

# Whiting Oil and Gas Corporation

Weld County, CO

Sec. 2-T10N-R57W

Horsetail #02D-0202

Plan A

Plan: Rev A0

## Sperry Drilling Services

# Proposal Report

25 February, 2014

Well Coordinates: 1,566,446.97 N, 3,490,732.35 E (40° 52' 29.25" N, 103° 43' 31.67" 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-0202

KB 17' @ 4795.00usft (Frontier 26)

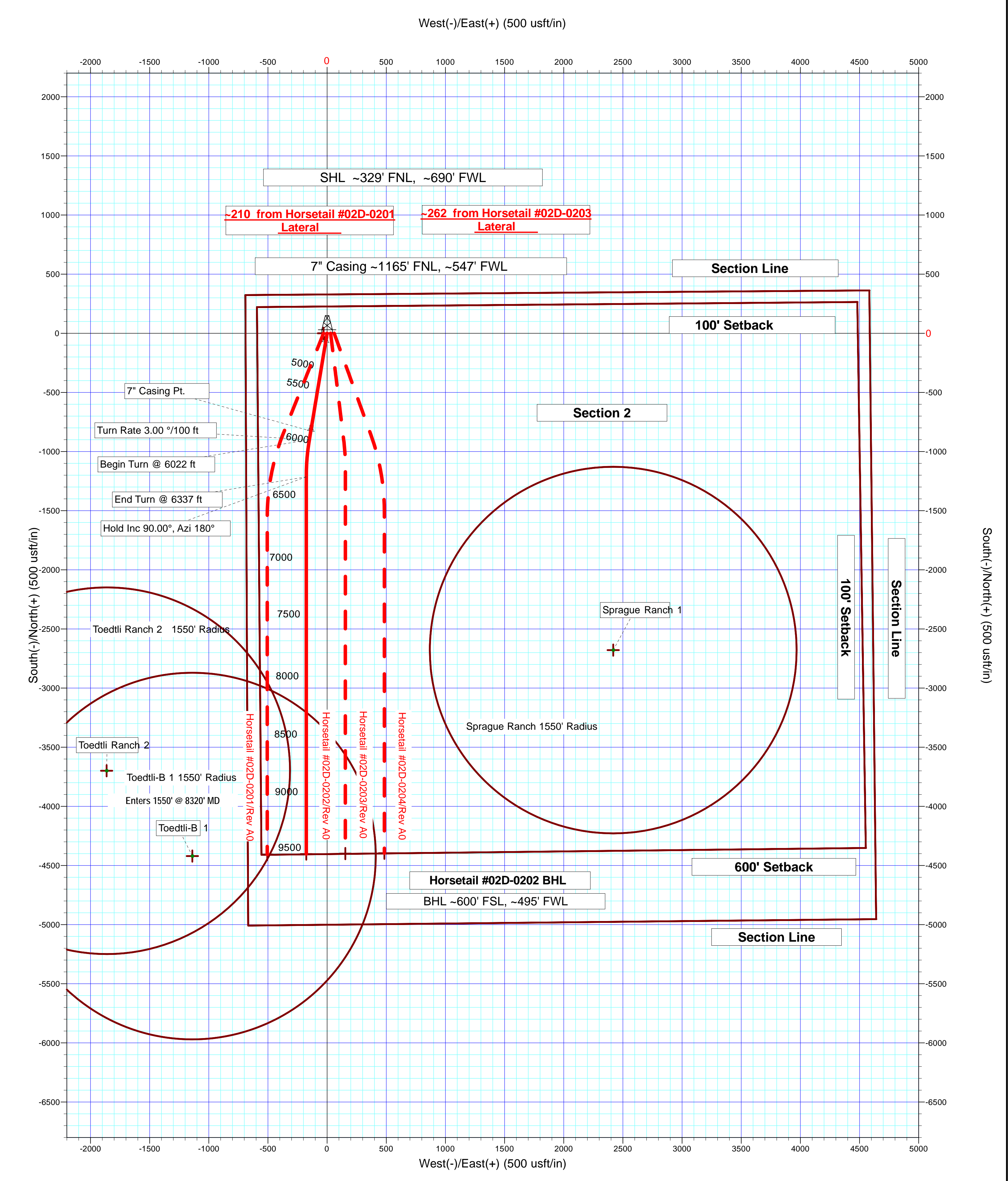
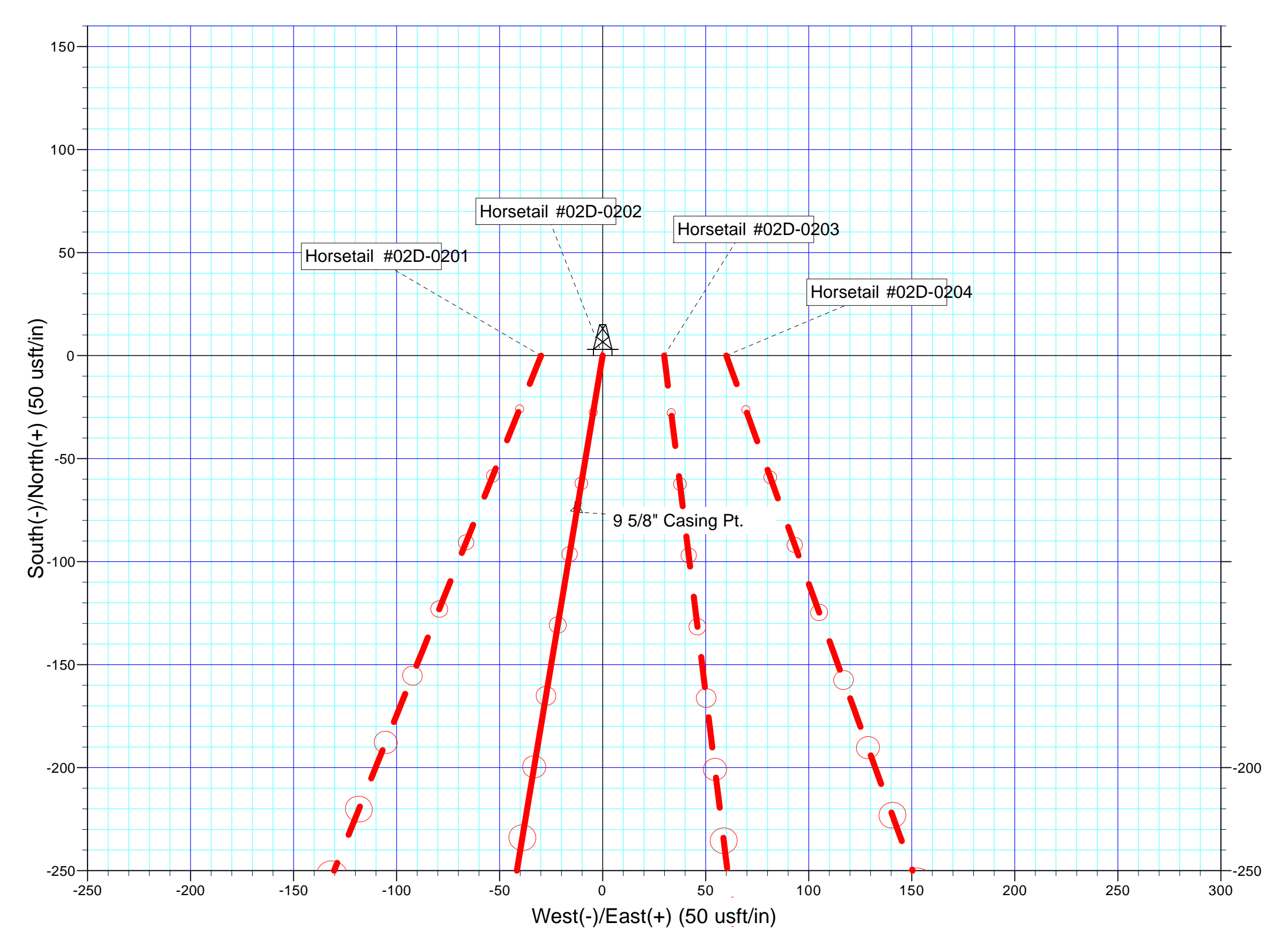
