49 bbl
Tail plus shoe joint	= 708.88 ft^3
	= 126.26 bbl
Total Tail	= 340 sks

Total Pipe Capacity:

500.00 ft * 0.868 ft^3/ft	= 433.98 ft^3
	= 77.30 bbl

Displacement Volume to Shoe Joint:

Capacity of Pipe - Shoe Joint	= 77.30 bbl - 6.49 bbl
	= 70.80 bbl

Fluid Instructions

Fluid 1: Water Spacer
Fresh Water

Fluid Density:	8.34 lbm/gal
Fluid Volume:	20 bbl

Fluid 2: Tail Cement
Rockies LT
0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)
0.25 lbm/sk Kwik Seal (Lost Circulation Additive)

Fluid Weight	12.80 lbm/gal
Slurry Yield:	2.08 ft^3/sk
Total Mixing Fluid:	11.44 Gal/sk
Top of Fluid:	0 ft
Calculated Fill:	500 ft
Volume:	126.26 bbl
Calculated Sacks:	340.48 sks
Proposed Sacks:	345 sks

Fluid 3: Water Spacer
Displacement Fluid

Fluid Density:	8.34 lbm/gal
Fluid Volume:	70.80 bbl

Fluid 4: Top Out Cement
Premium Cement
94 lbm/sk Premium Cement (Cement)
2 % Calcium Chloride (Accelerator)

Fluid Weight	15.80 lbm/gal
Slurry Yield:	1.17 ft^3/sk
Total Mixing Fluid:	5.02 Gal/sk
Proposed Sacks:	200 sks

Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	Spacer	Fresh Water	8.3		20 bbl
2	Cement	Tail Cement	12.8		345 sks
3	Spacer	Displacement Fluid	8.3		70.80 bbl
4	Cement	Top Out Cement	15.8		200 sks

Job Information — 9 5/8" Intermediate Casing

Well Name: WRD — Well #: 23-33

13 3/8" Surface Casing	0 - 500 ft (MD)
Outer Diameter	13.375 in
Inner Diameter	12.615 in
Linear Weight	54.50 lbm/ft
Thread	STC
Casing Grade	J-55
12 1/4" Open Hole	500 - 4200 ft (MD)
Inner Diameter	12.250 in
Job Excess	50 %
9 5/8" 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	L-80
Mud Type	Spud Mud
Mud Weight	8.50 lbm/gal

Spacer:

Total Spacer	= 112.29 ft^3
	= 20.00 bbl

Cement : (3700.00 ft fill)

500.00 ft * 0.3627 ft^3/ft * 0 %	= 181.34 ft^3
3200.00 ft * 0.3132 ft^3/ft * 50 %	= 1503.30 ft^3
Total Lead Cement	= 1684.65 ft^3
	= 300.05 bbl
Sacks of Cement	= 574 sks

Cement : (500.00 ft fill)

500.00 ft * 0.3132 ft^3/ft * 50 %	= 234.89 ft^3
Tail Cement	= 234.89 ft^3
	= 41.84 bbl

Shoe Joint Volume: (42.00 ft fill)

42.00 ft * 0.4257 ft^3/ft	= 17.88 ft^3
	= 3.18 bbl
Tail plus shoe joint	= 252.77 ft^3
	= 45.02 bbl
Total Tail	= 211 sks

Total Pipe Capacity:

4200.00 ft * 0.4257 ft^3/ft	= 1788.09 ft^3
	= 318.47 bbl

Displacement Volume to Shoe Joint:

Capacity of Pipe - Shoe Joint	= 318.47 bbl - 3.18 bbl
	= 315.29 bbl

Fluid Instructions
Fluid 1: Water Spacer
Fresh Water

Fluid Density:	8.34 lbm/gal
Fluid Volume:	20 bbl

Fluid 2: Lead Cement
Rockies LT
0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)
0.25 lbm/sk Kwik Seal (Lost Circulation Additive)

