

# Noble Energy

Weld County, CO (NAD 83)

Sec. 32-T6N-R62W (Wells Ranch AE32)

Wells Ranch AE32-630

05-123-41787

Plan A

Design: Actual Surveys

## Sperry Drilling Services

### Final Survey Report

20 October, 2015

Surface UWI : 05-123-41787

Well Coordinates: 1,404,481.46 N, 3,318,851.25 E (40° 26' 16.98" N, 104° 21' 16.13" W)

Ground Level: 4,720.00 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 AE32-630

KB = 24' @ 4744.00usft (H&P 273)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

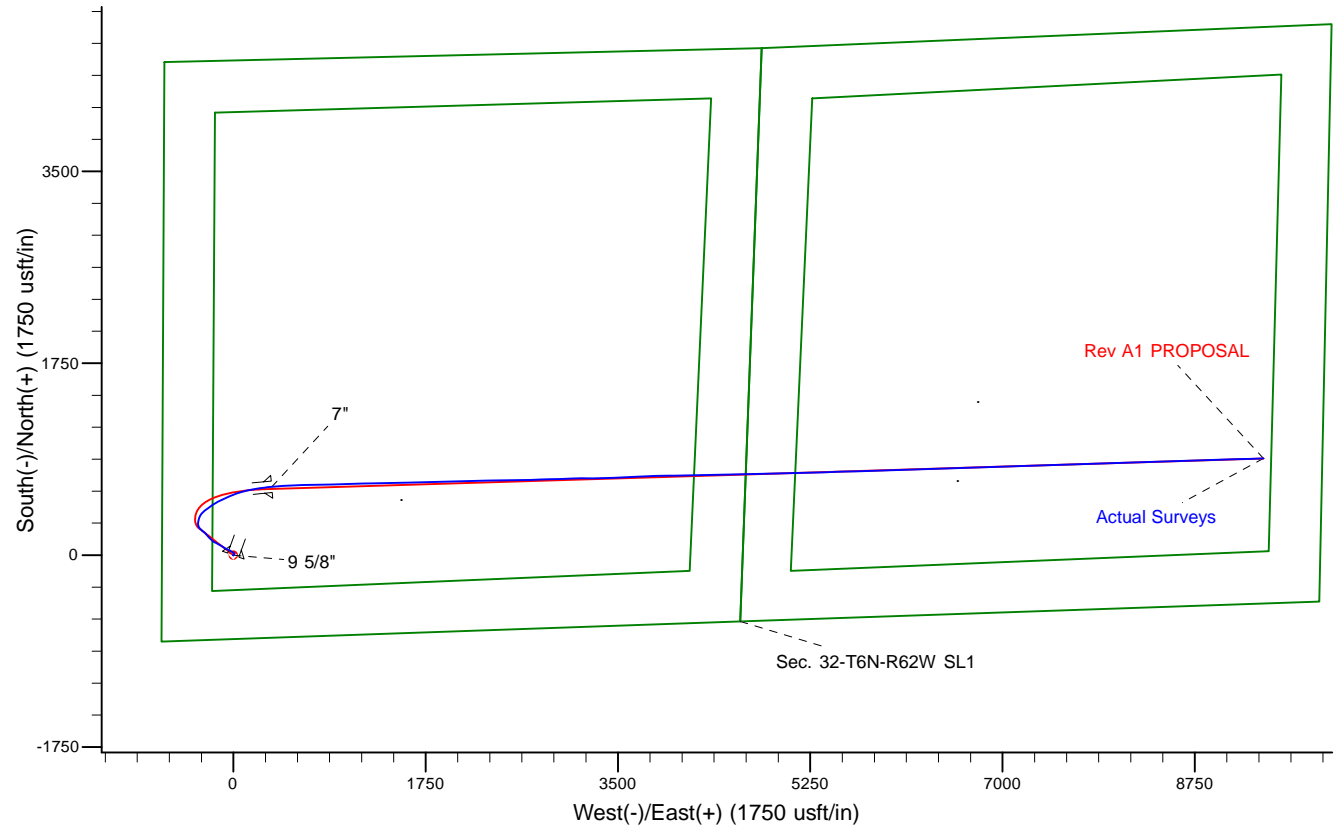
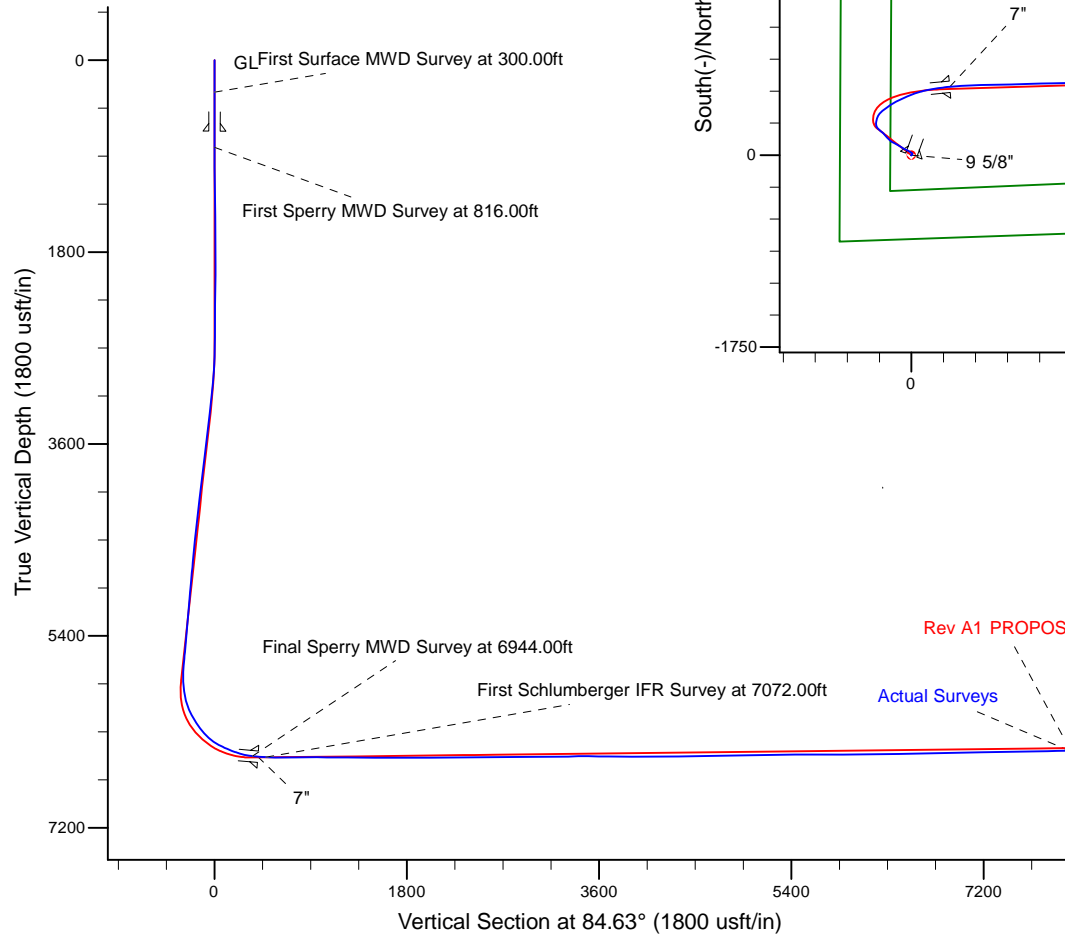
Project: Weld County, CO (NAD 83)  
 Site: Sec. 32-T6N-R62W (Wells Ranch AE32)  
 Well: Wells Ranch AE32-630  
 Wellbore: Plan A  
 Design: Actual Surveys



