

# Whiting Oil and Gas Corporation

Weld County, CO

Sec. 2-T10N-R57W

Horsetail #02D-0203

Plan A

Plan: Rev A0

## Sperry Drilling Services

# Proposal Report

25 February, 2014

Well Coordinates: 1,566,447.56 N, 3,490,762.21 E (40° 52' 29.25" N, 103° 43' 31.28" W)

Ground Level: 4,778.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Horsetail #02D-0203

KB 17' @ 4795.00usft (Frontier 26)

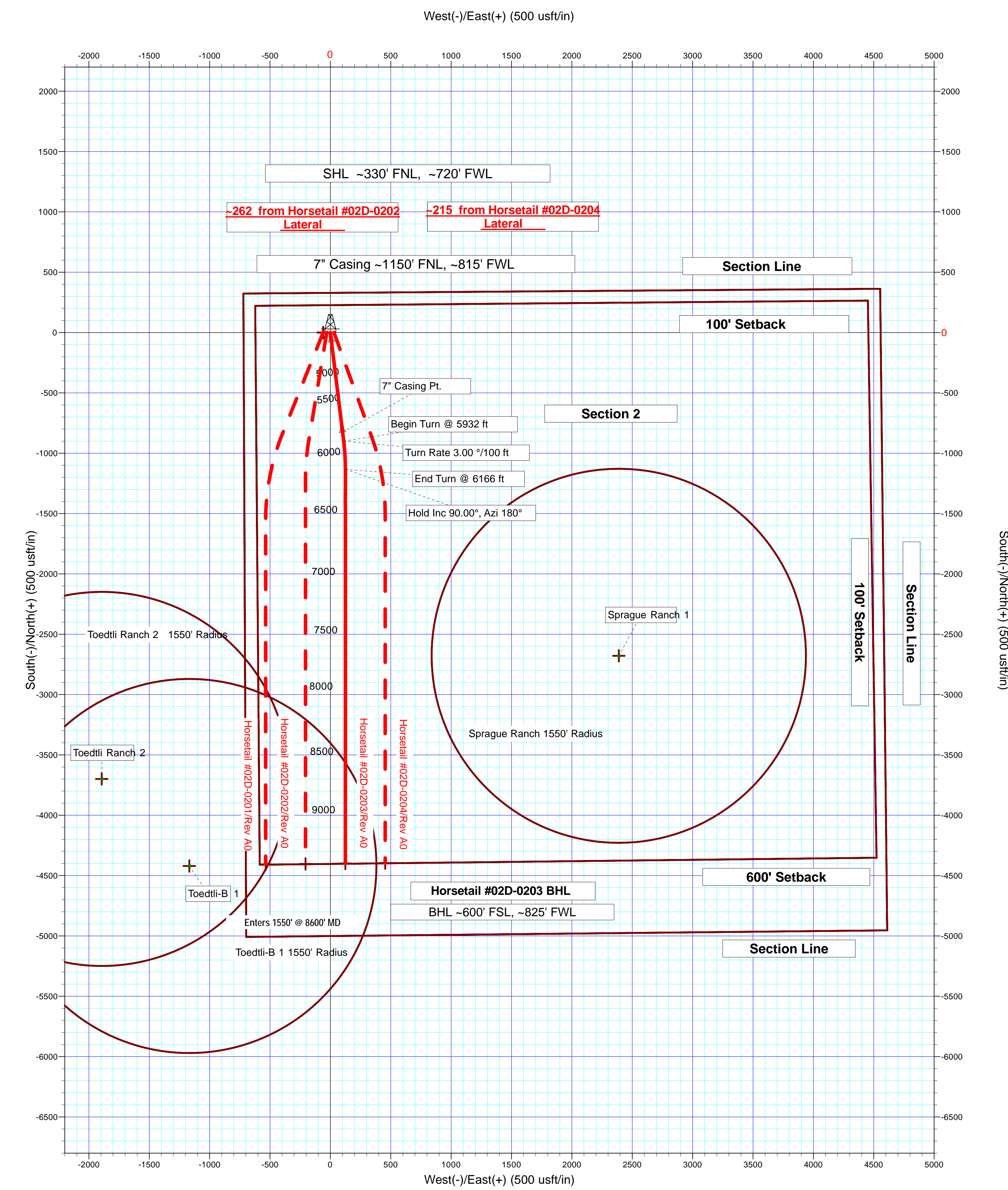
