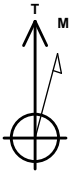




Company: Whiting Oil & Gas
 Site: Cottonwood 08E
 Well: 0502
 Project: Weld County, Colorado (NAD 83)
 Rig Name: Pioneer 54



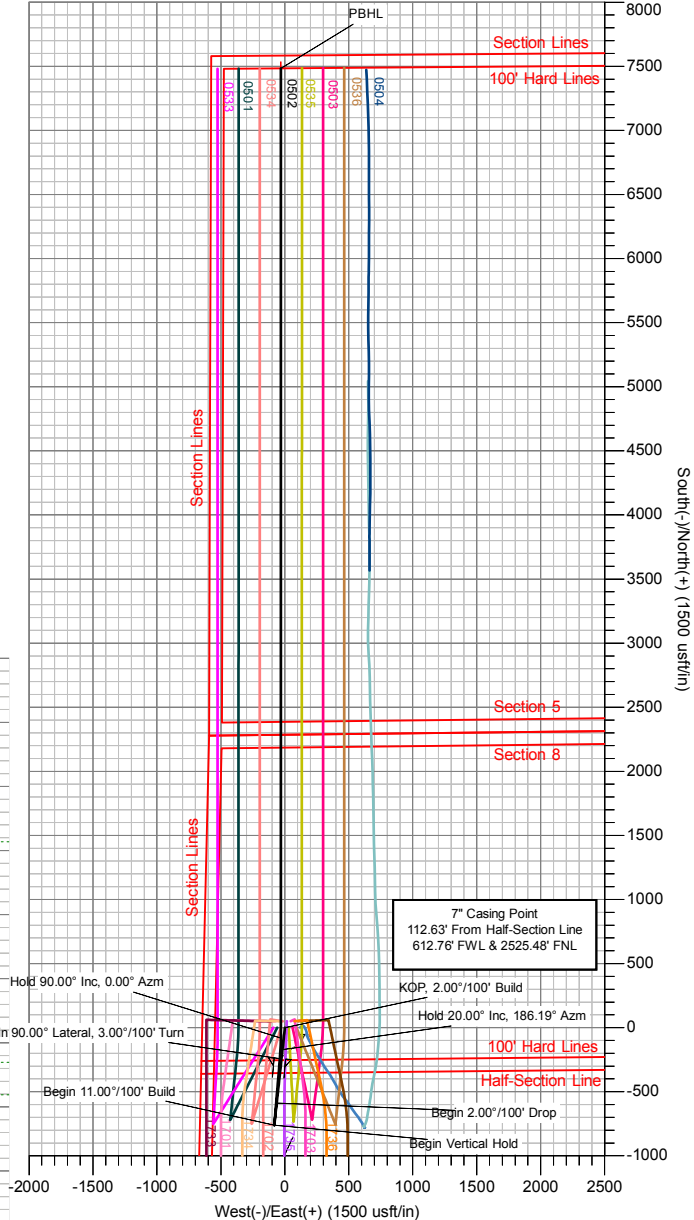
