



Project: Weld County, CO
Site: Sec 30-T10N-R57W
Well: Horsetail #30H-1948
Wellbore: Hz
Design: APD

PROJECT DETAILS: Weld County, CO
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Northern Zone
System Datum: Mean Sea Level



Magnetic North: 7.79°
Strength: 53002.4snT
Dip Angle: 67.38°
Date: 8/17/2015
Model: IGRF2010

WELL DETAILS: Horsetail #30H-1948

+N/-S	+E/-W	Northing	Ground Level:	Easting	Latitude	Longitude	Slot
0.00	0.00	1542746.52	4725.00	3474249.45	40° 48' 38.320 N	103° 47' 12.150 W	

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	300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	
3	834.94	10.70	163.06	831.84	-47.64	14.51	2.00	163.06	-47.19	
4	4549.85	10.70	163.06	4482.16	-707.36	215.49	0.00	0.00	-700.78	
5	5084.78	0.00	0.00	5014.00	-755.00	230.00	2.00	180.00	-747.97	
6	5284.78	0.00	0.00	5214.00	-755.00	230.00	0.00	0.00	-747.97	
7	6103.17	90.00	359.93	5735.00	-234.00	229.36	11.00	359.93	-227.21	
8	13876.00	90.00	359.93	5735.00	7538.83	219.85	0.00	0.00	7542.03	PBHL 1948

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1550.00	1565.81	Upper Pierre
3500.00	3550.31	Hygiene
3650.00	3702.96	Lower Pierre
5448.00	5527.46	P200 Marker
5475.00	5558.16	P300 Marker
5486.00	5570.96	P350 Marker
5498.00	5585.15	Sharon Springs
5500.00	5587.54	Niobrara
5516.00	5606.92	Top A Chalk
5548.00	5647.35	Top A Marl
5560.00	5663.19	A Marl
5566.00	5671.27	Top Upper B
5590.00	5704.83	Base Upper B
5606.00	5728.52	Top Lower B
5636.00	5776.67	Base Lower B
5646.00	5794.13	Top B Marl
5690.00	5885.04	Top C Chalk
5700.00	5911.11	Middle C Chalk
5714.00	5954.74	Middle C Marl
5735.00	6103.17	Lower C Chalk

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation
300.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	Build 2°/100'
831.84	834.94	10.70	163.06	-47.64	14.51	-47.19	49.80	Hold 10.70° Inc
4482.16	4549.85	10.70	163.06	-707.36	215.49	-700.78	739.46	Drop 2°/100'
5014.00	5084.78	0.00	0.00	-755.00	230.00	-747.97	789.26	Hold Vertical
5214.00	5284.78	0.00	0.00	-755.00	230.00	-747.97	789.26	KOP, Build 11°/100'
5735.00	6103.17	90.00	359.93	-234.00	229.36	-227.21	1310.26	LP @ 90° Inc, Hold
5735.00	13876.00	90.00	359.93	7538.83	219.85	7542.03	9083.09	TD at 13876.00' MD

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL 1948	5735.00	7538.83	219.85	1550288.18	3474323.61	40° 49' 52.810 N	103° 47' 9.290 W
Mertens #1-19	6440.00	6985.38	-1269.06	1549706.08	3472845.67	40° 49' 47.341 N	103° 47' 28.658 W

