

Burlington Resources

Arapahoe County, Colorado

Sec. 30-T4S-R64W

Watkins 30-5-4H

Plan A

Plan: Rev A1

Sperry Drilling Services

Proposal Report

02 November, 2013

Well Coordinates: 1,672,248.08 N, 3,252,693.77 E (39° 40' 32.49" N, 104° 36' 08.11" W)

Ground Level: 5,765.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Centered on Well Watkins 30-5-4H

KB 24 ft @ 5789.00usft (H&P 280)

N

True

API - US Survey Feet - Custom

Version: 5000.1 Build: 70

HALLIBURTON

Project: Arapahoe County, Colorado
Site: Sec. 30-T4S-R64W
Well: Watkins 30-5-4H
Wellbore: Plan A
Plan: Rev A1

Burlington Resources

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2200.00	0.00	0.00	2200.00	0.00	0.00	0.00	0.00	0.00	
3	2700.00	10.00	0.00	2697.47	43.52	0.00	2.00	0.00	5.16	
4	5390.00	10.00	0.00	5346.60	510.64	0.00	0.00	0.00	60.59	
5	5890.00	0.00	0.00	5844.07	554.16	0.00	2.00	180.00	65.76	
6	7248.00	0.00	0.00	7202.06	554.16	0.00	0.00	0.00	65.76	
7	8152.23	90.42	90.00	7775.00	554.13	577.19	10.00	90.00	638.87	
8	12210.09	90.42	90.00	7745.00	553.90	4634.94	0.00	0.00	4667.92	Watkins 30-5-4H_Rev A1_BHL Tgt