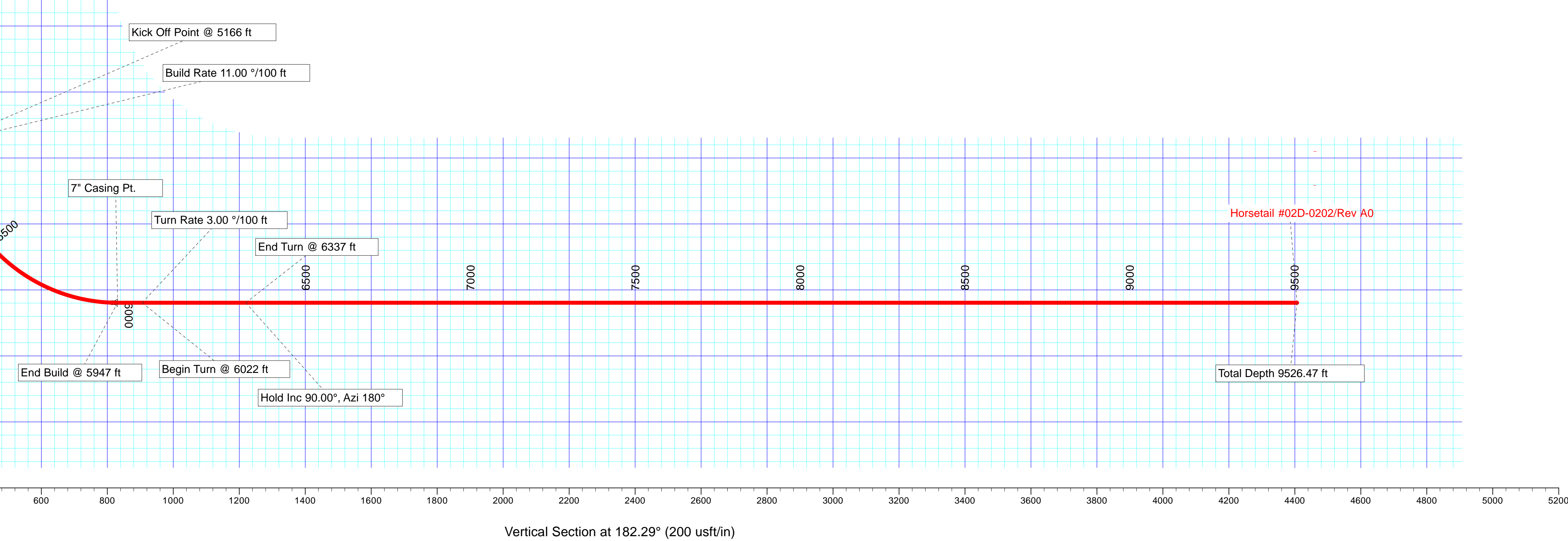
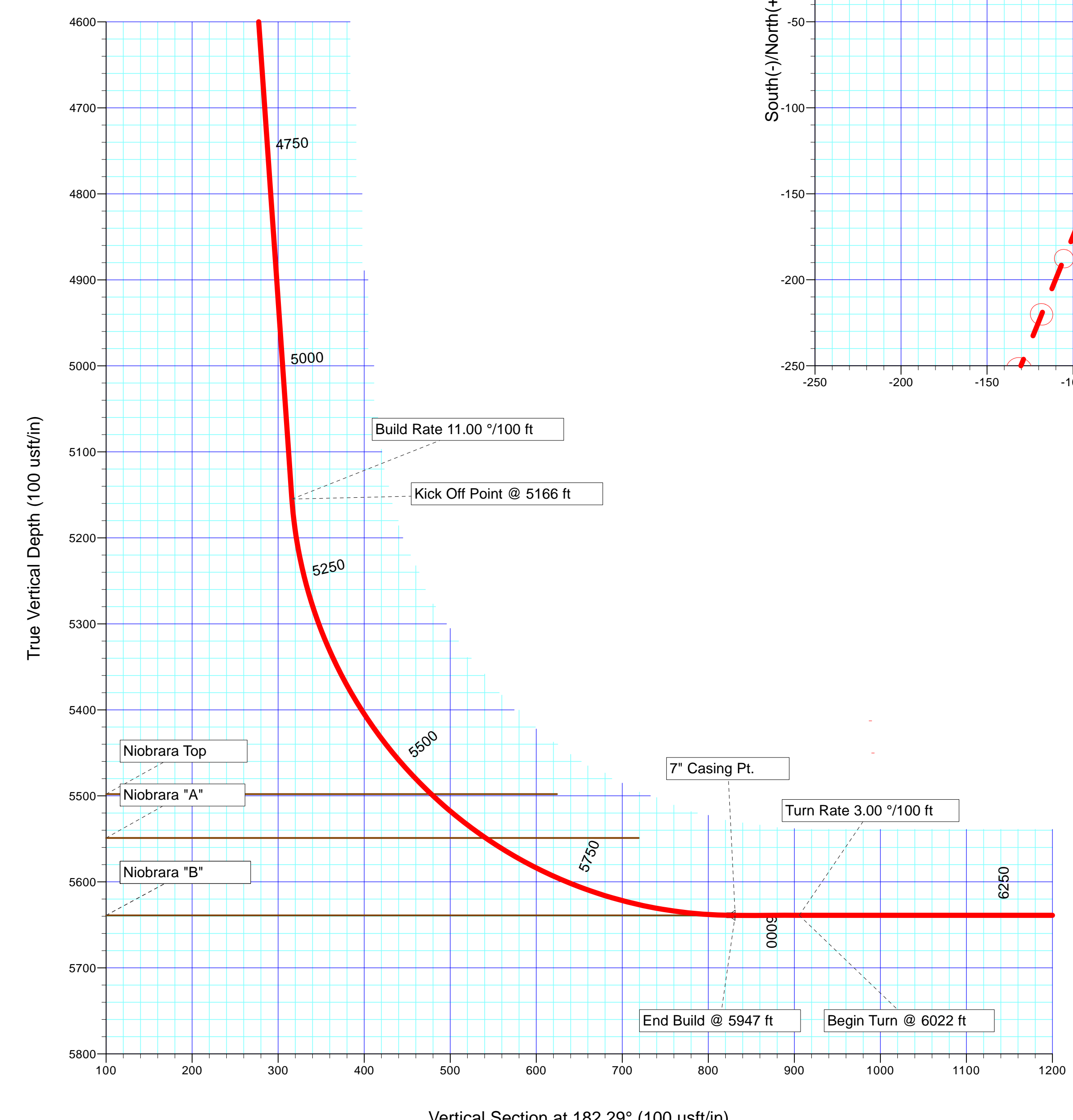
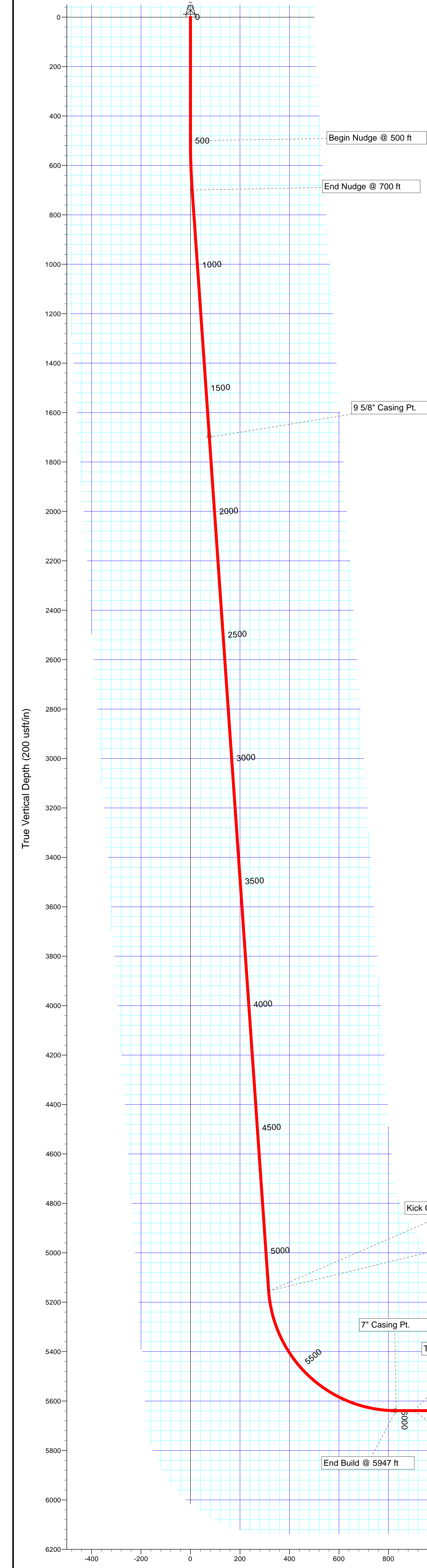
N