CASING DETAILS

TVD	MD	Name	Size
5735.00	6103.17	7"	7.000

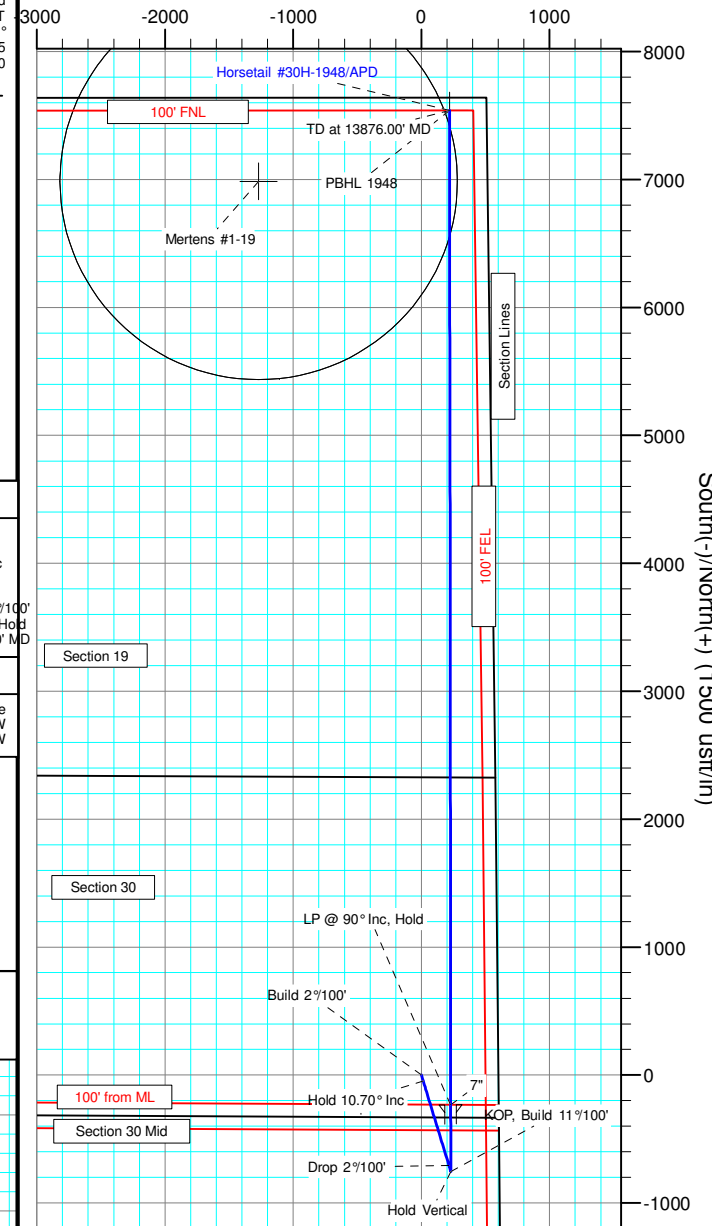
SHL:
2328' FNL, 600' FEL
Sec30-T10N-R57W

BHL:
100' FNL, 288' FEL
Sec19-T10N-R57W

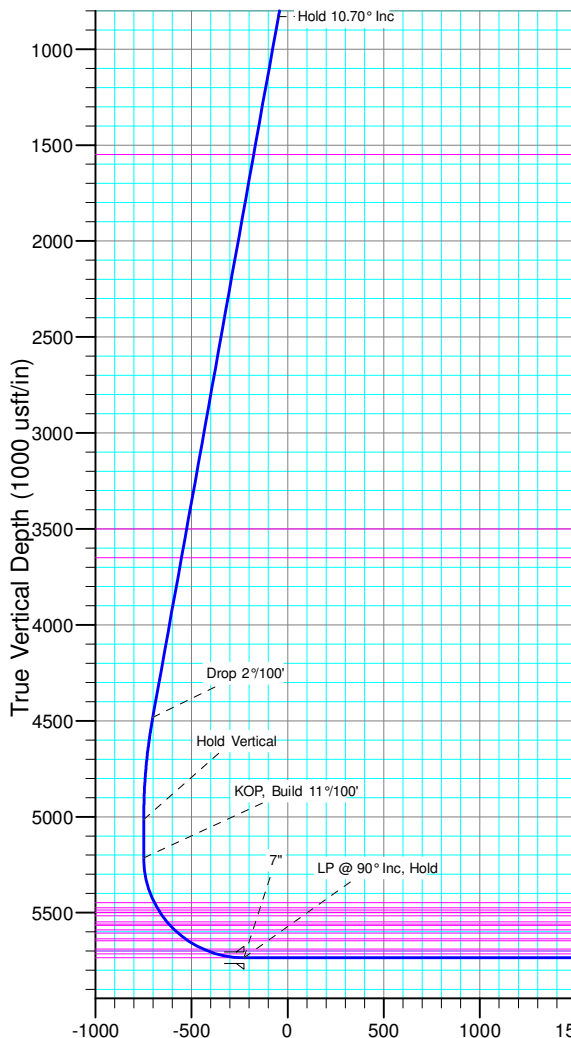
7":
2562' FNL, 370' FEL
Sec30-T10N-R57W

Enter Mertens #1-19
1550' Radius @
12916' MD

West(-)/East(+) (1500 usft/in)



South(-)/North(+) (1500 usft/in)



Vertical Section at 1.67° (1000 usft/in)



Whiting Petroleum Corp.

