

Job# 05-123-41249

HP 343

# Noble Energy

Weld County, CO (NAD 83) Sec. 11-T6N-R63W (Wells Ranch PAD)

API# 05-123-41249

## Wells Ranch AA11-615

Original Wellbore

Design: Final Surveys

# Sperry Drilling Services

## Combo Report

05 January, 2017

Well Coordinates: 40° 29' 44.16" N  
104° 23' 42.07" W

North American Datum 1983  
Colorado Northern Zone  
1,425,302.24 N  
3,307,306.44 E

Ground Level: 4,832.00 usft

Geodetic Scale Factor Applied

Local Coordinate Origin:

Centered on Well Wells Ranch AA11-615

Viewing Datum:

KB @ 4856.00usft (HP 343)

TVDs to System:

N

**North Reference:**

**Grid**

Unit System:

Dec-Deg - API - US Survey Feet - Custom

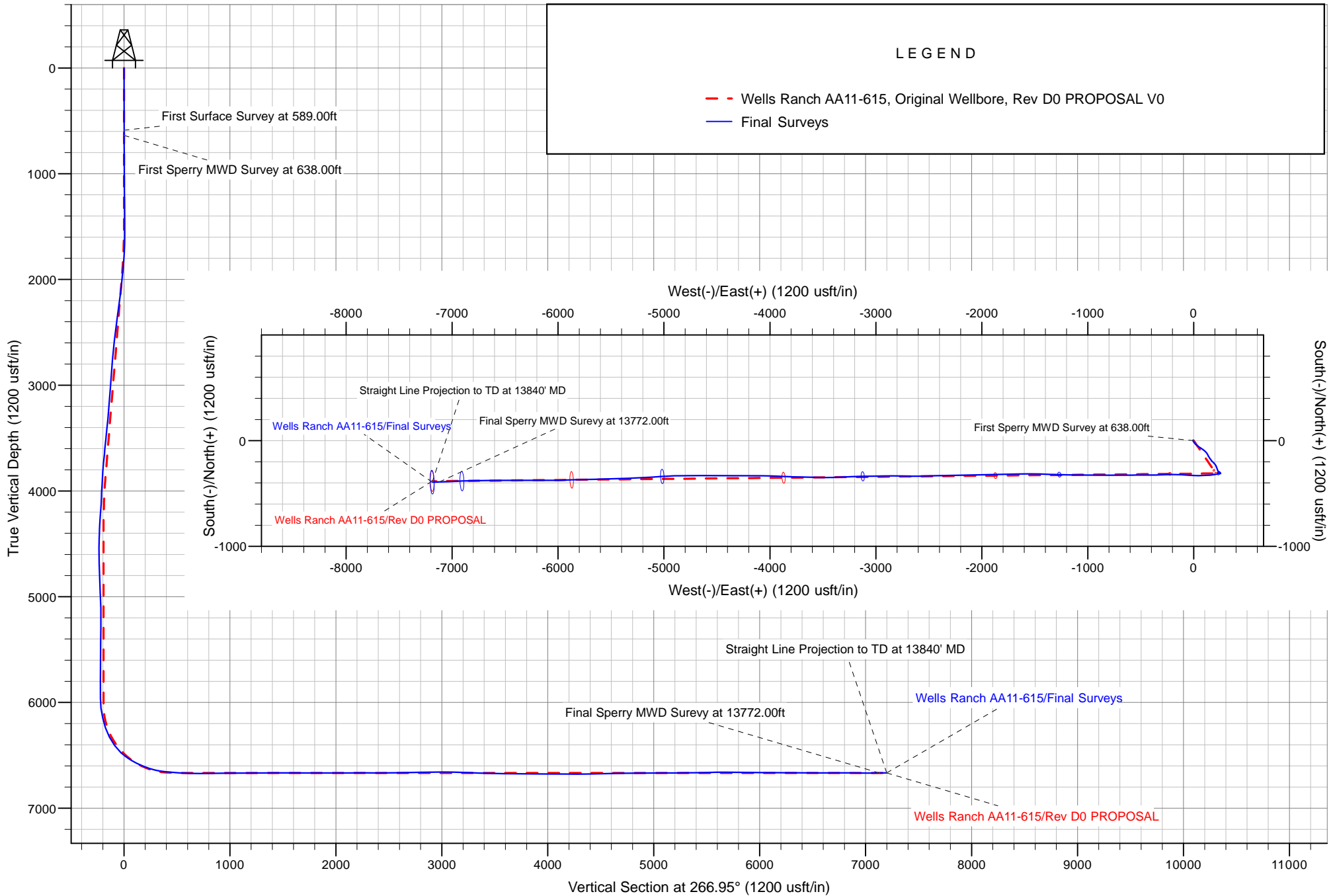
Geodetic Scale Factor Applied

Version: 5000.1 Build: 81

Report Version: Midcon Combo v1.11

**HALLIBURTON**

Project: Weld County, CO (NAD 83)  
 Site: Sec. 11-T6N-R63W (Wells Ranch PAD)  
 Well: Wells Ranch AA11-615  
 Wellbore: Original Wellbore  
 Design: Final Surveys





Design Report for Wells Ranch AA11-615 - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates (usft)		Map Coordinates (usft)		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing	Easting	Northing	Easting			
0.00	0.00	0.00	-4,856.00	0.00	0.00 N	0.00 E	1,425,302.24	3,307,306.44	0.00	0.00	
589.00	0.18	286.61	-4,267.00	589.00	0.26 N	0.89 W	1,425,302.51	3,307,305.55	0.03	0.87	First Surface Survey at 589.00ft
638.00	0.18	286.61	-4,218.00	638.00	0.31 N	1.03 W	1,425,302.55	3,307,305.40	0.00	1.02	First Sperry MWD Survey at 638.00ft
733.00	0.22	316.24	-4,123.00	733.00	0.48 N	1.30 W	1,425,302.72	3,307,305.14	0.12	1.28	
828.00	0.58	313.19	-4,028.00	828.00	0.94 N	1.78 W	1,425,303.18	3,307,304.66	0.38	1.73	
