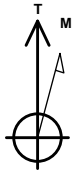




Company: Whiting Oil & Gas
Site: Cottonwood 08E
Well: 0504
Project: Weld County, Colorado (NAD 83)
Rig Name: Pioneer 54



Azimuths to True North
Magnetic North: 7.92°

Magnetic Field
Strength: 53090.9snT
Dip Angle: 67.38°
Date: 8/19/2014
Model: WMM_2010

US State Plane 1983
Colorado Northern Zone

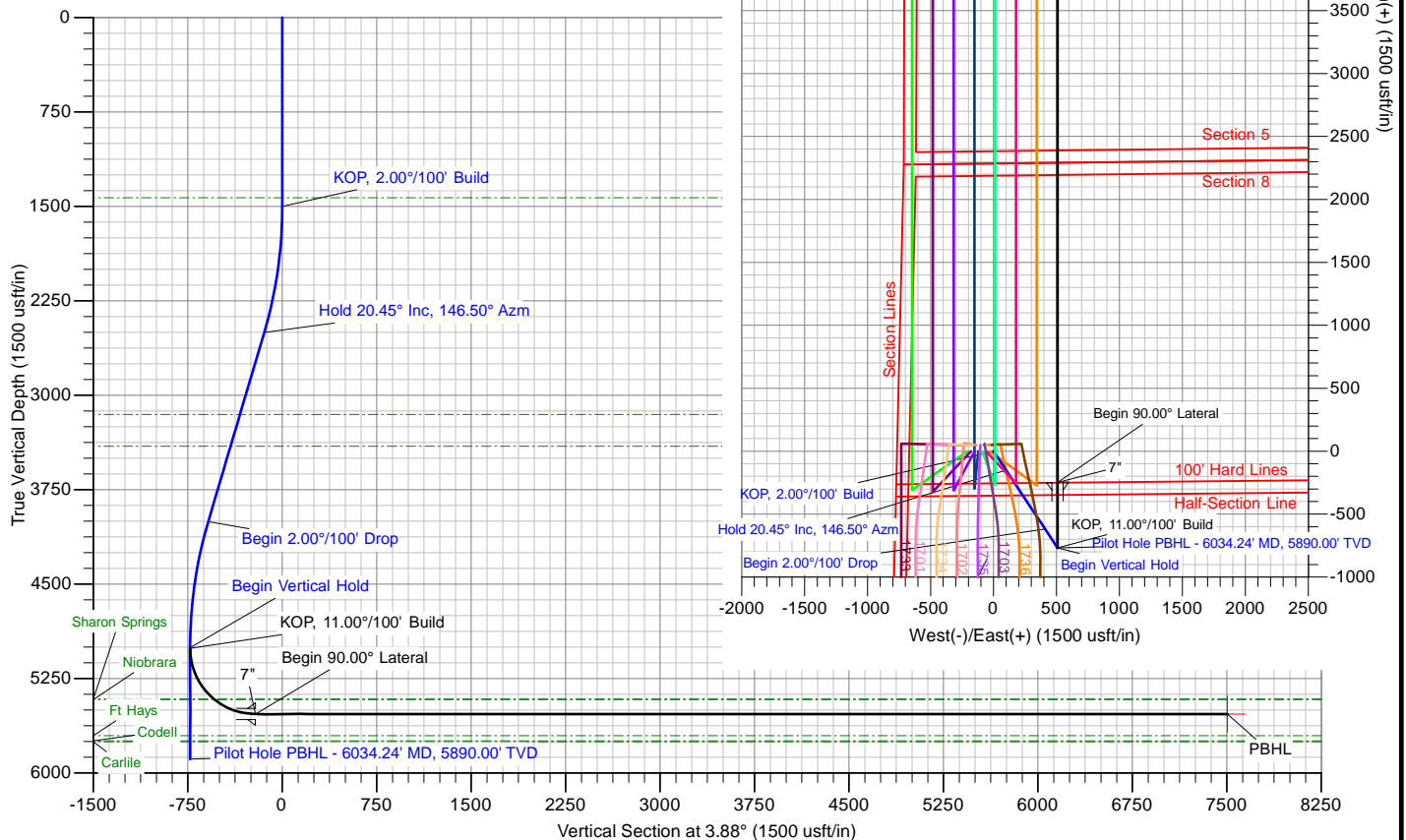
Created By: TWG
Date: 8:04, August 26 2014
Plan: Design #2