**Weld County, CO
Sec 30-T10N-R57W
Horsetail #30H-1948**

Hz

Plan: APD

Standard Planning Report

12 October, 2015



WOG

Planning Report

Database:	LandmarkEDM	Local Co-ordinate Reference:	Well Horsetail #30H-1948
Company:	Whiting Petroleum Corp.	TVD Reference:	KBE @ 4746.00usft (Original Well Elev)
Project:	Weld County, CO	MD Reference:	KBE @ 4746.00usft (Original Well Elev)
Site:	Sec 30-T10N-R57W	North Reference:	True
Well:	Horsetail #30H-1948	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	APD		

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

Site	Sec 30-T10N-R57W			
Site Position:		Northing:	1,545,003.67 usft	Latitude: 40° 49' 1.510 N
From:	Lat/Long	Easting:	3,469,557.91 usft	Longitude: 103° 48' 12.589 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.200 in	Grid Convergence: 1.10 °

Well	Horsetail #30H-1948			
Well Position	+N/-S	-2,346.49 usft	Northing:	1,542,746.52 usft
	+E/-W	4,647.49 usft	Easting:	3,474,249.45 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level: 4,725.00 usft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/17/2015	7.79	67.38	53,002

Design	APD			
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	1.67

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	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	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
834.94	10.70	163.06	831.84	-47.64	14.51	2.00	2.00	0.00	163.06	
4,549.85	10.70	163.06	4,482.16	-707.36	215.49	0.00	0.00	0.00	0.00	
5,084.78	0.00	0.00	5,014.00	-755.00	230.00	2.00	-2.00	0.00	180.00	
5,284.78	0.00	0.00	5,214.00	-755.00	230.00	0.00	0.00	0.00	0.00	
6,103.17	90.00	359.93	5,735.00	-234.00	229.36	11.00	11.00	0.00	359.93	
13,876.00	90.00	359.93	5,735.00	7,538.83	219.85	0.00	0.00	0.00	0.00	PBHL 1948