Fluid Weight	11.50 lbm/gal
Slurry Yield:	2.94 ft^3/sk
Total Mixing Fluid:	17.83 Gal/sk
Top of Fluid:	0 ft
Calculated Fill:	3700 ft
Volume:	300.05 bbl
Calculated Sacks:	573.79 sks
Proposed Sacks:	575 sks

Fluid 3: Tail Cement
Premium Cement
94 lbm/sk Premium Cement (Cement)
2 % Calcium Chloride (Accelerator)
0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)

Fluid Weight	15.60 lbm/gal
Slurry Yield:	1.20 ft^3/sk
Total Mixing Fluid:	5.24 Gal/sk
Top of Fluid:	3700 ft
Calculated Fill:	500 ft
Volume:	45.02 bbl
Calculated Sacks:	211.17 sks
Proposed Sacks:	215 sks

Fluid 4: Water Spacer
Displacement Fluid

Fluid Density:	8.34 lbm/gal
Fluid Volume:	315.29 bbl

Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	Spacer	Fresh Water	8.3		20 bbl
2	Cement	Lead Cement	11.5		575 sks
3	Cement	Tail Cement	15.6		215 sks
4	Spacer	Displacement Fluid	8.3		315.29 bbl

Job Information — 7" Intermediate Casing

Well Name: WRD	Well #: 23-33
9 5/8" 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	L-80
8 1/2" Open Hole	4200 - 12600 ft (MD)
Inner Diameter	8.500 in
Job Excess	35 %
7" Intermediate Casing	0 - 12600 ft (MD)
Outer Diameter	7.000 in
Inner Diameter	6.184 in
Linear Weight	29 lbm/ft
Thread	LTC
Casing Grade	HCP110
Mud Type	LSND
Mud Weight	10 lbm/gal
BHST	245 degF
BHCT	180 degF

Spacer:

354.27 ft * 0.1585 ft^3/ft * 0 %	= 56.15 ft^3
Total Spacer	= 56.15 ft^3
	= 10.00 bbl

Spacer:

1062.82 ft * 0.1585 ft^3/ft * 0 %	= 168.44 ft^3
Total Spacer	= 168.44 ft^3
	= 30.00 bbl

Spacer:

354.27 ft * 0.1585 ft^3/ft * 0 %	= 56.15 ft^3
Total Spacer	= 56.15 ft^3
	= 10.00 bbl

Cement : (5950.00 ft fill)

400.00 ft * 0.1585 ft^3/ft * 0 %	= 63.39 ft^3
5550.00 ft * 0.1268 ft^3/ft * 35 %	= 950.12 ft^3
Total Foamed Lead Cement	= 1013.51 ft^3
	= 180.51 bbl
Sacks of Cement	= 478 sks

Cement : (2850.00 ft fill)

2850.00 ft * 0.1268 ft^3/ft * 35 %	= 487.90 ft^3
Tail Cement	= 487.90 ft^3
	= 86.90 bbl

Shoe Joint Volume: (42.00 ft fill)

42.00 ft * 0.2086 ft^3/ft	= 8.76 ft^3
	= 1.56 bbl
Tail plus shoe joint	= 496.66 ft^3
	= 88.46 bbl
Total Tail	= 338 sks

Total Pipe Capacity:

12600.00 ft * 0.2086 ft^3/ft	= 2628.07 ft^3
	= 468.08 bbl

Displacement Volume to Shoe Joint:

Capacity of Pipe - Shoe Joint	= 468.08 bbl - 1.56 bbl
	= 466.52 bbl

Fluid Instructions
Fluid 1: Water Spacer
Fresh Water

Fluid Density:	8.34 lbm/gal
Fluid Volume:	10 bbl

Fluid 2: Reactive Spacer
SUPER FLUSH 101

Fluid Density:	10 lbm/gal
Fluid Volume:	30 bbl

Fluid 3: Water Spacer
Fresh Water

Fluid Density:	8.34 lbm/gal
Fluid Volume:	10 bbl

Fluid 4: Foamed Lead Cement
ELASTISEAL (TM) SYSTEM
1.5 % FDP-C760-04 (Foamer)

