

Noble Energy

Weld County, CO (NAD 83)

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

Wells Ranch AE32-615

05-123-41788

Plan A

Design: Actual Surveys

Sperry Drilling Services

Final Survey Report

07 October, 2015

Surface UWI : 05-123-41788

Well Coordinates: 1,404,368.50 N, 3,318,849.92 E (40° 26' 15.86" N, 104° 21' 16.16" W)

Ground Level: 4,718.00 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 AE32-615

KB = 24' @ 4742.00usft (H&P 273)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

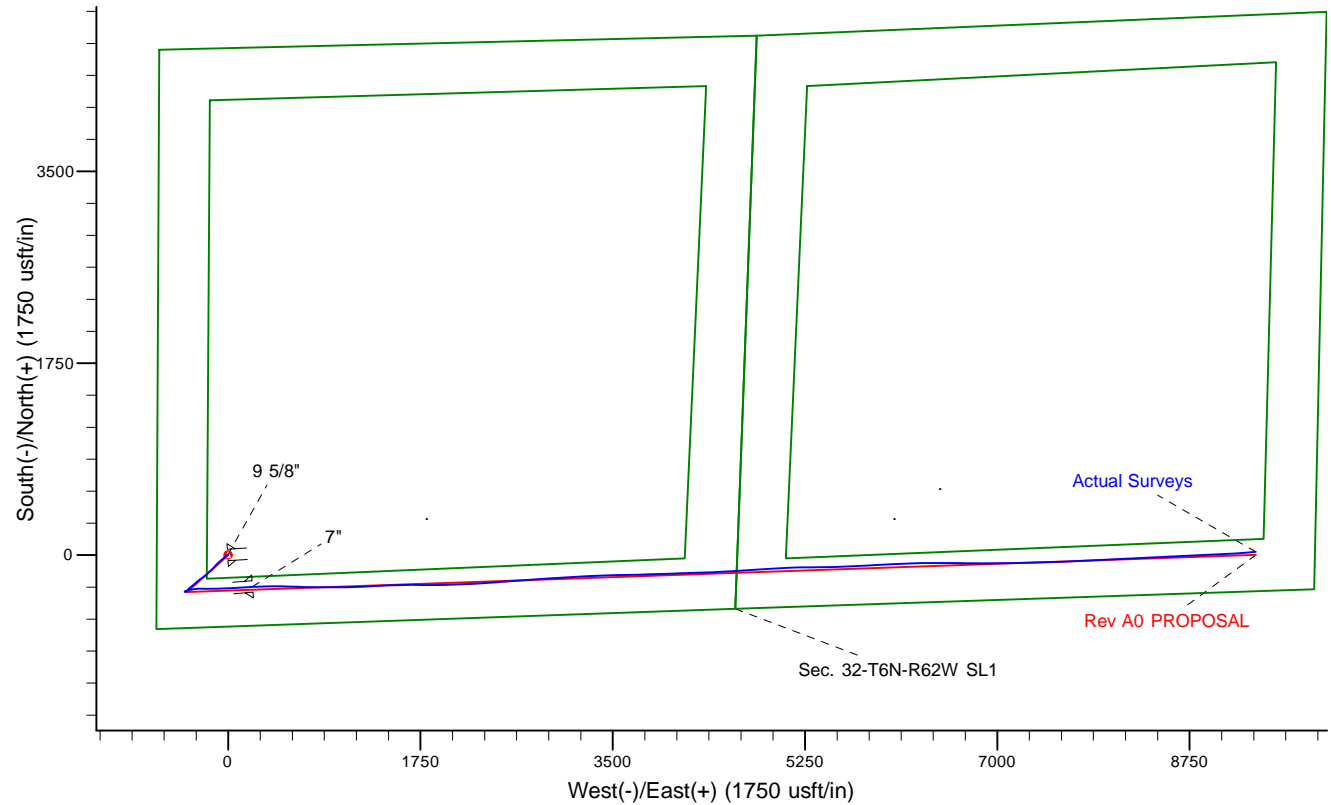
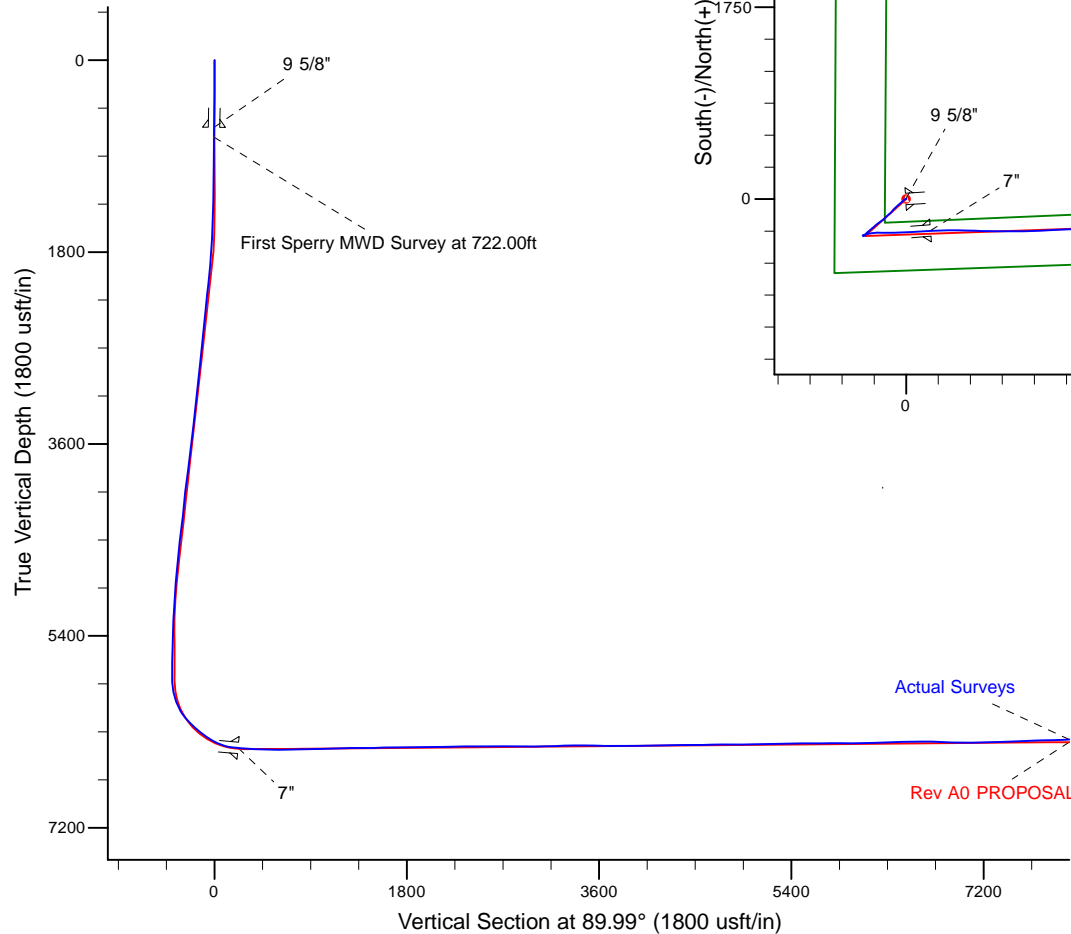
Project: Weld County, CO (NAD 83)
 Site: Sec. 32-T6N-R62W (Wells Ranch AE32)
 Well: Wells Ranch AE32-615
 Wellbore: Plan A
 Design: Actual Surveys