WOG

Planning Report

Database:	LandmarkEDM	Local Co-ordinate Reference:	Well Horsetail #30H-1948
Company:	Whiting Petroleum Corp.	TVD Reference:	KBE @ 4746.00usft (Original Well Elev)
Project:	Weld County, CO	MD Reference:	KBE @ 4746.00usft (Original Well Elev)
Site:	Sec 30-T10N-R57W	North Reference:	True
Well:	Horsetail #30H-1948	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	APD		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	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
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
Build 2°/100'									
400.00	2.00	163.06	399.98	-1.67	0.51	-1.65	2.00	2.00	0.00
500.00	4.00	163.06	499.84	-6.68	2.03	-6.61	2.00	2.00	0.00
600.00	6.00	163.06	599.45	-15.01	4.57	-14.87	2.00	2.00	0.00
700.00	8.00	163.06	698.70	-26.67	8.12	-26.42	2.00	2.00	0.00
800.00	10.00	163.06	797.47	-41.63	12.68	-41.25	2.00	2.00	0.00
834.94	10.70	163.06	831.84	-47.64	14.51	-47.19	2.00	2.00	0.00
Hold 10.70° Inc									
900.00	10.70	163.06	895.77	-59.19	18.03	-58.64	0.00	0.00	0.00
1,000.00	10.70	163.06	994.03	-76.95	23.44	-76.23	0.00	0.00	0.00
1,100.00	10.70	163.06	1,092.29	-94.71	28.85	-93.83	0.00	0.00	0.00
1,200.00	10.70	163.06	1,190.55	-112.47	34.26	-111.42	0.00	0.00	0.00
1,300.00	10.70	163.06	1,288.81	-130.23	39.67	-129.02	0.00	0.00	0.00
1,400.00	10.70	163.06	1,387.07	-147.99	45.08	-146.61	0.00	0.00	0.00
1,500.00	10.70	163.06	1,485.34	-165.75	50.49	-164.20	0.00	0.00	0.00
1,565.81	10.70	163.06	1,550.00	-177.43	54.05	-175.78	0.00	0.00	0.00
Upper Pierre									
1,600.00	10.70	163.06	1,583.60	-183.50	55.90	-181.80	0.00	0.00	0.00
1,700.00	10.70	163.06	1,681.86	-201.26	61.31	-199.39	0.00	0.00	0.00
1,800.00	10.70	163.06	1,780.12	-219.02	66.72	-216.98	0.00	0.00	0.00
1,900.00	10.70	163.06	1,878.38	-236.78	72.13	-234.58	0.00	0.00	0.00
2,000.00	10.70	163.06	1,976.64	-254.54	77.54	-252.17	0.00	0.00	0.00
2,100.00	10.70	163.06	2,074.91	-272.30	82.95	-269.76	0.00	0.00	0.00
2,200.00	10.70	163.06	2,173.17	-290.06	88.36	-287.36	0.00	0.00	0.00
2,300.00	10.70	163.06	2,271.43	-307.82	93.77	-304.95	0.00	0.00	0.00
2,400.00	10.70	163.06	2,369.69	-325.57	99.18	-322.55	0.00	0.00	0.00
2,500.00	10.70	163.06	2,467.95	-343.33	104.59	-340.14	0.00	0.00	0.00
2,600.00	10.70	163.06	2,566.21	-361.09	110.00	-357.73	0.00	0.00	0.00
2,700.00	10.70	163.06	2,664.48	-378.85	115.41	-375.33	0.00	0.00	0.00
2,800.00	10.70	163.06	2,762.74	-396.61	120.82	-392.92	0.00	0.00	0.00
2,900.00	10.70	163.06	2,861.00	-414.37	126.23	-410.51	0.00	0.00	0.00
3,000.00	10.70	163.06	2,959.26	-432.13	131.64	-428.11	0.00	0.00	0.00
3,100.00	10.70	163.06	3,057.52	-449.89	137.05	-445.70	0.00	0.00	0.00
3,200.00	10.70	163.06	3,155.78	-467.65	142.46	-463.29	0.00	0.00	0.00
3,300.00	10.70	163.06	3,254.05	-485.40	147.87	-480.89	0.00	0.00	0.00
3,400.00	10.70	163.06	3,352.31	-503.16	153.28	-498.48	0.00	0.00	0.00
3,500.00	10.70	163.06	3,450.57	-520.92	158.69	-516.07	0.00	0.00	0.00
3,550.31	10.70	163.06	3,500.00	-529.86	161.41	-524.93	0.00	0.00	0.00
Hygiene									
3,600.00	10.70	163.06	3,548.83	-538.68	164.10	-533.67	0.00	0.00	0.00
3,700.00	10.70	163.06	3,647.09	-556.44	169.51	-551.26	0.00	0.00	0.00
3,702.96	10.70	163.06	3,650.00	-556.96	169.67	-551.78	0.00	0.00	0.00
Lower Pierre									
3,800.00	10.70	163.06	3,745.35	-574.20	174.92	-568.86	0.00	0.00	0.00
3,900.00	10.70	163.06	3,843.62	-591.96	180.33	-586.45	0.00	0.00	0.00
4,000.00	10.70	163.06	3,941.88	-609.72	185.74	-604.04	0.00	0.00	0.00
4,100.00	10.70	163.06	4,040.14	-627.47	191.15	-621.64	0.00	0.00	0.00
4,200.00	10.70	163.06	4,138.40	-645.23	196.56	-639.23	0.00	0.00	0.00
4,300.00	10.70	163.06	4,236.66	-662.99	201.97	-656.82	0.00	0.00	0.00
4,400.00	10.70	163.06	4,334.92	-680.75	207.38	-674.42	0.00	0.00	0.00