Fluid Weight	14.30 lbm/gal
Slurry Yield:	1.47 ft^3/sk
Total Mixing Fluid:	6.41 Gal/sk
Top of Fluid:	3800 ft
Calculated Fill:	5950 ft
Volume:	180.51 bbl
Calculated Sacks:	477.74 sks
Proposed Sacks:	480 sks

Fluid 5: Tail Cement
ELASTISEAL (TM) SYSTEM

Fluid Weight	14.30 lbm/gal
Slurry Yield:	1.47 ft^3/sk
Total Mixing Fluid:	6.40 Gal/sk
Top of Fluid:	9750 ft
Calculated Fill:	2850 ft
Volume:	88.46 bbl
Calculated Sacks:	338.09 sks
Proposed Sacks:	340 sks

Fluid 6: Mud
Mud Displacement

Fluid Density:	10 lbm/gal
Fluid Volume	466.52 bbl

Fluid 7: Top Out Cement
Premium Cement
94 lbm/sk Premium Cement (Cement)
12 % Cal-Seal 60 (Accelerator)
3 % Calcium Chloride (Accelerator)

Fluid Weight	15.60 lbm/gal
Slurry Yield:	1.34 ft^3/sk
Total Mixing Fluid:	5.75 Gal/sk
Proposed Sacks:	200 sks

Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	Spacer	Fresh Water	8.3		10 bbl
2	Spacer	SUPER FLUSH 101	10.0		30 bbl
3	Spacer	Fresh Water	8.3		10 bbl
4	Cement	Foamed Lead Cement	14.3		480 sks
5	Cement	Tail Cement	14.3		340 sks
6	Mud	Mud Displacement	10.0		466.52 bbl
7	Cement	CAP CEMENT	15.6		200 sks

Foam Output Parameter Summary:

Fluid #	Fluid Name	Unfoamed Liquid Volume	Beginning Density lbm/gal	Ending Density lbm/gal	Beginning Rate scf/bbl	Ending Rate scf/bbl
Stage 1						
4	Foamed Lead Cement	125.08bbl	10.5	10.5	275.9	690.0

Foam Design Specifications:

Foam Calculation Method: Constant Density
Backpressure: 200 psig
Bottom Hole Circulating Temp: 180 degF
Mud Outlet Temperature: 140 degF

Calculated Gas = 60872.4 scf
Additional Gas = 40000 scf
Total Gas = 100872.4 scf

Job Information — 4 1/2" Production Liner

Well Name: WRD — Well #: 23-33

7" Intermediate Casing	0 - 12600 ft (MD)
Outer Diameter	7.000 in
Inner Diameter	6.184 in
Linear Weight	29 lbm/ft
Thread	LTC
Casing Grade	HCP110
6" Open Hole	12600 - 15104 ft (MD)
Inner Diameter	6.000 in
Job Excess	30 %
4" Drill Pipe	0 - 12400 ft (MD)
Outer Diameter	4.000 in
Inner Diameter	3.340 in
Linear Weight	14 lbm/ft
4 1/2" Production Liner	12400 - 15104 ft (MD)
Outer Diameter	4.500 in
Inner Diameter	3.920 in
Linear Weight	13.50 lbm/ft
Thread	LTC
Casing Grade	P-110
Mud Type	LSND
Mud Weight	9 lbm/gal

Spacer:

1851.32 ft * 0.1213 ft^3/ft * 0 %	= 224.58 ft^3
Total Spacer	= 224.58 ft^3
	= 40.00 bbl

Cement : (2704.00 ft fill)

200.00 ft * 0.0981 ft^3/ft * 0 %	= 19.63 ft^3
2504.00 ft * 0.0859 ft^3/ft * 30 %	= 279.63 ft^3
Primary Cement	= 299.26 ft^3
	= 53.30 bbl

Shoe Joint Volume: (42.00 ft fill)