True

API - US Survey Feet - Custom

**HALLIBURTON**

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V Sect	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	189.45	699.84	-6.88	-1.15	2.00	189.45	6.92	
4	5165.50	4.00	189.45	5154.46	-314.15	-52.29	0.00	0.00	315.99	
5	5947.32	90.00	189.45	5639.00	-826.70	-137.60	11.00	0.00	831.54	
6	6022.32	90.00	189.45	5639.00	-900.69	-149.92	0.00	0.00	905.95	
7	6337.27	90.00	180.00	5639.00	-1214.21	-175.83	3.00	-90.00	1220.26	
8	9526.47	90.00	180.00	5639.00	-4403.41	-175.92	0.00	0.00	4406.93	Horsetail #02D-0202 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-0202/Plan A)	
Created By: Troy L. Stoute	Date: 17:36, February 25 2014
Checked: _____	Date: _____
Reviewed: _____	Date: _____
Approved: _____	Date: _____

**Plan Report for Horsetail #02D-0202 - 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	189.45	599.98	-1.72	-0.29	1.73	2.00	2.00	0.00	189.45
700.00	4.00	189.45	699.84	-6.88	-1.15	6.92	2.00	2.00	0.00	0.00
<b>End Nudge @ 700 ft</b>										
800.00	4.00	189.45	799.59	-13.76	-2.29	13.85	0.00	0.00	0.00	0.00
900.00	4.00	189.45	899.35	-20.65	-3.44	20.77	0.00	0.00	0.00	0.00
1,000.00	4.00	189.45	999.11	-27.53	-4.58	27.69	0.00	0.00	0.00	0.00
1,100.00	4.00	189.45	1,098.86	-34.41	-5.73	34.61	0.00	0.00	0.00	0.00
1,200.00	4.00	189.45	1,198.62	-41.29	-6.87	41.53	0.00	0.00	0.00	0.00
1,300.00	4.00	189.45	1,298.38	-48.17	-8.02	48.45	0.00	0.00	0.00	0.00
1,400.00	4.00	189.45	1,398.13	-55.05	-9.16	55.37	0.00	0.00	0.00	0.00
1,500.00	4.00	189.45	1,497.89	-61.93	-10.31	62.29	0.00	0.00	0.00	0.00
1,600.00	4.00	189.45	1,597.65	-68.81	-11.45	69.21	0.00	0.00	0.00	0.00
1,606.37	4.00	189.45	1,604.00	-69.25	-11.53	69.66	0.00	0.00	0.00	0.00
<b>Pierre</b>										
1,700.00	4.00	189.45	1,697.40	-75.69	-12.60	76.14	0.00	0.00	0.00	0.00
1,702.60	4.00	189.45	1,700.00	-75.87	-12.63	76.32	0.00	0.00	0.00	0.00
<b>9 5/8" Casing Pt.</b>										
1,800.00	4.00	189.45	1,797.16	-82.57	-13.74	83.06	0.00	0.00	0.00	0.00
1,900.00	4.00	189.45	1,896.91	-89.46	-14.89	89.98	0.00	0.00	0.00	0.00
2,000.00	4.00	189.45	1,996.67	-96.34	-16.03	96.90	0.00	0.00	0.00	0.00
2,100.00	4.00	189.45	2,096.43	-103.22	-17.18	103.82	0.00	0.00	0.00	0.00
2,200.00	4.00	189.45	2,196.18	-110.10	-18.33	110.74	0.00	0.00	0.00	0.00
2,300.00	4.00	189.45	2,295.94	-116.98	-19.47	117.66	0.00	0.00	0.00	0.00
2,400.00	4.00	189.45	2,395.70	-123.86	-20.62	124.58	0.00	0.00	0.00	0.00
2,500.00	4.00	189.45	2,495.45	-130.74	-21.76	131.51	0.00	0.00	0.00	0.00
2,600.00	4.00	189.45	2,595.21	-137.62	-22.91	138.43	0.00	0.00	0.00	0.00
2,700.00	4.00	189.45	2,694.97	-144.50	-24.05	145.35	0.00	0.00	0.00	0.00
2,800.00	4.00	189.45	2,794.72	-151.38	-25.20	152.27	0.00	0.00	0.00	0.00
2,900.00	4.00	189.45	2,894.48	-158.27	-26.34	159.19	0.00	0.00	0.00	0.00
3,000.00	4.00	189.45	2,994.23	-165.15	-27.49	166.11	0.00	0.00	0.00	0.00
3,100.00	4.00	189.45	3,093.99	-172.03	-28.63	173.03	0.00	0.00	0.00	0.00
3,200.00	4.00	189.45	3,193.75	-178.91	-29.78	179.95	0.00	0.00	0.00	0.00
3,300.00	4.00	189.45	3,293.50	-185.79	-30.92	186.88	0.00	0.00	0.00	0.00
3,400.00	4.00	189.45	3,393.26	-192.67	-32.07	193.80	0.00	0.00	0.00	0.00
3,500.00	4.00	189.45	3,493.02	-199.55	-33.21	200.72	0.00	0.00	0.00	0.00
3,600.00	4.00	189.45	3,592.77	-206.43	-34.36	207.64	0.00	0.00	0.00	0.00
3,700.00	4.00	189.45	3,692.53	-213.31	-35.51	214.56	0.00	0.00	0.00	0.00
3,800.00	4.00	189.45	3,792.29	-220.19	-36.65	221.48	0.00	0.00	0.00	0.00
3,900.00	4.00	189.45	3,892.04	-227.08	-37.80	228.40	0.00	0.00	0.00	0.00
4,000.00	4.00	189.45	3,991.80	-233.96	-38.94	235.32	0.00	0.00	0.00	0.00
4,100.00	4.00	189.45	4,091.56	-240.84	-40.09	242.25	0.00	0.00	0.00	0.00
4,200.00	4.00	189.45	4,191.31	-247.72	-41.23	249.17	0.00	0.00	0.00	0.00
4,300.00	4.00	189.45	4,291.07	-254.60	-42.38	256.09	0.00	0.00	0.00	0.00
4,400.00	4.00	189.45	4,390.82	-261.48	-43.52	263.01	0.00	0.00	0.00	0.00
4,500.00	4.00	189.45	4,490.58	-268.36	-44.67	269.93	0.00	0.00	0.00	0.00
4,600.00	4.00	189.45	4,590.34	-275.24	-45.81	276.85	0.00	0.00	0.00	0.00
4,700.00	4.00	189.45	4,690.09	-282.12	-46.96	283.77	0.00	0.00	0.00	0.00
4,800.00	4.00	189.45	4,789.85	-289.00	-48.10	290.69	0.00	0.00	0.00	0.00
4,900.00	4.00	189.45	4,889.61	-295.89	-49.25	297.62	0.00	0.00	0.00	0.00
5,000.00	4.00	189.45	4,989.36	-302.77	-50.39	304.54	0.00	0.00	0.00	0.00
5,100.00	4.00	189.45	5,089.12	-309.65	-51.54	311.46	0.00	0.00	0.00	0.00