Platted SHL: 765' FSL, 650' FWL  
 Platted Lat/Long: 40.43805, -104.35448  
 Location: Sec. 32-T6N-R62W

~7" Casing: 1378' FSL, 996' FEL  
 Lat/Long: 40.439749 N, -104.353195 W  
 State Planes - CO Northern: 1,405,105.04 N, 3,319,200.94 E  
 Sec. 32-T6N-R62W

Platted BHL: 1320' FSL, 535' FEL  
 Platted Lat/Long: 40.440131 N, -104.320905 W  
 State Planes - CO Northern: 1,405,361.95 N, 3,328,186.12 E  
 Location: Sec. 33-T6N-R62W



# LEGEND

- Wells Ranch AE32-630, Plan A, Rev A1 PROPOSAL V0
- Actual Surveys

WELL DETAILS: Wells Ranch AE32-630

Ground Level: 4720.00

KB = 24' @ 4744.00usft (H&P 273)

Created By: Tatiana Gomez

Created On: 10/20/2015

## Design Report for Wells Ranch AE32-630 - 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
300.00	0.07	199.87	300.00	-0.17	-0.06	-0.08	0.02
<b>First Surface MWD Survey at 300.00ft</b>							
666.00	0.15	199.87	666.00	-0.83	-0.30	-0.37	0.02
<b>9 5/8"</b>							
676.00	0.15	199.87	676.00	-0.85	-0.31	-0.39	0.02
<b>Final Surface MWD Survey at 676.00ft</b>							
816.00	0.18	199.87	816.00	-1.23	-0.44	-0.56	0.02
<b>First Sperry MWD Survey at 816.00ft</b>							
910.00	1.20	22.42	909.99	-0.46	-0.12	-0.16	1.47
1,004.00	0.95	25.75	1,003.98	1.15	0.59	0.70	0.27
1,097.00	0.83	43.47	1,096.96	2.34	1.39	1.61	0.32
1,192.00	0.85	39.84	1,191.95	3.38	2.32	2.62	0.06
1,285.00	0.90	42.06	1,284.94	4.45	3.25	3.65	0.06
1,560.00	0.83	49.00	1,559.91	7.36	6.20	6.86	0.05
1,651.00	0.78	41.22	1,650.90	8.26	7.10	7.85	0.13
1,743.00	0.62	14.97	1,742.90	9.21	7.65	8.47	0.38
1,835.00	0.85	350.43	1,834.89	10.36	7.66	8.60	0.42
1,925.00	0.76	344.52	1,924.88	11.60	7.39	8.44	0.14
2,017.00	1.03	337.04	2,016.87	12.95	6.91	8.09	0.32
2,109.00	1.01	335.57	2,108.85	14.44	6.25	7.57	0.04
2,200.00	1.17	332.24	2,199.84	16.00	5.48	6.96	0.19
2,292.00	0.99	319.17	2,291.82	17.43	4.53	6.14	0.33
2,383.00	0.55	288.20	2,382.81	18.16	3.60	5.28	0.65
2,474.00	0.79	285.88	2,473.81	18.47	2.58	4.29	0.27
2,566.00	0.57	297.04	2,565.80	18.85	1.56	3.32	0.28
2,657.00	0.33	355.23	2,656.80	19.32	1.14	2.94	0.53
2,749.00	2.34	308.75	2,748.77	20.76	-0.35	1.59	2.31
2,840.00	4.00	309.85	2,839.63	23.95	-4.24	-1.98	1.83
2,932.00	5.43	310.54	2,931.31	28.84	-10.01	-7.27	1.56
3,024.00	5.84	291.70	3,022.88	33.40	-17.67	-14.46	2.05
3,116.00	6.37	298.41	3,114.36	37.56	-26.50	-22.88	0.97
3,211.00	7.80	300.08	3,208.63	43.30	-36.72	-32.51	1.52
3,306.00	7.58	295.29	3,302.78	49.21	-47.96	-43.15	0.71
3,400.00	7.39	291.58	3,395.97	54.08	-59.19	-53.87	0.55
3,495.00	7.91	300.18	3,490.13	59.61	-70.52	-64.64	1.32
3,589.00	8.64	301.39	3,583.15	66.54	-82.14	-75.56	0.80
3,684.00	9.15	301.27	3,677.01	74.18	-94.69	-87.34	0.54
3,779.00	9.69	301.50	3,770.73	82.28	-107.96	-99.79	0.57
3,874.00	9.31	300.91	3,864.43	90.40	-121.37	-112.38	0.41
3,969.00	8.66	300.34	3,958.26	97.96	-134.14	-124.39	0.69
4,063.00	8.06	297.40	4,051.26	104.57	-146.10	-135.67	0.78
4,158.00	6.89	298.61	4,145.45	110.36	-157.01	-146.00	1.24
4,252.00	6.89	301.30	4,238.77	115.99	-166.78	-155.20	0.34
4,347.00	6.77	296.03	4,333.10	121.41	-176.68	-164.55	0.67
4,442.00	8.55	306.63	4,427.25	128.08	-187.38	-174.58	2.38
4,537.00	9.23	316.05	4,521.12	137.78	-198.33	-184.58	1.69
4,631.00	8.77	313.47	4,613.96	148.14	-208.77	-194.00	0.65
4,726.00	7.88	313.58	4,707.96	157.61	-218.74	-203.04	0.94
4,821.00	8.92	319.06	4,801.94	167.66	-228.29	-211.60	1.38