42.00 ft * 0.0838 ft^3/ft	= 3.52 ft^3
	= 0.63 bbl
Tail plus shoe joint	= 302.78 ft^3
	= 53.93 bbl
Total Tail	= 172 sks

Total Pipe Capacity:

12400.00 ft * 0.0608 ft^3/ft	= 754.47 ft^3
2704.00 ft * 0.0838 ft^3/ft	= 226.62 ft^3
	= 174.74 bbl

Displacement Volume to Shoe Joint:

Capacity of Pipe - Shoe Joint	= 174.74 bbl - 0.63 bbl
	= 174.11 bbl

Fluid Instructions
Fluid 1: Water Based Spacer
TUNED SPACER III
117.6 lbm/bbl Barite (Heavy Weight Additive)

Fluid Density:	11 lbm/gal
Fluid Volume:	40 bbl

Fluid 2: Primary Cement
BONDCEM (TM) SYSTEM
0.5 % HR-601 (Retarder)

Fluid Weight	13.50 lbm/gal
Slurry Yield:	1.76 ft^3/sk
Total Mixing Fluid:	8.40 Gal/sk
Top of Fluid:	12400 ft
Calculated Fill:	2704 ft
Volume:	53.93 bbl
Calculated Sacks:	171.84 sks
Proposed Sacks:	175 sks

Fluid 3: Mud
Mud Displacement

Fluid Density:	9 lbm/gal
Fluid Volume	174.11 bbl

Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	Spacer	TUNED SPACER III	11.0		40 bbl
2	Cement	Primary Cement	13.5		175 sks
3	Mud	Mud Displacement	9.0		174.11 bbl

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.

Revised Formation Depths 07/28/11

WHITING OIL & GAS CORPORATION
WRD 23-33 DRILL PLAN

Surface Location: 1872' FSL & 771' FEL
SWNW Section 33, Township 2N, Range 97W
Rio Blanco County, Colorado

Summary:

Corrected drill plan based on update formation depths per Whiting Geologist.

The WRD (White River Dome) 23-33 will be a vertical test to the Weber formation. Primary pay section to test will be the Niobrara and the Weber formations. A conventional core will be taken in the Niobrara formation and sidewall cores will be taken in the Weber formation.

Surface section will be 17-1/2" OH with 13-3/8" casing set at 500'. The first intermediate section will be drilled with a 12-1/4" bit from 500' to 4,200' and 9-5/8" casing set into the Mesaverde formation. The second intermediate section will be drilled with a 8-1/2" bit vertically to the Curtis formation at 12,600' and 7" casing set at that depth. A 6" openhole will be drilled to TD at 15,104' in the Weber formation and a 4-1/2" liner run in that section.

1. ESTIMATED TOPS OF GEOLOGICAL MARKERS

Ground Level 6,169' Estimated KB 6,204' (35')

Formation	Est Top-TVD	Interval Thickness	Lithology	Potential
Green River Fm	35'	0'	Ss, Sh	
Base Aquifer	130'	130'	Ss, Sh	Water
Wasatch	130'	3,600'	Sh	
Ohio Creek	3,973'	100'	Ss, Sh	
Williams Fork	4,073'	2,743'	Ss, Sh	
Mancos	6,816'	3,100'	Sh	Oil
Niobrara	9,916'	1,750'	Sh	Oil
Frontier	11,666'	217'	Silts, Ss	Oil
Mowry	11,883'	83'	Sh	Oil
Dakota	11,966'	188'	Ss	Oil & Gas
Morrison	12,154'	406'	Ss, Sh	
Curtis	12,560'	81'	Ss, Sh	
Entrada	12,641'	539'	Ss	
Chinle	13,180'	266'	Ss, Sh	
Moenkopi	13,446'	469'	Silts, Sh	Cond & Gas
Park City (Phospheria)	13,915'	189'	Ls, Sh	Cond & Gas
Weber	14,104'	750'	Ss	Cond & Gas
Maroon Fm	14,854'	250'	Silts, Sh	
TD	15,104'			

