

Noble Energy

Weld County, CO (NAD 83)

Sec. 31-T6N-R63W (Wells Ranch State A36)

Wells Ranch State A36-655

05-123-41516

Plan A

Design: Actual Surveys

Sperry Drilling Services

Final Survey Report

12 July, 2015

Surface UWI : 05-123-41516

Well Coordinates: 1,405,557.11 N, 3,286,230.20 E (40° 26' 31.56" N, 104° 28' 17.83" W)

Ground Level: 4,656.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well Wells Ranch State A36-655

KB = 24' @ 4680.00usft (H&P 273)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

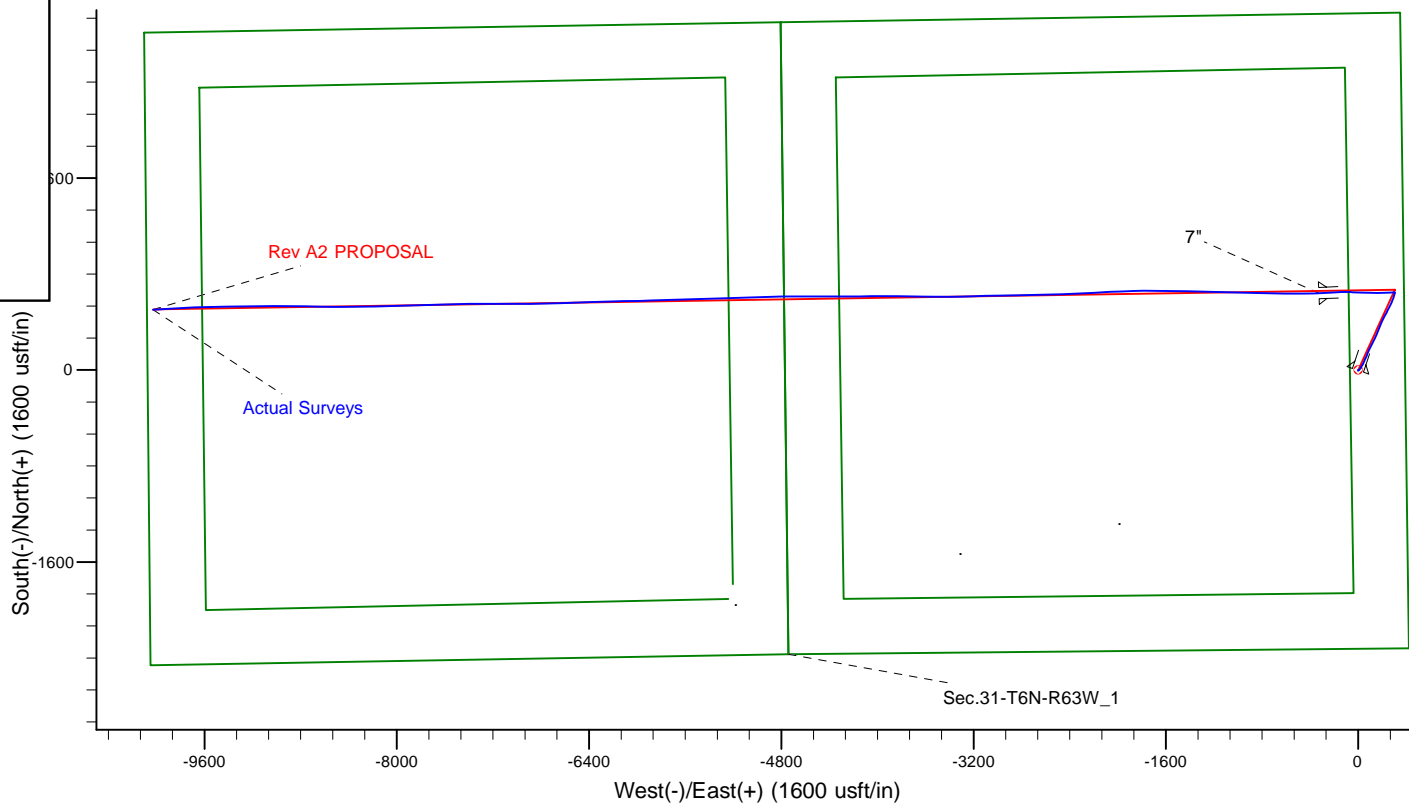
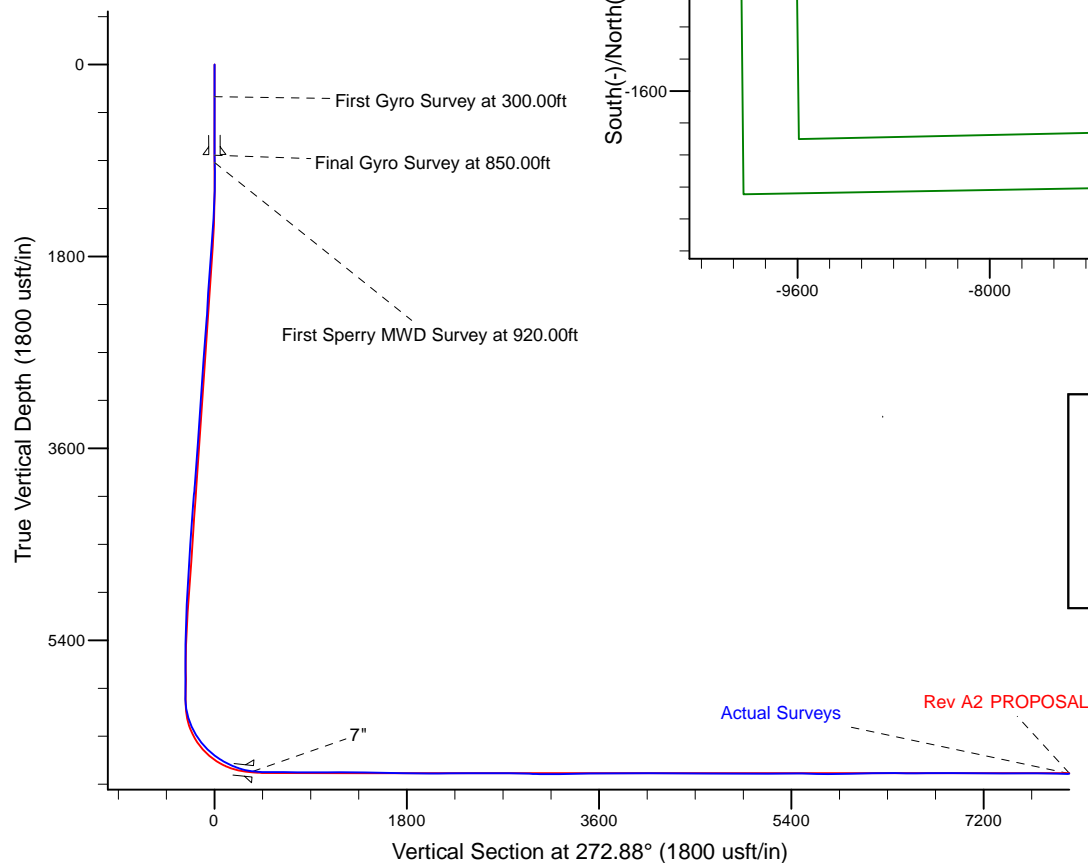
Project: Weld County, CO (NAD 83)
 Site: Sec. 31-T6N-R63W (Wells Ranch State A36)
 Well: Wells Ranch State A36-655
 Wellbore: Plan A
 Design: Actual Surveys