## Design Report for Wells Ranch AE32-630 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,916.00	8.85	319.24	4,895.80	178.76	-237.88	-220.12	0.08
5,010.00	7.97	318.77	4,988.79	189.14	-246.90	-228.13	0.94
5,105.00	7.09	316.47	5,082.97	198.34	-255.28	-235.61	0.98
5,200.00	7.63	310.50	5,177.18	206.69	-264.11	-243.62	0.98
5,295.00	7.96	304.01	5,271.31	214.47	-274.36	-253.10	0.99
5,389.00	6.18	308.49	5,364.59	221.26	-283.72	-261.78	1.98
5,484.00	7.60	320.90	5,458.91	229.32	-291.68	-268.96	2.16
5,579.00	7.78	309.05	5,553.06	238.24	-300.64	-277.04	1.68
5,674.00	10.07	320.62	5,646.91	248.71	-310.90	-286.28	3.05
5,768.00	15.61	345.77	5,738.59	267.35	-319.24	-292.83	8.24
5,863.00	18.00	2.17	5,829.58	294.43	-321.83	-292.88	5.56
5,958.00	20.36	18.32	5,919.36	324.81	-316.07	-284.31	6.09
6,053.00	24.04	26.36	6,007.33	357.86	-302.28	-267.48	5.01
6,147.00	29.43	45.03	6,091.40	391.42	-277.38	-239.55	10.55
6,242.00	34.98	53.98	6,171.79	423.97	-238.79	-198.09	7.69
6,337.00	38.06	56.61	6,248.14	456.11	-192.30	-148.79	3.64
6,432.00	43.68	62.36	6,319.97	487.48	-138.72	-92.52	7.11
6,526.00	55.55	65.15	6,380.77	518.94	-74.56	-25.70	12.83
6,621.00	64.18	68.78	6,428.44	550.95	1.00	52.53	9.66
6,716.00	67.38	74.02	6,467.43	578.52	83.08	136.82	6.05
6,811.00	72.45	79.61	6,500.06	598.79	169.90	225.15	7.68
6,944.00	83.27	83.26	6,528.00	618.04	298.27	354.77	8.56
<b>Final Sperry MWD Survey at 6944.00ft - Tie on to Sperry MWD Survey at 6944.00ft</b>							
6,996.00	85.32	84.38	6,533.17	623.61	349.71	406.50	4.49
<b>7"</b>							
7,072.00	88.32	86.00	6,537.38	629.97	425.31	482.37	4.49
<b>First Schlumberger IFR Survey at 7072.00ft</b>							
7,167.00	90.10	87.29	6,538.69	635.53	520.13	577.29	2.31
7,262.00	89.62	88.32	6,538.93	639.16	615.06	672.15	1.20
7,356.00	89.97	88.60	6,539.26	641.69	709.03	765.94	0.48
7,451.00	90.95	89.93	6,538.50	642.91	804.01	860.62	1.74
7,546.00	89.69	88.30	6,537.97	644.38	899.00	955.32	2.17
7,640.00	89.65	88.14	6,538.51	647.30	992.95	1,049.14	0.18
7,735.00	89.93	88.37	6,538.86	650.19	1,087.90	1,143.95	0.38
7,830.00	89.82	88.77	6,539.07	652.56	1,182.87	1,238.72	0.44
7,924.00	89.86	89.10	6,539.33	654.31	1,276.86	1,332.46	0.35
8,019.00	89.69	88.54	6,539.70	656.26	1,371.84	1,427.20	0.62
8,113.00	89.72	88.19	6,540.19	658.95	1,465.80	1,521.00	0.37
8,208.00	89.76	88.67	6,540.62	661.55	1,560.76	1,615.79	0.51
8,303.00	89.86	88.81	6,540.93	663.64	1,655.74	1,710.55	0.18
8,397.00	89.69	88.84	6,541.30	665.57	1,749.71	1,804.29	0.18
8,492.00	89.83	88.50	6,541.70	667.77	1,844.69	1,899.06	0.39
8,587.00	89.83	88.49	6,541.98	670.27	1,939.66	1,993.84	0.01
8,681.00	90.20	88.67	6,541.96	672.59	2,033.63	2,087.62	0.44
8,776.00	89.96	88.58	6,541.82	674.87	2,128.60	2,182.39	0.27
8,870.00	90.20	88.67	6,541.69	677.13	2,222.57	2,276.16	0.27
8,964.00	90.79	88.49	6,540.88	679.46	2,316.54	2,369.93	0.66
9,059.00	90.79	88.21	6,539.57	682.19	2,411.49	2,464.72	0.29
9,153.00	91.00	88.68	6,538.10	684.74	2,505.44	2,558.50	0.55
9,248.00	91.99	90.54	6,535.62	685.39	2,600.40	2,653.11	2.22
9,342.00	90.28	88.35	6,533.76	686.30	2,694.37	2,746.75	2.96

## Design Report for Wells Ranch AE32-630 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,437.00	90.14	87.87	6,533.41	689.44	2,789.32	2,841.57	0.53
9,531.00	90.31	88.67	6,533.04	692.27	2,883.27	2,935.38	0.87
9,625.00	90.17	88.19	6,532.65	694.85	2,977.24	3,029.18	0.53
9,720.00	90.17	88.47	6,532.37	697.62	3,072.20	3,123.98	0.29
9,814.00	89.93	87.55	6,532.29	700.88	3,166.14	3,217.81	1.01
9,909.00	91.69	91.83	6,530.94	701.40	3,261.10	3,312.41	4.87
10,003.00	90.79	88.91	6,528.91	700.79	3,355.07	3,405.91	3.25
10,098.00	89.69	86.46	6,528.51	704.63	3,449.98	3,500.76	2.83
10,192.00	89.69	87.70	6,529.02	709.41	3,543.86	3,594.67	1.32
10,287.00	88.93	87.91	6,530.16	713.05	3,638.78	3,689.52	0.83
10,381.00	88.52	86.55	6,532.25	717.59	3,732.64	3,783.40	1.51
10,476.00	90.28	88.24	6,533.25	721.91	3,827.53	3,878.27	2.57
10,571.00	90.96	90.02	6,532.22	723.35	3,922.51	3,972.97	2.01
10,664.00	90.34	88.05	6,531.17	724.92	4,015.49	4,065.69	2.22
10,756.00	90.48	88.56	6,530.51	727.64	4,107.44	4,157.49	0.57
10,847.00	90.31	89.80	6,529.88	728.94	4,198.43	4,248.20	1.38
10,938.00	90.55	88.67	6,529.20	730.16	4,289.42	4,338.91	1.27
11,030.00	90.28	88.91	6,528.53	732.10	4,381.40	4,430.66	0.39
11,121.00	90.31	88.18	6,528.06	734.41	4,472.36	4,521.45	0.80
11,213.00	89.97	89.12	6,527.84	736.58	4,564.34	4,613.22	1.09
11,305.00	90.83	88.95	6,527.19	738.13	4,656.32	4,704.95	0.95
11,396.00	91.20	88.60	6,525.58	740.07	4,747.29	4,795.69	0.56
11,487.00	92.24	89.01	6,522.85	741.97	4,838.22	4,886.41	1.23
11,579.00	91.86	88.39	6,519.56	744.06	4,930.14	4,978.12	0.79
11,670.00	91.27	88.60	6,517.08	746.45	5,021.07	5,068.88	0.69
11,761.00	90.86	88.51	6,515.38	748.74	5,112.03	5,159.65	0.46
11,853.00	90.52	88.38	6,514.28	751.24	5,203.99	5,251.44	0.40
11,945.00	90.62	88.38	6,513.36	753.84	5,295.95	5,343.24	0.11
12,037.00	90.48	88.07	6,512.48	756.69	5,387.90	5,435.05	0.37
12,129.00	89.62	88.17	6,512.40	759.71	5,479.85	5,526.88	0.94
12,224.00	90.03	88.41	6,512.69	762.54	5,574.81	5,621.69	0.50
12,318.00	90.31	88.28	6,512.41	765.25	5,668.77	5,715.49	0.33
12,413.00	89.66	88.41	6,512.43	768.00	5,763.73	5,810.29	0.70
12,508.00	90.10	88.50	6,512.63	770.56	5,858.69	5,905.08	0.47
12,602.00	89.83	88.89	6,512.69	772.70	5,952.67	5,998.84	0.50
12,697.00	90.69	88.48	6,512.26	774.88	6,047.64	6,093.60	1.00
12,792.00	90.96	87.78	6,510.89	777.98	6,142.58	6,188.42	0.79
12,887.00	90.52	88.29	6,509.66	781.24	6,237.51	6,283.24	0.71
12,982.00	91.24	87.46	6,508.20	784.76	6,332.44	6,378.08	1.16
13,076.00	91.00	88.25	6,506.37	788.28	6,426.35	6,471.91	0.88
13,170.00	92.34	87.92	6,503.63	791.42	6,520.26	6,565.70	1.47
13,265.00	91.14	87.68	6,500.74	795.06	6,615.14	6,660.50	1.29
13,360.00	90.93	88.57	6,499.03	798.17	6,710.07	6,755.31	0.96
13,455.00	91.00	88.44	6,497.43	800.65	6,805.03	6,850.08	0.16
13,550.00	91.10	88.18	6,495.69	803.45	6,899.97	6,944.87	0.29
13,644.00	91.44	88.34	6,493.60	806.30	6,993.90	7,038.66	0.40
13,739.00	90.52	87.52	6,491.98	809.73	7,088.83	7,133.49	1.30
13,834.00	90.69	87.52	6,490.98	813.84	7,183.73	7,228.36	0.18
13,929.00	90.76	88.43	6,489.77	817.20	7,278.66	7,323.19	0.96
14,023.00	90.48	88.54	6,488.76	819.69	7,372.63	7,416.97	0.32
14,118.00	91.48	88.77	6,487.13	821.92	7,467.58	7,511.72	1.08