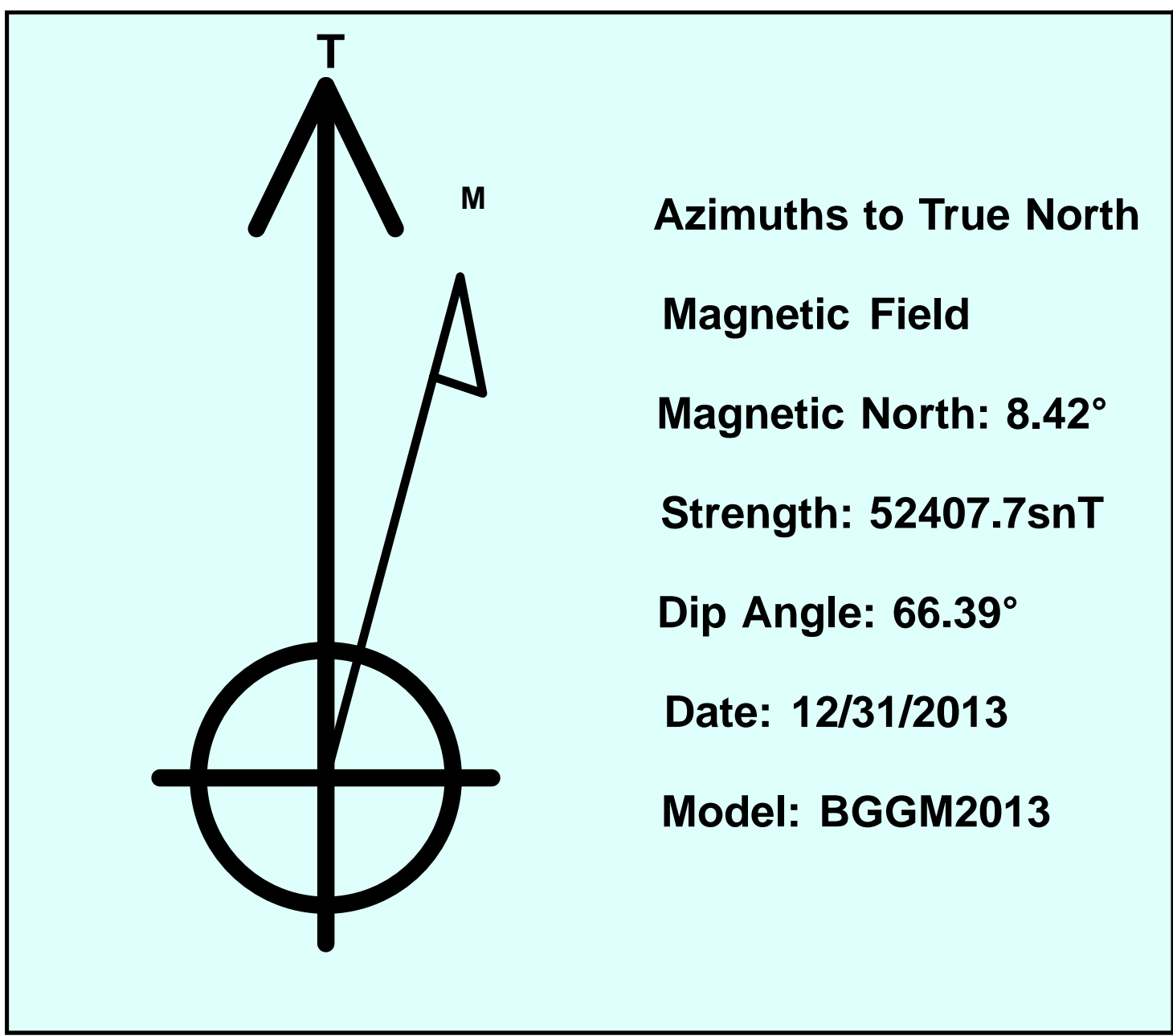
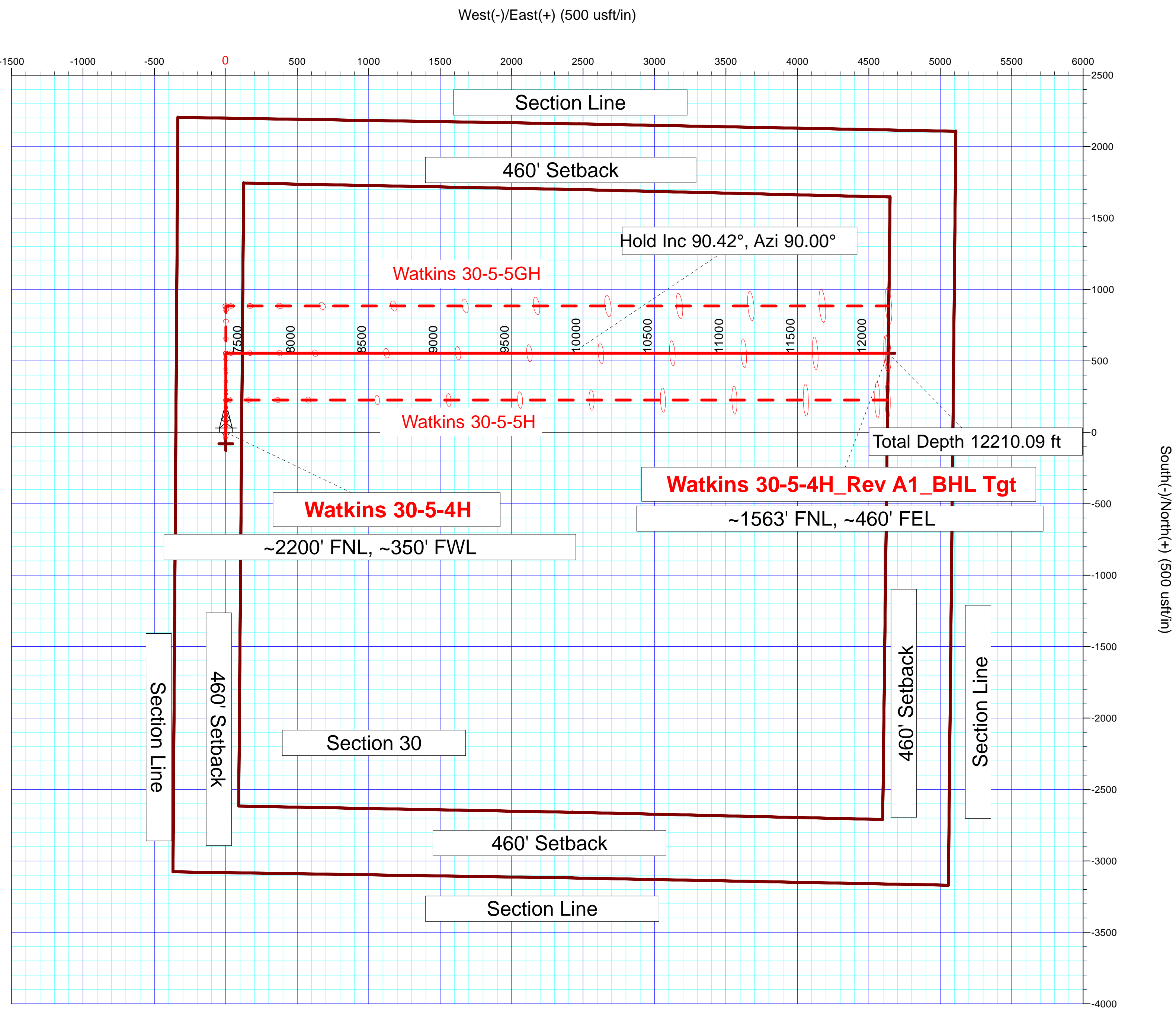