PILOT HOLE ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation
1500.00	0.00	0.00	1500.00	0.00	0.00	0.00	0.00	KOP, 2.00°/100' Build
2522.50	20.45	146.50	2500.93	-150.56	99.65	180.55	180.55	Hold 20.45° Inc, 146.50° Azm
4126.67	20.45	146.50	4004.00	-617.93	409.00	741.03	741.03	Begin 2.00°/100' Drop
5149.17	0.00	0.00	5004.93	-768.49	508.65	921.57	921.57	Begin Vertical Hold
6034.24	0.00	0.00	5890.00	-768.49	508.65	921.57	921.57	Pilot Hole PBHL - 6034.24' MD, 5890.00' TVD

ANNOTATIONS

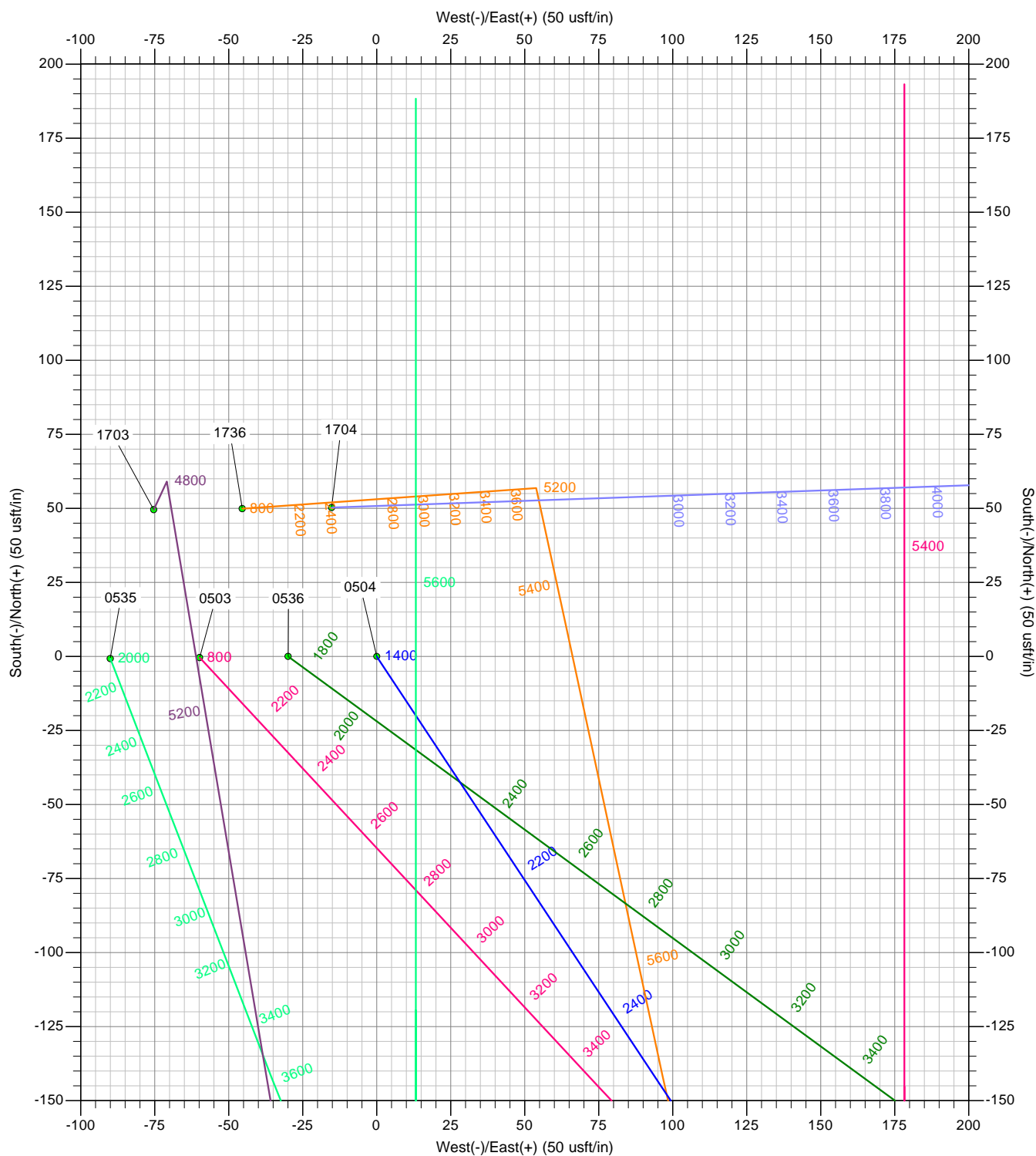
MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation
5155.67	0.00	0.00	5011.43	-768.49	508.65	-732.28	0.00	KOP, 11.00°/100' Build
5973.85	90.00	360.00	5532.30	-247.62	508.62	-212.61	520.87	Begin 90.00° Lateral
13708.78	90.00	360.00	5532.30	7487.31	508.14	7504.54	8255.80	PBHL