Platted SHL: 652' FSL, 650' FWL
 Platted Lat/Long: 40.43774, -104.35449
 Location: Sec. 32-T6N-R62W

~7" Casing: 363' FSL, 870' FWL
 Lat/Long: 40.436946 N, -104.353707 W
 State Planes - CO Northern: 1,404,082.04 N, 3,319,071.78 E
 Sec. 32-T6N-R62W

Platted BHL: 330' FSL, 535' FEL
 Platted Lat/Long: 40.437486 N, -104.320904 W
 State Planes - CO Northern: 1,404,398.52 N, 3,328,199.20 E
 Location: Sec. 33-T6N-R62W



LEGEND

- Wells Ranch AE32-615, Plan A, Rev A0 PROPOSAL V0
- Actual Surveys

WELL DETAILS: Wells Ranch AE32-615

Ground Level: 4718.00
 KB = 24' @ 4742.00usft (H&P 273)

Created By: Tatiana Gomez
 Created On: 10/7/2015

Design Report for Wells Ranch AE32-615 - 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 AE32-615_Rev A0_SHL							
300.00	0.32	266.48	300.00	-0.05	-0.84	-0.84	0.11
First Gyro Survey at 300.00ft							
630.00	0.66	266.48	629.99	-0.23	-3.66	-3.66	0.10
9 5/8"							
637.00	0.67	266.48	636.99	-0.23	-3.74	-3.74	0.10
Final Gyro Survey at 637.00ft							
722.00	0.76	266.48	721.98	-0.30	-4.80	-4.80	0.11
First Sperry MWD Survey at 722.00ft							
815.00	0.75	267.27	814.97	-0.36	-6.02	-6.02	0.02
909.00	0.75	264.58	908.96	-0.45	-7.25	-7.25	0.04
1,003.00	0.73	261.97	1,002.95	-0.59	-8.46	-8.46	0.04
1,097.00	0.76	264.88	1,096.95	-0.73	-9.67	-9.67	0.05
1,189.00	0.79	268.76	1,188.94	-0.80	-10.91	-10.91	0.07
1,280.00	0.71	273.09	1,279.93	-0.78	-12.10	-12.10	0.11
1,463.00	0.74	266.42	1,462.92	-0.79	-14.41	-14.41	0.05
1,555.00	3.36	230.32	1,554.85	-2.55	-17.08	-17.08	3.04
1,646.00	5.10	223.33	1,645.60	-7.20	-21.91	-21.91	1.99
1,737.00	5.00	223.64	1,736.25	-13.01	-27.42	-27.43	0.11
1,828.00	6.81	227.61	1,826.76	-19.52	-34.15	-34.15	2.04
1,920.00	6.84	225.69	1,918.11	-27.02	-42.09	-42.10	0.25
2,012.00	6.52	224.40	2,009.48	-34.58	-49.67	-49.68	0.38
2,103.00	8.15	231.41	2,099.74	-42.30	-58.33	-58.34	2.04
2,194.00	8.11	231.01	2,189.82	-50.36	-68.36	-68.37	0.08
2,286.00	7.80	230.08	2,280.94	-58.45	-78.19	-78.20	0.36
2,378.00	7.28	227.03	2,372.14	-66.43	-87.24	-87.26	0.71
2,469.00	8.95	225.25	2,462.23	-75.34	-96.49	-96.51	1.86
2,560.00	8.34	222.70	2,552.20	-85.18	-105.99	-106.01	0.79
2,652.00	8.09	221.98	2,643.25	-94.89	-114.85	-114.87	0.29
2,744.00	7.84	219.42	2,734.36	-104.55	-123.16	-123.19	0.47
2,836.00	9.08	225.33	2,825.36	-114.50	-132.31	-132.34	1.64
2,931.00	9.10	224.59	2,919.17	-125.12	-142.91	-142.95	0.12
3,025.00	9.15	226.62	3,011.98	-135.55	-153.56	-153.60	0.35
3,120.00	9.09	229.03	3,105.78	-145.66	-164.72	-164.76	0.41
3,215.00	8.25	226.77	3,199.69	-155.25	-175.35	-175.39	0.95
3,309.00	7.55	223.60	3,292.80	-164.34	-184.53	-184.57	0.88
3,404.00	7.06	223.47	3,387.03	-173.09	-192.85	-192.89	0.52
3,499.00	8.47	232.34	3,481.16	-181.61	-202.40	-202.45	1.94
3,593.00	8.89	232.86	3,574.08	-190.22	-213.67	-213.72	0.45
3,783.00	9.27	233.97	3,761.70	-208.09	-237.75	-237.80	0.22
3,878.00	8.95	234.46	3,855.50	-216.88	-249.95	-250.01	0.35
3,972.00	8.82	232.68	3,948.38	-225.50	-261.63	-261.69	0.32
4,067.00	8.43	230.93	4,042.30	-234.31	-272.83	-272.89	0.49
4,162.00	7.96	228.99	4,136.33	-243.01	-283.20	-283.26	0.57
4,256.00	7.33	223.80	4,229.50	-251.61	-292.26	-292.33	0.99
4,351.00	8.51	231.19	4,323.59	-260.39	-301.94	-302.00	1.64
4,446.00	8.99	234.64	4,417.49	-269.09	-313.47	-313.54	0.75
4,541.00	8.20	230.68	4,511.42	-277.68	-324.76	-324.83	1.04
4,635.00	7.73	230.03	4,604.51	-285.99	-334.79	-334.87	0.51

