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HOBBSOCD

COG Operating

Lea County, NM (NAD27 NME)
GC Federal #14
GC Federal #14
OH

Plan: Plan #4 - 7-7/8" Hole

Standard Planning Report

23 December, 2008

Scientific Drilling
Directional Drilling Operations

Scientific Drilling
Directional Drilling Operations

Database:	EDM 2003 16 Single User Db	**Local Co-ordinate Reference:**	Well GC Federal #14
Company:	COG Operating	**TVD Reference:**	Ground Elev. @ 3926 00ft (Rig ?)
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	Ground Elev @ 3926 00ft (Rig ?)
Site:	GC Federal #14	**North Reference:**	Grid
Well:	GC Federal #14	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #4 - 7-7/8" Hole		

Project Lea County, NM (NAD27 NME)

Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site GC Federal #14

Site Position:		**Northing:**	660,545.400 ft	**Latitude:**	32° 48' 53.308 N
From:	Map	**Easting:**	662,648 000 ft	**Longitude:**	103° 48' 14.117 W
Position Uncertainty:	0 00 ft	**Slot Radius:**	"	**Grid Convergence:**	0.29 °

Well GC Federal #14

Well Position	**+N/-S**	0.00 ft	**Northing:**	660,545 400 ft	**Latitude:**	32° 48' 53 308 N
	+E/-W	0 00 ft	**Easting:**	662,648 000 ft	**Longitude:**	103° 48' 14.117 W
Position Uncertainty		0 00 ft	**Wellhead Elevation:**	ft	**Ground Level:**	3,926 00 ft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/23/2008	8 02	60.77	49,217

Design Plan #4 - 7-7/8" Hole

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0 00	0 00	0 00	287.89

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0 00	0 00	0 00	0 00	0 00	0 00	0.00	
2,250.00	0.00	0.00	2,250 00	0.00	0.00	0 00	0 00	0 00	0.00	
2,967 11	14 34	287 89	2,959 64	27 43	-84 97	2.00	2.00	-10 06	287.89	
5,351 79	14 34	287 89	5,270 00	208 88	-647.12	0 00	0 00	0 00	0 00	PP-GC #14
5,920.96	2.96	287 89	5,831 77	235 14	-728 46	2 00	-2 00	0.00	180 00	
6,990 61	2 96	287 89	6,900 00	252.10	-781.00	0.00	0 00	0.00	0.00	BPHL-GC #14