922.00	0.56	298.87	-3,934.01	921.99	1.49 N	2.53 W	1,425,303.73	3,307,303.91	0.15	2.45	
1,017.00	0.59	303.33	-3,839.01	1,016.99	1.98 N	3.34 W	1,425,304.22	3,307,303.09	0.06	3.23	
1,111.00	0.66	317.57	-3,745.02	1,110.98	2.65 N	4.11 W	1,425,304.89	3,307,302.32	0.18	3.97	
1,204.00	0.50	334.77	-3,652.02	1,203.98	3.41 N	4.65 W	1,425,305.65	3,307,301.79	0.25	4.46	
1,296.00	0.38	311.62	-3,560.03	1,295.97	3.98 N	5.05 W	1,425,306.22	3,307,301.39	0.23	4.83	
1,390.00	0.29	313.03	-3,466.03	1,389.97	4.35 N	5.45 W	1,425,306.59	3,307,300.98	0.10	5.21	
1,483.00	0.35	299.92	-3,373.03	1,482.97	4.65 N	5.87 W	1,425,306.89	3,307,300.57	0.10	5.62	
1,575.00	2.71	188.15	-3,281.06	1,574.94	2.64 N	6.42 W	1,425,304.88	3,307,300.01	3.11	6.28	
1,668.00	5.58	161.41	-3,188.31	1,667.69	3.83 S	5.29 W	1,425,298.41	3,307,301.14	3.64	5.49	
1,760.00	6.71	144.44	-3,096.83	1,759.17	12.44 S	0.74 W	1,425,289.80	3,307,305.70	2.31	1.40	
1,853.00	7.56	140.45	-3,004.55	1,851.45	21.58 S	6.31 E	1,425,280.66	3,307,312.75	1.06	-5.15	
1,946.00	8.63	133.17	-2,912.48	1,943.52	31.07 S	15.30 E	1,425,271.17	3,307,321.74	1.59	-13.62	
2,039.00	7.67	129.17	-2,820.42	2,035.58	39.76 S	25.20 E	1,425,262.48	3,307,331.64	1.20	-23.04	
2,131.00	9.07	129.56	-2,729.40	2,126.60	48.26 S	35.55 E	1,425,253.98	3,307,341.99	1.52	-32.93	
2,222.00	10.11	130.67	-2,639.67	2,216.33	58.03 S	47.14 E	1,425,244.21	3,307,353.57	1.16	-43.98	
2,314.00	9.79	124.50	-2,549.05	2,306.95	67.73 S	59.71 E	1,425,234.52	3,307,366.14	1.21	-56.01	
2,407.00	9.12	118.79	-2,457.31	2,398.69	75.75 S	72.68 E	1,425,226.49	3,307,379.12	1.24	-68.54	
2,500.00	8.54	123.18	-2,365.42	2,490.58	83.08 S	84.92 E	1,425,219.16	3,307,391.36	0.96	-80.37	
2,593.00	7.98	119.98	-2,273.38	2,582.62	90.09 S	96.29 E	1,425,212.16	3,307,402.73	0.78	-91.36	