Design Report for Wells Ranch AE32-615 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,730.00	7.65	227.42	4,698.66	-294.37	-344.35	-344.42	0.38
4,825.00	7.35	224.49	4,792.85	-302.99	-353.26	-353.34	0.51
4,920.00	7.16	223.42	4,887.08	-311.62	-361.59	-361.67	0.25
5,014.00	6.64	223.13	4,980.40	-319.84	-369.33	-369.41	0.55
5,109.00	6.10	219.68	5,074.82	-327.74	-376.31	-376.39	0.70
5,204.00	4.05	235.11	5,169.44	-333.54	-382.28	-382.37	2.57
5,298.00	2.00	233.33	5,263.31	-336.42	-386.32	-386.41	2.18
5,393.00	1.42	314.59	5,358.28	-336.58	-388.49	-388.58	2.39
5,488.00	1.42	308.68	5,453.25	-335.02	-390.25	-390.33	0.15
5,583.00	1.40	299.56	5,548.22	-333.71	-392.18	-392.26	0.24
5,678.00	1.27	293.83	5,643.19	-332.71	-394.15	-394.23	0.20
5,772.00	1.29	300.16	5,737.17	-331.76	-396.02	-396.10	0.15
5,867.00	1.08	72.77	5,832.16	-330.96	-396.09	-396.17	2.29
5,962.00	12.02	68.07	5,926.40	-326.99	-386.02	-386.11	11.52
6,057.00	20.75	75.80	6,017.46	-319.15	-360.48	-360.56	9.45
6,151.00	31.34	81.62	6,101.81	-311.48	-320.03	-320.11	11.58
6,246.00	40.29	87.80	6,178.79	-306.69	-264.77	-264.84	10.15
6,341.00	48.99	91.05	6,246.33	-306.16	-198.10	-198.18	9.47
6,436.00	49.41	89.73	6,308.41	-306.65	-126.19	-126.27	1.14
6,530.00	58.66	88.48	6,363.56	-305.42	-50.20	-50.28	9.90
6,625.00	65.56	87.37	6,407.97	-302.35	33.66	33.58	7.34
6,720.00	77.29	84.74	6,438.18	-296.10	123.32	123.25	12.62
6,779.00	84.26	83.78	6,447.63	-290.27	181.23	181.16	11.92
6,820.00	84.93	85.52	6,451.50	-286.47	221.87	221.79	4.53
7"							
6,950.00	87.07	91.02	6,460.58	-282.56	351.43	351.36	4.53
7,044.00	88.15	91.79	6,464.50	-284.86	445.32	445.25	1.41
7,139.00	89.38	90.73	6,466.54	-286.95	540.27	540.20	1.71
7,234.00	89.57	91.47	6,467.41	-288.78	635.25	635.18	0.80
7,328.00	90.40	90.36	6,467.44	-290.28	729.24	729.16	1.47
7,423.00	92.28	91.90	6,465.22	-292.15	824.19	824.11	2.56
7,518.00	91.14	90.22	6,462.38	-293.91	919.12	919.05	2.14
7,612.00	92.37	89.51	6,459.50	-293.69	1,013.08	1,013.00	1.51
7,707.00	91.17	88.15	6,456.57	-291.75	1,108.01	1,107.93	1.91
7,801.00	92.40	87.16	6,453.64	-287.90	1,201.88	1,201.81	1.68
7,896.00	90.55	87.10	6,451.20	-283.15	1,296.72	1,296.65	1.95
7,991.00	89.85	87.79	6,450.86	-278.91	1,391.63	1,391.56	1.03
8,086.00	91.36	87.62	6,449.86	-275.11	1,486.54	1,486.47	1.60
8,180.00	91.26	88.36	6,447.71	-271.81	1,580.46	1,580.39	0.79
8,275.00	91.97	91.31	6,445.03	-271.54	1,675.41	1,675.34	3.19
8,369.00	89.41	90.30	6,443.90	-272.86	1,769.39	1,769.32	2.93
8,464.00	89.62	89.02	6,444.71	-272.29	1,864.38	1,864.31	1.37
8,558.00	91.39	89.36	6,443.88	-270.97	1,958.36	1,958.29	1.92
8,652.00	90.40	87.55	6,442.41	-268.43	2,052.31	2,052.24	2.19
8,747.00	91.88	88.34	6,440.52	-265.03	2,147.23	2,147.16	1.77
8,841.00	90.92	86.58	6,438.22	-260.86	2,241.10	2,241.04	2.13
8,936.00	90.40	86.29	6,437.13	-254.95	2,335.91	2,335.85	0.63
9,030.00	90.31	85.59	6,436.55	-248.30	2,429.67	2,429.61	0.75
9,125.00	90.25	85.64	6,436.08	-241.04	2,524.40	2,524.33	0.08
9,219.00	89.78	85.49	6,436.06	-233.77	2,618.11	2,618.05	0.52
9,313.00	90.93	86.10	6,435.47	-226.87	2,711.86	2,711.80	1.38

Design Report for Wells Ranch AE32-615 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,408.00	89.32	86.25	6,435.27	-220.54	2,806.64	2,806.59	1.70
9,502.00	89.11	86.16	6,436.56	-214.32	2,900.43	2,900.37	0.24
9,597.00	90.06	85.90	6,437.24	-207.74	2,995.20	2,995.14	1.04
9,691.00	91.91	85.74	6,435.63	-200.89	3,088.93	3,088.88	1.98
9,786.00	91.94	86.93	6,432.44	-194.82	3,183.68	3,183.63	1.25
9,880.00	91.91	88.38	6,429.28	-190.98	3,277.54	3,277.49	1.54
9,975.00	91.02	87.70	6,426.85	-187.73	3,372.46	3,372.41	1.18
10,069.00	89.01	88.45	6,426.83	-184.57	3,466.40	3,466.35	2.28
10,164.00	88.80	88.79	6,428.64	-182.28	3,561.35	3,561.30	0.42
10,256.00	89.01	88.62	6,430.40	-180.20	3,653.31	3,653.27	0.29
10,347.00	90.25	88.84	6,430.99	-178.19	3,744.29	3,744.24	1.38
10,438.00	89.51	87.56	6,431.18	-175.33	3,835.24	3,835.19	1.62
10,622.00	90.86	88.45	6,430.58	-168.92	4,019.12	4,019.08	0.88
10,713.00	92.25	87.55	6,428.11	-165.75	4,110.03	4,109.98	1.82
10,804.00	91.64	87.37	6,425.02	-161.72	4,200.88	4,200.84	0.70
10,895.00	90.15	88.50	6,423.60	-158.44	4,291.81	4,291.77	2.05
10,987.00	90.03	87.87	6,423.46	-155.53	4,383.76	4,383.72	0.70
11,079.00	90.15	86.98	6,423.31	-151.39	4,475.67	4,475.63	0.98
11,170.00	91.94	87.46	6,421.65	-146.98	4,566.54	4,566.51	2.04
11,261.00	90.77	87.29	6,419.50	-142.81	4,657.42	4,657.38	1.30
11,353.00	90.37	85.71	6,418.59	-137.20	4,749.24	4,749.21	1.77
11,445.00	90.06	85.57	6,418.24	-130.20	4,840.97	4,840.94	0.37
11,536.00	90.80	86.98	6,417.56	-124.29	4,931.78	4,931.75	1.75
11,627.00	90.34	85.74	6,416.65	-118.52	5,022.59	5,022.56	1.45
11,719.00	90.12	87.62	6,416.28	-113.19	5,114.43	5,114.40	2.06
11,811.00	92.13	89.65	6,414.48	-111.00	5,206.37	5,206.35	3.10
11,903.00	91.54	90.08	6,411.53	-110.78	5,298.33	5,298.30	0.79
11,998.00	90.86	89.28	6,409.54	-110.25	5,393.30	5,393.27	1.11
12,092.00	90.83	87.59	6,408.16	-107.68	5,487.25	5,487.23	1.80
12,187.00	90.09	87.85	6,407.39	-103.90	5,582.17	5,582.15	0.83
12,282.00	90.09	88.12	6,407.24	-100.56	5,677.12	5,677.09	0.28
12,376.00	90.83	88.63	6,406.49	-97.90	5,771.07	5,771.05	0.96
12,471.00	90.40	86.47	6,405.47	-93.84	5,865.98	5,865.95	2.32
12,566.00	90.31	86.36	6,404.88	-87.90	5,960.79	5,960.77	0.15
12,660.00	90.34	86.54	6,404.35	-82.08	6,054.61	6,054.59	0.19
12,755.00	90.96	87.01	6,403.27	-76.73	6,149.45	6,149.43	0.82
12,850.00	91.45	89.57	6,401.27	-73.90	6,244.38	6,244.36	2.74
12,945.00	92.78	89.18	6,397.77	-72.86	6,339.30	6,339.29	1.46
13,039.00	92.00	89.79	6,393.85	-72.02	6,433.22	6,433.20	1.05
13,134.00	91.26	89.84	6,391.14	-71.71	6,528.18	6,528.16	0.78
13,229.00	89.41	90.77	6,390.59	-72.22	6,623.17	6,623.15	2.18
13,323.00	88.71	90.48	6,392.13	-73.24	6,717.15	6,717.13	0.81
13,418.00	88.09	90.51	6,394.78	-74.06	6,812.11	6,812.09	0.65
13,513.00	87.78	89.72	6,398.21	-74.25	6,907.05	6,907.03	0.89
13,608.00	88.67	89.44	6,401.15	-73.56	7,002.00	7,001.98	0.98
13,702.00	90.80	89.49	6,401.58	-72.68	7,095.99	7,095.97	2.27
13,797.00	91.11	88.99	6,400.00	-71.42	7,190.97	7,190.95	0.62
13,892.00	91.82	88.21	6,397.57	-69.10	7,285.91	7,285.89	1.11
13,987.00	93.15	88.47	6,393.45	-66.35	7,380.77	7,380.76	1.43
14,081.00	92.62	88.19	6,388.72	-63.62	7,474.61	7,474.60	0.64
14,176.00	91.51	87.97	6,385.30	-60.43	7,569.50	7,569.48	1.19