## Design Report for Wells Ranch AE32-630 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
14,213.00	91.48	88.36	6,484.68	824.29	7,562.52	7,606.47	0.43
14,307.00	91.34	88.66	6,482.36	826.74	7,656.46	7,700.22	0.35
14,402.00	90.96	87.78	6,480.46	829.69	7,751.40	7,795.02	1.01
14,497.00	91.48	87.81	6,478.44	833.34	7,846.30	7,889.85	0.55
14,592.00	90.79	87.97	6,476.55	836.84	7,941.22	7,984.68	0.75
14,687.00	90.86	88.21	6,475.19	840.00	8,036.16	8,079.50	0.26
14,781.00	90.76	87.75	6,473.86	843.32	8,130.09	8,173.33	0.50
14,876.00	91.62	88.01	6,471.88	846.83	8,225.00	8,268.15	0.95
14,971.00	90.69	87.93	6,469.97	850.20	8,319.92	8,362.97	0.98
15,066.00	90.76	87.91	6,468.77	853.64	8,414.85	8,457.81	0.08
15,160.00	90.62	88.22	6,467.63	856.82	8,508.79	8,551.63	0.36
15,255.00	91.17	89.11	6,466.15	859.03	8,603.75	8,646.38	1.10
15,350.00	91.44	88.32	6,463.99	861.16	8,698.70	8,741.12	0.88
15,445.00	91.55	88.97	6,461.51	863.41	8,793.64	8,835.85	0.69
15,539.00	91.06	88.12	6,459.37	865.79	8,887.59	8,929.61	1.04
15,634.00	91.07	87.56	6,457.60	869.37	8,982.50	9,024.44	0.59
15,729.00	91.75	87.95	6,455.26	873.09	9,077.40	9,119.27	0.83
15,824.00	91.48	88.36	6,452.59	876.15	9,172.31	9,214.05	0.52
15,918.00	90.69	88.34	6,450.81	878.86	9,266.26	9,307.84	0.84
15,987.00	91.41	88.89	6,449.54	880.52	9,335.23	9,376.66	1.31
Final Schlumberger IFR Survey at 15987.00ft							
16,027.00	91.41	88.89	6,448.56	881.30	9,375.21	9,416.54	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
300.00	300.00	-0.17	-0.06	First Surface MWD Survey at 300.00ft
676.00	676.00	-0.85	-0.31	Final Surface MWD Survey at 676.00ft
816.00	816.00	-1.23	-0.44	First Sperry MWD Survey at 816.00ft
6,944.00	6,528.00	618.04	298.27	Final Sperry MWD Survey at 6944.00ft
6,944.00	6,528.00	618.04	298.27	Tie on to Sperry MWD Survey at 6944.00ft
7,072.00	6,537.38	629.97	425.31	First Schlumberger IFR Survey at 7072.00ft
15,987.00	6,449.54	880.52	9,335.23	Final Schlumberger IFR Survey at 15987.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Wells Ranch AE32-630_Rev A1_BHL	84.63	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
300.00	676.00	Surface Surveys	MWD
816.00	6,944.00	Intermediate Surveys	MWD
6,944.00	16,027.00	Schlumberger MWD+IFR Surveys	MWD+IFR1+MS_WY

## Design Report for Wells Ranch AE32-630 - Actual Surveys

### Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
666.00	666.00	9 5/8"	9-5/8	13-3/4
6,996.00	6,533.17	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 AE32-630 - 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	1,404,481.47	3,318,851.25	40.438050	-104.354480
Wells Ranch AE32-630 - actual wellpath misses target center by 12.58usft at 16027.00usft MD (6448.56 TVD, 881.30 N, 9375.21 E) - Point	0.00	0.00	6,436.00	880.75	9,375.57	1,405,362.18	3,328,226.46	40.440130	-104.320760
Wells Ranch AE32-630 - actual wellpath misses target center by 2.53usft at 16027.00usft MD (6448.56 TVD, 881.30 N, 9375.21 E) - Point	0.00	0.00	6,451.00	880.75	9,375.57	1,405,362.18	3,328,226.46	40.440130	-104.320760

### Directional Difficulty Index

Average Dogleg over Survey:	1.40 °/100usft	Maximum Dogleg over Survey:	12.83 °/100usft at 6,526.00 usft
Net Tortousity applicable to Plans:	0.65 °/100usft	Directional Difficulty Index:	6.753

### Audit Info

North Reference Sheet for Sec. 32-T6N-R62W (Wells Ranch AE32) - Wells Ranch  
AE32-630 - 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' @ 4744.00usft (H&P 273). Northing and Easting are relative to Wells Ranch AE32-630