The customer should only rely on this document after independently verifying all paths, targets, coordinates, lease and hard lines represented.
Any decisions made or wells drilled utilizing this or any other information supplied by MS Energy are at the sole risk and responsibility of the customer.
MS Energy is not responsible for the accuracy of this schematic or the information contained herein.



Company: Whiting Oil & Gas
Site: Cottonwood 08E
Well: 0504
Project: Weld County, Colorado (NAD 83)
Rig Name: Pioneer 54



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Whiting Oil & Gas

**Weld County, Colorado (NAD 83)
Cottonwood 08E
0504**

Pilot Hole

Plan: Design #2

Standard Planning Report

26 August, 2014



Planning Report

Database:	EDM 5000.1 Conroe DB	Local Co-ordinate Reference:	Well 0504
Company:	Whiting Oil & Gas	TVD Reference:	WELL @ 4737.30usft (Pioneer 54)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4737.30usft (Pioneer 54)
Site:	Cottonwood 08E	North Reference:	True
Well:	0504	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot Hole		
Design:	Design #2		

Project	Weld County, Colorado (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Well	0504			
Well Position	+N-S	1,914,058.37 usft	Northing:	1,526,894.98 usft
	+E-W	3,278,926.89 usft	Easting:	3,476,143.36 usft
Position Uncertainty		0.00 usft	Wellhead Elevation:	
			Latitude:	40° 46' 1.358 N
			Longitude:	103° 46' 51.521 W
			Ground Level:	4,720.30 usft

Wellbore	Pilot Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM_2010	8/19/2014	7.92	67.38	53,091

Design	Design #2			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.00	0.00	0.00	146.50

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,522.50	20.45	146.50	2,500.93	-150.56	99.65	2.00	2.00	0.00	146.50	
4,126.67	20.45	146.50	4,004.00	-617.93	409.00	0.00	0.00	0.00	0.00	
5,149.17	0.00	0.00	5,004.93	-768.49	508.65	2.00	-2.00	0.00	180.00	
6,034.24	0.00	0.00	5,890.00	-768.49	508.65	0.00	0.00	0.00	0.00	