WOG Planning Report

Database:	LandmarkEDM	Local Co-ordinate Reference:	Well Horsetail #30H-1948
Company:	Whiting Petroleum Corp.	TVD Reference:	KBE @ 4746.00usft (Original Well Elev)
Project:	Weld County, CO	MD Reference:	KBE @ 4746.00usft (Original Well Elev)
Site:	Sec 30-T10N-R57W	North Reference:	True
Well:	Horsetail #30H-1948	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	APD		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,500.00	10.70	163.06	4,433.19	-698.51	212.79	-692.01	0.00	0.00	0.00
4,549.85	10.70	163.06	4,482.16	-707.36	215.49	-700.78	0.00	0.00	0.00
Drop 2°/100'									
4,600.00	9.70	163.06	4,531.53	-715.86	218.08	-709.19	2.00	-2.00	0.00
4,700.00	7.70	163.06	4,630.37	-730.32	222.48	-723.52	2.00	-2.00	0.00
4,800.00	5.70	163.06	4,729.69	-741.47	225.88	-734.57	2.00	-2.00	0.00
4,900.00	3.70	163.06	4,829.34	-749.30	228.26	-742.33	2.00	-2.00	0.00
5,000.00	1.70	163.06	4,929.23	-753.80	229.63	-746.79	2.00	-2.00	0.00
5,084.78	0.00	0.00	5,014.00	-755.00	230.00	-747.97	2.00	-2.00	0.00
Hold Vertical									
5,100.00	0.00	0.00	5,029.22	-755.00	230.00	-747.97	0.00	0.00	0.00
5,200.00	0.00	0.00	5,129.22	-755.00	230.00	-747.97	0.00	0.00	0.00
5,284.78	0.00	0.00	5,214.00	-755.00	230.00	-747.97	0.00	0.00	0.00
KOP, Build 11°/100'									
5,300.00	1.67	359.93	5,229.21	-754.78	230.00	-747.75	11.00	11.00	0.00
5,350.00	7.17	359.93	5,279.05	-750.92	230.00	-743.90	11.00	11.00	0.00
5,400.00	12.67	359.93	5,328.28	-742.31	229.98	-735.29	11.00	11.00	0.00
5,450.00	18.17	359.93	5,376.46	-729.02	229.97	-722.01	11.00	11.00	0.00
5,500.00	23.67	359.93	5,423.15	-711.18	229.95	-704.17	11.00	11.00	0.00
5,527.46	26.69	359.93	5,448.00	-699.49	229.93	-692.49	11.00	11.00	0.00
P200 Marker									
5,550.00	29.17	359.93	5,467.91	-688.94	229.92	-681.95	11.00	11.00	0.00
5,558.16	30.06	359.93	5,475.00	-684.91	229.91	-677.92	11.00	11.00	0.00
P300 Marker									
5,570.96	31.47	359.93	5,486.00	-678.36	229.91	-671.37	11.00	11.00	0.00
P350 Marker									
5,585.15	33.03	359.93	5,498.00	-670.79	229.90	-663.80	11.00	11.00	0.00
Sharon Springs									
5,587.54	33.29	359.93	5,500.00	-669.48	229.90	-662.50	11.00	11.00	0.00
Niobrara									
5,600.00	34.67	359.93	5,510.33	-662.52	229.89	-655.53	11.00	11.00	0.00
5,606.92	35.43	359.93	5,516.00	-658.54	229.88	-651.56	11.00	11.00	0.00
Top A Chalk									
5,647.35	39.87	359.93	5,548.00	-633.86	229.85	-626.89	11.00	11.00	0.00
Top A Marl									
5,650.00	40.16	359.93	5,550.03	-632.15	229.85	-625.18	11.00	11.00	0.00
5,663.19	41.61	359.93	5,560.00	-623.52	229.84	-616.55	11.00	11.00	0.00
A Marl									
5,671.27	42.50	359.93	5,566.00	-618.11	229.83	-611.14	11.00	11.00	0.00
Top Upper B									
5,700.00	45.66	359.93	5,586.64	-598.12	229.81	-591.17	11.00	11.00	0.00
5,704.83	46.19	359.93	5,590.00	-594.65	229.80	-587.69	11.00	11.00	0.00
Base Upper B									
5,728.52	48.80	359.93	5,606.00	-577.19	229.78	-570.24	11.00	11.00	0.00
Top Lower B									
5,750.00	51.16	359.93	5,619.81	-560.74	229.76	-553.80	11.00	11.00	0.00
5,776.67	54.09	359.93	5,636.00	-539.54	229.74	-532.62	11.00	11.00	0.00
Base Lower B									
5,794.13	56.01	359.93	5,646.00	-525.23	229.72	-518.31	11.00	11.00	0.00
Top B Marl									
5,800.00	56.66	359.93	5,649.25	-520.35	229.71	-513.43	11.00	11.00	0.00
5,850.00	62.16	359.93	5,674.69	-477.32	229.66	-470.43	11.00	11.00	0.00