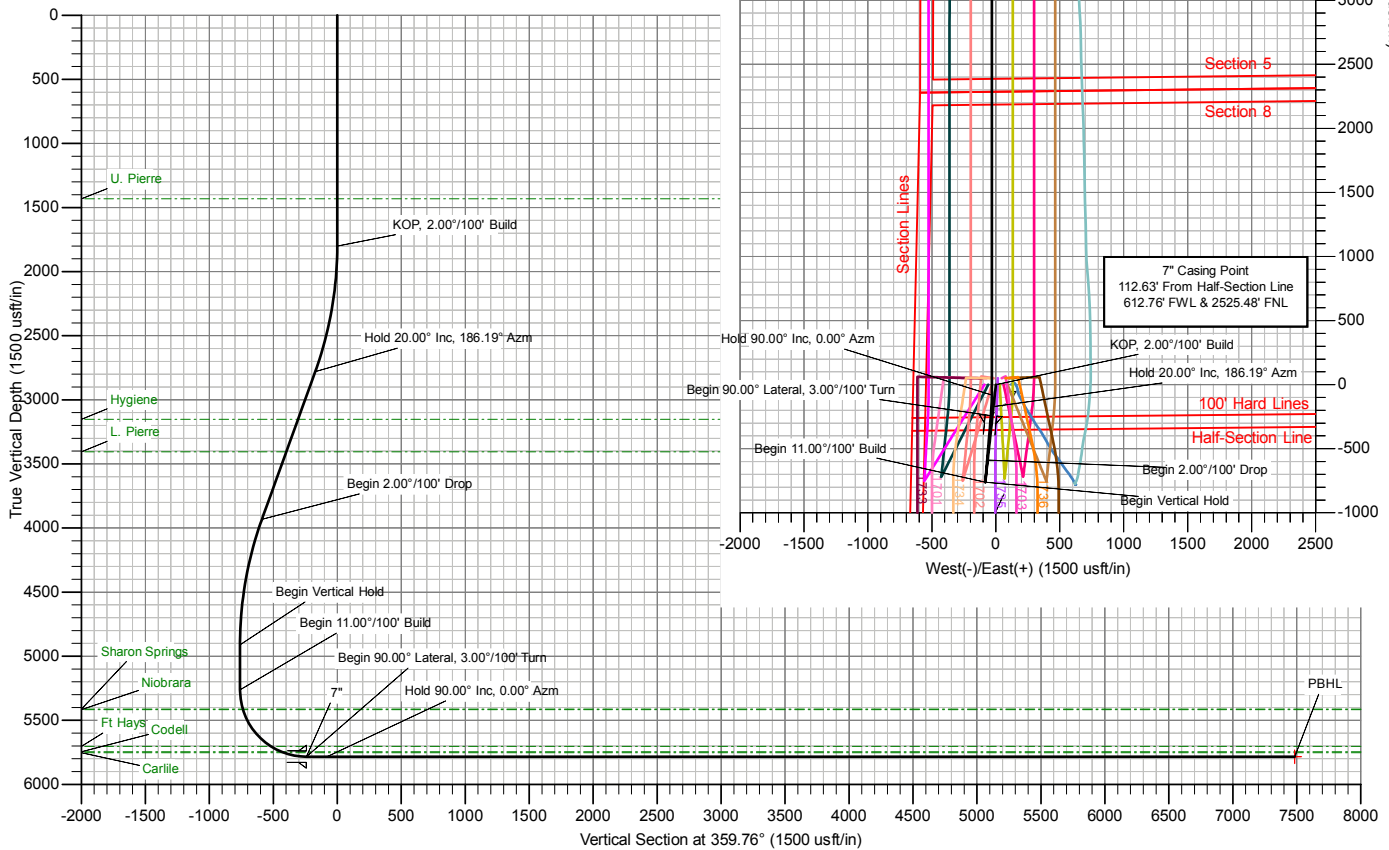
Azimuths to True North
 Magnetic North: 7.90°
 Magnetic Field
 Strength: 53068.7snT
 Dip Angle: 67.38°
 Date: 11/2/2014
 Model: WMM_2010