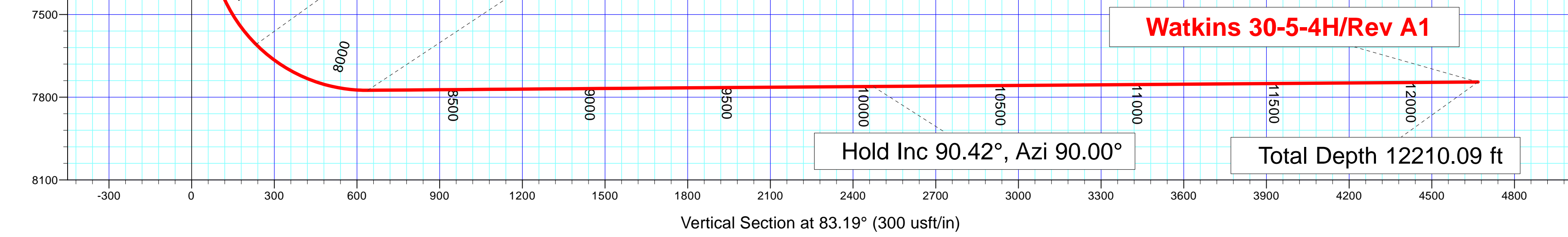
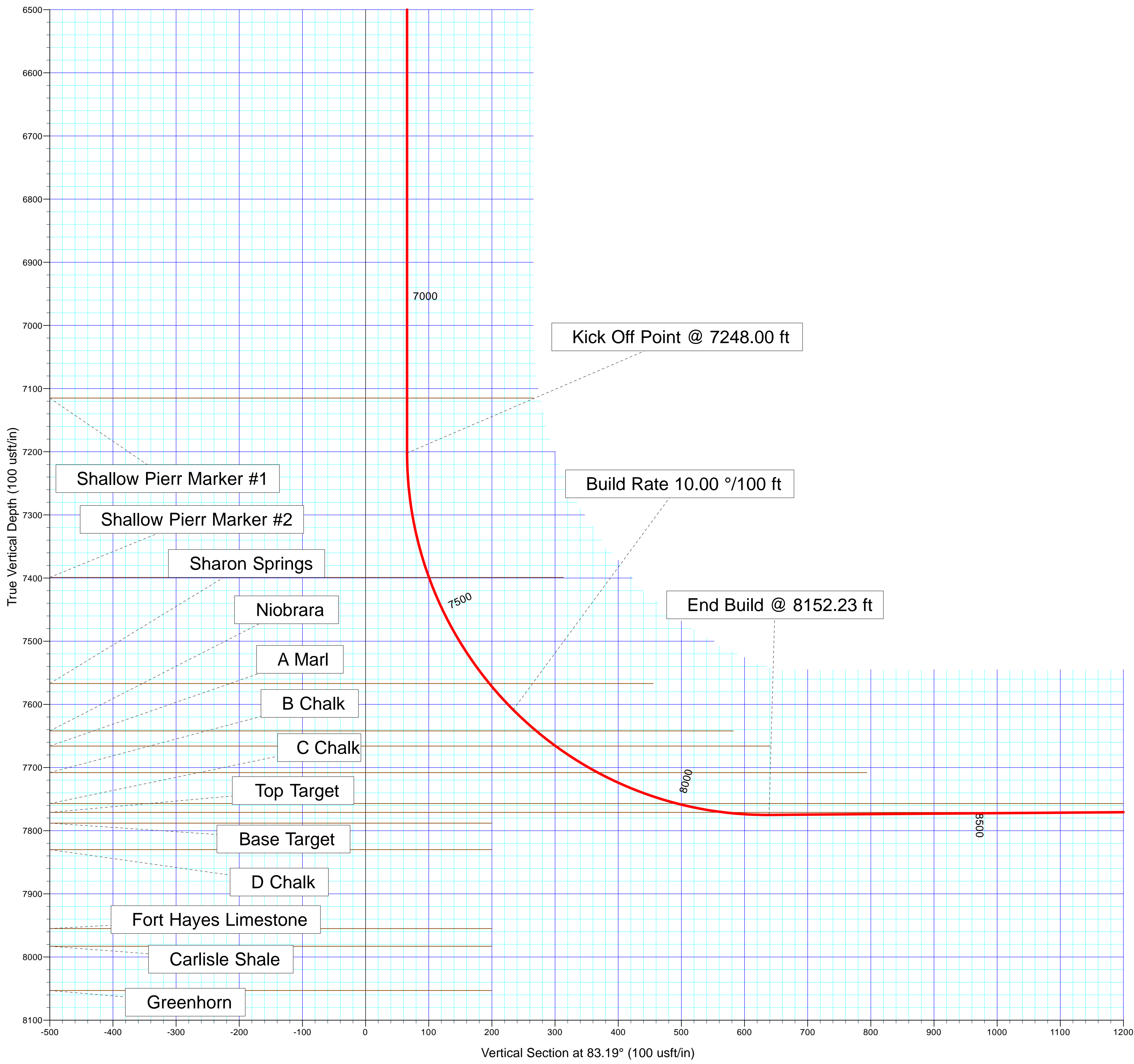