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Well:	GC Federal #14	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #4 - 7-7/8" Hole		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0 00	0 00	0 00	0 00	0.00	0.00	0 00	0.00	0 00	0 00
2,150.00	0 00	0 00	2,150 00	0 00	0 00	0 00	0.00	0 00	0.00
8 5/8" Casing									
2,250 00	0 00	0.00	2,250.00	0 00	0 00	0 00	0.00	0 00	0 00
KOP Start DLS 2.00°/100'									
2,300 00	1 00	287 89	2,300 00	0.13	-0 42	0 44	2.00	2.00	0 00
2,400 00	3 00	287 89	2,399.93	1 21	-3 74	3.93	2 00	2 00	0 00
2,500.00	5 00	287 89	2,499 68	3 35	-10.37	10.90	2 00	2.00	0.00
2,600 00	7.00	287 89	2,599.13	6.56	-20.32	21 35	2.00	2.00	0 00
2,700 00	9.00	287.89	2,698.15	10.83	-33 57	35.27	2 00	2 00	0.00
2,800 00	11.00	287.89	2,796.63	16 17	-50 09	52 63	2.00	2 00	0.00
2,900 00	13 00	287.89	2,894.44	22 55	-69.87	73 42	2 00	2 00	0.00
2,967.11	14 34	287.89	2,959 64	27.43	-84.97	89.29	2.00	2 00	0.00
EOC hold 14.34°									
3,000.00	14 34	287 89	2,991.51	29 93	-92.72	97.43	0.00	0.00	0 00
3,100.00	14.34	287.89	3,088.39	37 54	-116.30	122.20	0.00	0 00	0.00
3,200 00	14.34	287.89	3,185 28	45.15	-139.87	146 98	0 00	0.00	0.00
3,300 00	14 34	287 89	3,282 16	52.76	-163 44	171 75	0 00	0 00	0.00
3,400 00	14 34	287.89	3,379.04	60 37	-187 02	196.52	0.00	0.00	0 00
3,500 00	14.34	287.89	3,475 93	67.98	-210 59	221.29	0 00	0.00	0 00
3,600.00	14 34	287.89	3,572.81	75.59	-234.16	246 06	0.00	0.00	0.00
3,700 00	14 34	287.89	3,669 69	83.19	-257 74	270.83	0.00	0.00	0.00
3,800.00	14.34	287 89	3,766 58	90.80	-281.31	295 60	0 00	0.00	0.00
3,900.00	14 34	287.89	3,863 46	98.41	-304.88	320 37	0 00	0.00	0 00
4,000.00	14 34	287.89	3,960.34	106 02	-328.46	345.15	0 00	0 00	0.00
4,100.00	14 34	287 89	4,057 23	113.63	-352.03	369.92	0 00	0.00	0.00
4,200.00	14.34	287 89	4,154.11	121.24	-375.60	394.69	0 00	0.00	0 00
4,300.00	14 34	287.89	4,250 99	128 85	-399.18	419.46	0.00	0.00	0 00
4,400 00	14 34	287 89	4,347 88	136.46	-422.75	444 23	0.00	0.00	0 00
4,500 00	14.34	287 89	4,444 76	144 07	-446 33	469.00	0 00	0 00	0 00
4,600.00	14 34	287 89	4,541.64	151 68	-469.90	493.77	0 00	0 00	0.00
4,700.00	14 34	287 89	4,638 53	159.29	-493.47	518 54	0 00	0.00	0 00
4,800.00	14 34	287.89	4,735 41	166 90	-517.05	543 32	0 00	0.00	0 00
4,900 00	14 34	287 89	4,832 29	174.51	-540 62	568.09	0 00	0 00	0.00
5,000 00	14.34	287 89	4,929.18	182.12	-564 19	592.86	0.00	0.00	0 00
5,100.00	14 34	287 89	5,026.06	189 72	-587.77	617 63	0.00	0.00	0.00
5,200 00	14 34	287.89	5,122 94	197 33	-611 34	642.40	0 00	0 00	0 00
5,300 00	14 34	287 89	5,219.83	204 94	-634 91	667.17	0 00	0 00	0 00
5,351.79	14 34	287 89	5,270.00	208 88	-647.12	680 00	0.00	0 00	0 00
Start drop 2.00°/100' - Top of Paddock - PP-GC #14									
5,400.00	13 38	287 89	5,316 81	212 43	-658.11	691.55	2 00	-2 00	0 00
5,500.00	11 38	287 89	5,414 48	219.02	-678.51	712 98	2 00	-2.00	0 00
5,600 00	9.38	287.89	5,512.84	224 55	-695 65	731 00	2 00	-2 00	0.00
5,700 00	7 38	287.89	5,611 77	229 03	-709 52	745.57	2 00	-2 00	0.00
5,800 00	5 38	287.89	5,711 14	232 44	-720 09	756.67	2 00	-2 00	0 00
5,900 00	3 38	287 89	5,810 84	234.78	-727.35	764.31	2.00	-2 00	0 00
5,920.96	2.96	287.89	5,831 77	235 14	-728 46	765.47	2.00	-2 00	0 00
EOC hold 2.96°									
6,000 00	2 96	287 89	5,910 71	236 39	-732 34	769 55	0 00	0 00	0 00
6,100 00	2 96	287.89	6,010.57	237.98	-737 25	774.71	0.00	0 00	0.00
6,200.00	2.96	287 89	6,110.44	239.56	-742.16	779.87	0.00	0.00	0 00
6,300 00	2.96	287 89	6,210 31	241.15	-747 08	785.03	0 00	0 00	0 00
6,400 00	2.96	287 89	6,310 17	242 73	-751 99	790 19	0 00	0 00	0 00