Design Report for Wells Ranch AE32-615 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
14,271.00	92.19	87.94	6,382.23	-57.05	7,664.39	7,664.37	0.72
14,365.00	91.45	87.49	6,379.25	-53.30	7,758.26	7,758.25	0.92
14,460.00	90.96	87.32	6,377.25	-49.00	7,853.15	7,853.13	0.55
14,555.00	91.51	87.69	6,375.20	-44.87	7,948.03	7,948.02	0.70
14,650.00	92.44	87.09	6,371.93	-40.54	8,042.88	8,042.87	1.16
14,745.00	90.80	87.22	6,369.24	-35.83	8,137.72	8,137.71	1.73
14,839.00	90.83	87.42	6,367.90	-31.43	8,231.61	8,231.60	0.22
14,934.00	90.34	86.72	6,366.93	-26.58	8,326.48	8,326.47	0.90
15,029.00	90.59	85.67	6,366.16	-20.27	8,421.26	8,421.26	1.14
15,124.00	89.78	87.25	6,365.86	-14.41	8,516.08	8,516.07	1.87
15,218.00	89.78	87.51	6,366.22	-10.11	8,609.98	8,609.97	0.28
15,313.00	90.34	87.55	6,366.12	-6.02	8,704.89	8,704.89	0.59
15,408.00	90.80	87.53	6,365.17	-1.94	8,799.80	8,799.80	0.48
15,503.00	91.48	87.76	6,363.28	1.96	8,894.70	8,894.70	0.76
15,597.00	91.91	87.70	6,360.50	5.68	8,988.58	8,988.58	0.46
15,692.00	91.76	86.28	6,357.46	10.67	9,083.40	9,083.40	1.50
15,787.00	92.31	86.12	6,354.09	16.96	9,178.13	9,178.13	0.60
15,894.00	93.05	85.43	6,349.08	24.84	9,284.72	9,284.73	0.95
Final Sperry MWD Survey at 15894.00ft							
15,959.20	93.05	85.43	6,345.61	30.02	9,349.63	9,349.63	0.00
Wells Ranch AE32-615_Rev A0_BHL							
15,962.00	93.05	85.43	6,345.47	30.25	9,352.41	9,352.42	0.00
Straight Line Projection to TD at 15962.00ft							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
300.00	300.00	-0.05	-0.84	First Gyro Survey at 300.00ft
637.00	636.99	-0.23	-3.74	Final Gyro Survey at 637.00ft
722.00	721.98	-0.30	-4.80	First Sperry MWD Survey at 722.00ft
15,894.00	6,349.08	24.84	9,284.72	Final Sperry MWD Survey at 15894.00ft
15,962.00	6,345.47	30.25	9,352.41	Straight Line Projection to TD at 15962.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Wells Ranch AE32-615_Rev A0_BHL	89.99	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
300.00	637.00	Surface Surveys	Flexi-Shot
722.00	6,779.00	Intermediate Surveys	MWD
6,950.00	15,962.00	Production Surveys	MWD+IFR1+MS_WY

Design Report for Wells Ranch AE32-615 - Actual Surveys

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
630.00	629.99	9 5/8"	9-5/8	13-3/4
6,820.00	6,451.50	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 AE32-615	0.00	0.00	0.00	0.01	0.00	1,404,368.51	3,318,849.92	40.437740	-104.354490
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Wells Ranch AE32-615	0.00	0.00	6,384.00	2.39	9,353.89	1,404,370.89	3,328,203.46	40.437410	-104.320890
- actual wellpath misses target center by 47.49usft at 15959.20usft MD (6345.61 TVD, 30.02 N, 9349.63 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.54 °/100usft	Maximum Dogleg over Survey:	12.62 °/100usft at 6,720.00 usft
Net Tortosity applicable to Plans:	0.87 °/100usft	Directional Difficulty Index:	6.796

Audit Info

North Reference Sheet for Sec. 32-T6N-R62W (Wells Ranch AE32) - Wells Ranch
AE32-615 - 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' @ 4742.00usft (H&P 273). Northing and Easting are relative to Wells Ranch AE32-615