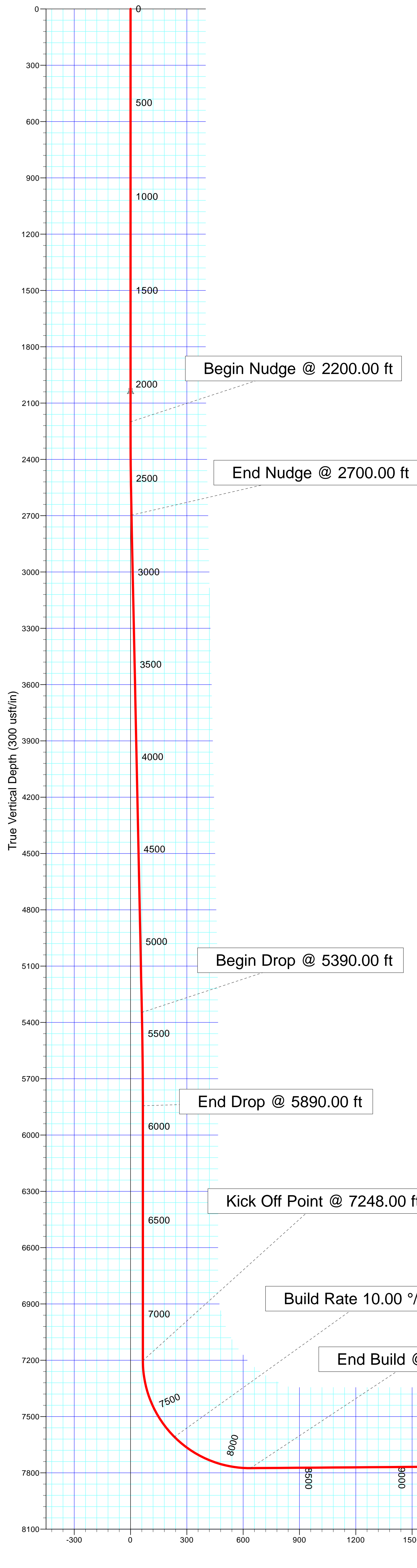
Plan: Rev A1 (Watkins 30-5-4H/Plan A)