Database:	EDM 5000.1 Conroe DB	Local Co-ordinate Reference:	Well 0504
Company:	Whiting Oil & Gas	TVD Reference:	WELL @ 4737.30usft (Pioneer 54)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4737.30usft (Pioneer 54)
Site:	Cottonwood 08E	North Reference:	True
Well:	0504	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot Hole		
Design:	Design #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,432.30	0.00	0.00	1,432.30	0.00	0.00	0.00	0.00	0.00	0.00
U. Pierre									
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, 2.00°/100' Build									
1,600.00	2.00	146.50	1,599.98	-1.46	0.96	1.75	2.00	2.00	0.00
1,700.00	4.00	146.50	1,699.84	-5.82	3.85	6.98	2.00	2.00	0.00
1,800.00	6.00	146.50	1,799.45	-13.09	8.66	15.69	2.00	2.00	0.00
1,900.00	8.00	146.50	1,898.70	-23.25	15.39	27.88	2.00	2.00	0.00
2,000.00	10.00	146.50	1,997.47	-36.29	24.02	43.52	2.00	2.00	0.00
2,100.00	12.00	146.50	2,095.62	-52.20	34.55	62.60	2.00	2.00	0.00
2,200.00	14.00	146.50	2,193.06	-70.96	46.97	85.10	2.00	2.00	0.00
2,300.00	16.00	146.50	2,289.64	-92.54	61.25	110.98	2.00	2.00	0.00
2,400.00	18.00	146.50	2,385.27	-116.92	77.39	140.21	2.00	2.00	0.00
2,500.00	20.00	146.50	2,479.82	-144.07	95.36	172.77	2.00	2.00	0.00
2,522.50	20.45	146.50	2,500.93	-150.56	99.65	180.55	2.00	2.00	0.00
Hold 20.45° Inc, 146.50° Azm									
2,600.00	20.45	146.50	2,573.54	-173.13	114.60	207.62	0.00	0.00	0.00
2,700.00	20.45	146.50	2,667.24	-202.27	133.88	242.56	0.00	0.00	0.00
2,800.00	20.45	146.50	2,760.94	-231.40	153.16	277.50	0.00	0.00	0.00
2,900.00	20.45	146.50	2,854.64	-260.54	172.45	312.44	0.00	0.00	0.00
3,000.00	20.45	146.50	2,948.33	-289.68	191.73	347.38	0.00	0.00	0.00
3,100.00	20.45	146.50	3,042.03	-318.81	211.02	382.32	0.00	0.00	0.00
3,200.00	20.45	146.50	3,135.73	-347.95	230.30	417.26	0.00	0.00	0.00
3,217.68	20.45	146.50	3,152.30	-353.10	233.71	423.44	0.00	0.00	0.00
Hygiene									
3,300.00	20.45	146.50	3,229.43	-377.08	249.58	452.20	0.00	0.00	0.00
3,400.00	20.45	146.50	3,323.13	-406.22	268.87	487.14	0.00	0.00	0.00
3,488.77	20.45	146.50	3,406.30	-432.08	285.99	518.15	0.00	0.00	0.00
L. Pierre									
3,500.00	20.45	146.50	3,416.82	-435.35	288.15	522.07	0.00	0.00	0.00
3,600.00	20.45	146.50	3,510.52	-464.49	307.44	557.01	0.00	0.00	0.00
3,700.00	20.45	146.50	3,604.22	-493.62	326.72	591.95	0.00	0.00	0.00
3,800.00	20.45	146.50	3,697.92	-522.76	346.00	626.89	0.00	0.00	0.00
3,900.00	20.45	146.50	3,791.61	-551.89	365.29	661.83	0.00	0.00	0.00
4,000.00	20.45	146.50	3,885.31	-581.03	384.57	696.77	0.00	0.00	0.00
4,100.00	20.45	146.50	3,979.01	-610.16	403.86	731.71	0.00	0.00	0.00
4,126.67	20.45	146.50	4,004.00	-617.93	409.00	741.03	0.00	0.00	0.00
Begin 2.00°/100' Drop									