Platted SHL: 2323' FSL, 390' FEL
 Platted Lat/Long: 40.4421, -104.471620
 Location: Sec. 31-T6N-R63W

~7" Casing: 2966' FSL, 700' FEL
 Lat/Long: 40.443868 N, -104.472769 W
 State Planes - CO Northern: 1,406,197.39 N, 3,285,903.01 E
 Sec. 31-T6N-R63W

Platted BHL: 2310' FNL, 50' FWL
 Platted Lat/Long: 40.443803 N, 104.507386 W
 State Planes - CO Northern: 1,406,064.06 N, 3,276,269.06 E
 Location: Sec. 36-T6N-R63W



LEGEND

△ Wells Ranch State A36-655, Plan A, Rev A2 PROPOSAL V0

□ Actual Surveys

WELL DETAILS: Wells Ranch State A36-655	
Ground Level:	4656.00
KB = 24' @ 4680.00usft (H&P 273)	
Created By:	Tatiana Gomez
Created On:	7/1/2015

Design Report for Wells Ranch State A36-655 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wells Ranch State A36-655_Rev A0_SHL							
300.00	0.14	198.52	300.00	-0.35	-0.12	0.10	0.05
First Gyro Survey at 300.00ft							
600.00	0.25	198.52	600.00	-1.32	-0.44	0.37	0.04
843.00	0.39	198.52	842.99	-2.59	-0.87	0.74	0.06
9 5/8"							
850.00	0.39	198.52	849.99	-2.64	-0.88	0.75	0.06
Final Gyro Survey at 850.00ft - Tie on to Gyro Survey at 850.00ft							
920.00	0.42	198.52	919.99	-3.11	-1.04	0.88	0.04
First Sperry MWD Survey at 920.00ft							
1,109.00	0.95	166.76	1,108.98	-5.29	-0.90	0.64	0.33
1,200.00	0.62	89.50	1,199.97	-6.02	-0.24	-0.07	1.11
1,292.00	2.68	44.03	1,291.93	-4.47	1.76	-1.98	2.49
1,382.00	4.00	49.19	1,381.78	-0.91	5.59	-5.63	1.50
1,474.00	6.27	37.90	1,473.40	5.16	11.11	-10.84	2.69
1,565.00	7.73	36.31	1,563.72	14.01	17.79	-17.06	1.62
1,657.00	9.87	29.07	1,654.64	25.89	25.28	-23.95	2.61
1,749.00	10.82	31.67	1,745.14	40.13	33.65	-31.59	1.15
1,841.00	9.92	27.03	1,835.64	54.54	41.78	-38.99	1.33
1,932.00	10.77	23.45	1,925.16	69.32	48.73	-45.18	1.17
2,023.00	10.24	18.26	2,014.64	84.80	54.65	-50.31	1.19
2,115.00	10.35	29.58	2,105.16	99.76	61.29	-56.19	2.20
2,207.00	10.96	23.14	2,195.58	114.99	68.81	-62.94	1.45
2,299.00	9.81	15.65	2,286.08	130.58	74.36	-67.70	1.93
2,391.00	11.09	28.33	2,376.56	145.92	80.67	-73.23	2.85
2,482.00	10.38	20.42	2,465.97	161.31	87.69	-79.46	1.80
2,574.00	11.10	29.93	2,556.37	176.75	95.00	-85.99	2.08
2,666.00	10.43	24.13	2,646.75	192.02	102.82	-93.03	1.38
2,757.00	10.38	22.62	2,736.25	207.11	109.34	-98.79	0.30
2,849.00	11.65	32.46	2,826.57	222.60	117.52	-106.17	2.46
2,941.00	10.81	27.40	2,916.81	238.10	126.47	-114.34	1.41
3,036.00	10.54	26.01	3,010.16	253.82	134.38	-121.45	0.39
3,131.00	9.67	21.70	3,103.69	269.04	141.14	-127.43	1.21
3,225.00	10.47	27.26	3,196.24	283.97	147.97	-133.50	1.34
3,320.00	8.58	17.75	3,289.93	298.39	154.09	-138.89	2.58
3,415.00	10.68	25.22	3,383.59	313.11	160.00	-144.05	2.57
3,510.00	11.95	22.55	3,476.75	330.15	167.52	-150.71	1.45
3,604.00	11.55	18.64	3,568.78	348.06	174.26	-156.54	0.95
3,699.00	11.77	18.21	3,661.82	366.27	180.33	-161.68	0.25
3,794.00	12.51	27.19	3,754.70	384.63	188.06	-168.48	2.13
3,889.00	12.72	24.97	3,847.41	403.27	197.18	-176.65	0.56
3,983.00	12.64	23.91	3,939.12	422.05	205.72	-184.23	0.26
4,078.00	10.70	29.76	4,032.15	439.21	214.31	-191.94	2.39
4,173.00	10.02	27.73	4,125.60	454.18	222.53	-199.40	0.81
4,268.00	9.18	28.82	4,219.27	468.14	230.03	-206.19	0.90
4,362.00	10.81	26.77	4,311.84	482.58	237.61	-213.04	1.77
4,457.00	10.35	26.78	4,405.23	498.15	245.47	-220.11	0.48
4,552.00	9.43	27.83	4,498.81	512.65	252.95	-226.85	0.99
4,647.00	8.30	26.53	4,592.68	525.67	259.65	-232.88	1.21