**Plan Report for Horsetail #02D-0202 - 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 (°)
5,165.50	4.00	189.45	5,154.46	-314.15	-52.29	315.99	0.00	0.00	0.00	0.00
5,166.00	4.06	189.45	5,154.96	-314.19	-52.30	316.03	11.00	11.00	0.00	0.00
<b>Build Rate 11.00 °/100 ft - Kick Off Point @ 5166 ft</b>										
5,200.00	7.80	189.45	5,188.77	-317.65	-52.87	319.51	11.00	11.00	0.00	0.00
5,300.00	18.80	189.45	5,285.94	-340.30	-56.64	342.29	11.00	11.00	0.00	0.00
5,400.00	29.80	189.45	5,376.95	-380.82	-63.39	383.05	11.00	11.00	0.00	0.00
5,500.00	40.80	189.45	5,458.44	-437.73	-72.86	440.29	11.00	11.00	0.00	0.00
5,554.85	46.83	189.45	5,498.00	-475.17	-79.09	477.95	11.00	11.00	0.00	0.00
<b>Niobrara Top</b>										
5,600.00	51.80	189.45	5,527.43	-508.93	-84.71	511.91	11.00	11.00	0.00	0.00
5,636.54	55.81	189.45	5,549.00	-538.01	-89.55	541.16	11.00	11.00	0.00	0.00
<b>Niobrara "A"</b>										
5,700.00	62.80	189.45	5,581.38	-591.81	-98.50	595.27	11.00	11.00	0.00	0.00
5,800.00	73.80	189.45	5,618.30	-683.32	-113.73	687.31	11.00	11.00	0.00	0.00
5,900.00	84.80	189.45	5,636.85	-780.09	-129.84	784.65	11.00	11.00	0.00	0.00
5,947.00	89.97	189.45	5,639.00	-826.39	-137.55	831.22	11.00	11.00	0.00	0.00
<b>End Build @ 5947 ft - 7" Casing Pt.</b>										
5,947.32	90.00	189.45	5,639.00	-826.70	-137.60	831.54	11.00	11.00	0.00	0.00
<b>Niobrara "B"</b>										
6,000.00	90.00	189.45	5,639.00	-878.67	-146.25	883.81	0.00	0.00	0.00	0.00
6,022.00	90.00	189.45	5,639.00	-900.37	-149.86	905.64	0.00	0.00	0.00	0.00
<b>Turn Rate 3.00 °/100 ft - Begin Turn @ 6022 ft</b>										
6,022.32	90.00	189.45	5,639.00	-900.69	-149.92	905.95	0.00	0.00	0.00	0.00
6,100.00	90.00	187.12	5,639.00	-977.55	-161.11	983.20	3.00	0.00	-3.00	-90.00
6,200.00	90.00	184.12	5,639.00	-1,077.06	-170.90	1,083.02	3.00	0.00	-3.00	-90.00
6,300.00	90.00	181.12	5,639.00	-1,176.94	-175.47	1,183.01	3.00	0.00	-3.00	-90.00
6,337.00	90.00	180.01	5,639.00	-1,213.94	-175.83	1,219.99	3.00	0.00	-3.00	-90.00
<b>End Turn @ 6337 ft - Hold Inc 90.00°, Azi 180°</b>										
6,337.27	90.00	180.00	5,639.00	-1,214.21	-175.83	1,220.26	3.00	0.00	-3.00	-90.00
6,400.00	90.00	180.00	5,639.00	-1,276.94	-175.84	1,282.94	0.00	0.00	0.00	0.00