Database:	EDM 5000.1 Conroe DB	Local Co-ordinate Reference:	Well 0504
Company:	Whiting Oil & Gas	TVD Reference:	WELL @ 4737.30usft (Pioneer 54)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4737.30usft (Pioneer 54)
Site:	Cottonwood 08E	North Reference:	True
Well:	0504	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot Hole		
Design:	Design #2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
4,200.00	18.98	146.50	4,073.03	-638.56	422.65	765.77	2.00	-2.00	0.00	
4,300.00	16.98	146.50	4,168.14	-664.31	439.69	796.64	2.00	-2.00	0.00	
4,400.00	14.98	146.50	4,264.27	-687.27	454.89	824.17	2.00	-2.00	0.00	
4,500.00	12.98	146.50	4,361.30	-707.42	468.23	848.34	2.00	-2.00	0.00	
4,600.00	10.98	146.50	4,459.11	-724.73	479.69	869.10	2.00	-2.00	0.00	
4,700.00	8.98	146.50	4,557.60	-739.18	489.26	886.43	2.00	-2.00	0.00	
4,800.00	6.98	146.50	4,656.62	-750.76	496.92	900.32	2.00	-2.00	0.00	
4,900.00	4.98	146.50	4,756.07	-759.46	502.67	910.74	2.00	-2.00	0.00	
5,000.00	2.98	146.50	4,855.82	-765.25	506.51	917.69	2.00	-2.00	0.00	
5,100.00	0.98	146.50	4,955.76	-768.14	508.42	921.15	2.00	-2.00	0.00	
5,149.17	0.00	0.00	5,004.93	-768.49	508.65	921.57	2.00	-2.00	-297.94	
Begin Vertical Hold										
5,200.00	0.00	0.00	5,055.76	-768.49	508.65	921.57	0.00	0.00	0.00	
5,300.00	0.00	0.00	5,155.76	-768.49	508.65	921.57	0.00	0.00	0.00	
5,400.00	0.00	0.00	5,255.76	-768.49	508.65	921.57	0.00	0.00	0.00	
5,500.00	0.00	0.00	5,355.76	-768.49	508.65	921.57	0.00	0.00	0.00	
5,556.54	0.00	0.00	5,412.30	-768.49	508.65	921.57	0.00	0.00	0.00	
Sharon Springs										
5,561.54	0.00	0.00	5,417.30	-768.49	508.65	921.57	0.00	0.00	0.00	
Niobrara										
5,600.00	0.00	0.00	5,455.76	-768.49	508.65	921.57	0.00	0.00	0.00	
5,700.00	0.00	0.00	5,555.76	-768.49	508.65	921.57	0.00	0.00	0.00	
5,800.00	0.00	0.00	5,655.76	-768.49	508.65	921.57	0.00	0.00	0.00	
5,847.54	0.00	0.00	5,703.30	-768.49	508.65	921.57	0.00	0.00	0.00	
Ft Hays										
5,890.54	0.00	0.00	5,746.30	-768.49	508.65	921.57	0.00	0.00	0.00	
Codell										
5,897.54	0.00	0.00	5,753.30	-768.49	508.65	921.57	0.00	0.00	0.00	
Carlile										
5,900.00	0.00	0.00	5,755.76	-768.49	508.65	921.57	0.00	0.00	0.00	
6,000.00	0.00	0.00	5,855.76	-768.49	508.65	921.57	0.00	0.00	0.00	
6,034.24	0.00	0.00	5,890.00	-768.49	508.65	921.57	0.00	0.00	0.00	
Pilot Hole PBHL - 6034.24' MD, 5890.00' TVD										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
- hit/miss target										
- Shape										
PBHL v1 - Cottonwood	0.00	0.00	5,532.30	7,487.31	508.14	1,534,390.73	3,476,506.28	40° 47' 15.340 N	103° 46' 44.915 W	
- plan misses target center by 8198.28usft at 3216.30usft MD (3151.00 TVD, -352.69 N, 233.44 E)										
- Point										