Created By: Kansa B. Becker Date: 13:11, November 02 2013

Checked: _____ Date: _____

Reviewed: _____ Date: _____

Approved: _____ Date: _____



Plan Report for Watkins 30-5-4H - Rev A1

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
600.00	0.00	0.00	600.00	0.00	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	0.00
800.00	0.00	0.00	800.00	0.00	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	0.00
1,000.00	0.00	0.00	1,000.00	0.00	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	0.00
1,200.00	0.00	0.00	1,200.00	0.00	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	0.00
1,400.00	0.00	0.00	1,400.00	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	0.00
1,600.00	0.00	0.00	1,600.00	0.00	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	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,050.00	0.00	0.00	2,050.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8" Casing Pt.										
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge @ 2200.00 ft										
2,300.00	2.00	0.00	2,299.98	1.75	0.00	0.21	2.00	2.00	0.00	0.00
2,400.00	4.00	0.00	2,399.84	6.98	0.00	0.83	2.00	2.00	0.00	0.00
2,500.00	6.00	0.00	2,499.45	15.69	0.00	1.86	2.00	2.00	0.00	0.00
2,600.00	8.00	0.00	2,598.70	27.88	0.00	3.31	2.00	2.00	0.00	0.00
2,700.00	10.00	0.00	2,697.47	43.52	0.00	5.16	2.00	2.00	0.00	0.00
End Nudge @ 2700.00 ft										
2,800.00	10.00	0.00	2,795.95	60.89	0.00	7.22	0.00	0.00	0.00	0.00
2,900.00	10.00	0.00	2,894.43	78.25	0.00	9.29	0.00	0.00	0.00	0.00
3,000.00	10.00	0.00	2,992.91	95.62	0.00	11.35	0.00	0.00	0.00	0.00
3,100.00	10.00	0.00	3,091.39	112.98	0.00	13.41	0.00	0.00	0.00	0.00
3,200.00	10.00	0.00	3,189.87	130.35	0.00	15.47	0.00	0.00	0.00	0.00
3,300.00	10.00	0.00	3,288.35	147.71	0.00	17.53	0.00	0.00	0.00	0.00
3,400.00	10.00	0.00	3,386.83	165.08	0.00	19.59	0.00	0.00	0.00	0.00
3,500.00	10.00	0.00	3,485.31	182.44	0.00	21.65	0.00	0.00	0.00	0.00
3,600.00	10.00	0.00	3,583.79	199.81	0.00	23.71	0.00	0.00	0.00	0.00
3,700.00	10.00	0.00	3,682.27	217.17	0.00	25.77	0.00	0.00	0.00	0.00
3,800.00	10.00	0.00	3,780.75	234.54	0.00	27.83	0.00	0.00	0.00	0.00
3,900.00	10.00	0.00	3,879.23	251.90	0.00	29.89	0.00	0.00	0.00	0.00
4,000.00	10.00	0.00	3,977.72	269.27	0.00	31.95	0.00	0.00	0.00	0.00
4,100.00	10.00	0.00	4,076.20	286.63	0.00	34.01	0.00	0.00	0.00	0.00
4,200.00	10.00	0.00	4,174.68	303.99	0.00	36.07	0.00	0.00	0.00	0.00
4,300.00	10.00	0.00	4,273.16	321.36	0.00	38.13	0.00	0.00	0.00	0.00
4,400.00	10.00	0.00	4,371.64	338.72	0.00	40.19	0.00	0.00	0.00	0.00
4,500.00	10.00	0.00	4,470.12	356.09	0.00	42.25	0.00	0.00	0.00	0.00
4,600.00	10.00	0.00	4,568.60	373.45	0.00	44.31	0.00	0.00	0.00	0.00
4,700.00	10.00	0.00	4,667.08	390.82	0.00	46.37	0.00	0.00	0.00	0.00
4,800.00	10.00	0.00	4,765.56	408.18	0.00	48.44	0.00	0.00	0.00	0.00
4,900.00	10.00	0.00	4,864.04	425.55	0.00	50.50	0.00	0.00	0.00	0.00
5,000.00	10.00	0.00	4,962.52	442.91	0.00	52.56	0.00	0.00	0.00	0.00
5,100.00	10.00	0.00	5,061.00	460.28	0.00	54.62	0.00	0.00	0.00	0.00
5,200.00	10.00	0.00	5,159.48	477.64	0.00	56.68	0.00	0.00	0.00	0.00
5,300.00	10.00	0.00	5,257.97	495.01	0.00	58.74	0.00	0.00	0.00	0.00