US State Plane 1983
 Colorado Northern Zone

Created By: MEB
 Date: 16:43, January 08 2015
 Plan: Design #3

ANNOTATIONS

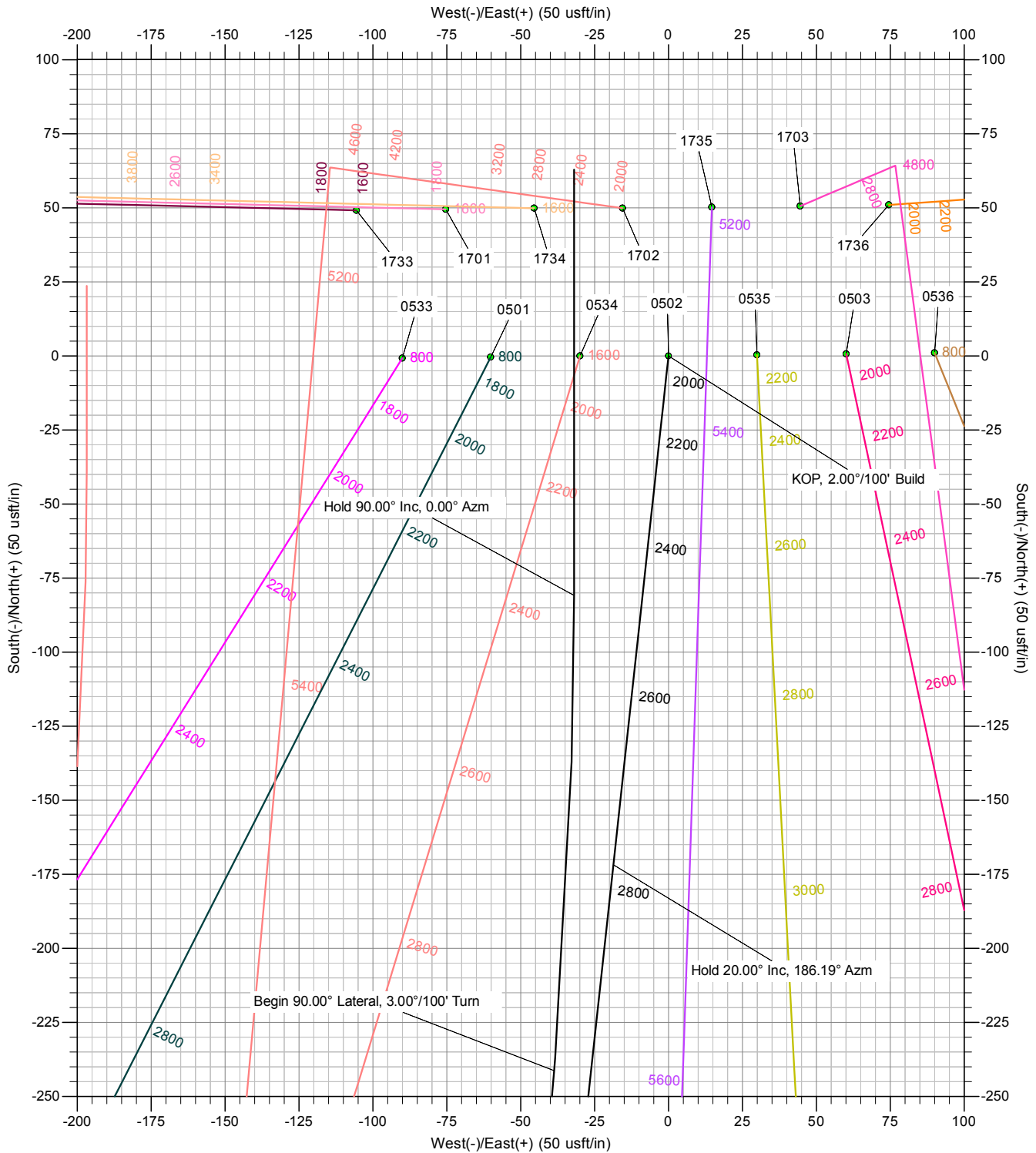
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation
1800.00	0.00	0.00	1800.00	0.00	0.00	0.00	0.00	KOP, 2.00°/100' Build
2800.00	20.00	186.19	2779.82	-171.76	-18.63	-171.68	172.77	Hold 20.00° Inc, 186.19° Azm
4025.71	20.00	186.19	3931.61	-588.54	-63.83	-588.26	591.99	Begin 2.00°/100' Drop
5025.71	0.00	0.00	4911.43	-760.30	-82.46	-759.94	764.75	Begin Vertical Hold
5377.42	0.00	0.00	5263.13	-760.30	-82.46	-759.94	764.75	Begin 11.00°/100' Build
6195.60	90.00	4.82	5784.00	-241.27	-38.69	-241.10	1285.63	Begin 90.00° Lateral, 3.00°/100' Turn
6356.24	90.00	0.00	5784.00	-80.81	-31.94	-80.68	1446.27	Hold 90.00° Inc, 0.00° Azm
13920.51	90.00	0.00	5784.00	7483.45	-31.85	7483.51	9010.53	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: 0502
 Project: Weld County, Colorado (NAD 83)
 Rig Name: Pioneer 54



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Whiting Oil & Gas

Weld County, Colorado (NAD 83)
Cottonwood 08E
0502

Wellbore #1

Plan: Design #3

Standard Planning Report

08 January, 2015



Database:	EDM 5000.1 CONROE DB	Local Co-ordinate Reference:	Well 0502
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:	0502	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