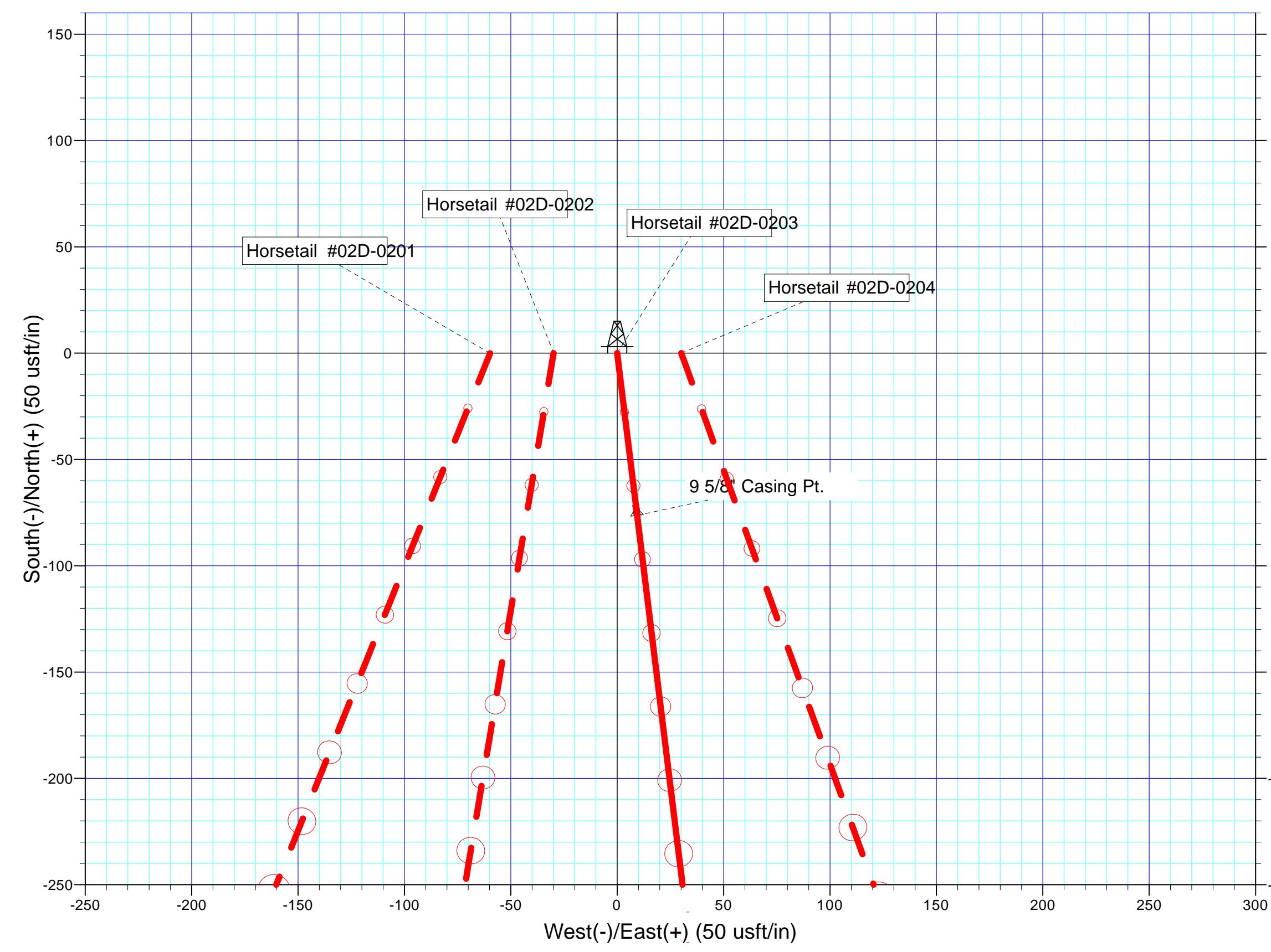
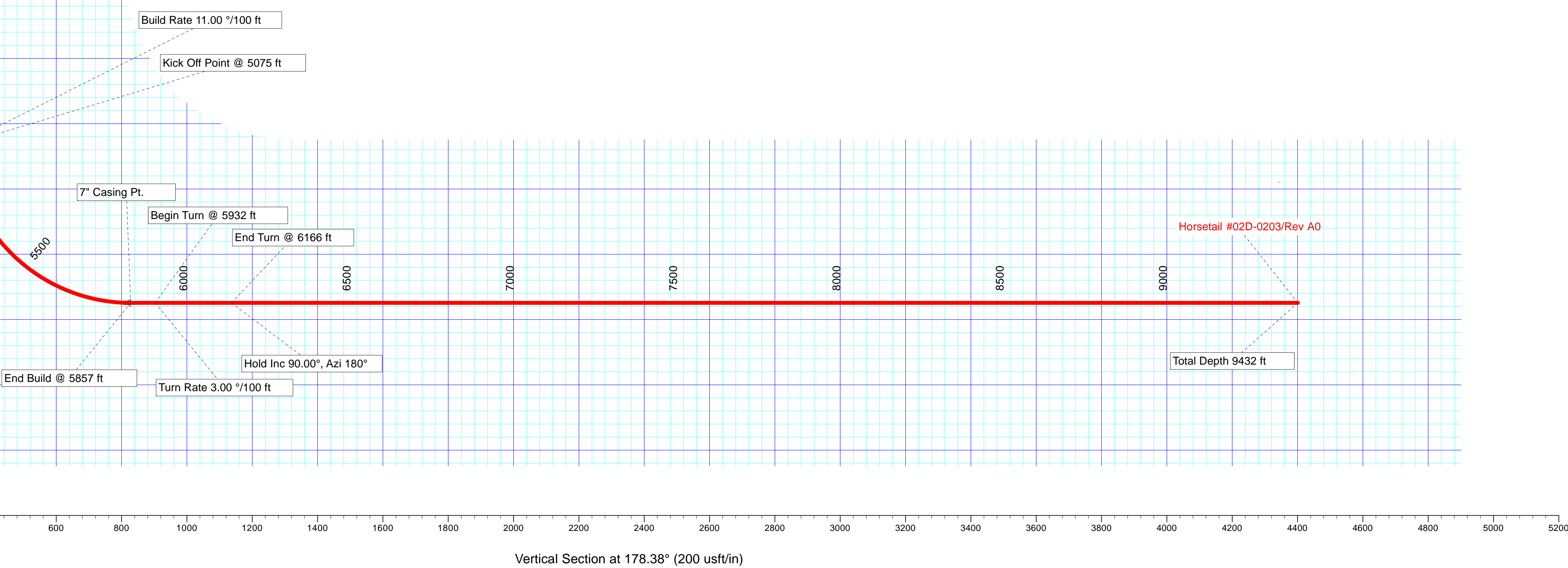
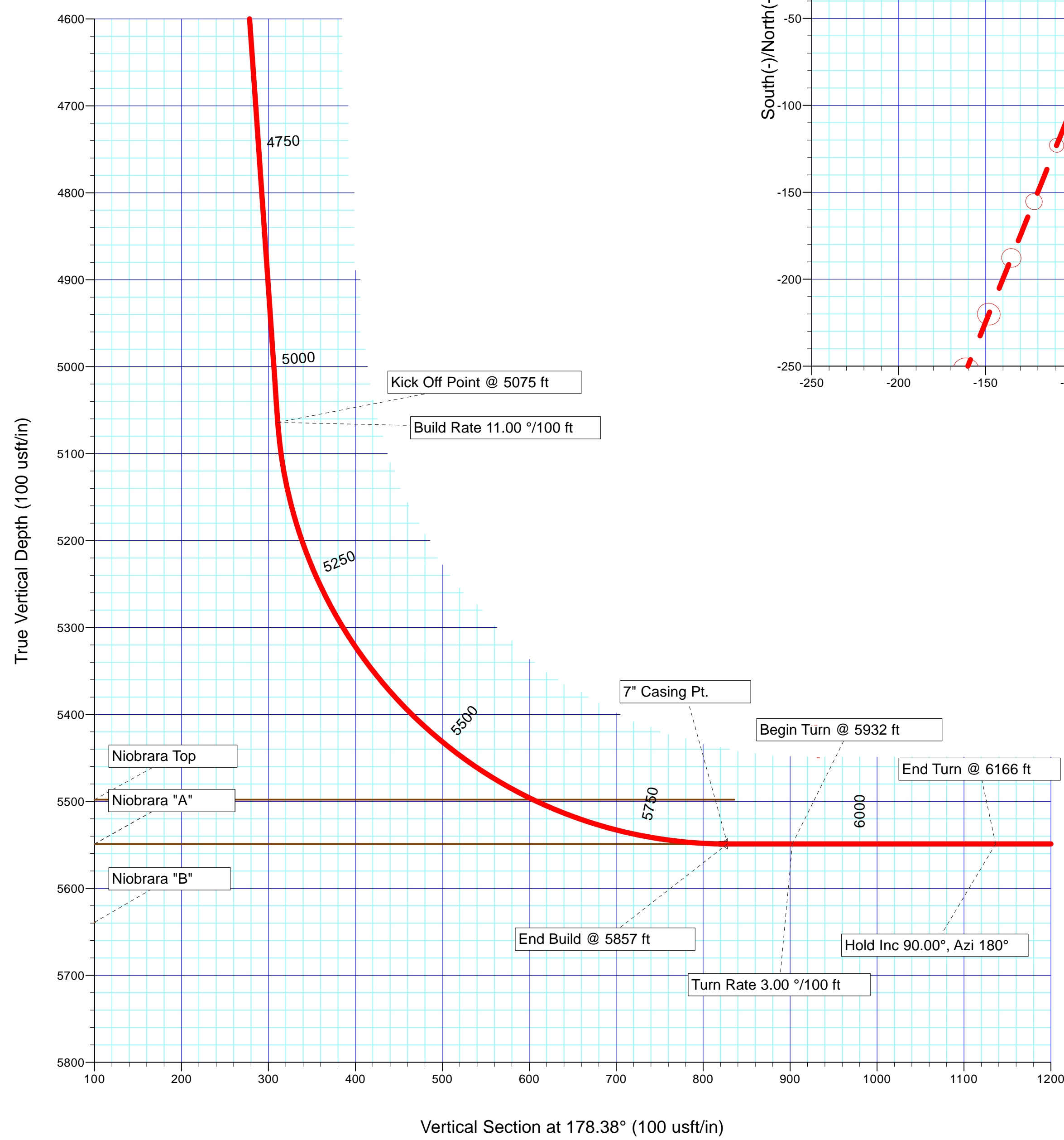
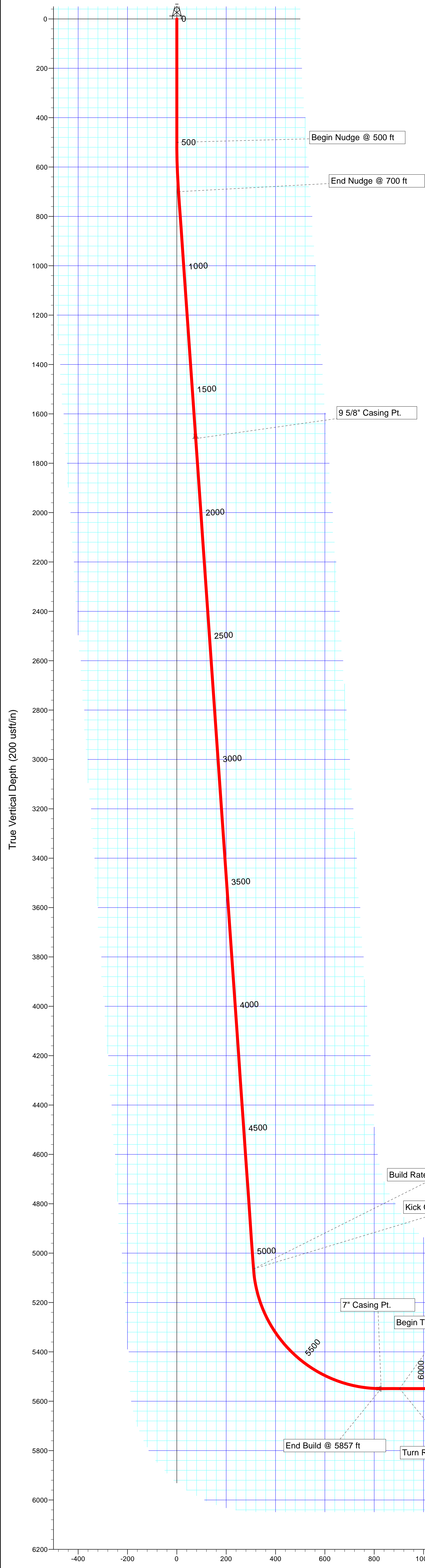
N