Design Report for Wells Ranch State A36-655 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,741.00	10.18	25.56	4,685.45	539.23	266.26	-238.80	2.01
4,836.00	8.61	24.97	4,779.18	553.25	272.89	-244.71	1.66
4,931.00	10.29	23.08	4,872.88	567.51	279.21	-250.32	1.80
5,025.00	9.48	22.24	4,965.49	582.40	285.44	-255.78	0.88
5,120.00	8.57	19.30	5,059.31	596.32	290.74	-260.38	1.07
5,215.00	7.02	17.42	5,153.43	608.54	294.81	-263.83	1.65
5,309.00	5.62	17.10	5,246.86	618.42	297.89	-266.41	1.49
5,404.00	4.27	19.23	5,341.50	626.21	300.42	-268.54	1.43
5,499.00	3.27	15.24	5,436.29	632.16	302.30	-270.12	1.09
5,594.00	2.53	13.89	5,531.17	636.81	303.51	-271.10	0.78
5,688.00	1.79	16.76	5,625.10	640.23	304.43	-271.85	0.80
5,783.00	1.46	7.85	5,720.07	642.85	305.03	-272.31	0.44
5,877.00	1.13	351.01	5,814.04	644.95	305.05	-272.22	0.53
5,972.00	1.18	6.38	5,909.02	646.85	305.01	-272.09	0.33
6,067.00	3.99	280.43	6,003.94	648.42	301.87	-268.87	4.29
6,162.00	13.41	264.49	6,097.75	647.96	287.62	-254.66	10.14
6,256.00	23.91	265.67	6,186.68	645.47	257.69	-224.90	11.18
6,351.00	30.56	268.50	6,271.11	643.38	214.30	-181.67	7.13
6,446.00	36.29	270.09	6,350.36	642.79	162.00	-129.46	6.10
6,541.00	46.23	270.96	6,421.69	643.41	99.43	-66.94	10.48
6,635.00	53.22	273.02	6,482.42	645.97	27.81	4.72	7.62
6,730.00	59.61	272.04	6,534.95	649.43	-51.21	83.81	6.78
6,825.00	66.89	268.62	6,577.69	649.84	-135.97	168.48	8.31
6,920.00	73.60	266.58	6,609.78	646.06	-225.24	257.45	7.35
6,978.00	80.88	266.50	6,622.58	642.65	-281.67	313.64	12.55
7,024.00	83.85	267.60	6,628.69	640.31	-327.20	358.99	6.88
7"							
7,060.00	86.18	268.45	6,631.82	639.07	-363.04	394.72	6.88
7,155.00	89.38	270.06	6,635.50	637.84	-457.94	489.44	3.77
7,250.00	90.37	269.66	6,635.71	637.61	-552.94	584.31	1.12
7,344.00	88.68	271.13	6,636.49	638.25	-646.93	678.21	2.38
7,439.00	89.69	271.61	6,637.84	640.53	-741.89	773.17	1.18
7,534.00	89.94	271.22	6,638.15	642.87	-836.86	868.14	0.49
7,629.00	90.74	271.22	6,637.58	644.89	-931.84	963.09	0.84
7,723.00	89.41	271.13	6,637.46	646.82	-1,025.81	1,057.05	1.42
7,818.00	90.28	271.94	6,637.72	649.37	-1,120.78	1,152.02	1.25
7,913.00	90.55	271.53	6,637.03	652.24	-1,215.73	1,247.00	0.52
8,008.00	89.45	271.89	6,637.03	655.08	-1,310.69	1,341.98	1.22
8,103.00	88.31	271.02	6,638.88	657.49	-1,405.64	1,436.93	1.51
8,197.00	88.68	270.77	6,641.35	658.96	-1,499.59	1,530.84	0.47
8,387.00	89.17	270.33	6,644.92	660.78	-1,689.55	1,720.65	0.35
8,482.00	89.26	269.71	6,646.22	660.81	-1,784.54	1,815.52	0.66
8,576.00	89.45	268.18	6,647.28	659.08	-1,878.51	1,909.29	1.64
8,671.00	89.69	267.88	6,647.99	655.82	-1,973.46	2,003.94	0.40
8,766.00	90.22	267.04	6,648.07	651.61	-2,068.36	2,098.52	1.05
8,861.00	90.68	266.10	6,647.32	645.92	-2,163.19	2,192.94	1.10
8,955.00	90.09	267.55	6,646.69	640.72	-2,257.04	2,286.41	1.67
9,050.00	89.97	267.81	6,646.64	636.87	-2,351.96	2,381.02	0.30
9,145.00	90.89	267.25	6,645.93	632.78	-2,446.87	2,475.60	1.13
9,239.00	90.12	269.38	6,645.10	630.01	-2,540.82	2,569.29	2.41
9,334.00	89.69	268.88	6,645.25	628.57	-2,635.80	2,664.08	0.69

Design Report for Wells Ranch State A36-655 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,429.00	89.08	267.72	6,646.27	625.75	-2,730.76	2,758.77	1.38
9,524.00	88.74	269.76	6,648.08	623.67	-2,825.71	2,853.50	2.18
9,618.00	87.72	267.63	6,650.98	621.53	-2,919.63	2,947.20	2.51
9,713.00	89.11	269.48	6,653.61	619.13	-3,014.56	3,041.89	2.44
9,808.00	89.82	268.75	6,654.50	617.66	-3,109.54	3,136.68	1.07
9,903.00	89.94	268.21	6,654.70	615.14	-3,204.51	3,231.39	0.58
9,998.00	90.18	267.89	6,654.60	611.91	-3,299.46	3,326.06	0.42
10,092.00	91.72	269.71	6,653.04	609.94	-3,393.42	3,419.80	2.54
10,187.00	93.23	270.17	6,648.94	609.84	-3,488.32	3,514.58	1.66
10,282.00	91.23	271.67	6,645.24	611.37	-3,583.23	3,609.45	2.63
10,376.00	89.69	271.49	6,644.49	613.96	-3,677.19	3,703.42	1.65
10,471.00	90.49	271.07	6,644.34	616.08	-3,772.17	3,798.38	0.95
10,566.00	88.80	270.33	6,644.93	617.24	-3,867.15	3,893.30	1.94
10,661.00	89.26	269.30	6,646.53	616.94	-3,962.14	3,988.15	1.19
10,755.00	90.77	268.87	6,646.51	615.44	-4,056.12	4,081.94	1.67
10,850.00	89.05	269.84	6,646.66	614.37	-4,151.11	4,176.76	2.08
10,941.00	89.41	270.20	6,647.88	614.40	-4,242.10	4,267.64	0.56
11,124.00	89.88	269.45	6,649.02	613.84	-4,425.10	4,450.37	0.48
11,215.00	89.14	269.89	6,649.79	613.32	-4,516.09	4,541.22	0.95
11,306.00	89.88	270.15	6,650.57	613.35	-4,607.09	4,632.10	0.86
11,398.00	90.55	270.43	6,650.23	613.81	-4,699.08	4,724.01	0.79
11,490.00	89.88	269.13	6,649.88	613.46	-4,791.08	4,815.87	1.59
11,582.00	89.82	268.25	6,650.12	611.36	-4,883.05	4,907.62	0.96
11,673.00	90.28	267.94	6,650.04	608.33	-4,974.00	4,998.31	0.61
11,764.00	91.26	267.78	6,648.82	604.93	-5,064.93	5,088.95	1.09
11,856.00	89.66	268.08	6,648.08	601.61	-5,156.87	5,180.60	1.77
11,948.00	89.54	268.52	6,648.72	598.88	-5,248.82	5,272.30	0.50
12,040.00	90.49	267.73	6,648.70	595.87	-5,340.77	5,363.98	1.34
12,132.00	89.35	268.87	6,648.83	593.14	-5,432.73	5,455.68	1.75
12,224.00	88.34	268.57	6,650.68	591.09	-5,524.68	5,547.42	1.15
12,315.00	88.98	268.54	6,652.81	588.79	-5,615.63	5,638.14	0.70
12,407.00	90.09	268.37	6,653.56	586.31	-5,707.59	5,729.86	1.22
12,498.00	90.46	268.03	6,653.12	583.45	-5,798.55	5,820.55	0.55
12,590.00	91.54	267.63	6,651.52	579.97	-5,890.46	5,912.18	1.25
12,682.00	91.26	268.39	6,649.27	576.78	-5,982.38	6,003.82	0.88
12,777.00	91.05	269.24	6,647.35	574.81	-6,077.34	6,098.56	0.92
12,871.00	90.77	269.48	6,645.86	573.76	-6,171.32	6,192.37	0.39
12,966.00	89.63	268.55	6,645.53	572.13	-6,266.31	6,287.15	1.55
13,061.00	89.82	267.63	6,645.98	568.96	-6,361.25	6,381.82	0.99
13,155.00	89.85	267.21	6,646.25	564.73	-6,455.15	6,475.39	0.45
13,250.00	90.43	266.82	6,646.02	559.79	-6,550.02	6,569.89	0.74
13,345.00	89.63	268.39	6,645.97	555.82	-6,644.94	6,664.48	1.85
13,440.00	89.60	269.91	6,646.61	554.41	-6,739.92	6,759.28	1.60
13,534.00	90.43	269.85	6,646.59	554.21	-6,833.92	6,853.15	0.89
13,629.00	91.26	269.32	6,645.19	553.52	-6,928.91	6,947.98	1.04
13,724.00	90.12	269.76	6,644.04	552.76	-7,023.90	7,042.81	1.29
13,818.00	88.58	270.40	6,645.11	552.89	-7,117.89	7,136.69	1.77
13,913.00	88.95	269.84	6,647.16	553.09	-7,212.86	7,231.55	0.71
14,007.00	89.60	269.92	6,648.35	552.89	-7,306.86	7,325.42	0.70
14,102.00	90.06	269.05	6,648.63	552.04	-7,401.85	7,420.25	1.04
14,197.00	90.46	268.31	6,648.20	549.85	-7,496.82	7,514.99	0.89