2. PRESSURE CONTROL EQUIPMENT

A. Type: BOPE
Thirteen and five eights (13-5/8") inch 10,000 psi double ram hydraulic BOP with Blind and Pipe rams.
Thirteen and five eights (13-5/8") inch 10,000 psi single ram hydraulic BOP with Pipe rams.
Thirteen and five eights (13-5/8") inch 5,000 psi annular preventer
*See attached drawing

Rotating Head
13-3/8", 2,500 psi

Wellhead
13-3/8" casing, 5,000 psi Casing head, (A Section)
9-5/8" casing, 10,000 psi Casing spool, (B Section)

After the 13-3/8" casing is landed at 500', the 5,000 psi casing head will be welded on and the 10,000 psi casing spool (B Section) will be bolted up to the casing head. The 10,000 psi BOP stack will be bolted up to the upper 10,000 psi flange on the B Section. Once the 9-5/8" casing is landed at 4,300', the packoff will be place around the 9-5/8" casing in the B Section. This will give a full 10,000 psi working pressure through the B Section and the BOP. *See attached drawings.

B. Testing Procedure:
The annular preventer will be pressure tested to 50% of stack rated working pressure for ten (10) minutes or until provisions of test are met, whichever is longer. The BOP, choke manifold, and related equipment will be pressure tested to approved BOP stack working pressure (if isolated from surface casing by a test plug) or to 70% of surface casing internal yield strength (if BOP is not isolated by a test plug). Pressure will be maintained for ten (10) minutes or until the requirements of the test are met, whichever is longer. At a minimum, the Annular and Blow-Out Preventer pressure tests will be performed:

1. When the BOPE is initially installed;
2. Whenever any seal subject to test pressure is broken;
3. Following related repairs; and
4. at thirty (30) day intervals.

Annular will be function tested weekly, and pipe & blind rams activated each trip, but not more than once per day. All BOP drills & tests will be recorded in IADC driller's log.

C. Choke Manifold Equipment:
All choke lines will be straight lines whenever possible at turns, tee blocks will be used or will be targeted with running tees, and will be anchored to prevent whip and vibration. *See attached drawing.

D. Accumulator:
Accumulator will have sufficient capacity to open a hydraulically-controlled choke line valve; close all rams plus annular preventer, and retain a minimum of 200 psi above pre-charge on the closing manifold without the use of closing unit pumps. The fluid reservoir capacity will be double accumulator capacity and the fluid level will be maintained at manufacturer's recommendations. Accumulator pre-charge pressure test will be conducted prior to connecting the closing unit to the BOP stack.

E. Miscellaneous Information:
Choke manifold and BOP extension rods with hand wheels will be located outside rig sub-structure.

Hydraulic BOP closing unit will be located at least twenty-five (25) feet from the wellhead but readily accessible to the driller. Exact locations and configurations of the hydraulic BOP closing unit will depend upon the particular rig contracted to drill this hole.
A flare line will be installed after the choke manifold with the discharge point of the flare line to a separate pit located at least 125 feet away from the well bore and any existing production facilities.

2. PROPOSED CASING DESIGN PROGRAM

A. Casing Program: All New

Section	Interval	Hole Size	Footage	Description
Conductor	0' – 60'	24"	60'	20" 94# H-40 STC
Surface	0' – 500'	17-1/2"	500'	13-3/8" 54.50# J-55 STC
1st Intermediate	0' – 4,200'	12-1/4"	4,200'	9-5/8" 40# L-80 LTC
2nd Intermediate	0' – 12,600'	8-1/2"	12,600'	7" 29# HCP-110 LTC
Production Liner	12,400' – 15,104'	6"	2,704'	4-1/2" 13.5# P-110 LTC

- Conductor, cellar & mousehole are set by third party company before the drilling rig moves to location.
- Base of water at 100' GL. 13-3/8" casing set to protect water zone.
- Production Liner will have a 200' liner lap.
- 4-1/2" liner has a 5" Collar OD.
- 7" Casing 6" Bit Combination – See attached backup data

13-3/8" surface casing will have five (5) centralizers as follows: Centralizer #1 set 10' above the guide shoe of joint #1 by stop ring, and a Centralizer set across collars of joints #2, #4, #6 and one centralizer set in the conductor.