2,686.00	8.71	138.74	-2,181.35	2,674.65	98.61 S	106.53 E	1,425,203.63	3,307,412.97	3.02	-101.13	
2,778.00	8.81	145.26	-2,090.42	2,765.58	109.64 S	115.14 E	1,425,192.61	3,307,421.58	1.08	-109.13	
2,870.00	8.67	140.00	-1,999.49	2,856.51	120.74 S	123.61 E	1,425,181.51	3,307,430.05	0.88	-117.00	
2,965.00	9.03	153.44	-1,905.61	2,950.39	132.89 S	131.55 E	1,425,169.35	3,307,437.98	2.20	-124.28	
3,060.00	9.46	151.65	-1,811.84	3,044.16	146.43 S	138.59 E	1,425,155.81	3,307,445.02	0.54	-130.59	
3,155.00	8.85	148.08	-1,718.05	3,137.95	159.50 S	146.16 E	1,425,142.74	3,307,452.60	0.88	-137.45	
3,249.00	8.26	141.63	-1,625.10	3,230.90	170.94 S	154.18 E	1,425,131.31	3,307,460.61	1.20	-144.85	
3,344.00	9.75	145.65	-1,531.27	3,324.73	182.93 S	162.95 E	1,425,119.32	3,307,469.39	1.70	-152.97	
3,438.00	8.64	135.88	-1,438.47	3,417.53	194.57 S	172.36 E	1,425,107.68	3,307,478.79	2.03	-161.75	
3,533.00	8.26	129.69	-1,344.50	3,511.50	204.05 S	182.58 E	1,425,098.20	3,307,489.01	1.04	-171.44	
3,628.00	9.23	141.52	-1,250.60	3,605.40	214.37 S	192.57 E	1,425,087.87	3,307,499.00	2.15	-180.87	
3,722.00	10.45	141.93	-1,157.98	3,698.02	226.99 S	202.52 E	1,425,075.26	3,307,508.95	1.30	-190.13	
3,817.00	10.85	157.65	-1,064.60	3,791.40	242.04 S	211.23 E	1,425,060.21	3,307,517.67	3.08	-198.03	
3,911.00	11.61	159.12	-972.40	3,883.60	259.06 S	217.97 E	1,425,043.19	3,307,524.40	0.86	-203.85	
4,006.00	10.43	158.30	-879.15	3,976.85	275.99 S	224.56 E	1,425,026.26	3,307,530.99	1.25	-209.53	
4,101.00	7.25	159.08	-785.29	4,070.71	289.58 S	229.88 E	1,425,012.67	3,307,536.31	3.35	-214.12	
4,195.00	7.06	144.74	-692.02	4,163.98	299.84 S	235.33 E	1,425,002.41	3,307,541.76	1.91	-219.02	