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: 0.99996218

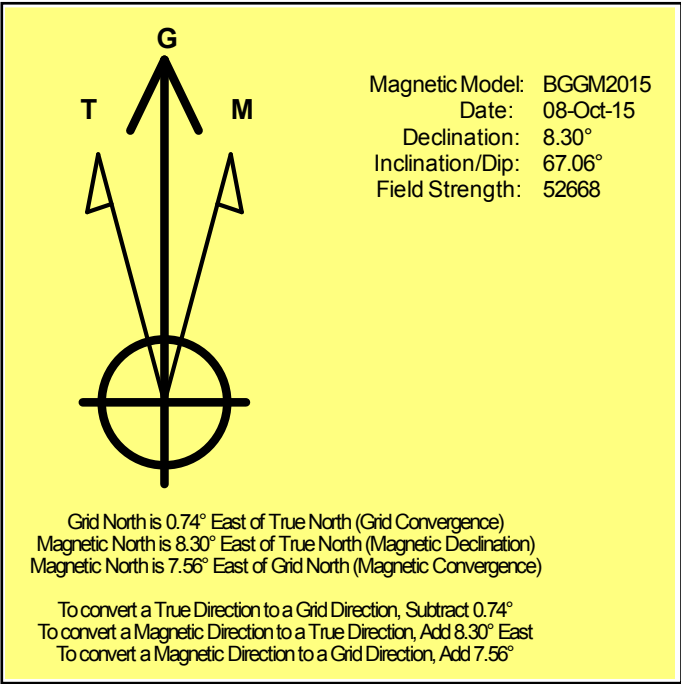
Grid Coordinates of Well: 1,404,481.46 usft N, 3,318,851.25 usft E

Geographical Coordinates of Well: 40° 26' 16.98" N, 104° 21' 16.13" W

Grid Convergence at Surface is: 0.74°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,027.00usft  
the Bottom Hole Displacement is 9,416.54usft in the Direction of 84.63° (Grid).

Magnetic Convergence at surface is: -7.56° ( 8 October 2015, , BGGM2015)





# Noble Energy

Weld County, CO (NAD 83)

Sec. 32-T6N-R62W (Wells Ranch AE32)

Wells Ranch AE32-630

05-123-41787

Plan A

Design: Actual Surveys

## Sperry Drilling Services

### Geodetic Report

20 October, 2015

Well Coordinates: 1,404,481.46 N, 3,318,851.25 E (40° 26' 16.98" N, 104° 21' 16.13" W)

Ground Level: 4,720.00 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 AE32-630

KB = 24' @ 4744.00usft (H&P 273)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

## Design Report for Wells Ranch AE32-630 - 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)
0.00	0.00	0.00	0.00	0.00	0.00	40.438050	-104.354480	1,404,481.46	3,318,851.25
300.00	0.07	199.87	300.00	-0.17	-0.06	40.438050	-104.354480	1,404,481.29	3,318,851.19
666.00	0.15	199.87	666.00	-0.83	-0.30	40.438048	-104.354481	1,404,480.63	3,318,850.95
676.00	0.15	199.87	676.00	-0.85	-0.31	40.438048	-104.354481	1,404,480.61	3,318,850.94
816.00	0.18	199.87	816.00	-1.23	-0.44	40.438047	-104.354482	1,404,480.23	3,318,850.80
910.00	1.20	22.42	909.99	-0.46	-0.12	40.438049	-104.354481	1,404,481.00	3,318,851.13
1,004.00	0.95	25.75	1,003.98	1.15	0.59	40.438053	-104.354478	1,404,482.61	3,318,851.84
1,097.00	0.83	43.47	1,096.96	2.34	1.39	40.438056	-104.354475	1,404,483.80	3,318,852.64
1,192.00	0.85	39.84	1,191.95	3.38	2.32	40.438059	-104.354472	1,404,484.84	3,318,853.57
1,285.00	0.90	42.06	1,284.94	4.45	3.25	40.438062	-104.354468	1,404,485.91	3,318,854.50
1,560.00	0.83	49.00	1,559.91	7.36	6.20	40.438070	-104.354458	1,404,488.82	3,318,857.45
1,651.00	0.78	41.22	1,650.90	8.26	7.10	40.438072	-104.354454	1,404,489.72	3,318,858.35
1,743.00	0.62	14.97	1,742.90	9.21	7.65	40.438075	-104.354452	1,404,490.67	3,318,858.89
1,835.00	0.85	350.43	1,834.89	10.36	7.66	40.438078	-104.354452	1,404,491.82	3,318,858.91
1,925.00	0.76	344.52	1,924.88	11.60	7.39	40.438082	-104.354453	1,404,493.06	3,318,858.64
2,017.00	1.03	337.04	2,016.87	12.95	6.91	40.438085	-104.354455	1,404,494.41	3,318,858.15
2,109.00	1.01	335.57	2,108.85	14.44	6.25	40.438089	-104.354457	1,404,495.90	3,318,857.50
2,200.00	1.17	332.24	2,199.84	16.00	5.48	40.438094	-104.354460	1,404,497.46	3,318,856.73
2,292.00	0.99	319.17	2,291.82	17.43	4.53	40.438098	-104.354463	1,404,498.89	3,318,855.77
2,383.00	0.55	288.20	2,382.81	18.16	3.60	40.438100	-104.354467	1,404,499.62	3,318,854.85
2,474.00	0.79	285.88	2,473.81	18.47	2.58	40.438101	-104.354470	1,404,499.93	3,318,853.83
2,566.00	0.57	297.04	2,565.80	18.85	1.56	40.438102	-104.354474	1,404,500.31	3,318,852.81
2,657.00	0.33	355.23	2,656.80	19.32	1.14	40.438103	-104.354475	1,404,500.78	3,318,852.38
2,749.00	2.34	308.75	2,748.77	20.76	-0.35	40.438107	-104.354481	1,404,502.22	3,318,850.90
2,840.00	4.00	309.85	2,839.63	23.95	-4.24	40.438116	-104.354494	1,404,505.41	3,318,847.01
2,932.00	5.43	310.54	2,931.31	28.84	-10.01	40.438130	-104.354515	1,404,510.30	3,318,841.24
3,024.00	5.84	291.70	3,022.88	33.40	-17.67	40.438142	-104.354542	1,404,514.86	3,318,833.58
3,116.00	6.37	298.41	3,114.36	37.56	-26.50	40.438154	-104.354574	1,404,519.02	3,318,824.75
3,211.00	7.80	300.08	3,208.63	43.30	-36.72	40.438170	-104.354610	1,404,524.76	3,318,814.53
3,306.00	7.58	295.29	3,302.78	49.21	-47.96	40.438187	-104.354650	1,404,530.66	3,318,803.29
3,400.00	7.39	291.58	3,395.97	54.08	-59.19	40.438201	-104.354690	1,404,535.54	3,318,792.06
3,495.00	7.91	300.18	3,490.13	59.61	-70.52	40.438216	-104.354731	1,404,541.07	3,318,780.73
3,589.00	8.64	301.39	3,583.15	66.54	-82.14	40.438236	-104.354772	1,404,548.00	3,318,769.11
3,684.00	9.15	301.27	3,677.01	74.18	-94.69	40.438257	-104.354817	1,404,555.64	3,318,756.56
3,779.00	9.69	301.50	3,770.73	82.28	-107.96	40.438280	-104.354864	1,404,563.73	3,318,743.29
3,874.00	9.31	300.91	3,864.43	90.40	-121.37	40.438302	-104.354912	1,404,571.86	3,318,729.88
3,969.00	8.66	300.34	3,958.26	97.96	-134.14	40.438324	-104.354958	1,404,579.42	3,318,717.12
4,063.00	8.06	297.40	4,051.26	104.57	-146.10	40.438342	-104.355000	1,404,586.03	3,318,705.16
4,158.00	6.89	298.61	4,145.45	110.36	-157.01	40.438359	-104.355039	1,404,591.82	3,318,694.24
4,252.00	6.89	301.30	4,238.77	115.99	-166.78	40.438374	-104.355074	1,404,597.45	3,318,684.48
4,347.00	6.77	296.03	4,333.10	121.41	-176.68	40.438390	-104.355109	1,404,602.87	3,318,674.58
4,442.00	8.55	306.63	4,427.25	128.08	-187.38	40.438408	-104.355147	1,404,609.54	3,318,663.88