True

API - US Survey Feet - Custom

**HALLIBURTON**

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	500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	
3	700.00	4.00	173.00	699.84	-6.93	0.85	2.00	173.00	6.95	
4	5075.28	4.00	173.00	5064.46	-309.86	38.05	0.00	0.00	310.81	
5	5857.10	90.00	173.00	5549.00	-825.58	101.37	11.00	0.00	828.12	
6	5932.10	90.00	173.00	5549.00	-900.03	110.51	0.00	0.00	902.79	
7	6165.59	90.00	180.00	5549.00	-1132.94	124.75	3.00	90.00	1136.01	
8	9432.06	90.00	180.00	5549.00	-4399.40	124.47	0.00	0.00	4401.17	Horsetail #02D-0203 BHL



**Azimuths to True North**  
 Magnetic Field  
 Magnetic North: 7.98°  
 Strength: 53101.7snT  
 Dip Angle: 67.48°  
 Date: 4/9/2014  
 Model: BGGM2013

Plan: Rev A0 (Horsetail #02D-0203/Plan A)  
 Created By: Troy L. Stoute      Date: 17:50, February 25 2014  
 Checked: \_\_\_\_\_      Date: \_\_\_\_\_  
 Reviewed: \_\_\_\_\_      Date: \_\_\_\_\_  
 Approved: \_\_\_\_\_      Date: \_\_\_\_\_

**Plan Report for Horsetail #02D-0203 - Rev A0**

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)	Toolface Azimuth (°)
0.00	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	0.00
200.00	0.00	0.00	200.00	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	0.00
400.00	0.00	0.00	400.00	0.00	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	0.00
<b>Begin Nudge @ 500 ft</b>										
600.00	2.00	173.00	599.98	-1.73	0.21	1.74	2.00	2.00	0.00	173.00
700.00	4.00	173.00	699.84	-6.93	0.85	6.95	2.00	2.00	0.00	0.00
<b>End Nudge @ 700 ft</b>										
800.00	4.00	173.00	799.59	-13.85	1.70	13.89	0.00	0.00	0.00	0.00
900.00	4.00	173.00	899.35	-20.77	2.55	20.84	0.00	0.00	0.00	0.00
1,000.00	4.00	173.00	999.11	-27.70	3.40	27.78	0.00	0.00	0.00	0.00
1,100.00	4.00	173.00	1,098.86	-34.62	4.25	34.73	0.00	0.00	0.00	0.00
1,200.00	4.00	173.00	1,198.62	-41.54	5.10	41.67	0.00	0.00	0.00	0.00
1,300.00	4.00	173.00	1,298.38	-48.47	5.95	48.62	0.00	0.00	0.00	0.00
1,400.00	4.00	173.00	1,398.13	-55.39	6.80	55.56	0.00	0.00	0.00	0.00
1,500.00	4.00	173.00	1,497.89	-62.32	7.65	62.51	0.00	0.00	0.00	0.00
1,600.00	4.00	173.00	1,597.65	-69.24	8.50	69.45	0.00	0.00	0.00	0.00
1,606.37	4.00	173.00	1,604.00	-69.68	8.56	69.89	0.00	0.00	0.00	0.00
<b>Pierre</b>										
1,700.00	4.00	173.00	1,697.40	-76.16	9.35	76.40	0.00	0.00	0.00	0.00
1,702.60	4.00	173.00	1,700.00	-76.34	9.37	76.58	0.00	0.00	0.00	0.00
<b>9 5/8" Casing Pt.</b>										