Plan Report for Watkins 30-5-4H - Rev A1

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 (°)
5,390.00	10.00	0.00	5,346.60	510.64	0.00	60.59	0.00	0.00	0.00	0.00
Begin Drop @ 5390.00 ft										
5,400.00	9.80	0.00	5,356.45	512.36	0.00	60.80	2.00	-2.00	0.00	180.00
5,500.00	7.80	0.00	5,455.27	527.65	0.00	62.61	2.00	-2.00	0.00	180.00
5,600.00	5.80	0.00	5,554.56	539.49	0.00	64.02	2.00	-2.00	0.00	180.00
5,700.00	3.80	0.00	5,654.20	547.86	0.00	65.01	2.00	-2.00	0.00	180.00
5,800.00	1.80	0.00	5,754.08	552.75	0.00	65.59	2.00	-2.00	0.00	180.00
5,890.00	0.00	0.00	5,844.07	554.16	0.00	65.76	2.00	-2.00	0.00	-180.00
End Drop @ 5890.00 ft										
5,900.00	0.00	0.00	5,854.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,954.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,054.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,154.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,254.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,354.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,454.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,554.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,654.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,754.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,854.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	6,954.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,054.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
7,160.94	0.00	0.00	7,115.00	554.16	0.00	65.76	0.00	0.00	0.00	0.00
Shallow Pierr Marker #1										
7,200.00	0.00	0.00	7,154.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
7,248.00	0.00	0.00	7,202.06	554.16	0.00	65.76	0.00	0.00	0.00	0.00
Kick Off Point @ 7248.00 ft										
7,300.00	5.20	90.00	7,253.99	554.16	2.36	68.10	10.00	10.00	0.00	90.00
7,400.00	15.20	90.00	7,352.29	554.16	20.05	85.66	10.00	10.00	0.00	0.00
7,449.04	20.10	90.00	7,399.00	554.16	34.91	100.42	10.00	10.00	0.00	0.00
Shallow Pierr Marker #2										
7,500.00	25.20	90.00	7,446.02	554.16	54.53	119.90	10.00	10.00	0.00	0.00
7,600.00	35.20	90.00	7,532.33	554.15	104.77	169.79	10.00	10.00	0.00	0.00
7,643.64	39.56	90.00	7,567.00	554.15	131.26	196.09	10.00	10.00	0.00	0.00
Sharon Springs										
7,700.00	45.20	90.00	7,608.62	554.15	169.23	233.79	10.00	10.00	0.00	0.00
Build Rate 10.00 °/100 ft										
7,749.60	50.16	90.00	7,642.00	554.15	205.90	270.20	10.00	10.00	0.00	0.00
Niobrara										
7,788.69	54.07	90.00	7,666.00	554.15	236.74	300.83	10.00	10.00	0.00	0.00
A Marl										
7,800.00	55.20	90.00	7,672.55	554.15	245.97	309.98	10.00	10.00	0.00	0.00
7,868.10	62.01	90.00	7,708.00	554.14	304.06	367.67	10.00	10.00	0.00	0.00
B Chalk										
7,900.00	65.20	90.00	7,722.18	554.14	332.63	396.04	10.00	10.00	0.00	0.00
8,000.00	75.20	90.00	7,756.01	554.14	426.60	489.34	10.00	10.00	0.00	0.00
8,003.93	75.59	90.00	7,757.00	554.13	430.40	493.11	10.00	10.00	0.00	0.00
C Chalk										
8,080.10	83.21	90.00	7,771.00	554.13	505.22	567.41	10.00	10.00	0.00	0.00
Top Target										
8,100.00	85.20	90.00	7,773.01	554.13	525.02	587.06	10.00	10.00	0.00	0.00
8,152.23	90.42	90.00	7,775.00	554.13	577.19	638.87	10.00	10.00	0.00	0.00
End Build @ 8152.23 ft										
8,200.00	90.42	90.00	7,774.65	554.12	624.96	686.30	0.00	0.00	0.00	0.00
8,300.00	90.42	90.00	7,773.91	554.12	724.96	785.59	0.00	0.00	0.00	0.00
8,400.00	90.42	90.00	7,773.17	554.11	824.95	884.88	0.00	0.00	0.00	0.00
8,500.00	90.42	90.00	7,772.43	554.11	924.95	984.17	0.00	0.00	0.00	0.00
8,600.00	90.42	90.00	7,771.69	554.10	1,024.95	1,083.46	0.00	0.00	0.00	0.00