WOG

Planning Report

Database:	LandmarkEDM	Local Co-ordinate Reference:	Well Horsetail #30H-1948
Company:	Whiting Petroleum Corp.	TVD Reference:	KBE @ 4746.00usft (Original Well Elev)
Project:	Weld County, CO	MD Reference:	KBE @ 4746.00usft (Original Well Elev)
Site:	Sec 30-T10N-R57W	North Reference:	True
Well:	Horsetail #30H-1948	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	APD		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,885.04	66.01	359.93	5,690.00	-445.81	229.62	-438.93	11.00	11.00	0.00
Top C Chalk									
5,900.00	67.66	359.93	5,695.89	-432.06	229.60	-425.18	11.00	11.00	0.00
5,911.11	68.88	359.93	5,700.00	-421.74	229.59	-414.86	11.00	11.00	0.00
Middle C Chalk									
5,950.00	73.16	359.93	5,712.65	-384.97	229.55	-378.12	11.00	11.00	0.00
5,954.74	73.68	359.93	5,714.00	-380.43	229.54	-373.57	11.00	11.00	0.00
Middle C Marl									
6,000.00	78.65	359.93	5,724.82	-336.50	229.49	-329.66	11.00	11.00	0.00
6,050.00	84.15	359.93	5,732.29	-287.08	229.43	-280.27	11.00	11.00	0.00
6,103.17	90.00	359.93	5,735.00	-234.00	229.36	-227.21	11.00	11.00	0.00
LP @ 90° Inc, Hold - Lower C Chalk - 7"									
6,200.00	90.00	359.93	5,735.00	-137.17	229.24	-130.43	0.00	0.00	0.00
6,300.00	90.00	359.93	5,735.00	-37.17	229.12	-30.47	0.00	0.00	0.00
6,400.00	90.00	359.93	5,735.00	62.83	229.00	69.48	0.00	0.00	0.00
6,500.00	90.00	359.93	5,735.00	162.83	228.88	169.43	0.00	0.00	0.00
6,600.00	90.00	359.93	5,735.00	262.83	228.75	269.39	0.00	0.00	0.00
6,700.00	90.00	359.93	5,735.00	362.83	228.63	369.34	0.00	0.00	0.00
6,800.00	90.00	359.93	5,735.00	462.83	228.51	469.29	0.00	0.00	0.00
6,900.00	90.00	359.93	5,735.00	562.83	228.39	569.25	0.00	0.00	0.00
7,000.00	90.00	359.93	5,735.00	662.83	228.27	669.20	0.00	0.00	0.00
7,100.00	90.00	359.93	5,735.00	762.83	228.14	769.16	0.00	0.00	0.00
7,200.00	90.00	359.93	5,735.00	862.83	228.02	869.11	0.00	0.00	0.00
7,300.00	90.00	359.93	5,735.00	962.83	227.90	969.06	0.00	0.00	0.00
7,400.00	90.00	359.93	5,735.00	1,062.83	227.78	1,069.02	0.00	0.00	0.00
7,500.00	90.00	359.93	5,735.00	1,162.83	227.65	1,168.97	0.00	0.00	0.00
7,600.00	90.00	359.93	5,735.00	1,262.83	227.53	1,268.93	0.00	0.00	0.00
7,700.00	90.00	359.93	5,735.00	1,362.83	227.41	1,368.88	0.00	0.00	0.00
7,800.00	90.00	359.93	5,735.00	1,462.83	227.29	1,468.83	0.00	0.00	0.00
7,900.00	90.00	359.93	5,735.00	1,562.83	227.16	1,568.79	0.00	0.00	0.00
8,000.00	90.00	359.93	5,735.00	1,662.83	227.04	1,668.74	0.00	0.00	0.00
8,100.00	90.00	359.93	5,735.00	1,762.83	226.92	1,768.70	0.00	0.00	0.00
8,200.00	90.00	359.93	5,735.00	1,862.83	226.80	1,868.65	0.00	0.00	0.00
8,300.00	90.00	359.93	5,735.00	1,962.83	226.67	1,968.60	0.00	0.00	0.00
8,400.00	90.00	359.93	5,735.00	2,062.83	226.55	2,068.56	0.00	0.00	0.00
8,500.00	90.00	359.93	5,735.00	2,162.83	226.43	2,168.51	0.00	0.00	0.00
8,600.00	90.00	359.93	5,735.00	2,262.83	226.31	2,268.46	0.00	0.00	0.00
8,700.00	90.00	359.93	5,735.00	2,362.83	226.19	2,368.42	0.00	0.00	0.00
8,800.00	90.00	359.93	5,735.00	2,462.83	226.06	2,468.37	0.00	0.00	0.00
8,900.00	90.00	359.93	5,735.00	2,562.83	225.94	2,568.33	0.00	0.00	0.00
9,000.00	90.00	359.93	5,735.00	2,662.83	225.82	2,668.28	0.00	0.00	0.00
9,100.00	90.00	359.93	5,735.00	2,762.83	225.70	2,768.23	0.00	0.00	0.00
9,200.00	90.00	359.93	5,735.00	2,862.83	225.57	2,868.19	0.00	0.00	0.00
9,300.00	90.00	359.93	5,735.00	2,962.83	225.45	2,968.14	0.00	0.00	0.00
9,400.00	90.00	359.93	5,735.00	3,062.83	225.33	3,068.10	0.00	0.00	0.00
9,500.00	90.00	359.93	5,735.00	3,162.83	225.21	3,168.05	0.00	0.00	0.00
9,600.00	90.00	359.93	5,735.00	3,262.83	225.08	3,268.00	0.00	0.00	0.00
9,700.00	90.00	359.93	5,735.00	3,362.83	224.96	3,367.96	0.00	0.00	0.00
9,800.00	90.00	359.93	5,735.00	3,462.83	224.84	3,467.91	0.00	0.00	0.00
9,900.00	90.00	359.93	5,735.00	3,562.83	224.72	3,567.86	0.00	0.00	0.00
10,000.00	90.00	359.93	5,735.00	3,662.83	224.60	3,667.82	0.00	0.00	0.00
10,100.00	90.00	359.93	5,735.00	3,762.83	224.47	3,767.77	0.00	0.00	0.00
10,200.00	90.00	359.93	5,735.00	3,862.83	224.35	3,867.73	0.00	0.00	0.00
10,300.00	90.00	359.93	5,735.00	3,962.83	224.23	3,967.68	0.00	0.00	0.00