Scientific Drilling
Directional Drilling Operations

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Company:	COG Operating	**TVD Reference:**	Ground Elev @ 3926 00ft (Rig ?)
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	Ground Elev. @ 3926.00ft (Rig ?)
Site:	GC Federal #14	**North Reference:**	Grid
Well:	GC Federal #14	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #4 - 7-7/8" Hole		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,500.00	2.96	287.89	6,410.04	244 32	-756 90	795 36	0 00	0 00	0 00
6,600 00	2 96	287.89	6,509 91	245 91	-761.81	800 52	0 00	0 00	0.00
6,700.00	2 96	287.89	6,609 77	247.49	-766 72	805 68	0 00	0 00	0 00
6,800.00	2.96	287 89	6,709 64	249.08	-771 64	810.84	0.00	0.00	0.00
6,900.00	2.96	287.89	6,809 51	250 66	-776.55	816.00	0 00	0.00	0 00
6,990.61	2 96	287 89	6,900.00	252.10	-781 00	820 68	0 00	0.00	0 00
BPHL-GC #14									

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
BPHL-GC #14 - plan hits target - Point	0.00	0 00	6,900.00	252.10	-781.00	660,797 500	661,867.000	32° 48' 55 842 N	103° 48' 23.254 W
PP-GC #14 - plan hits target - Point	0.00	0 00	5,270 00	208.88	-647.12	660,754 284	662,000 878	32° 48' 55.407 N	103° 48' 21.688 W

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
2,150.00	2,150.00	8 5/8" Casing	8-5/8	10-5/8

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,351.79	5,270.00	Top of Paddock		0 00	