Database:	EDM 5000.1 Conroe DB	Local Co-ordinate Reference:	Well 0504
Company:	Whiting Oil & Gas	TVD Reference:	WELL @ 4737.30usft (Pioneer 54)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4737.30usft (Pioneer 54)
Site:	Cottonwood 08E	North Reference:	True
Well:	0504	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot Hole		
Design:	Design #2		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,432.30	1,432.30	U. Pierre		0.00	0.00
3,217.68	3,152.30	Hygiene		0.00	0.00
3,488.77	3,406.30	L. Pierre		0.00	0.00
5,556.54	5,412.30	Sharon Springs		0.00	0.00
5,561.54	5,417.30	Niobrara		0.00	0.00
5,847.54	5,703.30	Ft Hays		0.00	0.00
5,890.54	5,746.30	Codell		0.00	0.00
5,897.54	5,753.30	Carlile		0.00	0.00

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,500.00	1,500.00	0.00	0.00	KOP, 2.00°/100' Build
2,522.50	2,500.93	-150.56	99.65	Hold 20.45° Inc, 146.50° Azm
4,126.67	4,004.00	-617.93	409.00	Begin 2.00°/100' Drop
5,149.17	5,004.93	-768.49	508.65	Begin Vertical Hold
6,034.24	5,890.00	-768.49	508.65	Pilot Hole PBHL - 6034.24' MD, 5890.00' TVD



Whiting Oil & Gas

**Weld County, Colorado (NAD 83)
Cottonwood 08E
0504**

Wellbore #1

Plan: Design #2

Standard Planning Report

26 August, 2014



Database:	EDM 5000.1 Conroe DB	Local Co-ordinate Reference:	Well 0504
Company:	Whiting Oil & Gas	TVD Reference:	WELL @ 4737.30usft (Pioneer 54)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4737.30usft (Pioneer 54)
Site:	Cottonwood 08E	North Reference:	True
Well:	0504	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Project	Weld County, Colorado (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Well	0504					
Well Position	+N-S	1,914,058.37 usft	Northing:	1,526,894.98 usft	Latitude:	40° 46' 1.358 N
	+E-W	3,278,926.89 usft	Easting:	3,476,143.36 usft	Longitude:	103° 46' 51.521 W
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	4,720.30 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM_2010	8/19/2014	7.92	67.38	53,091

Design	Design #2			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	5,155.67
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	3.88

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
5,155.67	0.00	0.00	5,011.43	-768.49	508.65	0.00	0.00	0.00	0.00	
5,973.85	90.00	360.00	5,532.30	-247.62	508.62	11.00	11.00	0.00	360.00	
13,708.78	90.00	360.00	5,532.30	7,487.31	508.14	0.00	0.00	0.00	0.00	PBHL v2 - Cottonw