WOG

Planning Report

Database:	LandmarkEDM	Local Co-ordinate Reference:	Well Horsetail #30H-1948
Company:	Whiting Petroleum Corp.	TVD Reference:	KBE @ 4746.00usft (Original Well Elev)
Project:	Weld County, CO	MD Reference:	KBE @ 4746.00usft (Original Well Elev)
Site:	Sec 30-T10N-R57W	North Reference:	True
Well:	Horsetail #30H-1948	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	APD		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,400.00	90.00	359.93	5,735.00	4,062.83	224.11	4,067.63	0.00	0.00	0.00
10,500.00	90.00	359.93	5,735.00	4,162.83	223.98	4,167.59	0.00	0.00	0.00
10,600.00	90.00	359.93	5,735.00	4,262.83	223.86	4,267.54	0.00	0.00	0.00
10,700.00	90.00	359.93	5,735.00	4,362.83	223.74	4,367.50	0.00	0.00	0.00
10,800.00	90.00	359.93	5,735.00	4,462.83	223.62	4,467.45	0.00	0.00	0.00
10,900.00	90.00	359.93	5,735.00	4,562.83	223.49	4,567.40	0.00	0.00	0.00
11,000.00	90.00	359.93	5,735.00	4,662.83	223.37	4,667.36	0.00	0.00	0.00
11,100.00	90.00	359.93	5,735.00	4,762.83	223.25	4,767.31	0.00	0.00	0.00
11,200.00	90.00	359.93	5,735.00	4,862.83	223.13	4,867.26	0.00	0.00	0.00
11,300.00	90.00	359.93	5,735.00	4,962.83	223.00	4,967.22	0.00	0.00	0.00
11,400.00	90.00	359.93	5,735.00	5,062.83	222.88	5,067.17	0.00	0.00	0.00
11,500.00	90.00	359.93	5,735.00	5,162.83	222.76	5,167.13	0.00	0.00	0.00
11,600.00	90.00	359.93	5,735.00	5,262.83	222.64	5,267.08	0.00	0.00	0.00
11,700.00	90.00	359.93	5,735.00	5,362.83	222.52	5,367.03	0.00	0.00	0.00
11,800.00	90.00	359.93	5,735.00	5,462.83	222.39	5,466.99	0.00	0.00	0.00
11,900.00	90.00	359.93	5,735.00	5,562.83	222.27	5,566.94	0.00	0.00	0.00
12,000.00	90.00	359.93	5,735.00	5,662.83	222.15	5,666.90	0.00	0.00	0.00
12,100.00	90.00	359.93	5,735.00	5,762.83	222.03	5,766.85	0.00	0.00	0.00
12,200.00	90.00	359.93	5,735.00	5,862.83	221.90	5,866.80	0.00	0.00	0.00
12,300.00	90.00	359.93	5,735.00	5,962.83	221.78	5,966.76	0.00	0.00	0.00
12,400.00	90.00	359.93	5,735.00	6,062.83	221.66	6,066.71	0.00	0.00	0.00
12,500.00	90.00	359.93	5,735.00	6,162.83	221.54	6,166.67	0.00	0.00	0.00
12,600.00	90.00	359.93	5,735.00	6,262.83	221.41	6,266.62	0.00	0.00	0.00
12,700.00	90.00	359.93	5,735.00	6,362.83	221.29	6,366.57	0.00	0.00	0.00
12,800.00	90.00	359.93	5,735.00	6,462.83	221.17	6,466.53	0.00	0.00	0.00
12,900.00	90.00	359.93	5,735.00	6,562.83	221.05	6,566.48	0.00	0.00	0.00
13,000.00	90.00	359.93	5,735.00	6,662.83	220.92	6,666.43	0.00	0.00	0.00
13,100.00	90.00	359.93	5,735.00	6,762.83	220.80	6,766.39	0.00	0.00	0.00
13,200.00	90.00	359.93	5,735.00	6,862.83	220.68	6,866.34	0.00	0.00	0.00
13,300.00	90.00	359.93	5,735.00	6,962.83	220.56	6,966.30	0.00	0.00	0.00
13,400.00	90.00	359.93	5,735.00	7,062.83	220.44	7,066.25	0.00	0.00	0.00
13,500.00	90.00	359.93	5,735.00	7,162.83	220.31	7,166.20	0.00	0.00	0.00
13,600.00	90.00	359.93	5,735.00	7,262.83	220.19	7,266.16	0.00	0.00	0.00
13,700.00	90.00	359.93	5,735.00	7,362.83	220.07	7,366.11	0.00	0.00	0.00
13,800.00	90.00	359.93	5,735.00	7,462.83	219.95	7,466.07	0.00	0.00	0.00
13,876.00	90.00	359.93	5,735.00	7,538.83	219.85	7,542.03	0.00	0.00	0.00
TD at 13876.00' MD									