Plan Report for Watkins 30-5-4H - Rev A1

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 (°)
8,700.00	90.42	90.00	7,770.95	554.10	1,124.95	1,182.75	0.00	0.00	0.00	0.00
8,800.00	90.42	90.00	7,770.21	554.09	1,224.94	1,282.04	0.00	0.00	0.00	0.00
8,900.00	90.42	90.00	7,769.47	554.08	1,324.94	1,381.33	0.00	0.00	0.00	0.00
9,000.00	90.42	90.00	7,768.73	554.08	1,424.94	1,480.62	0.00	0.00	0.00	0.00
9,100.00	90.42	90.00	7,767.99	554.07	1,524.94	1,579.91	0.00	0.00	0.00	0.00
9,200.00	90.42	90.00	7,767.26	554.07	1,624.93	1,679.20	0.00	0.00	0.00	0.00
9,300.00	90.42	90.00	7,766.52	554.06	1,724.93	1,778.49	0.00	0.00	0.00	0.00
9,400.00	90.42	90.00	7,765.78	554.06	1,824.93	1,877.78	0.00	0.00	0.00	0.00
9,500.00	90.42	90.00	7,765.04	554.05	1,924.92	1,977.07	0.00	0.00	0.00	0.00
9,600.00	90.42	90.00	7,764.30	554.05	2,024.92	2,076.36	0.00	0.00	0.00	0.00
9,700.00	90.42	90.00	7,763.56	554.04	2,124.92	2,175.65	0.00	0.00	0.00	0.00
9,800.00	90.42	90.00	7,762.82	554.03	2,224.92	2,274.94	0.00	0.00	0.00	0.00
9,900.00	90.42	90.00	7,762.08	554.03	2,324.91	2,374.23	0.00	0.00	0.00	0.00
10,000.00	90.42	90.00	7,761.34	554.02	2,424.91	2,473.52	0.00	0.00	0.00	0.00
Hold Inc 90.42°, Azi 90.00°										
10,100.00	90.42	90.00	7,760.60	554.02	2,524.91	2,572.81	0.00	0.00	0.00	0.00
10,200.00	90.42	90.00	7,759.86	554.01	2,624.91	2,672.10	0.00	0.00	0.00	0.00
10,300.00	90.42	90.00	7,759.12	554.01	2,724.90	2,771.39	0.00	0.00	0.00	0.00
10,400.00	90.42	90.00	7,758.38	554.00	2,824.90	2,870.68	0.00	0.00	0.00	0.00
10,500.00	90.42	90.00	7,757.64	553.99	2,924.90	2,969.97	0.00	0.00	0.00	0.00
10,600.00	90.42	90.00	7,756.90	553.99	3,024.89	3,069.26	0.00	0.00	0.00	0.00
10,700.00	90.42	90.00	7,756.16	553.98	3,124.89	3,168.55	0.00	0.00	0.00	0.00
10,800.00	90.42	90.00	7,755.43	553.98	3,224.89	3,267.84	0.00	0.00	0.00	0.00
10,900.00	90.42	90.00	7,754.69	553.97	3,324.89	3,367.13	0.00	0.00	0.00	0.00
11,000.00	90.42	90.00	7,753.95	553.97	3,424.88	3,466.42	0.00	0.00	0.00	0.00
11,100.00	90.42	90.00	7,753.21	553.96	3,524.88	3,565.71	0.00	0.00	0.00	0.00
11,200.00	90.42	90.00	7,752.47	553.96	3,624.88	3,665.00	0.00	0.00	0.00	0.00
11,300.00	90.42	90.00	7,751.73	553.95	3,724.88	3,764.29	0.00	0.00	0.00	0.00
11,400.00	90.42	90.00	7,750.99	553.94	3,824.87	3,863.58	0.00	0.00	0.00	0.00
11,500.00	90.42	90.00	7,750.25	553.94	3,924.87	3,962.87	0.00	0.00	0.00	0.00
11,600.00	90.42	90.00	7,749.51	553.93	4,024.87	4,062.16	0.00	0.00	0.00	0.00
11,700.00	90.42	90.00	7,748.77	553.93	4,124.86	4,161.45	0.00	0.00	0.00	0.00
11,800.00	90.42	90.00	7,748.03	553.92	4,224.86	4,260.74	0.00	0.00	0.00	0.00
11,900.00	90.42	90.00	7,747.29	553.92	4,324.86	4,360.03	0.00	0.00	0.00	0.00
12,000.00	90.42	90.00	7,746.55	553.91	4,424.86	4,459.32	0.00	0.00	0.00	0.00
12,100.00	90.42	90.00	7,745.81	553.90	4,524.85	4,558.61	0.00	0.00	0.00	0.00
12,200.00	90.42	90.00	7,745.07	553.90	4,624.85	4,657.90	0.00	0.00	0.00	0.00
12,210.09	90.42	90.00	7,745.00	553.90	4,634.94	4,667.92	0.00	0.00	0.00	0.00
Total Depth 12210.09 ft										