Design Report for Wells Ranch AA11-615 - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates (usft)		Map Coordinates (usft)		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing	Easting	Northing	Easting			
4,290.00	5.15	120.57	-597.55	4,258.45	306.77 S	242.37 E	1,424,995.48	3,307,548.80	3.33	-225.68	
4,354.00	3.50	123.22	-533.73	4,322.27	309.30 S	246.48 E	1,424,992.95	3,307,552.91	2.60	-229.65	
4,478.00	1.91	89.13	-409.87	4,446.13	311.35 S	251.72 E	1,424,990.90	3,307,558.15	1.77	-234.76	
4,573.00	2.36	357.72	-314.91	4,541.09	309.37 S	253.22 E	1,424,992.88	3,307,559.65	3.23	-236.37	
4,668.00	2.74	331.33	-220.00	4,636.00	305.42 S	252.05 E	1,424,996.83	3,307,558.48	1.29	-235.42	
4,763.00	2.41	312.72	-125.10	4,730.90	302.07 S	249.50 E	1,425,000.18	3,307,555.93	0.94	-233.04	
4,857.00	2.45	309.60	-31.18	4,824.82	299.45 S	246.50 E	1,425,002.80	3,307,552.93	0.15	-230.19	
4,952.00	2.75	301.07	63.72	4,919.72	296.98 S	242.98 E	1,425,005.27	3,307,549.41	0.51	-226.81	
5,047.00	3.17	289.22	158.60	5,014.60	294.94 S	238.55 E	1,425,007.31	3,307,544.98	0.78	-222.49	
5,141.00	1.17	268.61	252.53	5,108.53	294.11 S	235.13 E	1,425,008.14	3,307,541.56	2.25	-219.13	
5,236.00	0.45	177.97	347.52	5,203.52	294.51 S	234.18 E	1,425,007.75	3,307,540.61	1.32	-218.15	
5,330.00	0.89	141.09	441.51	5,297.51	295.44 S	234.65 E	1,425,006.81	3,307,541.08	0.63	-218.57	
5,425.00	0.90	120.18	536.50	5,392.50	296.39 S	235.76 E	1,425,005.86	3,307,542.19	0.34	-219.63	
5,520.00	1.05	126.11	631.49	5,487.49	297.28 S	237.11 E	1,425,004.97	3,307,543.54	0.19	-220.93	
5,614.00	1.07	122.40	725.47	5,581.47	298.26 S	238.54 E	1,425,003.99	3,307,544.97	0.08	-222.31	
5,709.00	1.39	200.08	820.45	5,676.45	299.81 S	238.90 E	1,425,002.44	3,307,545.33	1.64	-222.58	
5,803.00	1.55	185.22	914.42	5,770.42	302.15 S	238.39 E	1,425,000.10	3,307,544.82	0.44	-221.95	
5,898.00	1.67	171.72	1,009.39	5,865.39	304.80 S	238.47 E	1,424,997.45	3,307,544.90	0.42	-221.89	
5,992.00	1.66	163.25	1,103.35	5,959.35	307.46 S	239.06 E	1,424,994.79	3,307,545.49	0.26	-222.34	
6,087.00	7.42	244.07	1,198.06	6,054.06	311.47 S	233.93 E	1,424,990.79	3,307,540.36	7.73	-217.00	
6,182.00	13.07	256.13	1,291.52	6,147.52	316.73 S	217.97 E	1,424,985.52	3,307,524.40	6.33	-200.78	
6,276.00	18.84	261.17	1,381.86	6,237.86	321.61 S	192.63 E	1,424,980.64	3,307,499.07	6.31	-175.22	
6,371.00	26.96	265.16	1,469.31	6,325.31	325.79 S	155.96 E	1,424,976.46	3,307,462.39	8.70	-138.37	
6,466.00	35.62	267.35	1,550.41	6,406.41	328.89 S	106.77 E	1,424,973.36	3,307,413.20	9.19	-89.09	
6,560.00	47.53	268.97	1,620.61	6,476.61	330.79 S	44.53 E	1,424,971.47	3,307,350.97	12.72	-26.84	
6,655.00	57.77	274.65	1,678.20	6,534.20	328.15 S	30.79 W	1,424,974.10	3,307,275.65	11.77	48.23	
6,750.00	64.33	273.00	1,724.16	6,580.16	322.65 S	113.68 W	1,424,979.61	3,307,192.76	7.07	130.72	
6,844.00	70.04	270.03	1,760.60	6,616.60	320.40 S	200.25 W	1,424,981.85	3,307,106.19	6.74	217.04	
6,939.00	77.87	267.44	1,786.84	6,642.84	322.46 S	291.45 W	1,424,979.79	3,307,015.00	8.65	308.22	
6,965.00	81.65	267.70	1,791.46	6,647.46	323.54 S	317.00 W	1,424,978.71	3,306,989.44	14.57	333.80	
7,069.00	85.19	270.85	1,803.38	6,659.38	324.84 S	420.28 W	1,424,977.41	3,306,886.17	4.54	437.00	
7,164.00	86.45	268.90	1,810.30	6,666.30	325.05 S	515.02 W	1,424,977.20	3,306,791.43	2.44	531.61	
7,258.00	88.83	269.96	1,814.18	6,670.18	325.98 S	608.93 W	1,424,976.27	3,306,697.53	2.77	625.44	
7,353.00	89.66	269.77	1,815.43	6,671.43	326.20 S	703.92 W	1,424,976.05	3,306,602.54	0.90	720.30	
7,447.00	90.99	269.53	1,814.89	6,670.89	326.78 S	797.91 W	1,424,975.47	3,306,508.55	1.44	814.20	
7,542.00	91.48	269.89	1,812.85	6,668.85	327.26 S	892.89 W	1,424,974.99	3,306,413.58	0.64	909.06	
7,636.00	89.85	270.70	1,811.76	6,667.76	326.78 S	986.88 W	1,424,975.48	3,306,319.59	1.94	1,002.89	
7,731.00	90.59	270.84	1,811.39	6,667.39	325.50 S	1,081.87 W	1,424,976.75	3,306,224.61	0.79	1,097.68	
7,825.00	90.40	271.57	1,810.58	6,666.58	323.52 S	1,175.84 W	1,424,978.73	3,306,130.63	0.80	1,191.42	
7,918.00	89.75	271.45	1,810.46	6,666.46	321.07 S	1,268.81 W	1,424,981.18	3,306,037.67	0.71	1,284.12	
8,011.00	89.75	271.27	1,810.86	6,666.86	318.86 S	1,361.78 W	1,424,983.39	3,305,944.70	0.19	1,376.84	