6,500.00	90.00	180.00	5,639.00	-1,376.94	-175.84	1,382.86	0.00	0.00	0.00	0.00
6,600.00	90.00	180.00	5,639.00	-1,476.94	-175.84	1,482.78	0.00	0.00	0.00	0.00
6,700.00	90.00	180.00	5,639.00	-1,576.94	-175.84	1,582.70	0.00	0.00	0.00	0.00
6,800.00	90.00	180.00	5,639.00	-1,676.94	-175.85	1,682.63	0.00	0.00	0.00	0.00
6,900.00	90.00	180.00	5,639.00	-1,776.94	-175.85	1,782.55	0.00	0.00	0.00	0.00
7,000.00	90.00	180.00	5,639.00	-1,876.94	-175.85	1,882.47	0.00	0.00	0.00	0.00
7,100.00	90.00	180.00	5,639.00	-1,976.94	-175.85	1,982.39	0.00	0.00	0.00	0.00
7,200.00	90.00	180.00	5,639.00	-2,076.94	-175.86	2,082.31	0.00	0.00	0.00	0.00
7,300.00	90.00	180.00	5,639.00	-2,176.94	-175.86	2,182.23	0.00	0.00	0.00	0.00
7,400.00	90.00	180.00	5,639.00	-2,276.94	-175.86	2,282.15	0.00	0.00	0.00	0.00
7,500.00	90.00	180.00	5,639.00	-2,376.94	-175.87	2,382.07	0.00	0.00	0.00	0.00
7,600.00	90.00	180.00	5,639.00	-2,476.94	-175.87	2,481.99	0.00	0.00	0.00	0.00
7,700.00	90.00	180.00	5,639.00	-2,576.94	-175.87	2,581.91	0.00	0.00	0.00	0.00
7,800.00	90.00	180.00	5,639.00	-2,676.94	-175.87	2,681.83	0.00	0.00	0.00	0.00
7,900.00	90.00	180.00	5,639.00	-2,776.94	-175.88	2,781.75	0.00	0.00	0.00	0.00
8,000.00	90.00	180.00	5,639.00	-2,876.94	-175.88	2,881.67	0.00	0.00	0.00	0.00
8,100.00	90.00	180.00	5,639.00	-2,976.94	-175.88	2,981.59	0.00	0.00	0.00	0.00
8,200.00	90.00	180.00	5,639.00	-3,076.94	-175.88	3,081.51	0.00	0.00	0.00	0.00
8,300.00	90.00	180.00	5,639.00	-3,176.94	-175.89	3,181.43	0.00	0.00	0.00	0.00
8,400.00	90.00	180.00	5,639.00	-3,276.94	-175.89	3,281.35	0.00	0.00	0.00	0.00
8,500.00	90.00	180.00	5,639.00	-3,376.94	-175.89	3,381.27	0.00	0.00	0.00	0.00
8,600.00	90.00	180.00	5,639.00	-3,476.94	-175.90	3,481.19	0.00	0.00	0.00	0.00
8,700.00	90.00	180.00	5,639.00	-3,576.94	-175.90	3,581.11	0.00	0.00	0.00	0.00
8,800.00	90.00	180.00	5,639.00	-3,676.94	-175.90	3,681.03	0.00	0.00	0.00	0.00
8,900.00	90.00	180.00	5,639.00	-3,776.94	-175.90	3,780.95	0.00	0.00	0.00	0.00
9,000.00	90.00	180.00	5,639.00	-3,876.94	-175.91	3,880.87	0.00	0.00	0.00	0.00
9,100.00	90.00	180.00	5,639.00	-3,976.94	-175.91	3,980.79	0.00	0.00	0.00	0.00
9,200.00	90.00	180.00	5,639.00	-4,076.94	-175.91	4,080.71	0.00	0.00	0.00	0.00