## Design Report for Wells Ranch AE32-630 - 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)
4,537.00	9.23	316.05	4,521.12	137.78	-198.33	40.438435	-104.355186	1,404,619.24	3,318,652.92
4,631.00	8.77	313.47	4,613.96	148.14	-208.77	40.438464	-104.355223	1,404,629.59	3,318,642.49
4,726.00	7.88	313.58	4,707.96	157.61	-218.74	40.438490	-104.355259	1,404,639.06	3,318,632.52
4,821.00	8.92	319.06	4,801.94	167.66	-228.29	40.438518	-104.355293	1,404,649.12	3,318,622.97
4,916.00	8.85	319.24	4,895.80	178.76	-237.88	40.438549	-104.355326	1,404,660.22	3,318,613.37
5,010.00	7.97	318.77	4,988.79	189.14	-246.90	40.438578	-104.355358	1,404,670.59	3,318,604.36
5,105.00	7.09	316.47	5,082.97	198.34	-255.28	40.438604	-104.355388	1,404,679.80	3,318,595.98
5,200.00	7.63	310.50	5,177.18	206.69	-264.11	40.438627	-104.355419	1,404,688.14	3,318,587.15
5,295.00	7.96	304.01	5,271.31	214.47	-274.36	40.438648	-104.355456	1,404,695.92	3,318,576.90
5,389.00	6.18	308.49	5,364.59	221.26	-283.72	40.438667	-104.355489	1,404,702.71	3,318,567.54
5,484.00	7.60	320.90	5,458.91	229.32	-291.68	40.438690	-104.355517	1,404,710.77	3,318,559.58
5,579.00	7.78	309.05	5,553.06	238.24	-300.64	40.438715	-104.355549	1,404,719.69	3,318,550.62
5,674.00	10.07	320.62	5,646.91	248.71	-310.90	40.438744	-104.355586	1,404,730.17	3,318,540.36
5,768.00	15.61	345.77	5,738.59	267.35	-319.24	40.438795	-104.355615	1,404,748.81	3,318,532.02
5,863.00	18.00	2.17	5,829.58	294.43	-321.83	40.438870	-104.355623	1,404,775.88	3,318,529.43
5,958.00	20.36	18.32	5,919.36	324.81	-316.07	40.438953	-104.355601	1,404,806.26	3,318,535.19
6,053.00	24.04	26.36	6,007.33	357.86	-302.28	40.439043	-104.355549	1,404,839.31	3,318,548.98
6,147.00	29.43	45.03	6,091.40	391.42	-277.38	40.439134	-104.355458	1,404,872.87	3,318,573.88
6,242.00	34.98	53.98	6,171.79	423.97	-238.79	40.439222	-104.355318	1,404,905.42	3,318,612.47
6,337.00	38.06	56.61	6,248.14	456.11	-192.30	40.439309	-104.355150	1,404,937.56	3,318,658.96
6,432.00	43.68	62.36	6,319.97	487.48	-138.72	40.439393	-104.354956	1,404,968.92	3,318,712.53
6,526.00	55.55	65.15	6,380.77	518.94	-74.56	40.439477	-104.354724	1,405,000.39	3,318,776.69
6,621.00	64.18	68.78	6,428.44	550.95	1.00	40.439562	-104.354451	1,405,032.39	3,318,852.25
6,716.00	67.38	74.02	6,467.43	578.52	83.08	40.439635	-104.354155	1,405,059.96	3,318,934.33
6,811.00	72.45	79.61	6,500.06	598.79	169.90	40.439688	-104.353842	1,405,080.22	3,319,021.14
6,944.00	83.27	83.26	6,528.00	618.04	298.27	40.439736	-104.353380	1,405,099.47	3,319,149.51
6,996.00	85.32	84.38	6,533.17	623.61	349.71	40.439749	-104.353195	1,405,105.04	3,319,200.94
7,072.00	88.32	86.00	6,537.38	629.97	425.31	40.439764	-104.352923	1,405,111.40	3,319,276.54
7,167.00	90.10	87.29	6,538.69	635.53	520.13	40.439776	-104.352582	1,405,116.96	3,319,371.36
7,262.00	89.62	88.32	6,538.93	639.16	615.06	40.439783	-104.352241	1,405,120.60	3,319,466.29
7,356.00	89.97	88.60	6,539.26	641.69	709.03	40.439786	-104.351904	1,405,123.13	3,319,560.25
7,451.00	90.95	89.93	6,538.50	642.91	804.01	40.439786	-104.351562	1,405,124.35	3,319,655.23
7,546.00	89.69	88.30	6,537.97	644.38	899.00	40.439787	-104.351221	1,405,125.81	3,319,750.21
7,640.00	89.65	88.14	6,538.51	647.30	992.95	40.439791	-104.350883	1,405,128.73	3,319,844.16
7,735.00	89.93	88.37	6,538.86	650.19	1,087.90	40.439796	-104.350542	1,405,131.63	3,319,939.11
7,830.00	89.82	88.77	6,539.07	652.56	1,182.87	40.439799	-104.350201	1,405,134.00	3,320,034.08
7,924.00	89.86	89.10	6,539.33	654.31	1,276.86	40.439801	-104.349863	1,405,135.74	3,320,128.06
8,019.00	89.69	88.54	6,539.70	656.26	1,371.84	40.439803	-104.349522	1,405,137.70	3,320,223.03
8,113.00	89.72	88.19	6,540.19	658.95	1,465.80	40.439807	-104.349184	1,405,140.38	3,320,316.99
8,208.00	89.76	88.67	6,540.62	661.55	1,560.76	40.439810	-104.348843	1,405,142.98	3,320,411.95
8,303.00	89.86	88.81	6,540.93	663.64	1,655.74	40.439813	-104.348502	1,405,145.07	3,320,506.92
8,397.00	89.69	88.84	6,541.30	665.57	1,749.71	40.439815	-104.348164	1,405,147.00	3,320,600.90