Design Report for Wells Ranch AA11-615 - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates (usft)		Map Coordinates (usft)		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing	Easting	Northing	Easting			
8,104.00	91.36	272.77	1,809.96	6,665.96	315.59 S	1,454.72 W	1,424,986.66	3,305,851.77	2.37	1,469.47	
8,197.00	89.38	268.94	1,809.36	6,665.36	314.20 S	1,547.68 W	1,424,988.05	3,305,758.81	4.64	1,562.23	
8,289.00	89.60	269.17	1,810.18	6,666.18	315.72 S	1,639.67 W	1,424,986.53	3,305,666.83	0.35	1,654.16	
8,382.00	89.72	268.48	1,810.73	6,666.73	317.62 S	1,732.64 W	1,424,984.63	3,305,573.85	0.75	1,747.11	
8,474.00	90.12	269.16	1,810.86	6,666.86	319.52 S	1,824.62 W	1,424,982.73	3,305,481.88	0.86	1,839.06	
8,567.00	89.63	269.14	1,811.06	6,667.06	320.90 S	1,917.61 W	1,424,981.35	3,305,388.89	0.53	1,931.99	
8,660.00	90.40	269.01	1,811.04	6,667.04	322.40 S	2,010.60 W	1,424,979.85	3,305,295.91	0.84	2,024.93	
8,753.00	90.49	268.32	1,810.32	6,666.32	324.57 S	2,103.57 W	1,424,977.69	3,305,202.94	0.75	2,117.88	
8,845.00	89.91	268.65	1,810.00	6,666.00	327.00 S	2,195.54 W	1,424,975.25	3,305,110.97	0.73	2,209.85	
8,936.00	90.80	268.82	1,809.43	6,665.43	329.01 S	2,286.51 W	1,424,973.24	3,305,020.00	1.00	2,300.80	
9,028.00	89.32	269.12	1,809.34	6,665.34	330.66 S	2,378.50 W	1,424,971.59	3,304,928.02	1.64	2,392.74	
9,121.00	89.85	268.67	1,810.01	6,666.01	332.45 S	2,471.48 W	1,424,969.80	3,304,835.05	0.75	2,485.68	
9,214.00	90.46	268.52	1,809.76	6,665.76	334.73 S	2,564.45 W	1,424,967.52	3,304,742.08	0.68	2,578.64	
9,307.00	92.37	270.42	1,807.46	6,663.46	335.60 S	2,657.41 W	1,424,966.66	3,304,649.12	2.90	2,671.52	
9,400.00	91.79	270.83	1,804.09	6,660.09	334.58 S	2,750.34 W	1,424,967.67	3,304,556.19	0.76	2,764.26	
9,492.00	90.62	269.90	1,802.15	6,658.15	334.00 S	2,842.31 W	1,424,968.26	3,304,464.22	1.62	2,856.07	
9,584.00	89.88	269.74	1,801.75	6,657.75	334.28 S	2,934.31 W	1,424,967.97	3,304,372.23	0.82	2,947.96	
9,679.00	89.94	268.99	1,801.90	6,657.90	335.34 S	3,029.31 W	1,424,966.91	3,304,277.24	0.79	3,042.87	
9,774.00	88.00	268.37	1,803.61	6,659.61	337.53 S	3,124.26 W	1,424,964.73	3,304,182.28	2.14	3,137.81	
9,868.00	88.34	268.29	1,806.61	6,662.61	340.26 S	3,218.17 W	1,424,961.99	3,304,088.38	0.37	3,231.73	