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: 0.99996216

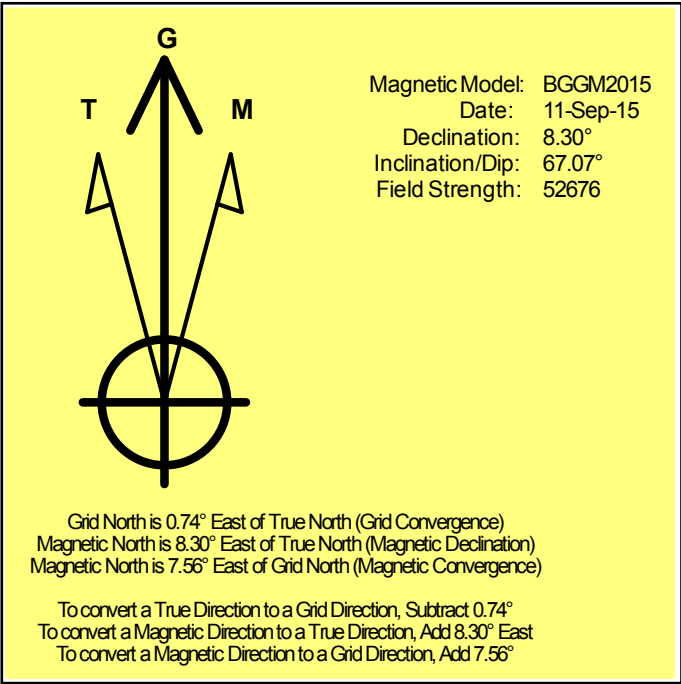
Grid Coordinates of Well: 1,404,368.50 usft N, 3,318,849.92 usft E

Geographical Coordinates of Well: 40° 26' 15.86" N, 104° 21' 16.16" W

Grid Convergence at Surface is: 0.74°

Based upon Minimum Curvature type calculations, at a Measured Depth of 15,962.00usft
the Bottom Hole Displacement is 9,352.46usft in the Direction of 89.81° (Grid).

Magnetic Convergence at surface is: -7.56° (11 September 2015, , BGGM2015)



Noble Energy

Weld County, CO (NAD 83)

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

Wells Ranch AE32-615

05-123-41788

Plan A

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

07 October, 2015

Well Coordinates: 1,404,368.50 N, 3,318,849.92 E (40° 26' 15.86" N, 104° 21' 16.16" W)

Ground Level: 4,718.00 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 AE32-615

KB = 24' @ 4742.00usft (H&P 273)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for Wells Ranch AE32-615 - 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	40.437740	-104.354490	1,404,368.50	3,318,849.92
300.00	0.32	266.48	300.00	-0.05	-0.84	40.437740	-104.354493	1,404,368.45	3,318,849.09
630.00	0.66	266.48	629.99	-0.23	-3.66	40.437740	-104.354503	1,404,368.27	3,318,846.26
637.00	0.67	266.48	636.99	-0.23	-3.74	40.437740	-104.354504	1,404,368.27	3,318,846.18
722.00	0.76	266.48	721.98	-0.30	-4.80	40.437739	-104.354508	1,404,368.20	3,318,845.12
815.00	0.75	267.27	814.97	-0.36	-6.02	40.437739	-104.354512	1,404,368.13	3,318,843.90
909.00	0.75	264.58	908.96	-0.45	-7.25	40.437739	-104.354516	1,404,368.05	3,318,842.67
1,003.00	0.73	261.97	1,002.95	-0.59	-8.46	40.437739	-104.354521	1,404,367.91	3,318,841.47
1,097.00	0.76	264.88	1,096.95	-0.73	-9.67	40.437738	-104.354525	1,404,367.77	3,318,840.25
1,189.00	0.79	268.76	1,188.94	-0.80	-10.91	40.437738	-104.354529	1,404,367.70	3,318,839.01
1,280.00	0.71	273.09	1,279.93	-0.78	-12.10	40.437738	-104.354534	1,404,367.72	3,318,837.82
1,463.00	0.74	266.42	1,462.92	-0.79	-14.41	40.437738	-104.354542	1,404,367.70	3,318,835.51
1,555.00	3.36	230.32	1,554.85	-2.55	-17.08	40.437734	-104.354552	1,404,365.94	3,318,832.84
1,646.00	5.10	223.33	1,645.60	-7.20	-21.91	40.437721	-104.354569	1,404,361.30	3,318,828.01
1,737.00	5.00	223.64	1,736.25	-13.01	-27.42	40.437705	-104.354589	1,404,355.49	3,318,822.50
1,828.00	6.81	227.61	1,826.76	-19.52	-34.15	40.437688	-104.354614	1,404,348.98	3,318,815.78
1,920.00	6.84	225.69	1,918.11	-27.02	-42.09	40.437667	-104.354643	1,404,341.48	3,318,807.83
2,012.00	6.52	224.40	2,009.48	-34.58	-49.67	40.437647	-104.354670	1,404,333.92	3,318,800.26
2,103.00	8.15	231.41	2,099.74	-42.30	-58.33	40.437626	-104.354702	1,404,326.20	3,318,791.60
2,194.00	8.11	231.01	2,189.82	-50.36	-68.36	40.437604	-104.354738	1,404,318.14	3,318,781.57
2,286.00	7.80	230.08	2,280.94	-58.45	-78.19	40.437582	-104.354774	1,404,310.05	3,318,771.74
2,378.00	7.28	227.03	2,372.14	-66.43	-87.24	40.437561	-104.354807	1,404,302.07	3,318,762.69
2,469.00	8.95	225.25	2,462.23	-75.34	-96.49	40.437537	-104.354840	1,404,293.16	3,318,753.44
2,560.00	8.34	222.70	2,552.20	-85.18	-105.99	40.437510	-104.354875	1,404,283.32	3,318,743.94
2,652.00	8.09	221.98	2,643.25	-94.89	-114.85	40.437484	-104.354907	1,404,273.61	3,318,735.08
2,744.00	7.84	219.42	2,734.36	-104.55	-123.16	40.437457	-104.354938	1,404,263.95	3,318,726.77
2,836.00	9.08	225.33	2,825.36	-114.50	-132.31	40.437430	-104.354971	1,404,254.00	3,318,717.62
2,931.00	9.10	224.59	2,919.17	-125.12	-142.91	40.437402	-104.355009	1,404,243.38	3,318,707.02
3,025.00	9.15	226.62	3,011.98	-135.55	-153.56	40.437373	-104.355048	1,404,232.95	3,318,696.37
3,120.00	9.09	229.03	3,105.78	-145.66	-164.72	40.437346	-104.355089	1,404,222.84	3,318,685.21
3,215.00	8.25	226.77	3,199.69	-155.25	-175.35	40.437320	-104.355127	1,404,213.26	3,318,674.58
3,309.00	7.55	223.60	3,292.80	-164.34	-184.53	40.437296	-104.355161	1,404,204.17	3,318,665.41
3,404.00	7.06	223.47	3,387.03	-173.09	-192.85	40.437272	-104.355191	1,404,195.41	3,318,657.09
3,499.00	8.47	232.34	3,481.16	-181.61	-202.40	40.437249	-104.355226	1,404,186.90	3,318,647.53
3,593.00	8.89	232.86	3,574.08	-190.22	-213.67	40.437226	-104.355267	1,404,178.28	3,318,636.26
3,783.00	9.27	233.97	3,761.70	-208.09	-237.75	40.437177	-104.355354	1,404,160.42	3,318,612.18
3,878.00	8.95	234.46	3,855.50	-216.88	-249.95	40.437154	-104.355398	1,404,151.62	3,318,599.98
3,972.00	8.82	232.68	3,948.38	-225.50	-261.63	40.437130	-104.355441	1,404,143.00	3,318,588.30
4,067.00	8.43	230.93	4,042.30	-234.31	-272.83	40.437107	-104.355481	1,404,134.20	3,318,577.10
4,162.00	7.96	228.99	4,136.33	-243.01	-283.20	40.437083	-104.355519	1,404,125.49	3,318,566.73
4,256.00	7.33	223.80	4,229.50	-251.61	-292.26	40.437060	-104.355552	1,404,116.89	3,318,557.67
4,351.00	8.51	231.19	4,323.59	-260.39	-301.94	40.437036	-104.355587	1,404,108.12	3,318,548.00