Database:	EDM 5000.1 Conroe DB	Local Co-ordinate Reference:	Well 0504
Company:	Whiting Oil & Gas	TVD Reference:	WELL @ 4737.30usft (Pioneer 54)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4737.30usft (Pioneer 54)
Site:	Cottonwood 08E	North Reference:	True
Well:	0504	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,155.67	0.00	0.00	5,011.43	-768.49	508.65	-732.28	0.00	0.00	0.00
KOP, 11.00°/100' Build									
5,200.00	4.88	360.00	5,055.70	-766.60	508.65	-730.40	11.00	11.00	0.00
5,250.00	10.38	360.00	5,105.24	-759.97	508.65	-723.78	11.00	11.00	0.00
5,300.00	15.88	360.00	5,153.92	-748.62	508.65	-712.46	11.00	11.00	0.00
5,350.00	21.38	360.00	5,201.28	-732.65	508.65	-696.53	11.00	11.00	0.00
5,400.00	26.88	360.00	5,246.90	-712.23	508.65	-676.15	11.00	11.00	0.00
5,450.00	32.38	360.00	5,290.34	-687.52	508.65	-651.50	11.00	11.00	0.00
5,500.00	37.88	360.00	5,331.22	-658.76	508.64	-622.81	11.00	11.00	0.00
5,550.00	43.38	360.00	5,369.15	-626.22	508.64	-590.34	11.00	11.00	0.00
5,600.00	48.88	360.00	5,403.79	-590.19	508.64	-554.39	11.00	11.00	0.00
5,613.12	50.32	360.00	5,412.30	-580.19	508.64	-544.42	11.00	11.00	0.00
Sharon Springs									
5,621.03	51.19	360.00	5,417.30	-574.07	508.64	-538.31	11.00	11.00	0.00
Niobrara									
5,650.00	54.38	360.00	5,434.82	-551.00	508.64	-515.30	11.00	11.00	0.00
5,700.00	59.88	360.00	5,461.95	-509.03	508.63	-473.42	11.00	11.00	0.00
5,750.00	65.38	360.00	5,484.93	-464.64	508.63	-429.13	11.00	11.00	0.00
5,800.00	70.88	360.00	5,503.55	-418.26	508.63	-382.86	11.00	11.00	0.00
5,850.00	76.38	360.00	5,517.64	-370.30	508.63	-335.01	11.00	11.00	0.00
5,900.00	81.88	360.00	5,527.07	-321.22	508.62	-286.04	11.00	11.00	0.00
5,950.00	87.38	360.00	5,531.75	-271.46	508.62	-236.40	11.00	11.00	0.00
5,973.85	90.00	360.00	5,532.30	-247.62	508.62	-212.61	11.00	11.00	0.00
Begin 90.00° Lateral - 7"									
6,000.00	90.00	360.00	5,532.30	-221.47	508.62	-186.52	0.00	0.00	0.00
6,100.00	90.00	360.00	5,532.30	-121.47	508.61	-86.75	0.00	0.00	0.00
6,200.00	90.00	360.00	5,532.30	-21.47	508.60	13.02	0.00	0.00	0.00
6,300.00	90.00	360.00	5,532.30	78.53	508.60	112.79	0.00	0.00	0.00
6,400.00	90.00	360.00	5,532.30	178.53	508.59	212.56	0.00	0.00	0.00
6,500.00	90.00	360.00	5,532.30	278.53	508.59	312.33	0.00	0.00	0.00
6,600.00	90.00	360.00	5,532.30	378.53	508.58	412.10	0.00	0.00	0.00
6,700.00	90.00	360.00	5,532.30	478.53	508.57	511.87	0.00	0.00	0.00
6,800.00	90.00	360.00	5,532.30	578.53	508.57	611.64	0.00	0.00	0.00
6,900.00	90.00	360.00	5,532.30	678.53	508.56	711.41	0.00	0.00	0.00
7,000.00	90.00	360.00	5,532.30	778.53	508.56	811.18	0.00	0.00	0.00
7,100.00	90.00	360.00	5,532.30	878.53	508.55	910.95	0.00	0.00	0.00
7,200.00	90.00	360.00	5,532.30	978.53	508.54	1,010.72	0.00	0.00	0.00
7,300.00	90.00	360.00	5,532.30	1,078.53	508.54	1,110.49	0.00	0.00	0.00
7,400.00	90.00	360.00	5,532.30	1,178.53	508.53	1,210.26	0.00	0.00	0.00
7,500.00	90.00	360.00	5,532.30	1,278.53	508.53	1,310.03	0.00	0.00	0.00
7,600.00	90.00	360.00	5,532.30	1,378.53	508.52	1,409.80	0.00	0.00	0.00
7,700.00	90.00	360.00	5,532.30	1,478.53	508.51	1,509.57	0.00	0.00	0.00
7,800.00	90.00	360.00	5,532.30	1,578.53	508.51	1,609.34	0.00	0.00	0.00
7,900.00	90.00	360.00	5,532.30	1,678.53	508.50	1,709.11	0.00	0.00	0.00
8,000.00	90.00	360.00	5,532.30	1,778.53	508.49	1,808.88	0.00	0.00	0.00
8,100.00	90.00	360.00	5,532.30	1,878.53	508.49	1,908.65	0.00	0.00	0.00
8,200.00	90.00	360.00	5,532.30	1,978.53	508.48	2,008.42	0.00	0.00	0.00
8,300.00	90.00	360.00	5,532.30	2,078.53	508.48	2,108.19	0.00	0.00	0.00
8,400.00	90.00	360.00	5,532.30	2,178.53	508.47	2,207.96	0.00	0.00	0.00
8,500.00	90.00	360.00	5,532.30	2,278.53	508.46	2,307.73	0.00	0.00	0.00
8,600.00	90.00	360.00	5,532.30	2,378.53	508.46	2,407.50	0.00	0.00	0.00
8,700.00	90.00	360.00	5,532.30	2,478.53	508.45	2,507.27	0.00	0.00	0.00
8,800.00	90.00	360.00	5,532.30	2,578.53	508.45	2,607.04	0.00	0.00	0.00
8,900.00	90.00	360.00	5,532.30	2,678.53	508.44	2,706.81	0.00	0.00	0.00