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	0502					
Well Position	+N/-S	1,914,041.29 usft	Northing:	1,526,891.57 usft	Latitude:	40° 46' 1.347 N
	+E/-W	3,278,808.16 usft	Easting:	3,476,023.47 usft	Longitude:	103° 46' 53.080 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	11/2/2014	7.90	67.38	53,069

Design	Design #3			
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	359.76

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	
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,800.00	20.00	186.19	2,779.82	-171.76	-18.63	2.00	2.00	0.00	186.19	
4,025.71	20.00	186.19	3,931.61	-588.54	-63.83	0.00	0.00	0.00	0.00	
5,025.71	0.00	0.00	4,911.43	-760.30	-82.46	2.00	-2.00	17.38	180.00	
5,377.42	0.00	0.00	5,263.13	-760.30	-82.46	0.00	0.00	0.00	0.00	
6,195.60	90.00	4.82	5,784.00	-241.27	-38.69	11.00	11.00	0.00	4.82	
6,356.24	90.00	0.00	5,784.00	-80.81	-31.94	3.00	0.00	-3.00	-90.00	
13,920.51	90.00	0.00	5,784.00	7,483.45	-31.85	0.00	0.00	0.00	0.00	PBHL v3 - Cottonw



Database:	EDM 5000.1 CONROE DB	Local Co-ordinate Reference:	Well 0502
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:	0502	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

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	
1,452.30	0.00	0.00	1,452.30	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	
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
KOP, 2.00°/100' Build										
1,900.00	2.00	186.19	1,899.98	-1.73	-0.19	-1.73	2.00	2.00	0.00	
2,000.00	4.00	186.19	1,999.84	-6.94	-0.75	-6.93	2.00	2.00	0.00	
2,100.00	6.00	186.19	2,099.45	-15.60	-1.69	-15.59	2.00	2.00	0.00	
2,200.00	8.00	186.19	2,198.70	-27.72	-3.01	-27.70	2.00	2.00	0.00	
2,300.00	10.00	186.19	2,297.47	-43.27	-4.69	-43.25	2.00	2.00	0.00	
2,400.00	12.00	186.19	2,395.62	-62.24	-6.75	-62.21	2.00	2.00	0.00	
2,500.00	14.00	186.19	2,493.06	-84.60	-9.18	-84.56	2.00	2.00	0.00	
2,600.00	16.00	186.19	2,589.64	-110.33	-11.97	-110.28	2.00	2.00	0.00	
2,700.00	18.00	186.19	2,685.27	-139.40	-15.12	-139.33	2.00	2.00	0.00	
2,800.00	20.00	186.19	2,779.82	-171.76	-18.63	-171.68	2.00	2.00	0.00	
Hold 20.00° Inc, 186.19° Azm										
2,900.00	20.00	186.19	2,873.78	-205.76	-22.32	-205.67	0.00	0.00	0.00	
3,000.00	20.00	186.19	2,967.75	-239.77	-26.00	-239.65	0.00	0.00	0.00	
3,100.00	20.00	186.19	3,061.72	-273.77	-29.69	-273.64	0.00	0.00	0.00	
3,200.00	20.00	186.19	3,155.69	-307.77	-33.38	-307.63	0.00	0.00	0.00	
3,217.67	20.00	186.19	3,172.30	-313.78	-34.03	-313.63	0.00	0.00	0.00	
Hygiene										
3,300.00	20.00	186.19	3,249.66	-341.77	-37.07	-341.61	0.00	0.00	0.00	
3,400.00	20.00	186.19	3,343.63	-375.78	-40.76	-375.60	0.00	0.00	0.00	
3,487.97	20.00	186.19	3,426.30	-405.69	-44.00	-405.50	0.00	0.00	0.00	
L. Pierre										
3,500.00	20.00	186.19	3,437.60	-409.78	-44.44	-409.59	0.00	0.00	0.00	
3,600.00	20.00	186.19	3,531.57	-443.78	-48.13	-443.57	0.00	0.00	0.00	
3,700.00	20.00	186.19	3,625.54	-477.78	-51.82	-477.56	0.00	0.00	0.00	
3,800.00	20.00	186.19	3,719.51	-511.79	-55.51	-511.55	0.00	0.00	0.00	
3,900.00	20.00	186.19	3,813.48	-545.79	-59.20	-545.53	0.00	0.00	0.00	
4,000.00	20.00	186.19	3,907.45	-579.79	-62.88	-579.52	0.00	0.00	0.00	
4,025.71	20.00	186.19	3,931.61	-588.54	-63.83	-588.26	0.00	0.00	0.00	
Begin 2.00°/100' Drop										
4,100.00	18.51	186.19	4,001.74	-612.89	-66.47	-612.60	2.00	-2.00	0.00	
4,200.00	16.51	186.19	4,097.10	-642.81	-69.72	-642.51	2.00	-2.00	0.00	