Design Report for Wells Ranch State A36-655 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
14,292.00	91.26	268.06	6,646.77	546.84	-7,591.76	7,609.66	0.88
14,386.00	89.29	268.29	6,646.32	543.85	-7,685.71	7,703.34	2.11
14,481.00	88.52	268.36	6,648.13	541.07	-7,780.65	7,798.02	0.81
14,576.00	88.89	268.76	6,650.28	538.69	-7,875.60	7,892.72	0.57
14,671.00	89.72	268.54	6,651.43	536.45	-7,970.56	7,987.46	0.90
14,765.00	90.37	268.38	6,651.36	533.92	-8,064.53	8,081.18	0.71
14,860.00	91.17	268.12	6,650.08	531.02	-8,159.47	8,175.86	0.89
14,955.00	90.80	269.12	6,648.45	528.73	-8,254.43	8,270.58	1.12
15,050.00	89.69	269.98	6,648.04	527.99	-8,349.43	8,365.41	1.48
15,143.00	90.49	269.22	6,647.90	527.34	-8,442.42	8,458.26	1.19
15,238.00	89.11	270.93	6,648.23	527.46	-8,537.42	8,553.14	2.31
15,333.00	89.08	271.58	6,649.73	529.54	-8,632.38	8,648.09	0.68
15,428.00	89.38	270.96	6,651.01	531.65	-8,727.35	8,743.04	0.72
15,522.00	89.69	270.44	6,651.77	532.80	-8,821.34	8,836.97	0.64
15,617.00	90.18	270.18	6,651.88	533.31	-8,916.34	8,931.87	0.58
15,712.00	90.34	269.46	6,651.45	533.02	-9,011.33	9,026.74	0.78
15,807.00	91.05	269.55	6,650.29	532.20	-9,106.32	9,121.56	0.75
15,902.00	90.77	269.86	6,648.78	531.71	-9,201.31	9,216.41	0.44
15,996.00	89.69	269.54	6,648.41	531.21	-9,295.30	9,310.26	1.20
16,101.00	89.78	268.69	6,648.89	529.59	-9,400.29	9,415.03	0.81
16,196.00	89.94	269.11	6,649.13	527.77	-9,495.27	9,509.80	0.47
16,290.00	90.37	268.09	6,648.87	525.47	-9,589.24	9,603.53	1.18
16,385.00	91.08	267.44	6,647.67	521.77	-9,684.16	9,698.15	1.01
16,480.00	92.10	267.10	6,645.03	517.25	-9,779.02	9,792.65	1.13
16,575.00	92.87	266.71	6,640.91	512.12	-9,873.79	9,887.05	0.91
16,663.00	93.23	266.57	6,636.23	506.97	-9,961.51	9,974.40	0.44
Final Sperry MWD Survey at 16663.00ft							
16,725.39	93.23	266.57	6,632.72	503.24	-10,023.69	10,036.32	0.00
Wells Ranch State A36-655_Rev A0_BHL							
16,729.34	93.23	266.57	6,632.49	503.01	-10,027.62	10,040.23	0.00
Wells Ranch State A36-655_Rev A1_BHL							
16,730.00	93.23	266.57	6,632.46	502.97	-10,028.28	10,040.89	0.00
Straight Line Projection to TD at 16730.00ft - Wells Ranch State A36-655_Rev A2_BHL							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
300.00	300.00	-0.35	-0.12	First Gyro Survey at 300.00ft
850.00	849.99	-2.64	-0.88	Final Gyro Survey at 850.00ft
850.00	849.99	-2.64	-0.88	Tie on to Gyro Survey at 850.00ft
920.00	919.99	-3.11	-1.04	First Sperry MWD Survey at 920.00ft
16,663.00	6,636.23	506.97	-9,961.51	Final Sperry MWD Survey at 16663.00ft
16,730.00	6,632.46	502.97	-10,028.28	Straight Line Projection to TD at 16730.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Wells Ranch State A36-655_Rev A2_BHL	272.88	Slot	0.00	0.00	0.00

Design Report for Wells Ranch State A36-655 - Actual Surveys

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
300.00	850.00	Gyro Surveys	Flexi-Shot
920.00	6,978.00	Intermediate Surveys	MWD
7,060.00	16,730.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
843.00	842.99	9 5/8"	9-5/8	13-3/4
7,024.00	6,628.69	7"	7	8-3/4

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Wells Ranch State A36 - actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	0.01	0.00	1,405,557.12	3,286,230.20	40.442100	-104.471620
Wells Ranch State A36 - actual wellpath misses target center by 12.79usft at 16730.00usft MD (6632.46 TVD, 502.97 N, -10028.28 E) - Point	0.00	0.00	6,645.00	505.10	-10,029.59	1,406,062.19	3,276,200.99	40.443800	-104.507630
Wells Ranch State A36 - actual wellpath misses target center by 32.63usft at 16729.34usft MD (6632.49 TVD, 503.01 N, -10027.62 E) - Point	0.00	0.00	6,665.00	505.10	-10,029.59	1,406,062.19	3,276,200.99	40.443800	-104.507630
Wells Ranch State A36 - actual wellpath misses target center by 102.47usft at 16725.39usft MD (6632.72 TVD, 503.24 N, -10023.69 E) - Circle (radius 100.00)	0.00	0.00	6,735.00	505.10	-10,029.59	1,406,062.19	3,276,200.99	40.443800	-104.507630

Directional Difficulty Index

Average Dogleg over Survey:	1.59 °/100usft	Maximum Dogleg over Survey:	12.55 °/100usft at 6,978.00 usft
Net Tortousity applicable to Plans:	0.93 °/100usft	Directional Difficulty Index:	6.870

Audit Info

North Reference Sheet for Sec. 31-T6N-R63W (Wells Ranch State A36) - Wells Ranch State A36-655 - Plan A

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

Vertical Depths are relative to KB = 24' @ 4680.00usft (H&P 273). Northing and Easting are relative to Wells Ranch State A36-655

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 -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996241

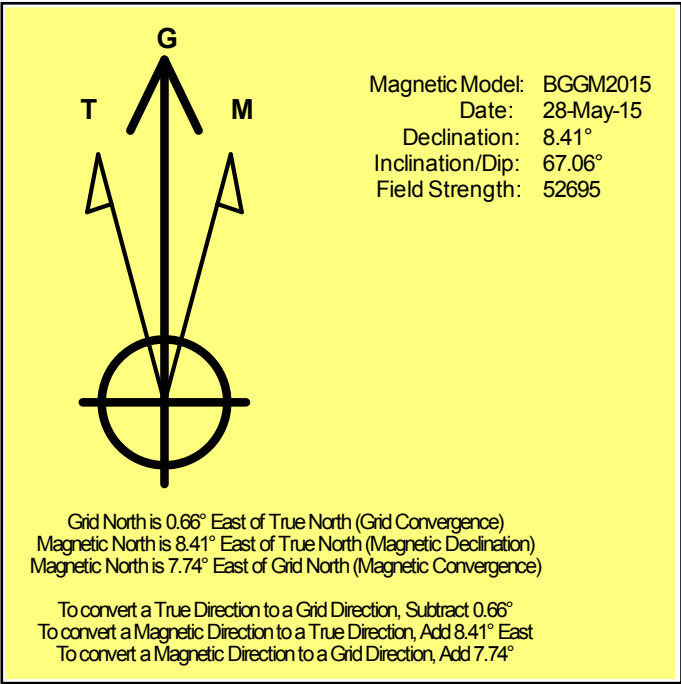
Grid Coordinates of Well: 1,405,557.11 usft N, 3,286,230.20 usft E

Geographical Coordinates of Well: 40° 26' 31.56" N, 104° 28' 17.83" W

Grid Convergence at Surface is: 0.66°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,730.00usft the Bottom Hole Displacement is 10,040.89usft in the Direction of 272.87° (Grid).