9-5/8" intermediate casing will have five (5) centralizers as follows: Centralizer #1 set on middle of joint #1 by stop ring, and a Centralizer set across collars of joints #2, #4, #6 and one centralizer set in the 13-3/8" casing.

7" intermediate casing will have twenty-three (23)centralizers as follows: Centralizer #1 set 10' above the guide shoe of joint #1 by stop ring, and a Centralizer set across collars of joints #2, #4, #6. Run a Centralizer every 5th joints to 9,500' top of tail cement. Run a Centralizer every 10th joints from 9,500' to 4,200'. Run a 1 Centralizer in the 9-5/8" intermediate.

4-1/2" liner will have twelve (12) centralizers as follows: Centralizer #1 set on middle of joint #1 by stop ring, and a Centralizer set across collars of joints #2, #4, and #6. Run a Centralizer every 6th joints to the 7" casing at 12,180'. Run a 1 Centralizer in the 7" intermediate.

Casing string(s) will be pressure tested to 0.22 psi/foot of casing string length or 1500 psi, whichever is greater (not to exceed 70% of the internal yield strength of the casing), after cementing and prior to drilling out from under the casing shoe.

B. Casing Design Parameters:

Surface Casing, 13-5/8"

Interval	Description	Burst (psi)[a]	Collapse (psi)[b]	Tension (klb)[c]
0' – 500'	13-3/8" 54.50# J-55 STC	2,730/1.5	1,130/4.39	514/12.09

a. based on Methane gas kick to surface, 0.0427 psi/ft
b. based on full evacuation with 9.0 ppg fluid on backside
c. based on casing string weight in 9 ppg mud
String Weight in 9.0 ppg mud ≈ 23,600 lbs

1st Intermediate Casing, 9-5/8"

Interval	Description	Burst (psi)[a]	Collapse (psi)[b]	Tension (klb)[c]
0' – 4,200'	9-5/8" 40# L-80 LTC	5,750/1.4	3,090/1.4	727/3.0

a. based on BLM Burst Rules, 0.22 psi/ft.
b. based on full evacuation with 9.0 ppg fluid on backside
c. based on casing string weight in 9.0 ppg mud.
String Weight in 9.0 ppg mud ≈ 145,500 lbs.

2nd Intermediate Casing, 7"

Interval	Description	Burst (psi)[a]	Collapse (psi)[b]	Tension (klb)[c]
0' – 12,600'	7" 29# HCP-110 LTC	11,220/2.6	9,200/1.2	797/1.4

a. based on BLM Burst Rules, 0.22 psi/ft.
b. based on full evacuation with 10.8 ppg fluid on backside
c. based on casing string weight in 10.8 ppg mud.
String Weight in 10.8 ppg mud ≈ 307,000 lbs.

Production Liner, 4-1/2"

Interval	Description	Burst (psi)[a]	Collapse (psi)[b]	Tension (klb)[c]
12,400' – 15,104'	4-1/2" 13.5# P-110 LTC	12,410/3.2	10,680/1.6	338/6.5

a. based on BLM Burst Rules, 0.22 psi/ft.
b. based on full evacuation with 9.2 ppg fluid on backside
c. based on casing string weight in 9.2 ppg mud.
String Weight in 9.2 ppg mud ≈ 29,000 lbs.

4. PROPOSED CEMENTING PROGRAM

All slurries tested for compatibility, compression strengths, and pumping times based on actual job conditions.