1,800.00	4.00	173.00	1,797.16	-83.09	10.20	83.34	0.00	0.00	0.00	0.00
1,900.00	4.00	173.00	1,896.91	-90.01	11.05	90.29	0.00	0.00	0.00	0.00
2,000.00	4.00	173.00	1,996.67	-96.93	11.90	97.23	0.00	0.00	0.00	0.00
2,100.00	4.00	173.00	2,096.43	-103.86	12.75	104.18	0.00	0.00	0.00	0.00
2,200.00	4.00	173.00	2,196.18	-110.78	13.60	111.12	0.00	0.00	0.00	0.00
2,300.00	4.00	173.00	2,295.94	-117.70	14.45	118.07	0.00	0.00	0.00	0.00
2,400.00	4.00	173.00	2,395.70	-124.63	15.30	125.01	0.00	0.00	0.00	0.00
2,500.00	4.00	173.00	2,495.45	-131.55	16.15	131.96	0.00	0.00	0.00	0.00
2,600.00	4.00	173.00	2,595.21	-138.48	17.00	138.90	0.00	0.00	0.00	0.00
2,700.00	4.00	173.00	2,694.97	-145.40	17.85	145.85	0.00	0.00	0.00	0.00
2,800.00	4.00	173.00	2,794.72	-152.32	18.70	152.79	0.00	0.00	0.00	0.00
2,900.00	4.00	173.00	2,894.48	-159.25	19.55	159.74	0.00	0.00	0.00	0.00
3,000.00	4.00	173.00	2,994.23	-166.17	20.40	166.68	0.00	0.00	0.00	0.00
3,100.00	4.00	173.00	3,093.99	-173.09	21.25	173.63	0.00	0.00	0.00	0.00
3,200.00	4.00	173.00	3,193.75	-180.02	22.10	180.57	0.00	0.00	0.00	0.00
3,300.00	4.00	173.00	3,293.50	-186.94	22.95	187.52	0.00	0.00	0.00	0.00
3,400.00	4.00	173.00	3,393.26	-193.87	23.80	194.46	0.00	0.00	0.00	0.00
3,500.00	4.00	173.00	3,493.02	-200.79	24.65	201.41	0.00	0.00	0.00	0.00
3,600.00	4.00	173.00	3,592.77	-207.71	25.50	208.35	0.00	0.00	0.00	0.00
3,700.00	4.00	173.00	3,692.53	-214.64	26.35	215.30	0.00	0.00	0.00	0.00
3,800.00	4.00	173.00	3,792.29	-221.56	27.20	222.24	0.00	0.00	0.00	0.00
3,900.00	4.00	173.00	3,892.04	-228.48	28.05	229.19	0.00	0.00	0.00	0.00
4,000.00	4.00	173.00	3,991.80	-235.41	28.90	236.13	0.00	0.00	0.00	0.00
4,100.00	4.00	173.00	4,091.56	-242.33	29.75	243.08	0.00	0.00	0.00	0.00
4,200.00	4.00	173.00	4,191.31	-249.25	30.60	250.02	0.00	0.00	0.00	0.00
4,300.00	4.00	173.00	4,291.07	-256.18	31.45	256.97	0.00	0.00	0.00	0.00
4,400.00	4.00	173.00	4,390.82	-263.10	32.30	263.91	0.00	0.00	0.00	0.00
4,500.00	4.00	173.00	4,490.58	-270.03	33.15	270.85	0.00	0.00	0.00	0.00
4,600.00	4.00	173.00	4,590.34	-276.95	34.01	277.80	0.00	0.00	0.00	0.00
4,700.00	4.00	173.00	4,690.09	-283.87	34.86	284.74	0.00	0.00	0.00	0.00
4,800.00	4.00	173.00	4,789.85	-290.80	35.71	291.69	0.00	0.00	0.00	0.00
4,900.00	4.00	173.00	4,889.61	-297.72	36.56	298.63	0.00	0.00	0.00	0.00
5,000.00	4.00	173.00	4,989.36	-304.64	37.41	305.58	0.00	0.00	0.00	0.00
5,075.00	4.00	173.00	5,064.18	-309.84	38.04	310.79	0.00	0.00	0.00	0.00