Magnetic Convergence at surface is: -7.74° (28 May 2015, , BGGM2015)



Noble Energy

Weld County, CO (NAD 83)

Sec. 31-T6N-R63W (Wells Ranch State A36)

Wells Ranch State A36-655

Plan A

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

01 July, 2015

Well Coordinates: 1,405,557.11 N, 3,286,230.20 E (40° 26' 31.56" N, 104° 28' 17.83" W)

Ground Level: 4,656.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well Wells Ranch State A36-655

KB = 24' @ 4680.00usft (H&P 273)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for Wells Ranch State A36-655 - Actual Surveys

Measured			Vertical			Local Coordinates		Geographic Coordinates		UTM Coordinates	
Depth (usft)	Inclination (°)	Azimuth (°)	Depth (usft)	+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.442100	-104.471620	40.442100	-104.471620	1,405,557.11	3,286,230.20
300.00	0.14	198.52	300.00	-0.35	-0.12	40.442099	-104.471621	40.442099	-104.471621	1,405,556.76	3,286,230.08
600.00	0.25	198.52	600.00	-1.32	-0.44	40.442096	-104.471622	40.442096	-104.471622	1,405,555.79	3,286,229.76
843.00	0.39	198.52	842.99	-2.59	-0.87	40.442093	-104.471623	40.442093	-104.471623	1,405,554.51	3,286,229.33
850.00	0.39	198.52	849.99	-2.64	-0.88	40.442093	-104.471624	40.442093	-104.471624	1,405,554.47	3,286,229.31
920.00	0.42	198.52	919.99	-3.11	-1.04	40.442092	-104.471624	40.442092	-104.471624	1,405,554.00	3,286,229.16
1,109.00	0.95	166.76	1,108.98	-5.29	-0.90	40.442086	-104.471624	40.442086	-104.471624	1,405,551.82	3,286,229.30
1,200.00	0.62	89.50	1,199.97	-6.02	-0.24	40.442084	-104.471621	40.442084	-104.471621	1,405,551.09	3,286,229.96
1,292.00	2.68	44.03	1,291.93	-4.47	1.76	40.442088	-104.471614	40.442088	-104.471614	1,405,552.64	3,286,231.95
1,382.00	4.00	49.19	1,381.78	-0.91	5.59	40.442097	-104.471600	40.442097	-104.471600	1,405,556.20	3,286,235.79
1,474.00	6.27	37.90	1,473.40	5.16	11.11	40.442114	-104.471580	40.442114	-104.471580	1,405,562.26	3,286,241.31
1,565.00	7.73	36.31	1,563.72	14.01	17.79	40.442138	-104.471556	40.442138	-104.471556	1,405,571.12	3,286,247.98
1,657.00	9.87	29.07	1,654.64	25.89	25.28	40.442170	-104.471528	40.442170	-104.471528	1,405,583.00	3,286,255.48
1,749.00	10.82	31.67	1,745.14	40.13	33.65	40.442209	-104.471498	40.442209	-104.471498	1,405,597.24	3,286,263.84
1,841.00	9.92	27.03	1,835.64	54.54	41.78	40.442248	-104.471468	40.442248	-104.471468	1,405,611.65	3,286,271.98
1,932.00	10.77	23.45	1,925.16	69.32	48.73	40.442289	-104.471442	40.442289	-104.471442	1,405,626.43	3,286,278.93
2,023.00	10.24	18.26	2,014.64	84.80	54.65	40.442331	-104.471420	40.442331	-104.471420	1,405,641.91	3,286,284.84
2,115.00	10.35	29.58	2,105.16	99.76	61.29	40.442372	-104.471396	40.442372	-104.471396	1,405,656.86	3,286,291.49
2,207.00	10.96	23.14	2,195.58	114.99	68.81	40.442413	-104.471368	40.442413	-104.471368	1,405,672.09	3,286,299.00
2,299.00	9.81	15.65	2,286.08	130.58	74.36	40.442456	-104.471348	40.442456	-104.471348	1,405,687.68	3,286,304.55
2,391.00	11.09	28.33	2,376.56	145.92	80.67	40.442498	-104.471324	40.442498	-104.471324	1,405,703.02	3,286,310.87
2,482.00	10.38	20.42	2,465.97	161.31	87.69	40.442540	-104.471299	40.442540	-104.471299	1,405,718.41	3,286,317.88
2,574.00	11.10	29.93	2,556.37	176.75	95.00	40.442582	-104.471272	40.442582	-104.471272	1,405,733.85	3,286,325.19
2,666.00	10.43	24.13	2,646.75	192.02	102.82	40.442624	-104.471243	40.442624	-104.471243	1,405,749.12	3,286,333.02
2,757.00	10.38	22.62	2,736.25	207.11	109.34	40.442665	-104.471219	40.442665	-104.471219	1,405,764.21	3,286,339.54
2,849.00	11.65	32.46	2,826.57	222.60	117.52	40.442707	-104.471189	40.442707	-104.471189	1,405,779.70	3,286,347.71
2,941.00	10.81	27.40	2,916.81	238.10	126.47	40.442750	-104.471156	40.442750	-104.471156	1,405,795.20	3,286,356.67
3,036.00	10.54	26.01	3,010.16	253.82	134.38	40.442792	-104.471127	40.442792	-104.471127	1,405,810.91	3,286,364.58
3,131.00	9.67	21.70	3,103.69	269.04	141.14	40.442834	-104.471102	40.442834	-104.471102	1,405,826.14	3,286,371.34
3,225.00	10.47	27.26	3,196.24	283.97	147.97	40.442875	-104.471077	40.442875	-104.471077	1,405,841.06	3,286,378.17
3,320.00	8.58	17.75	3,289.93	298.39	154.09	40.442914	-104.471054	40.442914	-104.471054	1,405,855.49	3,286,384.28
3,415.00	10.68	25.22	3,383.59	313.11	160.00	40.442954	-104.471032	40.442954	-104.471032	1,405,870.20	3,286,390.19
3,510.00	11.95	22.55	3,476.75	330.15	167.52	40.443001	-104.471005	40.443001	-104.471005	1,405,887.25	3,286,397.72
3,604.00	11.55	18.64	3,568.78	348.06	174.26	40.443050	-104.470980	40.443050	-104.470980	1,405,905.15	3,286,404.46
3,699.00	11.77	18.21	3,661.82	366.27	180.33	40.443100	-104.470957	40.443100	-104.470957	1,405,923.37	3,286,410.52
3,794.00	12.51	27.19	3,754.70	384.63	188.06	40.443150	-104.470929	40.443150	-104.470929	1,405,941.73	3,286,418.25
3,889.00	12.72	24.97	3,847.41	403.27	197.18	40.443201	-104.470895	40.443201	-104.470895	1,405,960.36	3,286,427.37
3,983.00	12.64	23.91	3,939.12	422.05	205.72	40.443252	-104.470864	40.443252	-104.470864	1,405,979.14	3,286,435.91
4,078.00	10.70	29.76	4,032.15	439.21	214.31	40.443299	-104.470832	40.443299	-104.470832	1,405,996.30	3,286,444.50
4,173.00	10.02	27.73	4,125.60	454.18	222.53	40.443340	-104.470802	40.443340	-104.470802	1,406,011.27	3,286,452.72
4,268.00	9.18	28.82	4,219.27	468.14	230.03	40.443378	-104.470774	40.443378	-104.470774	1,406,025.23	3,286,460.22
4,362.00	10.81	26.77	4,311.84	482.58	237.61	40.443417	-104.470747	40.443417	-104.470747	1,406,039.67	3,286,467.80