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 1948	0.00	0.00	5,735.00	7,538.83	219.85	1,550,288.19	3,474,323.61	40° 49' 52.810 N	103° 47' 9.290 W
- plan hits target center									
- Point									
Mertens #1-19	0.00	0.00	6,440.00	6,985.38	-1,269.06	1,549,706.08	3,472,845.67	40° 49' 47.341 N	103° 47' 28.658 W
- plan misses target center by 1648.00usft at 13324.38usft MD (5735.00 TVD, 6987.20 N, 220.53 E)									
- Circle (radius 1,550.00)									



WOG

Planning Report

Database:	LandmarkEDM	Local Co-ordinate Reference:	Well Horsetail #30H-1948
Company:	Whiting Petroleum Corp.	TVD Reference:	KBE @ 4746.00usft (Original Well Elev)
Project:	Weld County, CO	MD Reference:	KBE @ 4746.00usft (Original Well Elev)
Site:	Sec 30-T10N-R57W	North Reference:	True
Well:	Horsetail #30H-1948	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	APD		

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)	
6,103.17	5,735.00	7"	7.000	8.750	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,565.81	1,550.00	Upper Pierre				
3,550.31	3,500.00	Hygiene				
3,702.96	3,650.00	Lower Pierre				
5,527.46	5,448.00	P200 Marker				
5,558.16	5,475.00	P300 Marker				
5,570.96	5,486.00	P350 Marker				
5,585.15	5,498.00	Sharon Springs				
5,587.54	5,500.00	Niobrara				
5,606.92	5,516.00	Top A Chalk				
5,647.35	5,548.00	Top A Marl				
5,663.19	5,560.00	A Marl				
5,671.27	5,566.00	Top Upper B				
5,704.83	5,590.00	Base Upper B				
5,728.52	5,606.00	Top Lower B				
5,776.67	5,636.00	Base Lower B				
5,794.13	5,646.00	Top B Marl				
5,885.04	5,690.00	Top C Chalk				
5,911.11	5,700.00	Middle C Chalk				
5,954.74	5,714.00	Middle C Marl				
6,103.17	5,735.00	Lower C Chalk				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
300.00	300.00	0.00	0.00	Build 2°/100'	
834.94	831.84	-47.64	14.51	Hold 10.70° Inc	
4,549.85	4,482.16	-707.36	215.49	Drop 2°/100'	
5,084.78	5,014.00	-755.00	230.00	Hold Vertical	
5,284.78	5,214.00	-755.00	230.00	KOP, Build 11°/100'	
6,103.17	5,735.00	-234.00	229.36	LP @ 90° Inc, Hold	
13,876.00	5,735.00	7,538.83	219.85	TD at 13876.00' MD	