## Design Report for Wells Ranch AE32-630 - 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)
8,492.00	89.83	88.50	6,541.70	667.77	1,844.69	40.439817	-104.347823	1,405,149.21	3,320,695.87
8,587.00	89.83	88.49	6,541.98	670.27	1,939.66	40.439821	-104.347482	1,405,151.70	3,320,790.83
8,681.00	90.20	88.67	6,541.96	672.59	2,033.63	40.439824	-104.347144	1,405,154.03	3,320,884.80
8,776.00	89.96	88.58	6,541.82	674.87	2,128.60	40.439827	-104.346803	1,405,156.31	3,320,979.77
8,870.00	90.20	88.67	6,541.69	677.13	2,222.57	40.439829	-104.346465	1,405,158.56	3,321,073.74
8,964.00	90.79	88.49	6,540.88	679.46	2,316.54	40.439833	-104.346127	1,405,160.89	3,321,167.70
9,059.00	90.79	88.21	6,539.57	682.19	2,411.49	40.439837	-104.345786	1,405,163.63	3,321,262.65
9,153.00	91.00	88.68	6,538.10	684.74	2,505.44	40.439840	-104.345448	1,405,166.18	3,321,356.60
9,248.00	91.99	90.54	6,535.62	685.39	2,600.40	40.439839	-104.345107	1,405,166.83	3,321,451.55
9,342.00	90.28	88.35	6,533.76	686.30	2,694.37	40.439838	-104.344770	1,405,167.74	3,321,545.52
9,437.00	90.14	87.87	6,533.41	689.44	2,789.32	40.439843	-104.344428	1,405,170.87	3,321,640.46
9,531.00	90.31	88.67	6,533.04	692.27	2,883.27	40.439847	-104.344091	1,405,173.71	3,321,734.41
9,625.00	90.17	88.19	6,532.65	694.85	2,977.24	40.439851	-104.343753	1,405,176.28	3,321,828.37
9,720.00	90.17	88.47	6,532.37	697.62	3,072.20	40.439855	-104.343412	1,405,179.05	3,321,923.33
9,814.00	89.93	87.55	6,532.29	700.88	3,166.14	40.439861	-104.343074	1,405,182.32	3,322,017.27
9,909.00	91.69	91.83	6,530.94	701.40	3,261.10	40.439859	-104.342733	1,405,182.83	3,322,112.23
10,003.00	90.79	88.91	6,528.91	700.79	3,355.07	40.439854	-104.342396	1,405,182.22	3,322,206.19
10,098.00	89.69	86.46	6,528.51	704.63	3,449.98	40.439861	-104.342055	1,405,186.06	3,322,301.10
10,192.00	89.69	87.70	6,529.02	709.41	3,543.86	40.439871	-104.341717	1,405,190.85	3,322,394.97
10,287.00	88.93	87.91	6,530.16	713.05	3,638.78	40.439877	-104.341376	1,405,194.49	3,322,489.89
10,381.00	88.52	86.55	6,532.25	717.59	3,732.64	40.439886	-104.341039	1,405,199.03	3,322,583.75
10,476.00	90.28	88.24	6,533.25	721.91	3,827.53	40.439895	-104.340697	1,405,203.34	3,322,678.64
10,571.00	90.96	90.02	6,532.22	723.35	3,922.51	40.439895	-104.340356	1,405,204.79	3,322,773.61
10,664.00	90.34	88.05	6,531.17	724.92	4,015.49	40.439896	-104.340022	1,405,206.35	3,322,866.58
10,756.00	90.48	88.56	6,530.51	727.64	4,107.44	40.439901	-104.339692	1,405,209.07	3,322,958.54
10,847.00	90.31	89.80	6,529.88	728.94	4,198.43	40.439901	-104.339365	1,405,210.38	3,323,049.52
10,938.00	90.55	88.67	6,529.20	730.16	4,289.42	40.439901	-104.339038	1,405,211.59	3,323,140.50
11,030.00	90.28	88.91	6,528.53	732.10	4,381.40	40.439903	-104.338707	1,405,213.53	3,323,232.48
11,121.00	90.31	88.18	6,528.06	734.41	4,472.36	40.439906	-104.338381	1,405,215.84	3,323,323.44
11,213.00	89.97	89.12	6,527.84	736.58	4,564.34	40.439909	-104.338050	1,405,218.01	3,323,415.41
11,305.00	90.83	88.95	6,527.19	738.13	4,656.32	40.439910	-104.337720	1,405,219.56	3,323,507.39
11,396.00	91.20	88.60	6,525.58	740.07	4,747.29	40.439912	-104.337393	1,405,221.51	3,323,598.35
11,487.00	92.24	89.01	6,522.85	741.97	4,838.22	40.439914	-104.337066	1,405,223.40	3,323,689.29
11,579.00	91.86	88.39	6,519.56	744.06	4,930.14	40.439916	-104.336736	1,405,225.49	3,323,781.20
11,670.00	91.27	88.60	6,517.08	746.45	5,021.07	40.439919	-104.336409	1,405,227.88	3,323,872.13
11,761.00	90.86	88.51	6,515.38	748.74	5,112.03	40.439922	-104.336082	1,405,230.17	3,323,963.08
11,853.00	90.52	88.38	6,514.28	751.24	5,203.99	40.439926	-104.335752	1,405,232.67	3,324,055.04
11,945.00	90.62	88.38	6,513.36	753.84	5,295.95	40.439930	-104.335421	1,405,235.27	3,324,147.00
12,037.00	90.48	88.07	6,512.48	756.69	5,387.90	40.439934	-104.335091	1,405,238.12	3,324,238.94
12,129.00	89.62	88.17	6,512.40	759.71	5,479.85	40.439939	-104.334760	1,405,241.14	3,324,330.89
12,224.00	90.03	88.41	6,512.69	762.54	5,574.81	40.439944	-104.334419	1,405,243.97	3,324,425.84
12,318.00	90.31	88.28	6,512.41	765.25	5,668.77	40.439948	-104.334081	1,405,246.69	3,324,519.80