Design Report for Wells Ranch AE32-615 - 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)
4,446.00	8.99	234.64	4,417.49	-269.09	-313.47	40.437013	-104.355629	1,404,099.41	3,318,536.47
4,541.00	8.20	230.68	4,511.42	-277.68	-324.76	40.436989	-104.355670	1,404,090.83	3,318,525.17
4,635.00	7.73	230.03	4,604.51	-285.99	-334.79	40.436967	-104.355706	1,404,082.52	3,318,515.14
4,730.00	7.65	227.42	4,698.66	-294.37	-344.35	40.436944	-104.355741	1,404,074.14	3,318,505.59
4,825.00	7.35	224.49	4,792.85	-302.99	-353.26	40.436921	-104.355773	1,404,065.52	3,318,496.68
4,920.00	7.16	223.42	4,887.08	-311.62	-361.59	40.436898	-104.355804	1,404,056.89	3,318,488.35
5,014.00	6.64	223.13	4,980.40	-319.84	-369.33	40.436875	-104.355832	1,404,048.67	3,318,480.61
5,109.00	6.10	219.68	5,074.82	-327.74	-376.31	40.436854	-104.355857	1,404,040.77	3,318,473.63
5,204.00	4.05	235.11	5,169.44	-333.54	-382.28	40.436838	-104.355879	1,404,034.97	3,318,467.66
5,298.00	2.00	233.33	5,263.31	-336.42	-386.32	40.436830	-104.355894	1,404,032.09	3,318,463.62
5,393.00	1.42	314.59	5,358.28	-336.58	-388.49	40.436830	-104.355901	1,404,031.93	3,318,461.45
5,488.00	1.42	308.68	5,453.25	-335.02	-390.25	40.436834	-104.355908	1,404,033.49	3,318,459.69
5,583.00	1.40	299.56	5,548.22	-333.71	-392.18	40.436838	-104.355914	1,404,034.80	3,318,457.76
5,678.00	1.27	293.83	5,643.19	-332.71	-394.15	40.436841	-104.355922	1,404,035.80	3,318,455.79
5,772.00	1.29	300.16	5,737.17	-331.76	-396.02	40.436844	-104.355928	1,404,036.75	3,318,453.92
5,867.00	1.08	72.77	5,832.16	-330.96	-396.09	40.436846	-104.355928	1,404,037.55	3,318,453.85
5,962.00	12.02	68.07	5,926.40	-326.99	-386.02	40.436856	-104.355892	1,404,041.52	3,318,463.92
6,057.00	20.75	75.80	6,017.46	-319.15	-360.48	40.436877	-104.355800	1,404,049.36	3,318,489.46
6,151.00	31.34	81.62	6,101.81	-311.48	-320.03	40.436896	-104.355654	1,404,057.03	3,318,529.91
6,246.00	40.29	87.80	6,178.79	-306.69	-264.77	40.436908	-104.355456	1,404,061.82	3,318,585.17
6,341.00	48.99	91.05	6,246.33	-306.16	-198.10	40.436907	-104.355216	1,404,062.34	3,318,651.83
6,436.00	49.41	89.73	6,308.41	-306.65	-126.19	40.436903	-104.354958	1,404,061.86	3,318,723.74
6,530.00	58.66	88.48	6,363.56	-305.42	-50.20	40.436904	-104.354685	1,404,063.09	3,318,799.72
6,625.00	65.56	87.37	6,407.97	-302.35	33.66	40.436909	-104.354383	1,404,066.16	3,318,883.58
6,720.00	77.29	84.74	6,438.18	-296.10	123.32	40.436923	-104.354061	1,404,072.41	3,318,973.24
6,779.00	84.26	83.78	6,447.63	-290.27	181.23	40.436937	-104.353853	1,404,078.24	3,319,031.15
6,820.00	84.93	85.52	6,451.50	-286.47	221.87	40.436946	-104.353707	1,404,082.04	3,319,071.78
6,950.00	87.07	91.02	6,460.58	-282.56	351.43	40.436952	-104.353241	1,404,085.95	3,319,201.35
7,044.00	88.15	91.79	6,464.50	-284.86	445.32	40.436942	-104.352904	1,404,083.64	3,319,295.23
7,139.00	89.38	90.73	6,466.54	-286.95	540.27	40.436933	-104.352563	1,404,081.55	3,319,390.18
7,234.00	89.57	91.47	6,467.41	-288.78	635.25	40.436925	-104.352222	1,404,079.73	3,319,485.15
7,328.00	90.40	90.36	6,467.44	-290.28	729.24	40.436917	-104.351884	1,404,078.23	3,319,579.13
7,423.00	92.28	91.90	6,465.22	-292.15	824.19	40.436909	-104.351543	1,404,076.36	3,319,674.08
7,518.00	91.14	90.22	6,462.38	-293.91	919.12	40.436901	-104.351202	1,404,074.60	3,319,769.01
7,612.00	92.37	89.51	6,459.50	-293.69	1,013.08	40.436898	-104.350865	1,404,074.82	3,319,862.96
7,707.00	91.17	88.15	6,456.57	-291.75	1,108.01	40.436900	-104.350524	1,404,076.76	3,319,957.89
7,801.00	92.40	87.16	6,453.64	-287.90	1,201.88	40.436907	-104.350186	1,404,080.61	3,320,051.76
7,896.00	90.55	87.10	6,451.20	-283.15	1,296.72	40.436917	-104.349846	1,404,085.36	3,320,146.60
7,991.00	89.85	87.79	6,450.86	-278.91	1,391.63	40.436925	-104.349504	1,404,089.60	3,320,241.50
8,086.00	91.36	87.62	6,449.86	-275.11	1,486.54	40.436932	-104.349163	1,404,093.40	3,320,336.41
8,180.00	91.26	88.36	6,447.71	-271.81	1,580.46	40.436938	-104.348826	1,404,096.69	3,320,430.33
8,275.00	91.97	91.31	6,445.03	-271.54	1,675.41	40.436935	-104.348485	1,404,096.97	3,320,525.27