Design Report for Wells Ranch State A36-655 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
4,457.00	10.35	26.78	4,405.23	498.15	245.47	40.443460	-104.470718	1,406,055.24	3,286,475.66
4,552.00	9.43	27.83	4,498.81	512.65	252.95	40.443499	-104.470690	1,406,069.74	3,286,483.14
4,647.00	8.30	26.53	4,592.68	525.67	259.65	40.443535	-104.470666	1,406,082.76	3,286,489.84
4,741.00	10.18	25.56	4,685.45	539.23	266.26	40.443572	-104.470641	1,406,096.32	3,286,496.45
4,836.00	8.61	24.97	4,779.18	553.25	272.89	40.443610	-104.470617	1,406,110.34	3,286,503.07
4,931.00	10.29	23.08	4,872.88	567.51	279.21	40.443649	-104.470594	1,406,124.59	3,286,509.40
5,025.00	9.48	22.24	4,965.49	582.40	285.44	40.443689	-104.470571	1,406,139.48	3,286,515.62
5,120.00	8.57	19.30	5,059.31	596.32	290.74	40.443728	-104.470551	1,406,153.40	3,286,520.92
5,215.00	7.02	17.42	5,153.43	608.54	294.81	40.443761	-104.470536	1,406,165.62	3,286,525.00
5,309.00	5.62	17.10	5,246.86	618.42	297.89	40.443788	-104.470524	1,406,175.50	3,286,528.07
5,404.00	4.27	19.23	5,341.50	626.21	300.42	40.443809	-104.470515	1,406,183.29	3,286,530.61
5,499.00	3.27	15.24	5,436.29	632.16	302.30	40.443826	-104.470508	1,406,189.24	3,286,532.48
5,594.00	2.53	13.89	5,531.17	636.81	303.51	40.443838	-104.470503	1,406,193.89	3,286,533.70
5,688.00	1.79	16.76	5,625.10	640.23	304.43	40.443848	-104.470500	1,406,197.31	3,286,534.62
5,783.00	1.46	7.85	5,720.07	642.85	305.03	40.443855	-104.470498	1,406,199.93	3,286,535.21
5,877.00	1.13	351.01	5,814.04	644.95	305.05	40.443861	-104.470498	1,406,202.03	3,286,535.23
5,972.00	1.18	6.38	5,909.02	646.85	305.01	40.443866	-104.470498	1,406,203.93	3,286,535.20
6,067.00	3.99	280.43	6,003.94	648.42	301.87	40.443870	-104.470509	1,406,205.50	3,286,532.05
6,162.00	13.41	264.49	6,097.75	647.96	287.62	40.443869	-104.470560	1,406,205.04	3,286,517.80
6,256.00	23.91	265.67	6,186.68	645.47	257.69	40.443863	-104.470668	1,406,202.55	3,286,487.88
6,351.00	30.56	268.50	6,271.11	643.38	214.30	40.443859	-104.470824	1,406,200.46	3,286,444.49
6,446.00	36.29	270.09	6,350.36	642.79	162.00	40.443859	-104.471012	1,406,199.87	3,286,392.19
6,541.00	46.23	270.96	6,421.69	643.41	99.43	40.443863	-104.471236	1,406,200.49	3,286,329.62
6,635.00	53.22	273.02	6,482.42	645.97	27.81	40.443872	-104.471493	1,406,203.05	3,286,258.01
6,730.00	59.61	272.04	6,534.95	649.43	-51.21	40.443884	-104.471777	1,406,206.52	3,286,178.99
6,825.00	66.89	268.62	6,577.69	649.84	-135.97	40.443888	-104.472082	1,406,206.92	3,286,094.23
6,920.00	73.60	266.58	6,609.78	646.06	-225.24	40.443880	-104.472403	1,406,203.15	3,286,004.96
6,978.00	80.88	266.50	6,622.58	642.65	-281.67	40.443873	-104.472605	1,406,199.74	3,285,948.54
7,024.00	83.85	267.60	6,628.69	640.31	-327.20	40.443868	-104.472769	1,406,197.39	3,285,903.01
7,060.00	86.18	268.45	6,631.82	639.07	-363.04	40.443866	-104.472898	1,406,196.15	3,285,867.18
7,155.00	89.38	270.06	6,635.50	637.84	-457.94	40.443865	-104.473239	1,406,194.92	3,285,772.27
7,250.00	90.37	269.66	6,635.71	637.61	-552.94	40.443868	-104.473580	1,406,194.69	3,285,677.28
7,344.00	88.68	271.13	6,636.49	638.25	-646.93	40.443872	-104.473918	1,406,195.34	3,285,583.30
7,439.00	89.69	271.61	6,637.84	640.53	-741.89	40.443882	-104.474259	1,406,197.61	3,285,488.34
7,534.00	89.94	271.22	6,638.15	642.87	-836.86	40.443891	-104.474600	1,406,199.95	3,285,393.37
7,629.00	90.74	271.22	6,637.58	644.89	-931.84	40.443900	-104.474941	1,406,201.98	3,285,298.40
7,723.00	89.41	271.13	6,637.46	646.82	-1,025.81	40.443908	-104.475279	1,406,203.90	3,285,204.42
7,818.00	90.28	271.94	6,637.72	649.37	-1,120.78	40.443918	-104.475620	1,406,206.45	3,285,109.46
7,913.00	90.55	271.53	6,637.03	652.24	-1,215.73	40.443929	-104.475961	1,406,209.33	3,285,014.51
8,008.00	89.45	271.89	6,637.03	655.08	-1,310.69	40.443940	-104.476302	1,406,212.16	3,284,919.56
8,103.00	88.31	271.02	6,638.88	657.49	-1,405.64	40.443949	-104.476643	1,406,214.57	3,284,824.62
8,197.00	88.68	270.77	6,641.35	658.96	-1,499.59	40.443956	-104.476980	1,406,216.04	3,284,730.66