Database:	EDM 5000.1 Conroe DB	Local Co-ordinate Reference:	Well 0504
Company:	Whiting Oil & Gas	TVD Reference:	WELL @ 4737.30usft (Pioneer 54)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4737.30usft (Pioneer 54)
Site:	Cottonwood 08E	North Reference:	True
Well:	0504	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,000.00	90.00	360.00	5,532.30	2,778.53	508.43	2,806.58	0.00	0.00	0.00
9,100.00	90.00	360.00	5,532.30	2,878.53	508.43	2,906.35	0.00	0.00	0.00
9,200.00	90.00	360.00	5,532.30	2,978.53	508.42	3,006.12	0.00	0.00	0.00
9,300.00	90.00	360.00	5,532.30	3,078.53	508.41	3,105.89	0.00	0.00	0.00
9,400.00	90.00	360.00	5,532.30	3,178.53	508.41	3,205.66	0.00	0.00	0.00
9,500.00	90.00	360.00	5,532.30	3,278.53	508.40	3,305.43	0.00	0.00	0.00
9,600.00	90.00	360.00	5,532.30	3,378.53	508.40	3,405.20	0.00	0.00	0.00
9,700.00	90.00	360.00	5,532.30	3,478.53	508.39	3,504.97	0.00	0.00	0.00
9,800.00	90.00	360.00	5,532.30	3,578.53	508.38	3,604.74	0.00	0.00	0.00
9,900.00	90.00	360.00	5,532.30	3,678.53	508.38	3,704.51	0.00	0.00	0.00
10,000.00	90.00	360.00	5,532.30	3,778.53	508.37	3,804.28	0.00	0.00	0.00
10,100.00	90.00	360.00	5,532.30	3,878.53	508.37	3,904.05	0.00	0.00	0.00
10,200.00	90.00	360.00	5,532.30	3,978.53	508.36	4,003.82	0.00	0.00	0.00
10,300.00	90.00	360.00	5,532.30	4,078.53	508.35	4,103.59	0.00	0.00	0.00
10,400.00	90.00	360.00	5,532.30	4,178.53	508.35	4,203.36	0.00	0.00	0.00
10,500.00	90.00	360.00	5,532.30	4,278.53	508.34	4,303.13	0.00	0.00	0.00
10,600.00	90.00	360.00	5,532.30	4,378.53	508.34	4,402.90	0.00	0.00	0.00
10,700.00	90.00	360.00	5,532.30	4,478.53	508.33	4,502.67	0.00	0.00	0.00
10,800.00	90.00	360.00	5,532.30	4,578.53	508.32	4,602.44	0.00	0.00	0.00
10,900.00	90.00	360.00	5,532.30	4,678.53	508.32	4,702.21	0.00	0.00	0.00
11,000.00	90.00	360.00	5,532.30	4,778.53	508.31	4,801.98	0.00	0.00	0.00
11,100.00	90.00	360.00	5,532.30	4,878.53	508.30	4,901.75	0.00	0.00	0.00
11,200.00	90.00	360.00	5,532.30	4,978.53	508.30	5,001.52	0.00	0.00	0.00
11,300.00	90.00	360.00	5,532.30	5,078.53	508.29	5,101.29	0.00	0.00	0.00
11,400.00	90.00	360.00	5,532.30	5,178.53	508.29	5,201.06	0.00	0.00	0.00
11,500.00	90.00	360.00	5,532.30	5,278.53	508.28	5,300.83	0.00	0.00	0.00
11,600.00	90.00	360.00	5,532.30	5,378.53	508.27	5,400.60	0.00	0.00	0.00
11,700.00	90.00	360.00	5,532.30	5,478.53	508.27	5,500.37	0.00	0.00	0.00
11,800.00	90.00	360.00	5,532.30	5,578.53	508.26	5,600.14	0.00	0.00	0.00
11,900.00	90.00	360.00	5,532.30	5,678.53	508.26	5,699.91	0.00	0.00	0.00
12,000.00	90.00	360.00	5,532.30	5,778.53	508.25	5,799.68	0.00	0.00	0.00
12,100.00	90.00	360.00	5,532.30	5,878.53	508.24	5,899.45	0.00	0.00	0.00
12,200.00	90.00	360.00	5,532.30	5,978.53	508.24	5,999.22	0.00	0.00	0.00
12,300.00	90.00	360.00	5,532.30	6,078.53	508.23	6,098.99	0.00	0.00	0.00
12,400.00	90.00	360.00	5,532.30	6,178.53	508.22	6,198.76	0.00	0.00	0.00
12,500.00	90.00	360.00	5,532.30	6,278.53	508.22	6,298.53	0.00	0.00	0.00
12,600.00	90.00	360.00	5,532.30	6,378.53	508.21	6,398.30	0.00	0.00	0.00
12,700.00	90.00	360.00	5,532.30	6,478.53	508.21	6,498.07	0.00	0.00	0.00
12,800.00	90.00	360.00	5,532.30	6,578.53	508.20	6,597.84	0.00	0.00	0.00
12,900.00	90.00	360.00	5,532.30	6,678.53	508.19	6,697.61	0.00	0.00	0.00
13,000.00	90.00	360.00	5,532.30	6,778.53	508.19	6,797.38	0.00	0.00	0.00
13,100.00	90.00	360.00	5,532.30	6,878.53	508.18	6,897.16	0.00	0.00	0.00
13,200.00	90.00	360.00	5,532.30	6,978.53	508.18	6,996.93	0.00	0.00	0.00
13,300.00	90.00	360.00	5,532.30	7,078.53	508.17	7,096.70	0.00	0.00	0.00
13,400.00	90.00	360.00	5,532.30	7,178.53	508.16	7,196.47	0.00	0.00	0.00
13,500.00	90.00	360.00	5,532.30	7,278.53	508.16	7,296.24	0.00	0.00	0.00
13,600.00	90.00	360.00	5,532.30	7,378.53	508.15	7,396.01	0.00	0.00	0.00
13,708.78	90.00	360.00	5,532.30	7,487.31	508.14	7,504.54	0.00	0.00	0.00
PBHL									



Database:	EDM 5000.1 Conroe DB	Local Co-ordinate Reference:	Well 0504
Company:	Whiting Oil & Gas	TVD Reference:	WELL @ 4737.30usft (Pioneer 54)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4737.30usft (Pioneer 54)
Site:	Cottonwood 08E	North Reference:	True
Well:	0504	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Design Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL v2 - Cottonwood - plan hits target center - Point	0.00	0.00	5,532.30	7,487.31	508.14	1,534,390.73	3,476,506.28	40° 47' 15.340 N	103° 46' 44.915 W

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
5,973.85	5,532.30	7"	7	7-1/2

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,432.30	1,432.30	U. Pierre		0.00	0.00
3,217.68	3,152.30	Hygiene		0.00	0.00
3,488.77	3,406.30	L. Pierre		0.00	0.00
5,613.12	5,412.30	Sharon Springs		0.00	0.00
5,621.03	5,417.30	Niobrara		0.00	0.00

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,155.67	5,011.43	-768.49	508.65	KOP, 11.00°/100' Build
5,973.85	5,532.30	-247.62	508.62	Begin 90.00° Lateral
13,708.78	5,532.30	7,487.31	508.14	PBHL