Design Report for Wells Ranch AE32-615 - 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)
8,369.00	89.41	90.30	6,443.90	-272.86	1,769.39	40.436928	-104.348147	1,404,095.65	3,320,619.24
8,464.00	89.62	89.02	6,444.71	-272.29	1,864.38	40.436926	-104.347806	1,404,096.21	3,320,714.23
8,558.00	91.39	89.36	6,443.88	-270.97	1,958.36	40.436927	-104.347468	1,404,097.54	3,320,808.21
8,652.00	90.40	87.55	6,442.41	-268.43	2,052.31	40.436930	-104.347131	1,404,100.08	3,320,902.16
8,747.00	91.88	88.34	6,440.52	-265.03	2,147.23	40.436936	-104.346790	1,404,103.48	3,320,997.07
8,841.00	90.92	86.58	6,438.22	-260.86	2,241.10	40.436944	-104.346452	1,404,107.65	3,321,090.94
8,936.00	90.40	86.29	6,437.13	-254.95	2,335.91	40.436957	-104.346111	1,404,113.55	3,321,185.75
9,030.00	90.31	85.59	6,436.55	-248.30	2,429.67	40.436972	-104.345774	1,404,120.21	3,321,279.51
9,125.00	90.25	85.64	6,436.08	-241.04	2,524.40	40.436989	-104.345434	1,404,127.47	3,321,374.22
9,219.00	89.78	85.49	6,436.06	-233.77	2,618.11	40.437005	-104.345097	1,404,134.74	3,321,467.94
9,313.00	90.93	86.10	6,435.47	-226.87	2,711.86	40.437021	-104.344760	1,404,141.63	3,321,561.68
9,408.00	89.32	86.25	6,435.27	-220.54	2,806.64	40.437035	-104.344419	1,404,147.97	3,321,656.46
9,502.00	89.11	86.16	6,436.56	-214.32	2,900.43	40.437049	-104.344082	1,404,154.19	3,321,750.24
9,597.00	90.06	85.90	6,437.24	-207.74	2,995.20	40.437063	-104.343741	1,404,160.77	3,321,845.01
9,691.00	91.91	85.74	6,435.63	-200.89	3,088.93	40.437079	-104.343404	1,404,167.62	3,321,938.73
9,786.00	91.94	86.93	6,432.44	-194.82	3,183.68	40.437092	-104.343063	1,404,173.68	3,322,033.48
9,880.00	91.91	88.38	6,429.28	-190.98	3,277.54	40.437099	-104.342726	1,404,177.53	3,322,127.34
9,975.00	91.02	87.70	6,426.85	-187.73	3,372.46	40.437105	-104.342385	1,404,180.78	3,322,222.25
10,069.00	89.01	88.45	6,426.83	-184.57	3,466.40	40.437110	-104.342047	1,404,183.93	3,322,316.19
10,164.00	88.80	88.79	6,428.64	-182.28	3,561.35	40.437113	-104.341706	1,404,186.22	3,322,411.14
10,256.00	89.01	88.62	6,430.40	-180.20	3,653.31	40.437115	-104.341376	1,404,188.30	3,322,503.10
10,347.00	90.25	88.84	6,430.99	-178.19	3,744.29	40.437117	-104.341049	1,404,190.32	3,322,594.07
10,438.00	89.51	87.56	6,431.18	-175.33	3,835.24	40.437122	-104.340722	1,404,193.17	3,322,685.02
10,622.00	90.86	88.45	6,430.58	-168.92	4,019.12	40.437133	-104.340061	1,404,199.58	3,322,868.89
10,713.00	92.25	87.55	6,428.11	-165.75	4,110.03	40.437138	-104.339734	1,404,202.75	3,322,959.80
10,804.00	91.64	87.37	6,425.02	-161.72	4,200.88	40.437146	-104.339408	1,404,206.78	3,323,050.65
10,895.00	90.15	88.50	6,423.60	-158.44	4,291.81	40.437152	-104.339081	1,404,210.06	3,323,141.57
10,987.00	90.03	87.87	6,423.46	-155.53	4,383.76	40.437157	-104.338751	1,404,212.98	3,323,233.52
11,079.00	90.15	86.98	6,423.31	-151.39	4,475.67	40.437165	-104.338420	1,404,217.11	3,323,325.42
11,170.00	91.94	87.46	6,421.65	-146.98	4,566.54	40.437174	-104.338094	1,404,221.52	3,323,416.30
11,261.00	90.77	87.29	6,419.50	-142.81	4,657.42	40.437182	-104.337767	1,404,225.69	3,323,507.17
11,353.00	90.37	85.71	6,418.59	-137.20	4,749.24	40.437194	-104.337437	1,404,231.30	3,323,598.99
11,445.00	90.06	85.57	6,418.24	-130.20	4,840.97	40.437210	-104.337107	1,404,238.30	3,323,690.72
11,536.00	90.80	86.98	6,417.56	-124.29	4,931.78	40.437223	-104.336781	1,404,244.21	3,323,781.51
11,627.00	90.34	85.74	6,416.65	-118.52	5,022.59	40.437235	-104.336454	1,404,249.99	3,323,872.32
11,719.00	90.12	87.62	6,416.28	-113.19	5,114.43	40.437247	-104.336124	1,404,255.31	3,323,964.16
11,811.00	92.13	89.65	6,414.48	-111.00	5,206.37	40.437249	-104.335794	1,404,257.50	3,324,056.10
11,903.00	91.54	90.08	6,411.53	-110.78	5,298.33	40.437247	-104.335463	1,404,257.72	3,324,148.05
11,998.00	90.86	89.28	6,409.54	-110.25	5,393.30	40.437245	-104.335122	1,404,258.25	3,324,243.02
12,092.00	90.83	87.59	6,408.16	-107.68	5,487.25	40.437248	-104.334785	1,404,260.82	3,324,336.97
12,187.00	90.09	87.85	6,407.39	-103.90	5,582.17	40.437255	-104.334444	1,404,264.60	3,324,431.89
12,282.00	90.09	88.12	6,407.24	-100.56	5,677.12	40.437261	-104.334102	1,404,267.94	3,324,526.83