Database:	EDM 5000.1 CONROE DB	Local Co-ordinate Reference:	Well 0502
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:	0502	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

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)	
4,300.00	14.51	186.19	4,193.45	-669.40	-72.60	-669.08	2.00	-2.00	0.00	
4,400.00	12.51	186.19	4,290.67	-692.63	-75.12	-692.31	2.00	-2.00	0.00	
4,500.00	10.51	186.19	4,388.66	-712.48	-77.27	-712.14	2.00	-2.00	0.00	
4,600.00	8.51	186.19	4,487.28	-728.91	-79.06	-728.56	2.00	-2.00	0.00	
4,700.00	6.51	186.19	4,586.41	-741.91	-80.47	-741.56	2.00	-2.00	0.00	
4,800.00	4.51	186.19	4,685.95	-751.46	-81.50	-751.11	2.00	-2.00	0.00	
4,900.00	2.51	186.19	4,785.75	-757.55	-82.16	-757.20	2.00	-2.00	0.00	
5,000.00	0.51	186.19	4,885.71	-760.18	-82.45	-759.82	2.00	-2.00	0.00	
5,025.71	0.00	0.00	4,911.43	-760.30	-82.46	-759.94	2.00	-2.00	675.93	
Begin Vertical Hold										
5,100.00	0.00	0.00	4,985.71	-760.30	-82.46	-759.94	0.00	0.00	0.00	
5,200.00	0.00	0.00	5,085.71	-760.30	-82.46	-759.94	0.00	0.00	0.00	
5,300.00	0.00	0.00	5,185.71	-760.30	-82.46	-759.94	0.00	0.00	0.00	
5,377.42	0.00	0.00	5,263.13	-760.30	-82.46	-759.94	0.00	0.00	0.00	
Begin 11.00°/100' Build										
5,400.00	2.48	4.82	5,285.70	-759.81	-82.42	-759.45	11.00	11.00	21.35	
5,450.00	7.98	4.82	5,335.48	-755.27	-82.04	-754.91	11.00	11.00	0.00	
5,500.00	13.48	4.82	5,384.58	-745.99	-81.25	-745.64	11.00	11.00	0.00	
5,521.42	15.84	4.82	5,405.30	-740.59	-80.80	-740.24	11.00	11.00	0.00	
Sharon Springs										
5,550.00	18.98	4.82	5,432.57	-732.07	-80.08	-731.72	11.00	11.00	0.00	
5,576.39	21.89	4.82	5,457.30	-722.89	-79.31	-722.54	11.00	11.00	0.00	
Niobrara										
5,600.00	24.48	4.82	5,479.00	-713.62	-78.52	-713.28	11.00	11.00	0.00	
5,650.00	29.98	4.82	5,523.44	-690.83	-76.60	-690.50	11.00	11.00	0.00	
5,700.00	35.48	4.82	5,565.48	-663.90	-74.33	-663.58	11.00	11.00	0.00	
5,750.00	40.98	4.82	5,604.74	-633.08	-71.73	-632.77	11.00	11.00	0.00	
5,800.00	46.48	4.82	5,640.86	-598.65	-68.83	-598.35	11.00	11.00	0.00	
5,850.00	51.98	4.82	5,673.49	-560.93	-65.65	-560.64	11.00	11.00	0.00	
5,888.93	56.27	4.82	5,696.30	-529.50	-63.00	-529.23	11.00	11.00	0.00	
Ft Hays										
5,900.00	57.48	4.82	5,702.35	-520.27	-62.22	-520.00	11.00	11.00	0.00	
5,950.00	62.98	4.82	5,727.16	-477.03	-58.57	-476.78	11.00	11.00	0.00	
5,978.23	66.09	4.82	5,739.30	-451.64	-56.43	-451.39	11.00	11.00	0.00	
Codell										
5,996.21	68.07	4.82	5,746.30	-435.14	-55.04	-434.90	11.00	11.00	0.00	
Carlile										
6,000.00	68.48	4.82	5,747.70	-431.63	-54.75	-431.39	11.00	11.00	0.00	
6,050.00	73.98	4.82	5,763.78	-384.47	-50.77	-384.25	11.00	11.00	0.00	
6,100.00	79.48	4.82	5,775.25	-336.00	-46.68	-335.80	11.00	11.00	0.00	
6,150.00	84.98	4.82	5,782.01	-286.65	-42.52	-286.47	11.00	11.00	0.00	
6,195.60	90.00	4.82	5,784.00	-241.27	-38.69	-241.10	11.00	11.00	0.00	
Begin 90.00° Lateral, 3.00°/100' Turn - 7"										
6,200.00	90.00	4.69	5,784.00	-236.88	-38.33	-236.72	3.00	0.00	-3.00	
6,300.00	90.00	1.69	5,784.00	-137.05	-32.77	-136.91	3.00	0.00	-3.00	
6,356.24	90.00	0.00	5,784.00	-80.81	-31.94	-80.68	3.00	0.00	-3.00	
Hold 90.00° Inc, 0.00° Azm										
6,400.00	90.00	0.00	5,784.00	-37.06	-31.94	-36.92	0.00	0.00	0.00	
6,500.00	90.00	0.00	5,784.00	62.94	-31.94	63.08	0.00	0.00	0.00	
6,600.00	90.00	0.00	5,784.00	162.94	-31.94	163.08	0.00	0.00	0.00	
6,700.00	90.00	0.00	5,784.00	262.94	-31.94	263.07	0.00	0.00	0.00	
6,800.00	90.00	0.00	5,784.00	362.94	-31.93	363.07	0.00	0.00	0.00	
6,900.00	90.00	0.00	5,784.00	462.94	-31.93	463.07	0.00	0.00	0.00	