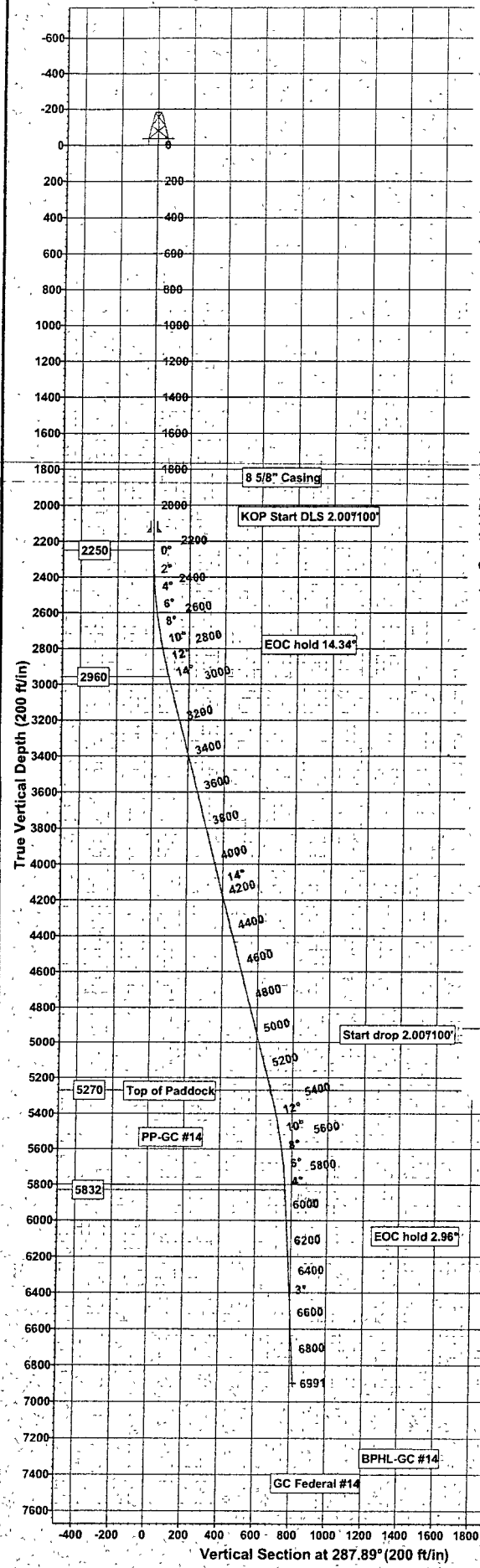
Plan Annotations

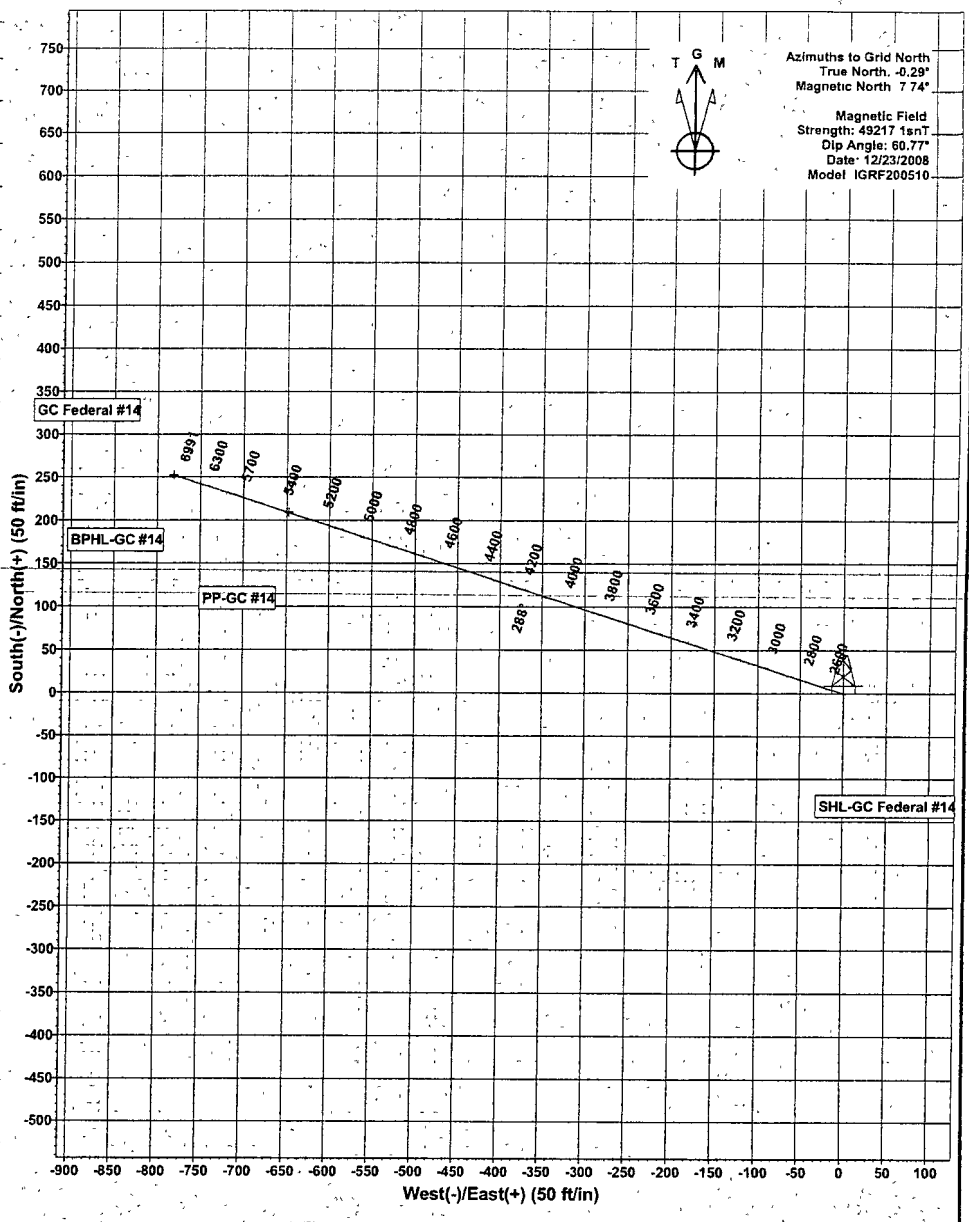
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
2,250.00	2,250.00	0 00	0.00	KOP Start DLS 2.00°/100'
2,967 11	2,959.64	27.43	-84.97	EOC hold 14 34°
5,351 79	5,270.00	208 88	-647.12	Start drop 2 00°/100'
5,920 96	5,831 77	235 14	-728 46	EOC hold 2 96°