Design Report for Wells Ranch AE32-615 - 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)
12,376.00	90.83	88.63	6,406.49	-97.90	5,771.07	40.437265	-104.333765	1,404,270.60	3,324,620.78
12,471.00	90.40	86.47	6,405.47	-93.84	5,865.98	40.437273	-104.333424	1,404,274.66	3,324,715.68
12,566.00	90.31	86.36	6,404.88	-87.90	5,960.79	40.437285	-104.333083	1,404,280.60	3,324,810.49
12,660.00	90.34	86.54	6,404.35	-82.08	6,054.61	40.437298	-104.332745	1,404,286.42	3,324,904.30
12,755.00	90.96	87.01	6,403.27	-76.73	6,149.45	40.437309	-104.332405	1,404,291.77	3,324,999.14
12,850.00	91.45	89.57	6,401.27	-73.90	6,244.38	40.437314	-104.332063	1,404,294.60	3,325,094.07
12,945.00	92.78	89.18	6,397.77	-72.86	6,339.30	40.437313	-104.331722	1,404,295.64	3,325,188.99
13,039.00	92.00	89.79	6,393.85	-72.02	6,433.22	40.437312	-104.331385	1,404,296.48	3,325,282.90
13,134.00	91.26	89.84	6,391.14	-71.71	6,528.18	40.437309	-104.331044	1,404,296.79	3,325,377.86
13,229.00	89.41	90.77	6,390.59	-72.22	6,623.17	40.437305	-104.330703	1,404,296.28	3,325,472.84
13,323.00	88.71	90.48	6,392.13	-73.24	6,717.15	40.437298	-104.330365	1,404,295.26	3,325,566.82
13,418.00	88.09	90.51	6,394.78	-74.06	6,812.11	40.437293	-104.330024	1,404,294.44	3,325,661.78
13,513.00	87.78	89.72	6,398.21	-74.25	6,907.05	40.437289	-104.329683	1,404,294.25	3,325,756.71
13,608.00	88.67	89.44	6,401.15	-73.56	7,002.00	40.437287	-104.329342	1,404,294.94	3,325,851.66
13,702.00	90.80	89.49	6,401.58	-72.68	7,095.99	40.437286	-104.329004	1,404,295.82	3,325,945.64
13,797.00	91.11	88.99	6,400.00	-71.42	7,190.97	40.437286	-104.328663	1,404,297.08	3,326,040.62
13,892.00	91.82	88.21	6,397.57	-69.10	7,285.91	40.437289	-104.328322	1,404,299.40	3,326,135.55
13,987.00	93.15	88.47	6,393.45	-66.35	7,380.77	40.437293	-104.327981	1,404,302.15	3,326,230.42
14,081.00	92.62	88.19	6,388.72	-63.62	7,474.61	40.437297	-104.327644	1,404,304.88	3,326,324.26
14,176.00	91.51	87.97	6,385.30	-60.43	7,569.50	40.437303	-104.327303	1,404,308.07	3,326,419.14
14,271.00	92.19	87.94	6,382.23	-57.05	7,664.39	40.437308	-104.326962	1,404,311.45	3,326,514.02
14,365.00	91.45	87.49	6,379.25	-53.30	7,758.26	40.437315	-104.326624	1,404,315.20	3,326,607.89
14,460.00	90.96	87.32	6,377.25	-49.00	7,853.15	40.437324	-104.326283	1,404,319.50	3,326,702.77
14,555.00	91.51	87.69	6,375.20	-44.87	7,948.03	40.437332	-104.325942	1,404,323.63	3,326,797.66
14,650.00	92.44	87.09	6,371.93	-40.54	8,042.88	40.437340	-104.325602	1,404,327.96	3,326,892.50
14,745.00	90.80	87.22	6,369.24	-35.83	8,137.72	40.437349	-104.325261	1,404,332.67	3,326,987.33
14,839.00	90.83	87.42	6,367.90	-31.43	8,231.61	40.437358	-104.324923	1,404,337.06	3,327,081.22
14,934.00	90.34	86.72	6,366.93	-26.58	8,326.48	40.437368	-104.324582	1,404,341.92	3,327,176.09
15,029.00	90.59	85.67	6,366.16	-20.27	8,421.26	40.437382	-104.324241	1,404,348.22	3,327,270.87
15,124.00	89.78	87.25	6,365.86	-14.41	8,516.08	40.437395	-104.323901	1,404,354.09	3,327,365.68
15,218.00	89.78	87.51	6,366.22	-10.11	8,609.98	40.437403	-104.323563	1,404,358.39	3,327,459.58
15,313.00	90.34	87.55	6,366.12	-6.02	8,704.89	40.437411	-104.323222	1,404,362.48	3,327,554.48
15,408.00	90.80	87.53	6,365.17	-1.94	8,799.80	40.437418	-104.322881	1,404,366.56	3,327,649.39
15,503.00	91.48	87.76	6,363.28	1.96	8,894.70	40.437426	-104.322540	1,404,370.46	3,327,744.28
15,597.00	91.91	87.70	6,360.50	5.68	8,988.58	40.437432	-104.322202	1,404,374.18	3,327,838.17
15,692.00	91.76	86.28	6,357.46	10.67	9,083.40	40.437443	-104.321861	1,404,379.17	3,327,932.98
15,787.00	92.31	86.12	6,354.09	16.96	9,178.13	40.437456	-104.321521	1,404,385.46	3,328,027.71
15,894.00	93.05	85.43	6,349.08	24.84	9,284.72	40.437474	-104.321138	1,404,393.33	3,328,134.29
15,959.20	93.05	85.43	6,345.61	30.02	9,349.63	40.437486	-104.320904	1,404,398.52	3,328,199.20
15,962.00	93.05	85.43	6,345.47	30.25	9,352.41	40.437487	-104.320894	1,404,398.74	3,328,201.98

Design Report for Wells Ranch AE32-615 - Actual Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
300.00	300.00	-0.05	-0.84	First Gyro Survey at 300.00ft
637.00	636.99	-0.23	-3.74	Final Gyro Survey at 637.00ft
722.00	721.98	-0.30	-4.80	First Sperry MWD Survey at 722.00ft
15,894.00	6,349.08	24.84	9,284.72	Final Sperry MWD Survey at 15894.00ft
15,962.00	6,345.47	30.25	9,352.41	Straight Line Projection to TD at 15962.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Wells Ranch AE32-615_Rev A0_BHL	89.99	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
300.00	637.00	Surface Surveys	Flexi-Shot
722.00	6,779.00	Intermediate Surveys	MWD
6,950.00	15,962.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
630.00	629.99	9 5/8"	9-5/8	13-3/4
6,820.00	6,451.50	7"	7	8-3/4

Design Report for Wells Ranch AE32-615 - Actual Surveys

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:	1.54 °/100usft	Maximum Dogleg over Survey:	12.62 °/100usft at 6,720.00 usft
Net Tortosity applicable to Plans:	0.87 °/100usft	Directional Difficulty Index:	6.796

Audit Info

North Reference Sheet for Sec. 32-T6N-R62W (Wells Ranch AE32) - Wells Ranch AE32-615 - 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' @ 4742.00usft (H&P 273). Northing and Easting are relative to Wells Ranch AE32-615

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: 0.99996216

Grid Coordinates of Well: 1,404,368.50 usft N, 3,318,849.92 usft E

Geographical Coordinates of Well: 40° 26' 15.86" N, 104° 21' 16.16" W

Grid Convergence at Surface is: 0.74°

Based upon Minimum Curvature type calculations, at a Measured Depth of 15,962.00usft

the Bottom Hole Displacement is 9,352.46usft in the Direction of 89.81° (Grid).

Magnetic Convergence at surface is: -7.56° (11 September 2015, , BGGM2015)