9,963.00	88.06	267.63	1,809.59	6,665.59	343.64 S	3,313.06 W	1,424,958.61	3,303,993.49	0.75	3,326.67	
10,057.00	87.84	267.75	1,812.95	6,668.95	347.43 S	3,406.93 W	1,424,954.82	3,303,899.63	0.27	3,420.60	
10,152.00	88.24	270.80	1,816.20	6,672.20	348.63 S	3,501.85 W	1,424,953.62	3,303,804.70	3.24	3,515.46	
10,247.00	89.48	271.60	1,818.09	6,674.09	346.64 S	3,596.81 W	1,424,955.61	3,303,709.75	1.55	3,610.17	
10,341.00	89.57	271.10	1,818.87	6,674.87	344.43 S	3,690.78 W	1,424,957.83	3,303,615.78	0.54	3,703.89	
10,436.00	89.78	271.90	1,819.41	6,675.41	341.94 S	3,785.75 W	1,424,960.31	3,303,520.82	0.87	3,798.59	
10,531.00	90.12	272.08	1,819.50	6,675.50	338.64 S	3,880.69 W	1,424,963.61	3,303,425.88	0.40	3,893.22	
10,626.00	89.35	272.48	1,819.93	6,675.93	334.86 S	3,975.61 W	1,424,967.39	3,303,330.96	0.91	3,987.81	
10,720.00	90.22	271.21	1,820.29	6,676.29	331.84 S	4,069.56 W	1,424,970.42	3,303,237.02	1.64	4,081.46	
10,815.00	89.51	268.86	1,820.51	6,676.51	331.78 S	4,164.55 W	1,424,970.47	3,303,142.03	2.58	4,176.32	
10,909.00	89.69	270.59	1,821.17	6,677.17	332.23 S	4,258.55 W	1,424,970.02	3,303,048.04	1.85	4,270.20	
11,004.00	91.11	271.01	1,820.50	6,676.50	330.90 S	4,353.53 W	1,424,971.35	3,302,953.06	1.56	4,364.98	
11,099.00	91.36	270.35	1,818.46	6,674.46	329.78 S	4,448.50 W	1,424,972.48	3,302,858.09	0.74	4,459.75	
11,193.00	90.96	269.19	1,816.55	6,672.55	330.15 S	4,542.48 W	1,424,972.10	3,302,764.11	1.31	4,553.62	
11,288.00	90.59	269.75	1,815.27	6,671.27	331.03 S	4,637.47 W	1,424,971.22	3,302,669.13	0.71	4,648.52	
11,383.00	91.85	269.82	1,813.25	6,669.25	331.39 S	4,732.44 W	1,424,970.86	3,302,574.16	1.33	4,743.38	
11,477.00	90.96	269.73	1,810.94	6,666.94	331.76 S	4,826.41 W	1,424,970.50	3,302,480.19	0.95	4,837.23	
11,572.00	89.51	267.87	1,810.55	6,666.55	333.75 S	4,921.38 W	1,424,968.51	3,302,385.22	2.48	4,932.18	
11,667.00	89.32	266.61	1,811.52	6,667.52	338.32 S	5,016.27 W	1,424,963.93	3,302,290.34	1.34	5,027.17	
11,761.00	90.00	265.87	1,812.08	6,668.08	344.48 S	5,110.06 W	1,424,957.77	3,302,196.55	1.07	5,121.16	
11,856.00	90.83	266.82	1,811.39	6,667.39	350.54 S	5,204.86 W	1,424,951.71	3,302,101.75	1.33	5,216.15	