**Plan Report for Horsetail #02D-0203 - Rev A0**

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)	Toolface Azimuth (°)
<b>Kick Off Point @ 5075 ft - Build Rate 11.00 °/100 ft</b>										
5,075.28	4.00	173.00	5,064.46	-309.86	38.05	310.81	0.00	0.00	0.00	0.00
5,100.00	6.72	173.00	5,089.07	-312.15	38.33	313.11	11.00	11.00	0.00	0.00
5,200.00	17.72	173.00	5,186.65	-333.12	40.90	334.15	11.00	11.00	0.00	0.00
5,300.00	28.72	173.00	5,278.41	-372.19	45.70	373.34	11.00	11.00	0.00	0.00
5,400.00	39.72	173.00	5,360.98	-427.92	52.54	429.24	11.00	11.00	0.00	0.00
5,500.00	50.72	173.00	5,431.31	-498.27	61.18	499.80	11.00	11.00	0.00	0.00
5,600.00	61.72	173.00	5,486.82	-580.64	71.29	582.42	11.00	11.00	0.00	0.00
5,624.69	64.43	173.00	5,498.00	-602.48	73.98	604.34	11.00	11.00	0.00	0.00
<b>Niobrara Top</b>										
5,700.00	72.72	173.00	5,525.48	-672.01	82.51	674.08	11.00	11.00	0.00	0.00
5,800.00	83.72	173.00	5,545.87	-769.03	94.42	771.39	11.00	11.00	0.00	0.00
5,857.00	89.99	173.00	5,549.00	-825.49	101.36	828.02	11.00	11.00	0.00	0.00
<b>End Build @ 5857 ft - 7" Casing Pt.</b>										
5,857.10	90.00	173.00	5,549.00	-825.58	101.37	828.12	11.00	11.00	0.00	0.00
<b>Niobrara "A"</b>										
5,900.00	90.00	173.00	5,549.00	-868.17	106.60	870.83	0.00	0.00	0.00	0.00
5,932.00	90.00	173.00	5,549.00	-899.93	110.50	902.69	0.00	0.00	0.00	0.00
<b>Begin Turn @ 5932 ft - Turn Rate 3.00 °/100 ft</b>										
5,932.10	90.00	173.00	5,549.00	-900.03	110.51	902.79	0.00	0.00	0.00	0.00
6,000.00	90.00	175.04	5,549.00	-967.55	117.58	970.49	3.00	0.00	3.00	90.00
6,100.00	90.00	178.04	5,549.00	-1,067.36	123.62	1,070.43	3.00	0.00	3.00	90.00
6,165.59	90.00	180.00	5,549.00	-1,132.94	124.75	1,136.01	3.00	0.00	3.00	90.00
6,166.00	90.00	180.00	5,549.00	-1,133.35	124.74	1,136.42	0.00	0.00	0.00	0.00
<b>End Turn @ 6166 ft - Hold Inc 90.00°, Azi 180°</b>										
6,200.00	90.00	180.00	5,549.00	-1,167.35	124.74	1,170.41	0.00	0.00	0.00	0.00
6,300.00	90.00	180.00	5,549.00	-1,267.35	124.73	1,270.37	0.00	0.00	0.00	0.00
6,400.00	90.00	180.00	5,549.00	-1,367.35	124.73	1,370.33	0.00	0.00	0.00	0.00
6,500.00	90.00	180.00	5,549.00	-1,467.35	124.72	1,470.29	0.00	0.00	0.00	0.00
6,600.00	90.00	180.00	5,549.00	-1,567.35	124.71	1,570.25	0.00	0.00	0.00	0.00
6,700.00	90.00	180.00	5,549.00	-1,667.35	124.70	1,670.21	0.00	0.00	0.00	0.00
6,800.00	90.00	180.00	5,549.00	-1,767.35	124.69	1,770.17	0.00	0.00	0.00	0.00
6,900.00	90.00	180.00	5,549.00	-1,867.35	124.68	1,870.13	0.00	0.00	0.00	0.00
7,000.00	90.00	180.00	5,549.00	-1,967.35	124.68	1,970.09	0.00	0.00	0.00	0.00
7,100.00	90.00	180.00	5,549.00	-2,067.35	124.67	2,070.05	0.00	0.00	0.00	0.00
7,200.00	90.00	180.00	5,549.00	-2,167.35	124.66	2,170.01	0.00	0.00	0.00	0.00
7,300.00	90.00	180.00	5,549.00	-2,267.35	124.65	2,269.97	0.00	0.00	0.00	0.00
7,400.00	90.00	180.00	5,549.00	-2,367.35	124.64	2,369.93	0.00	0.00	0.00	0.00
7,500.00	90.00	180.00	5,549.00	-2,467.35	124.63	2,469.89	0.00	0.00	0.00	0.00
7,600.00	90.00	180.00	5,549.00	-2,567.35	124.63	2,569.84	0.00	0.00	0.00	0.00
7,700.00	90.00	180.00	5,549.00	-2,667.35	124.62	2,669.80	0.00	0.00	0.00	0.00
7,800.00	90.00	180.00	5,549.00	-2,767.35	124.61	2,769.76	0.00	0.00	0.00	0.00
7,900.00	90.00	180.00	5,549.00	-2,867.35	124.60	2,869.72	0.00	0.00	0.00	0.00
8,000.00	90.00	180.00	5,549.00	-2,967.35	124.59	2,969.68	0.00	0.00	0.00	0.00
8,100.00	90.00	180.00	5,549.00	-3,067.35	124.58	3,069.64	0.00	0.00	0.00	0.00
8,200.00	90.00	180.00	5,549.00	-3,167.35	124.58	3,169.60	0.00	0.00	0.00	0.00
8,300.00	90.00	180.00	5,549.00	-3,267.35	124.57	3,269.56	0.00	0.00	0.00	0.00
8,400.00	90.00	180.00	5,549.00	-3,367.35	124.56	3,369.52	0.00	0.00	0.00	0.00
8,500.00	90.00	180.00	5,549.00	-3,467.35	124.55	3,469.48	0.00	0.00	0.00	0.00
8,600.00	90.00	180.00	5,549.00	-3,567.35	124.54	3,569.44	0.00	0.00	0.00	0.00
8,700.00	90.00	180.00	5,549.00	-3,667.35	124.53	3,669.40	0.00	0.00	0.00	0.00
8,800.00	90.00	180.00	5,549.00	-3,767.35	124.52	3,769.36	0.00	0.00	0.00	0.00
8,900.00	90.00	180.00	5,549.00	-3,867.35	124.52	3,869.32	0.00	0.00	0.00	0.00
9,000.00	90.00	180.00	5,549.00	-3,967.35	124.51	3,969.28	0.00	0.00	0.00	0.00
9,100.00	90.00	180.00	5,549.00	-4,067.35	124.50	4,069.24	0.00	0.00	0.00	0.00
9,200.00	90.00	180.00	5,549.00	-4,167.35	124.49	4,169.20	0.00	0.00	0.00	0.00
9,300.00	90.00	180.00	5,549.00	-4,267.35	124.48	4,269.16	0.00	0.00	0.00	0.00
9,400.00	90.00	180.00	5,549.00	-4,367.35	124.47	4,369.12	0.00	0.00	0.00	0.00
9,432.00	90.00	180.00	5,549.00	-4,399.35	124.47	4,401.11	0.00	0.00	0.00	0.00