Surface, 13-5/8" Casing: TOC Surface, (100% Excess)

Lead: 710 cu-ft; 345 sx Rockies LT
0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)
0.25 lbm/sk Kwik Seal (Lost Circulation Additive)

Cement Properties	Tail Slurry
Slurry Weight (ppg)	12.80
Slurry Yield (cf/sack)	2.08

1st Intermediate, 9-5/8" Casing: TOT 3,700', TOL Surface, 50% excess

Lead: 1685 cu-ft; 575 sacks Rockies LT

0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)
0.25 lbm/sk Kwik Seal (Lost Circulation Additive)

Tail: 235 cu-ft; 215 sacks Premium Cement
94 lbm/sk Premium Cement (Cement)
2 % Calcium Chloride (Accelerator)
0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)

Cement Properties	Tail Slurry	Lead Slurry
Slurry Weight (ppg)	15.60	11.50
Slurry Yield (cf/sack)	1.20	2.94

2nd Intermediate, 7" Casing: TOT 9,750', TOL 3,800', (35% Excess)

Lead: 1014 cu-ft; 480 sacks Foamed Lead Cement
ELASTISEAL (TM) SYSTEM
1.5 % FDP-C760-04 (Foamer)

Tail: 497 cu-ft; 340 sacks ELASTISEAL (TM) SYSTEM

Cement Properties	Tail Slurry	Lead Slurry
Slurry Weight (ppg)	14.30	14.30
Slurry Yield (cf/sack)	1.47	1.47

Foam Output Parameter Summary:

Foamed Lead Cement, Unfoamed Volume 125.08bbl, Beginning Density 10.5 ppg, Ending Density 10.5 ppg, Beginning Rate 275.9 scf/bbl, Ending Rate 690.0 scf/bbl

Foam Design Specifications:
Foam Calculation Method: Constant
Backpressure: 200 psig
Bottom Hole Circulating Temp: 180 degF
Mud Outlet Temperature: 140 degF

Density Calculated Gas = 60872.4 scf
Additional Gas = 40000 scf
Total Gas = 100872.4 scf

Production Liner, 4-1/2" Casing: TOC at liner hanger at 12,400', (30% Excess)

Lead: 303 cu-ft; 175 sx Primary Cement
BONDCEM (TM) SYSTEM
0.5 % HR-601 (Retarder)

Cement Properties	Tail Slurry
Slurry Weight (ppg)	13.50
Slurry Yield (cf/sack)	1.76

- See Attached Cement Program for the well.

5. MUD PROGRAM

Depth	Mud System	MW (ppg)	PV (cp)	YP (lb/100ft2)	FL (ml/30min)
0' – 500'	Spud	8.5 – 8.8	6 - 10	15 - 25	NA
500' - 4,200'	Spud/LSND	8.5 – 9.0	6 - 10	15 - 25	NA
4,200'-12,600'	LSND/Asphalt	8.7 – 10.8	6 - 15	10 - 15	6
12,600' –15,104'	LSND/Asphalt	8.8 – 9.2	6 - 10	10 - 12	6

- Rig will have a trip tank to monitor pit volumes while tripping
- Rig will have a mud pit monitoring system to show active volumes of mud
- See Attached Drilling Fluid Program

6. TESTING, LOGGING AND CORE PROGRAMS

Cores: 200' in Niobrara
Sidewall cores in Weber
DST: None planned

Surveys: Deviation surveys every 500' to TD in both surface and production hole.

Mud Logger: From 4,700' to TD.

Samples: 30' samples 4,700' to TD

Open Hole Logging Program:

Induction w/GR Log	TD to Surface Casing
Density Compensated Neutron	TD to 4,700'

7. ANTICIPATED ABNORMAL PRESSURES OR TEMPERATURES:

No abnormal temperatures are anticipated. No H_2S is anticipated.

Maximum anticipated bottom hole pressure equals approximately 6,540 psi (calculated at 0.433 psi/foot) at TD in the Weber formation at 15,104'.

8. ANTICIPATED STARTING DATE AND DURATION:

Dirt work startup: Upon Approval
Spud: Upon Approval
Duration: 60 - 90 days