## Design Report for Wells Ranch AE32-630 - 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)
12,413.00	89.66	88.41	6,512.43	768.00	5,763.73	40.439952	-104.333740	1,405,249.43	3,324,614.76
12,508.00	90.10	88.50	6,512.63	770.56	5,858.69	40.439955	-104.333399	1,405,251.99	3,324,709.72
12,602.00	89.83	88.89	6,512.69	772.70	5,952.67	40.439958	-104.333061	1,405,254.13	3,324,803.69
12,697.00	90.69	88.48	6,512.26	774.88	6,047.64	40.439960	-104.332720	1,405,256.31	3,324,898.66
12,792.00	90.96	87.78	6,510.89	777.98	6,142.58	40.439965	-104.332379	1,405,259.41	3,324,993.59
12,887.00	90.52	88.29	6,509.66	781.24	6,237.51	40.439971	-104.332038	1,405,262.67	3,325,088.53
12,982.00	91.24	87.46	6,508.20	784.76	6,332.44	40.439977	-104.331696	1,405,266.19	3,325,183.44
13,076.00	91.00	88.25	6,506.37	788.28	6,426.35	40.439983	-104.331359	1,405,269.71	3,325,277.36
13,170.00	92.34	87.92	6,503.63	791.42	6,520.26	40.439989	-104.331021	1,405,272.85	3,325,371.26
13,265.00	91.14	87.68	6,500.74	795.06	6,615.14	40.439995	-104.330680	1,405,276.49	3,325,466.14
13,360.00	90.93	88.57	6,499.03	798.17	6,710.07	40.440000	-104.330339	1,405,279.60	3,325,561.07
13,455.00	91.00	88.44	6,497.43	800.65	6,805.03	40.440004	-104.329998	1,405,282.08	3,325,656.02
13,550.00	91.10	88.18	6,495.69	803.45	6,899.97	40.440008	-104.329657	1,405,284.88	3,325,750.96
13,644.00	91.44	88.34	6,493.60	806.30	6,993.90	40.440012	-104.329319	1,405,287.73	3,325,844.89
13,739.00	90.52	87.52	6,491.98	809.73	7,088.83	40.440018	-104.328978	1,405,291.16	3,325,939.81
13,834.00	90.69	87.52	6,490.98	813.84	7,183.73	40.440026	-104.328637	1,405,295.27	3,326,034.71
13,929.00	90.76	88.43	6,489.77	817.20	7,278.66	40.440032	-104.328296	1,405,298.63	3,326,129.64
14,023.00	90.48	88.54	6,488.76	819.69	7,372.63	40.440035	-104.327958	1,405,301.12	3,326,223.59
14,118.00	91.48	88.77	6,487.13	821.92	7,467.58	40.440038	-104.327617	1,405,303.34	3,326,318.55
14,213.00	91.48	88.36	6,484.68	824.29	7,562.52	40.440041	-104.327276	1,405,305.72	3,326,413.48
14,307.00	91.34	88.66	6,482.36	826.74	7,656.46	40.440044	-104.326938	1,405,308.17	3,326,507.42
14,402.00	90.96	87.78	6,480.46	829.69	7,751.40	40.440049	-104.326597	1,405,311.12	3,326,602.35
14,497.00	91.48	87.81	6,478.44	833.34	7,846.30	40.440056	-104.326256	1,405,314.77	3,326,697.26
14,592.00	90.79	87.97	6,476.55	836.84	7,941.22	40.440062	-104.325915	1,405,318.27	3,326,792.17
14,687.00	90.86	88.21	6,475.19	840.00	8,036.16	40.440067	-104.325574	1,405,321.43	3,326,887.10
14,781.00	90.76	87.75	6,473.86	843.32	8,130.09	40.440073	-104.325236	1,405,324.75	3,326,981.03
14,876.00	91.62	88.01	6,471.88	846.83	8,225.00	40.440079	-104.324895	1,405,328.26	3,327,075.94
14,971.00	90.69	87.93	6,469.97	850.20	8,319.92	40.440085	-104.324554	1,405,331.62	3,327,170.86
15,066.00	90.76	87.91	6,468.77	853.64	8,414.85	40.440091	-104.324213	1,405,335.07	3,327,265.78
15,160.00	90.62	88.22	6,467.63	856.82	8,508.79	40.440096	-104.323875	1,405,338.25	3,327,359.72
15,255.00	91.17	89.11	6,466.15	859.03	8,603.75	40.440099	-104.323534	1,405,340.46	3,327,454.68
15,350.00	91.44	88.32	6,463.99	861.16	8,698.70	40.440101	-104.323193	1,405,342.59	3,327,549.62
15,445.00	91.55	88.97	6,461.51	863.41	8,793.64	40.440104	-104.322851	1,405,344.83	3,327,644.56
15,539.00	91.06	88.12	6,459.37	865.79	8,887.59	40.440107	-104.322514	1,405,347.22	3,327,738.50
15,634.00	91.07	87.56	6,457.60	869.37	8,982.50	40.440113	-104.322173	1,405,350.80	3,327,833.41
15,729.00	91.75	87.95	6,455.26	873.09	9,077.40	40.440120	-104.321832	1,405,354.52	3,327,928.31
15,824.00	91.48	88.36	6,452.59	876.15	9,172.31	40.440125	-104.321491	1,405,357.58	3,328,023.22
15,918.00	90.69	88.34	6,450.81	878.86	9,266.26	40.440129	-104.321153	1,405,360.28	3,328,117.16
15,987.00	91.41	88.89	6,449.54	880.52	9,335.23	40.440131	-104.320905	1,405,361.95	3,328,186.12
16,027.00	91.41	88.89	6,448.56	881.30	9,375.21	40.440132	-104.320762	1,405,362.73	3,328,226.10

## Design Report for Wells Ranch AE32-630 - Actual Surveys

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
300.00	300.00	-0.17	-0.06	First Surface MWD Survey at 300.00ft
676.00	676.00	-0.85	-0.31	Final Surface MWD Survey at 676.00ft
816.00	816.00	-1.23	-0.44	First Sperry MWD Survey at 816.00ft
6,944.00	6,528.00	618.04	298.27	Final Sperry MWD Survey at 6944.00ft
6,944.00	6,528.00	618.04	298.27	Tie on to Sperry MWD Survey at 6944.00ft
7,072.00	6,537.38	629.97	425.31	First Schlumberger IFR Survey at 7072.00ft
15,987.00	6,449.54	880.52	9,335.23	Final Schlumberger IFR Survey at 15987.00ft

### Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Wells Ranch AE32-630_Rev A1_BHL	84.63	Slot	0.00	0.00	0.00

### Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
300.00	676.00	Surface Surveys	MWD
816.00	6,944.00	Intermediate Surveys	MWD
6,944.00	16,027.00	Schlumberger MWD+IFR Surveys	MWD+IFR1+MS_WY

### Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
666.00	666.00	9 5/8"	9-5/8	13-3/4
6,996.00	6,533.17	7"	7	8-3/4

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Design Report for Wells Ranch AE32-630 - Actual Surveys

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**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:	1.40 °/100usft	Maximum Dogleg over Survey:	12.83 °/100usft at 6,526.00 usft
Net Tortousity applicable to Plans:	0.65 °/100usft	Directional Difficulty Index:	6.753

**Audit Info**

**North Reference Sheet for Sec. 32-T6N-R62W (Wells Ranch AE32) - Wells Ranch AE32-630 - 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' @ 4744.00usft (H&P 273). Northing and Easting are relative to Wells Ranch AE32-630

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: 0.99996218

Grid Coordinates of Well: 1,404,481.46 usft N, 3,318,851.25 usft E

Geographical Coordinates of Well: 40° 26' 16.98" N, 104° 21' 16.13" W

Grid Convergence at Surface is: 0.74°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,027.00usft

the Bottom Hole Displacement is 9,416.54usft in the Direction of 84.63° (Grid).

Magnetic Convergence at surface is: -7.56° ( 8 October 2015, , BGGM2015)