**Plan Report for Horsetail #02D-0203 - Rev A0**

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)	Toolface Azimuth (°)
<b>Total Depth 9432 ft</b>										
9,432.06	90.00	180.00	5,549.00	-4,399.40	124.47	4,401.17	0.00	0.00	0.00	0.00

**Plan Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
500.00	500.00	0.00	0.00	Begin Nudge @ 500 ft
700.00	699.84	-6.93	0.85	End Nudge @ 700 ft
5,075.00	5,064.18	-309.84	38.04	Kick Off Point @ 5075 ft
5,075.00	5,064.18	-309.84	38.04	Build Rate 11.00 °/100 ft
5,857.00	5,549.00	-825.49	101.36	End Build @ 5857 ft
5,932.00	5,549.00	-899.93	110.50	Begin Turn @ 5932 ft
5,932.00	5,549.00	-899.93	110.50	Turn Rate 3.00 °/100 ft
6,166.00	5,549.00	-1,133.35	124.74	End Turn @ 6166 ft
6,166.00	5,549.00	-1,133.35	124.74	Hold Inc 90.00°, Azi 180°
9,432.00	5,549.00	-4,399.35	124.47	Total Depth 9432 ft

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Horsetail #02D-0203 BHL	178.38	Slot	0.00	0.00	0.00

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	1,700.00	Rev A0	MWD+IFR1+MS+sag
1,700.00	5,857.00	Rev A0	MWD+IFR1+MS+sag
5,857.00	9,432.06	Rev A0	MWD+IFR1+MS+sag

**Casing Details**

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,702.60	1,700.00	9 5/8" Casing Pt.	9-5/8	13-1/2
5,857.00	5,549.00	7" Casing Pt.	7	8-3/4

**Formation Details**

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,606.37	1,604.00	Pierre		0.00	
5,624.69	5,498.00	Niobrara Top		0.00	
5,857.10	5,549.00	Niobrara "A"		0.00	

**Plan Report for Horsetail #02D-0203 - Rev A0*****Targets associated with this wellbore***

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Horsetail #02D Section 2 Lines	0.00	0.01	-59.74	Polygon
Horsetail #02D Section Setback	0.00	0.01	-59.74	Polygon
Horsetail #02D-0203 BHL	5,549.00	-4,399.40	124.47	Point

**Directional Difficulty Index**

Average Dogleg over Survey:	1.03 °/100usft	Maximum Dogleg over Survey:	11.00 °/100usft at 5,857.10 usft
Net Tortousity applicable to Plans:	1.03 °/100usft	Directional Difficulty Index:	5.960

**Audit Info**

**North Reference Sheet for Sec. 2-T10N-R57W - Horsetail #02D-0203 - Plan A**

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to KB 17' @ 4795.00usft (Frontier 26). Northing and Easting are relative to Horsetail #02D-0203

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.50°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:40° 47' 0.000 N°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 1.00001612

Grid Coordinates of Well: 1,566,447.56 usft N, 3,490,762.21 usft E

Geographical Coordinates of Well: 40° 52' 29.25" N, 103° 43' 31.28" W

Grid Convergence at Surface is: 1.15°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,432.06usft the Bottom Hole Displacement is 4,401.17usft in the Direction of 178.38° (True).

Magnetic Convergence at surface is: -6.83° ( 9 April 2014, , BGGM2013)