COG Operating

Scientific Drilling for COG Operating
Site: Lea County, NM (NAD27 NME)
Well: GC Federal #14
Wellbore: OH
Design: Plan #4 - 7-7/8" Hole

Scientific Drilling
Directional Drilling Operations





WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PP-GC #14	5270.00	208.88	-647.12	660754.284	662000.878	32° 48' 55.407 N	103° 48' 21.688 W	Point
BPHL-GC #14	6900.00	252.10	-781.00	660797.500	661867.000	32° 48' 55.842 N	103° 48' 23.254 W	Point

AZIMUTH CORRECTIONS
ALL AZIMUTHS MUST BE CORRECTED TO GRID
GRID CORRECTIONS MUST BE APPLIED BEFORE PLOTTING
To convert a Magnetic Direction to a Grid Direction, Add 7.74°
To convert a True Direction to a Grid Direction, Subtract 0.29°

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2250.00	0.00	0.00	2250.00	0.00	0.00	0.00	0.00	0.00	
3	2967.11	14.34	287.89	2959.64	27.43	-84.97	2.00	287.89	89.29	
4	5351.79	14.34	287.89	5270.00	208.88	-647.12	0.00	0.00	680.00	PP-GC #14
5	5920.96	2.96	287.89	5831.77	235.14	-728.46	2.00	180.00	765.47	
6	6990.61	2.96	287.89	6900.00	252.10	-781.00	0.00	0.00	820.68	BPHL-GC #14

WELL DETAILS: GC Federal #14

Ground Level: 3926.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	660545.400	662648.000	32° 48' 53.308 N	103° 48' 14.117 W	

PROJECT DETAILS: Lea County, NM (NAD27 NME)

Plan: Plan #4 - 7-7/8" Hole (GC Federal #14/OH)

Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

Created By: Julio Pina Date: 23-Dec-08
Checked: _____ Date: _____
Reviewed: _____ Date: _____
Approved: _____ Date: _____

PECOS DISTRICT
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG OPERATING LLC
LEASE NO.:	LC029405B
WELL NAME & NO.:	G C FEDERAL #14
SURFACE HOLE FOOTAGE:	0735' FSL & 2222' FEL
LOCATION:	Section 19, T. 17 S., R 32 E., NMPM
COUNTY:	Lea County, New Mexico

I. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified a minimum of 4 hours in advance for a representative to witness:

a. Spudding well
b. Setting and/or Cementing of all casing strings
c. BOPE tests

☒ **Lea County**
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240,
(575) 393-3612

1. A Hydrogen Sulfide (H2S) Drilling Plan should be activated 500 feet prior to drilling into the **Grayburg** formation. **As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.**

2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.

B. CASING

Changes to the approved APD casing and cement program require submitting a sundry and receiving approval prior to work. Failure to obtain approval prior to work will result in an Incident of Non-Compliance being issued.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) time for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

Possible lost circulation in the Grayburg and San Andres formations.
Possible water and brine flows in the Salado and Artesia Group.

1. The **13-3/8** inch surface casing shall be set **a minimum of 25 feet into the Rustler Anhydrite at approximately 650** feet and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with a surface log readout will be used or a cement bond log shall be run to verify the top of the cement.

    b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

    d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The minimum required fill of cement behind the **8-5/8** inch intermediate casing is:

    ☒ Cement to surface. If cement does not circulate see B.1.a-d above. **This casing is to be set in the Tansill formation at approximately 1900'. This is a more competent formation than the Yates.**

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:

    ☒ Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.

2. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

    a. The tests shall be done by an independent service company.

    b. The results of the test shall be reported to the appropriate BLM office.

    c. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.

    d. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.

    e. **Effective November 1, 2008, no variances will be granted on reduced pressure tests on the surface casing and BOP/BOPE. Onshore Order 2 requirements will be in effect.**

D. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

WWI 051109