Database:	EDM 5000.1 CONROE DB	Local Co-ordinate Reference:	Well 0502
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:	0502	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

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)
7,000.00	90.00	0.00	5,784.00	562.94	-31.93	563.07	0.00	0.00	0.00
7,100.00	90.00	0.00	5,784.00	662.94	-31.93	663.07	0.00	0.00	0.00
7,200.00	90.00	0.00	5,784.00	762.94	-31.93	763.07	0.00	0.00	0.00
7,300.00	90.00	0.00	5,784.00	862.94	-31.93	863.07	0.00	0.00	0.00
7,400.00	90.00	0.00	5,784.00	962.94	-31.93	963.07	0.00	0.00	0.00
7,500.00	90.00	0.00	5,784.00	1,062.94	-31.93	1,063.07	0.00	0.00	0.00
7,600.00	90.00	0.00	5,784.00	1,162.94	-31.92	1,163.07	0.00	0.00	0.00
7,700.00	90.00	0.00	5,784.00	1,262.94	-31.92	1,263.07	0.00	0.00	0.00
7,800.00	90.00	0.00	5,784.00	1,362.94	-31.92	1,363.06	0.00	0.00	0.00
7,900.00	90.00	0.00	5,784.00	1,462.94	-31.92	1,463.06	0.00	0.00	0.00
8,000.00	90.00	0.00	5,784.00	1,562.94	-31.92	1,563.06	0.00	0.00	0.00
8,100.00	90.00	0.00	5,784.00	1,662.94	-31.92	1,663.06	0.00	0.00	0.00
8,200.00	90.00	0.00	5,784.00	1,762.94	-31.92	1,763.06	0.00	0.00	0.00
8,300.00	90.00	0.00	5,784.00	1,862.94	-31.92	1,863.06	0.00	0.00	0.00
8,400.00	90.00	0.00	5,784.00	1,962.94	-31.91	1,963.06	0.00	0.00	0.00
8,500.00	90.00	0.00	5,784.00	2,062.94	-31.91	2,063.06	0.00	0.00	0.00
8,600.00	90.00	0.00	5,784.00	2,162.94	-31.91	2,163.06	0.00	0.00	0.00
8,700.00	90.00	0.00	5,784.00	2,262.94	-31.91	2,263.06	0.00	0.00	0.00
8,800.00	90.00	0.00	5,784.00	2,362.94	-31.91	2,363.06	0.00	0.00	0.00
8,900.00	90.00	0.00	5,784.00	2,462.94	-31.91	2,463.05	0.00	0.00	0.00
9,000.00	90.00	0.00	5,784.00	2,562.94	-31.91	2,563.05	0.00	0.00	0.00
9,100.00	90.00	0.00	5,784.00	2,662.94	-31.91	2,663.05	0.00	0.00	0.00
9,200.00	90.00	0.00	5,784.00	2,762.94	-31.90	2,763.05	0.00	0.00	0.00
9,300.00	90.00	0.00	5,784.00	2,862.94	-31.90	2,863.05	0.00	0.00	0.00
9,400.00	90.00	0.00	5,784.00	2,962.94	-31.90	2,963.05	0.00	0.00	0.00
9,500.00	90.00	0.00	5,784.00	3,062.94	-31.90	3,063.05	0.00	0.00	0.00