**Plan Report for Horsetail #02D-0202 - 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 (°)
9,300.00	90.00	180.00	5,639.00	-4,176.94	-175.91	4,180.64	0.00	0.00	0.00	0.00
9,400.00	90.00	180.00	5,639.00	-4,276.94	-175.92	4,280.56	0.00	0.00	0.00	0.00
9,500.00	90.00	180.00	5,639.00	-4,376.94	-175.92	4,380.48	0.00	0.00	0.00	0.00
9,526.00	90.00	180.00	5,639.00	-4,402.94	-175.92	4,406.46	0.00	0.00	0.00	0.00
<b>Total Depth 9526.47 ft</b>										
9,526.47	90.00	180.00	5,639.00	-4,403.41	-175.92	4,406.93	0.00	0.00	0.00	0.00

**Plan Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
500.00	500.00	0.00	0.00	Begin Nudge @ 500 ft
700.00	699.84	-6.88	-1.15	End Nudge @ 700 ft
5,166.00	5,154.96	-314.19	-52.30	Build Rate 11.00 °/100 ft
5,166.00	5,154.96	-314.19	-52.30	Kick Off Point @ 5166 ft
5,947.00	5,639.00	-826.39	-137.55	End Build @ 5947 ft
6,022.00	5,639.00	-900.37	-149.86	Turn Rate 3.00 °/100 ft
6,022.00	5,639.00	-900.37	-149.86	Begin Turn @ 6022 ft
6,337.00	5,639.00	-1,213.94	-175.83	End Turn @ 6337 ft
6,337.00	5,639.00	-1,213.94	-175.83	Hold Inc 90.00°, Azi 180°
9,526.00	5,639.00	-4,402.94	-175.92	Total Depth 9526.47 ft

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	+E/-W (usft)	Start TVD (usft)
Target	Horsetail #02D-0202 BHL	182.29	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	5,947.00	Rev A0	MWD+IFR1+MS+sag
5,947.00	9,526.32	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
5,947.00	5,639.00	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	
5,554.85	5,498.00	Niobrara Top		0.00	
5,636.54	5,549.00	Niobrara "A"		0.00	
5,947.32	5,639.00	Niobrara "B"		0.00	

**Plan Report for Horsetail #02D-0202 - 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	-29.87	Polygon
Horsetail #02D Section Setback	0.00	0.01	-29.87	Polygon
Horsetail #02D-0202 BHL	5,639.00	-4,403.41	-175.92	Point

**Directional Difficulty Index**

Average Dogleg over Survey:	1.04 °/100usft	Maximum Dogleg over Survey:	11.00 °/100usft at 5,947.32 usft
Net Tortousity applicable to Plans:	1.04 °/100usft	Directional Difficulty Index:	6.021

**Audit Info**

**North Reference Sheet for Sec. 2-T10N-R57W - Horsetail #02D-0202 - 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-0202

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: 1,566,446.97 usft N, 3,490,732.35 usft E

Geographical Coordinates of Well: 40° 52' 29.25" N, 103° 43' 31.67" W

Grid Convergence at Surface is: 1.15°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,526.47usft the Bottom Hole Displacement is 4,406.93usft in the Direction of 182.29° (True).

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