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,200.00	2,200.00	0.00	0.00	Begin Nudge @ 2200.00 ft
2,700.00	2,697.47	43.52	0.00	End Nudge @ 2700.00 ft
5,390.00	5,346.60	510.64	0.00	Begin Drop @ 5390.00 ft
5,890.00	5,844.07	554.16	0.00	End Drop @ 5890.00 ft
7,248.00	7,202.06	554.16	0.00	Kick Off Point @ 7248.00 ft
7,700.00	7,608.62	554.15	169.23	Build Rate 10.00 °/100 ft
8,152.23	7,775.00	554.13	577.19	End Build @ 8152.23 ft
10,000.00	7,761.34	554.02	2,424.91	Hold Inc 90.42°, Azi 90.00°
12,210.09	7,745.00	553.90	4,634.94	Total Depth 12210.09 ft

Plan Report for Watkins 30-5-4H - Rev A1

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Watkins 30-5-4H_Rev A1_BHL Tgt	83.19	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	2,050.00	Rev A1	NSG-CT_D/P
2,050.00	12,210.09	Rev A1	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,050.00	2,050.00	9 5/8" Casing Pt.	9-5/8	13-1/2

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
7,160.94	7,115.00	Shallow Pierr Marker #1			
7,449.04	7,399.00	Shallow Pierr Marker #2			
7,643.64	7,567.00	Sharon Springs			
7,749.60	7,642.00	Niobrara			
7,788.69	7,666.00	A Marl			
7,868.10	7,708.00	B Chalk			
8,003.93	7,757.00	C Chalk			
8,080.10	7,771.00	Top Target			

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Watkins 30-5-8H_SB	0.00	-79.93	0.00	Polygon
Watkins 30-5-8H_SL	0.00	-79.93	0.00	Polygon
Watkins 30-5-4H_Rev A1_BHL Tgt	7,745.00	553.90	4,634.94	Point

Directional Difficulty Index

Average Dogleg over Survey:	0.90 °/100usft	Maximum Dogleg over Survey:	10.00 °/100usft at 8,152.23 usft
Net Tortousity applicable to Plans:	0.90 °/100usft	Directional Difficulty Index:	6.062

Plan Report for Watkins 30-5-4H - Rev A1

Audit Info

North Reference Sheet for Sec. 30-T4S-R64W - Watkins 30-5-4H - 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 24 ft @ 5789.00usft (H&P 280). Northing and Easting are relative to Watkins 30-5-4H
 Coordinate System is US State Plane 1983, Colorado Central 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:39° 45' 0.000 N°
 False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99998614

Grid Coordinates of Well: 1,672,248.08 usft N, 3,252,693.77 usft E
 Geographical Coordinates of Well: 39° 40' 32.49" N, 104° 36' 08.11" W
 Grid Convergence at Surface is: 0.57°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,210.09usft
 the Bottom Hole Displacement is 4,667.92usft in the Direction of 83.19° (True).
 Magnetic Convergence at surface is: -7.85° (31 December 2013, , BGGM2013)