9,600.00	90.00	0.00	5,784.00	3,162.94	-31.90	3,163.05	0.00	0.00	0.00
9,700.00	90.00	0.00	5,784.00	3,262.94	-31.90	3,263.05	0.00	0.00	0.00
9,800.00	90.00	0.00	5,784.00	3,362.94	-31.90	3,363.05	0.00	0.00	0.00
9,900.00	90.00	0.00	5,784.00	3,462.94	-31.90	3,463.05	0.00	0.00	0.00
10,000.00	90.00	0.00	5,784.00	3,562.94	-31.89	3,563.04	0.00	0.00	0.00
10,100.00	90.00	0.00	5,784.00	3,662.94	-31.89	3,663.04	0.00	0.00	0.00
10,200.00	90.00	0.00	5,784.00	3,762.94	-31.89	3,763.04	0.00	0.00	0.00
10,300.00	90.00	0.00	5,784.00	3,862.94	-31.89	3,863.04	0.00	0.00	0.00
10,400.00	90.00	0.00	5,784.00	3,962.94	-31.89	3,963.04	0.00	0.00	0.00
10,500.00	90.00	0.00	5,784.00	4,062.94	-31.89	4,063.04	0.00	0.00	0.00
10,600.00	90.00	0.00	5,784.00	4,162.94	-31.89	4,163.04	0.00	0.00	0.00
10,700.00	90.00	0.00	5,784.00	4,262.94	-31.89	4,263.04	0.00	0.00	0.00
10,800.00	90.00	0.00	5,784.00	4,362.94	-31.88	4,363.04	0.00	0.00	0.00
10,900.00	90.00	0.00	5,784.00	4,462.94	-31.88	4,463.04	0.00	0.00	0.00
11,000.00	90.00	0.00	5,784.00	4,562.94	-31.88	4,563.04	0.00	0.00	0.00
11,100.00	90.00	0.00	5,784.00	4,662.94	-31.88	4,663.03	0.00	0.00	0.00
11,200.00	90.00	0.00	5,784.00	4,762.94	-31.88	4,763.03	0.00	0.00	0.00
11,300.00	90.00	0.00	5,784.00	4,862.94	-31.88	4,863.03	0.00	0.00	0.00
11,400.00	90.00	0.00	5,784.00	4,962.94	-31.88	4,963.03	0.00	0.00	0.00
11,500.00	90.00	0.00	5,784.00	5,062.94	-31.88	5,063.03	0.00	0.00	0.00
11,600.00	90.00	0.00	5,784.00	5,162.94	-31.87	5,163.03	0.00	0.00	0.00
11,700.00	90.00	0.00	5,784.00	5,262.94	-31.87	5,263.03	0.00	0.00	0.00
11,800.00	90.00	0.00	5,784.00	5,362.94	-31.87	5,363.03	0.00	0.00	0.00
11,900.00	90.00	0.00	5,784.00	5,462.94	-31.87	5,463.03	0.00	0.00	0.00
12,000.00	90.00	0.00	5,784.00	5,562.94	-31.87	5,563.03	0.00	0.00	0.00
12,100.00	90.00	0.00	5,784.00	5,662.94	-31.87	5,663.03	0.00	0.00	0.00
12,200.00	90.00	0.00	5,784.00	5,762.94	-31.87	5,763.02	0.00	0.00	0.00
12,300.00	90.00	0.00	5,784.00	5,862.94	-31.87	5,863.02	0.00	0.00	0.00