Design Report for Wells Ranch State A36-655 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
8,387.00	89.17	270.33	6,644.92	660.78	-1,689.55	40.443967	-104.477662	1,406,217.86	3,284,540.71
8,482.00	89.26	269.71	6,646.22	660.81	-1,784.54	40.443970	-104.478004	1,406,217.90	3,284,445.73
8,576.00	89.45	268.18	6,647.28	659.08	-1,878.51	40.443969	-104.478341	1,406,216.17	3,284,351.75
8,671.00	89.69	267.88	6,647.99	655.82	-1,973.46	40.443963	-104.478683	1,406,212.90	3,284,256.82
8,766.00	90.22	267.04	6,648.07	651.61	-2,068.36	40.443954	-104.479024	1,406,208.69	3,284,161.92
8,861.00	90.68	266.10	6,647.32	645.92	-2,163.19	40.443942	-104.479365	1,406,203.01	3,284,067.09
8,955.00	90.09	267.55	6,646.69	640.72	-2,257.04	40.443930	-104.479702	1,406,197.80	3,283,973.25
9,050.00	89.97	267.81	6,646.64	636.87	-2,351.96	40.443923	-104.480043	1,406,193.96	3,283,878.33
9,145.00	90.89	267.25	6,645.93	632.78	-2,446.87	40.443914	-104.480384	1,406,189.86	3,283,783.42
9,239.00	90.12	269.38	6,645.10	630.01	-2,540.82	40.443910	-104.480722	1,406,187.10	3,283,689.48
9,334.00	89.69	268.88	6,645.25	628.57	-2,635.80	40.443909	-104.481063	1,406,185.66	3,283,594.49
9,429.00	89.08	267.72	6,646.27	625.75	-2,730.76	40.443904	-104.481404	1,406,182.84	3,283,499.55
9,524.00	88.74	269.76	6,648.08	623.67	-2,825.71	40.443901	-104.481746	1,406,180.75	3,283,404.59
9,618.00	87.72	267.63	6,650.98	621.53	-2,919.63	40.443898	-104.482083	1,406,178.61	3,283,310.67
9,713.00	89.11	269.48	6,653.61	619.13	-3,014.56	40.443895	-104.482424	1,406,176.22	3,283,215.75
9,808.00	89.82	268.75	6,654.50	617.66	-3,109.54	40.443894	-104.482766	1,406,174.75	3,283,120.77
9,903.00	89.94	268.21	6,654.70	615.14	-3,204.51	40.443890	-104.483107	1,406,172.23	3,283,025.81
9,998.00	90.18	267.89	6,654.60	611.91	-3,299.46	40.443884	-104.483448	1,406,169.00	3,282,930.87
10,092.00	91.72	269.71	6,653.04	609.94	-3,393.42	40.443882	-104.483786	1,406,167.03	3,282,836.91
10,187.00	93.23	270.17	6,648.94	609.84	-3,488.32	40.443884	-104.484127	1,406,166.93	3,282,742.01
10,282.00	91.23	271.67	6,645.24	611.37	-3,583.23	40.443891	-104.484467	1,406,168.45	3,282,647.10
10,376.00	89.69	271.49	6,644.49	613.96	-3,677.19	40.443902	-104.484805	1,406,171.05	3,282,553.15
10,471.00	90.49	271.07	6,644.34	616.08	-3,772.17	40.443910	-104.485146	1,406,173.17	3,282,458.17
10,566.00	88.80	270.33	6,644.93	617.24	-3,867.15	40.443916	-104.485487	1,406,174.33	3,282,363.19
10,661.00	89.26	269.30	6,646.53	616.94	-3,962.14	40.443919	-104.485828	1,406,174.02	3,282,268.21
10,755.00	90.77	268.87	6,646.51	615.44	-4,056.12	40.443917	-104.486166	1,406,172.52	3,282,174.23
10,850.00	89.05	269.84	6,646.66	614.37	-4,151.11	40.443918	-104.486507	1,406,171.45	3,282,079.24
10,941.00	89.41	270.20	6,647.88	614.40	-4,242.10	40.443920	-104.486834	1,406,171.48	3,281,988.26
11,124.00	89.88	269.45	6,649.02	613.84	-4,425.10	40.443925	-104.487492	1,406,170.92	3,281,805.27
11,215.00	89.14	269.89	6,649.79	613.32	-4,516.09	40.443926	-104.487819	1,406,170.40	3,281,714.28
11,306.00	89.88	270.15	6,650.57	613.35	-4,607.09	40.443929	-104.488146	1,406,170.43	3,281,623.29
11,398.00	90.55	270.43	6,650.23	613.81	-4,699.08	40.443933	-104.488476	1,406,170.90	3,281,531.29
11,490.00	89.88	269.13	6,649.88	613.46	-4,791.08	40.443935	-104.488807	1,406,170.54	3,281,439.30
11,582.00	89.82	268.25	6,650.12	611.36	-4,883.05	40.443932	-104.489137	1,406,168.44	3,281,347.33
11,673.00	90.28	267.94	6,650.04	608.33	-4,974.00	40.443927	-104.489464	1,406,165.42	3,281,256.38
11,764.00	91.26	267.78	6,648.82	604.93	-5,064.93	40.443920	-104.489791	1,406,162.02	3,281,165.46
11,856.00	89.66	268.08	6,648.08	601.61	-5,156.87	40.443914	-104.490121	1,406,158.70	3,281,073.53
11,948.00	89.54	268.52	6,648.72	598.88	-5,248.82	40.443909	-104.490452	1,406,155.97	3,280,981.57
12,040.00	90.49	267.73	6,648.70	595.87	-5,340.77	40.443904	-104.490782	1,406,152.96	3,280,889.63
12,132.00	89.35	268.87	6,648.83	593.14	-5,432.73	40.443899	-104.491113	1,406,150.23	3,280,797.67
12,224.00	88.34	268.57	6,650.68	591.09	-5,524.68	40.443897	-104.491443	1,406,148.17	3,280,705.72
12,315.00	88.98	268.54	6,652.81	588.79	-5,615.63	40.443893	-104.491770	1,406,145.88	3,280,614.78