Database:	EDM 5000.1 CONROE DB	Local Co-ordinate Reference:	Well 0502
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:	0502	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

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)	
12,400.00	90.00	0.00	5,784.00	5,962.94	-31.86	5,963.02	0.00	0.00	0.00	
12,500.00	90.00	0.00	5,784.00	6,062.94	-31.86	6,063.02	0.00	0.00	0.00	
12,600.00	90.00	0.00	5,784.00	6,162.94	-31.86	6,163.02	0.00	0.00	0.00	
12,700.00	90.00	0.00	5,784.00	6,262.94	-31.86	6,263.02	0.00	0.00	0.00	
12,800.00	90.00	0.00	5,784.00	6,362.94	-31.86	6,363.02	0.00	0.00	0.00	
12,900.00	90.00	0.00	5,784.00	6,462.94	-31.86	6,463.02	0.00	0.00	0.00	
13,000.00	90.00	0.00	5,784.00	6,562.94	-31.86	6,563.02	0.00	0.00	0.00	
13,100.00	90.00	0.00	5,784.00	6,662.94	-31.86	6,663.02	0.00	0.00	0.00	
13,200.00	90.00	0.00	5,784.00	6,762.94	-31.85	6,763.02	0.00	0.00	0.00	
13,300.00	90.00	0.00	5,784.00	6,862.94	-31.85	6,863.01	0.00	0.00	0.00	
13,400.00	90.00	0.00	5,784.00	6,962.94	-31.85	6,963.01	0.00	0.00	0.00	
13,500.00	90.00	0.00	5,784.00	7,062.94	-31.85	7,063.01	0.00	0.00	0.00	
13,600.00	90.00	0.00	5,784.00	7,162.94	-31.85	7,163.01	0.00	0.00	0.00	
13,700.00	90.00	0.00	5,784.00	7,262.94	-31.85	7,263.01	0.00	0.00	0.00	
13,800.00	90.00	0.00	5,784.00	7,362.94	-31.85	7,363.01	0.00	0.00	0.00	
13,900.00	90.00	0.00	5,784.00	7,462.94	-31.85	7,463.01	0.00	0.00	0.00	
13,920.51	90.00	0.00	5,784.00	7,483.45	-31.85	7,483.51	0.00	0.00	0.00	
PBHL										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
PBHL v3 - Cottonwoo - hit/miss target - Shape - Point	0.00	0.00	5,784.00	7,483.45	-31.85	1,534,372.99	3,475,846.60	40° 47' 15.292 N	103° 46' 53.494 W	

Casing Points						
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")		
6,195.60	5,784.00	7"	7	7-1/2		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,452.30	1,452.30	U. Pierre		0.00	0.00	
3,217.67	3,172.30	Hygiene		0.00	0.00	
3,487.97	3,426.30	L. Pierre		0.00	0.00	
5,521.42	5,405.30	Sharon Springs		0.00	0.00	
5,576.39	5,457.30	Niobrara		0.00	0.00	
5,888.93	5,696.30	Ft Hays		0.00	0.00	
5,978.23	5,739.30	Codell		0.00	0.00	
5,996.21	5,746.30	Carlile		0.00	0.00	



Database:	EDM 5000.1 CONROE DB	Local Co-ordinate Reference:	Well 0502
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:	0502	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,800.00	1,800.00	0.00	0.00	KOP, 2.00°/100' Build
2,800.00	2,779.82	-171.76	-18.63	Hold 20.00° Inc, 186.19° Azm
4,025.71	3,931.61	-588.54	-63.83	Begin 2.00°/100' Drop
5,025.71	4,911.43	-760.30	-82.46	Begin Vertical Hold
5,377.42	5,263.13	-760.30	-82.46	Begin 11.00°/100' Build
6,195.60	5,784.00	-241.27	-38.69	Begin 90.00° Lateral, 3.00°/100' Turn
6,356.24	5,784.00	-80.81	-31.94	Hold 90.00° Inc, 0.00° Azm
13,920.51	5,784.00	7,483.45	-31.85	PBHL