Design Report for Wells Ranch State A36-655 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
12,407.00	90.09	268.37	6,653.56	586.31	-5,707.59	40.443889	-104.492100	1,406,143.40	3,280,522.82
12,498.00	90.46	268.03	6,653.12	583.45	-5,798.55	40.443884	-104.492427	1,406,140.54	3,280,431.87
12,590.00	91.54	267.63	6,651.52	579.97	-5,890.46	40.443877	-104.492757	1,406,137.06	3,280,339.96
12,682.00	91.26	268.39	6,649.27	576.78	-5,982.38	40.443872	-104.493088	1,406,133.86	3,280,248.04
12,777.00	91.05	269.24	6,647.35	574.81	-6,077.34	40.443869	-104.493429	1,406,131.90	3,280,153.09
12,871.00	90.77	269.48	6,645.86	573.76	-6,171.32	40.443869	-104.493767	1,406,130.85	3,280,059.11
12,966.00	89.63	268.55	6,645.53	572.13	-6,266.31	40.443868	-104.494108	1,406,129.22	3,279,964.13
13,061.00	89.82	267.63	6,645.98	568.96	-6,361.25	40.443862	-104.494449	1,406,126.05	3,279,869.19
13,155.00	89.85	267.21	6,646.25	564.73	-6,455.15	40.443853	-104.494787	1,406,121.82	3,279,775.29
13,250.00	90.43	266.82	6,646.02	559.79	-6,550.02	40.443843	-104.495128	1,406,116.87	3,279,680.42
13,345.00	89.63	268.39	6,645.97	555.82	-6,644.94	40.443835	-104.495469	1,406,112.90	3,279,585.51
13,440.00	89.60	269.91	6,646.61	554.41	-6,739.92	40.443834	-104.495810	1,406,111.49	3,279,490.53
13,534.00	90.43	269.85	6,646.59	554.21	-6,833.92	40.443836	-104.496148	1,406,111.30	3,279,396.53
13,629.00	91.26	269.32	6,645.19	553.52	-6,928.91	40.443837	-104.496489	1,406,110.61	3,279,301.55
13,724.00	90.12	269.76	6,644.04	552.76	-7,023.90	40.443838	-104.496830	1,406,109.85	3,279,206.57
13,818.00	88.58	270.40	6,645.11	552.89	-7,117.89	40.443841	-104.497168	1,406,109.98	3,279,112.58
13,913.00	88.95	269.84	6,647.16	553.09	-7,212.86	40.443845	-104.497509	1,406,110.18	3,279,017.61
14,007.00	89.60	269.92	6,648.35	552.89	-7,306.86	40.443847	-104.497847	1,406,109.98	3,278,923.62
14,102.00	90.06	269.05	6,648.63	552.04	-7,401.85	40.443848	-104.498188	1,406,109.13	3,278,828.63
14,197.00	90.46	268.31	6,648.20	549.85	-7,496.82	40.443845	-104.498530	1,406,106.94	3,278,733.66
14,292.00	91.26	268.06	6,646.77	546.84	-7,591.76	40.443839	-104.498871	1,406,103.93	3,278,638.72
14,386.00	89.29	268.29	6,646.32	543.85	-7,685.71	40.443834	-104.499208	1,406,100.94	3,278,544.78
14,481.00	88.52	268.36	6,648.13	541.07	-7,780.65	40.443829	-104.499550	1,406,098.16	3,278,449.84
14,576.00	88.89	268.76	6,650.28	538.69	-7,875.60	40.443826	-104.499891	1,406,095.77	3,278,354.90
14,671.00	89.72	268.54	6,651.43	536.45	-7,970.56	40.443823	-104.500232	1,406,093.54	3,278,259.94
14,765.00	90.37	268.38	6,651.36	533.92	-8,064.53	40.443819	-104.500570	1,406,091.01	3,278,165.97
14,860.00	91.17	268.12	6,650.08	531.02	-8,159.47	40.443814	-104.500911	1,406,088.11	3,278,071.03
14,955.00	90.80	269.12	6,648.45	528.73	-8,254.43	40.443810	-104.501252	1,406,085.82	3,277,976.08
15,050.00	89.69	269.98	6,648.04	527.99	-8,349.43	40.443811	-104.501593	1,406,085.07	3,277,881.09
15,143.00	90.49	269.22	6,647.90	527.34	-8,442.42	40.443812	-104.501927	1,406,084.43	3,277,788.09
15,238.00	89.11	270.93	6,648.23	527.46	-8,537.42	40.443816	-104.502269	1,406,084.55	3,277,693.10
15,333.00	89.08	271.58	6,649.73	529.54	-8,632.38	40.443824	-104.502610	1,406,086.63	3,277,598.14
15,428.00	89.38	270.96	6,651.01	531.65	-8,727.35	40.443833	-104.502951	1,406,088.74	3,277,503.18
15,522.00	89.69	270.44	6,651.77	532.80	-8,821.34	40.443839	-104.503289	1,406,089.88	3,277,409.19
15,617.00	90.18	270.18	6,651.88	533.31	-8,916.34	40.443843	-104.503630	1,406,090.40	3,277,314.20
15,712.00	90.34	269.46	6,651.45	533.02	-9,011.33	40.443845	-104.503971	1,406,090.10	3,277,219.20
15,807.00	91.05	269.55	6,650.29	532.20	-9,106.32	40.443846	-104.504312	1,406,089.28	3,277,124.22
15,902.00	90.77	269.86	6,648.78	531.71	-9,201.31	40.443848	-104.504654	1,406,088.79	3,277,029.24
15,996.00	89.69	269.54	6,648.41	531.21	-9,295.30	40.443849	-104.504991	1,406,088.30	3,276,935.24
16,101.00	89.78	268.69	6,648.89	529.59	-9,400.29	40.443848	-104.505369	1,406,086.68	3,276,830.26
16,196.00	89.94	269.11	6,649.13	527.77	-9,495.27	40.443846	-104.505710	1,406,084.86	3,276,735.28
16,290.00	90.37	268.09	6,648.87	525.47	-9,589.24	40.443842	-104.506048	1,406,082.56	3,276,641.32

Design Report for Wells Ranch State A36-655 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
16,385.00	91.08	267.44	6,647.67	521.77	-9,684.16	40.443835	-104.506389	1,406,078.86	3,276,546.40
16,480.00	92.10	267.10	6,645.03	517.25	-9,779.02	40.443826	-104.506730	1,406,074.33	3,276,451.55
16,575.00	92.87	266.71	6,640.91	512.12	-9,873.79	40.443815	-104.507070	1,406,069.21	3,276,356.78
16,663.00	93.23	266.57	6,636.23	506.97	-9,961.51	40.443803	-104.507386	1,406,064.06	3,276,269.06
16,730.00	93.23	266.57	6,632.46	502.97	-10,028.28	40.443794	-104.507626	1,406,060.06	3,276,202.29

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
300.00	300.00	-0.35	-0.12	First Gyro Survey at 300.00ft
850.00	849.99	-2.64	-0.88	Final Gyro Survey at 850.00ft
850.00	849.99	-2.64	-0.88	Tie on to Gyro Survey at 850.00ft
920.00	919.99	-3.11	-1.04	First Sperry MWD Survey at 920.00ft
16,663.00	6,636.23	506.97	-9,961.51	Final Sperry MWD Survey at 16663.00ft
16,730.00	6,632.46	502.97	-10,028.28	Straight Line Projection to TD at 16730.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Wells Ranch State A36-655_Rev A2_BHL	272.88	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
300.00	850.00	Gyro Surveys	Flexi-Shot
920.00	6,978.00	Intermediate Surveys	MWD
7,060.00	16,730.00	Production Surveys	MWD+IFR1+MS_WY

Design Report for Wells Ranch State A36-655 - Actual Surveys

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
843.00	842.99	9 5/8"	9-5/8	13-3/4
7,024.00	6,628.69	7"	7	8-3/4

Design Targets

Shape	Target Name	TVD (')	Northing (')	Easting (')	+N/-S	+E/-W	Created	Updated
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Directional Difficulty Index

Average Dogleg over Survey:	1.59 °/100usft	Maximum Dogleg over Survey:	12.55 °/100usft at 6,978.00 usft
Net Tortosity applicable to Plans:	0.93 °/100usft	Directional Difficulty Index:	6.870

Audit Info

North Reference Sheet for Sec. 31-T6N-R63W (Wells Ranch State A36) - Wells Ranch State A36-655 - Plan A

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

Vertical Depths are relative to KB = 24' @ 4680.00usft (H&P 273). Northing and Easting are relative to Wells Ranch State A36-655

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 -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996241

Grid Coordinates of Well: 1,405,557.11 usft N, 3,286,230.20 usft E

Geographical Coordinates of Well: 40° 26' 31.56" N, 104° 28' 17.83" W

Grid Convergence at Surface is: 0.66°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,730.00usft

the Bottom Hole Displacement is 10,040.89usft in the Direction of 272.87° (Grid).

Magnetic Convergence at surface is: -7.74° (28 May 2015, , BGGM2015)