## Design Report for Wells Ranch AA11-615 - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates (usft)		Map Coordinates (usft)		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing	Easting	Northing	Easting			
11,951.00	91.69	267.96	1,809.30	6,665.30	354.87 S	5,299.74 W	1,424,947.39	3,302,006.88	1.50	5,311.12	
12,045.00	90.74	268.03	1,807.31	6,663.31	358.15 S	5,393.66 W	1,424,944.10	3,301,912.96	1.01	5,405.08	
12,140.00	91.57	268.22	1,805.39	6,661.39	361.26 S	5,488.59 W	1,424,940.99	3,301,818.04	0.90	5,500.04	
12,234.00	90.71	268.92	1,803.52	6,659.52	363.61 S	5,582.54 W	1,424,938.65	3,301,724.09	1.18	5,593.98	
12,329.00	89.14	268.36	1,803.65	6,659.65	365.86 S	5,677.51 W	1,424,936.39	3,301,629.12	1.75	5,688.94	
12,424.00	89.48	268.64	1,804.79	6,660.79	368.35 S	5,772.47 W	1,424,933.91	3,301,534.16	0.46	5,783.90	
12,518.00	89.54	268.40	1,805.60	6,661.60	370.78 S	5,866.44 W	1,424,931.48	3,301,440.20	0.26	5,877.86	
12,613.00	89.97	267.83	1,806.00	6,662.00	373.90 S	5,961.38 W	1,424,928.35	3,301,345.26	0.75	5,972.84	
12,708.00	89.17	269.86	1,806.72	6,662.72	375.81 S	6,056.35 W	1,424,926.44	3,301,250.29	2.30	6,067.78	
12,802.00	89.35	270.49	1,807.93	6,663.93	375.53 S	6,150.35 W	1,424,926.73	3,301,156.30	0.70	6,161.62	
12,897.00	89.54	270.22	1,808.85	6,664.85	374.94 S	6,245.34 W	1,424,927.31	3,301,061.31	0.35	6,256.45	
12,991.00	89.78	269.56	1,809.41	6,665.41	375.12 S	6,339.34 W	1,424,927.13	3,300,967.32	0.75	6,350.32	
13,086.00	90.03	269.97	1,809.57	6,665.57	375.51 S	6,434.34 W	1,424,926.74	3,300,872.32	0.51	6,445.20	
13,180.00	90.37	269.96	1,809.24	6,665.24	375.57 S	6,528.33 W	1,424,926.69	3,300,778.33	0.36	6,539.07	
13,275.00	89.97	269.35	1,808.96	6,664.96	376.14 S	6,623.33 W	1,424,926.11	3,300,683.33	0.77	6,633.97	
13,370.00	89.63	269.07	1,809.29	6,665.29	377.45 S	6,718.32 W	1,424,924.80	3,300,588.34	0.46	6,728.89	
13,464.00	89.66	268.78	1,809.87	6,665.87	379.21 S	6,812.30 W	1,424,923.04	3,300,494.37	0.31	6,822.83	
13,559.00	89.54	267.97	1,810.53	6,666.53	381.91 S	6,907.26 W	1,424,920.35	3,300,399.41	0.86	6,917.80	
13,654.00	89.48	267.44	1,811.35	6,667.35	385.71 S	7,002.18 W	1,424,916.54	3,300,304.49	0.56	7,012.79	
13,772.00	90.86	268.34	1,810.99	6,666.99	390.05 S	7,120.10 W	1,424,912.20	3,300,186.58	1.40	7,130.77	Final Sperry MWD Surevy at 13772.00ft
13,840.00	90.86	268.34	1,809.97	6,665.97	392.02 S	7,188.06 W	1,424,910.23	3,300,118.62	0.00	7,198.74	Straight Line Projection to TD at 13840' MD

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
589.00	589.00	0.26	-0.89	First Surface Survey at 589.00ft
638.00	638.00	0.31	-1.03	First Sperry MWD Survey at 638.00ft
13,772.00	6,666.99	-390.05	-7,120.10	Final Sperry MWD Surevy at 13772.00ft
13,840.00	6,665.97	-392.02	-7,188.06	Straight Line Projection to TD at 13840' MD

### Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Wells Ranch AA11-615_BHL	266.95	Slot	0.00	0.00	0.00

## Design Report for Wells Ranch AA11-615 - Final Surveys

### Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
589.00	589.00	Gyro Surveys	Flexi-Shot
638.00	6,965.00	Intermediate Surveys	MWD
7,069.00	13,772.00	Production Surveys	MWD+IFR1+MS_WY
13,840.00	13,840.00	Projection to Bit - No Surveys	BLIND-OWSG

### Design Targets

Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target									
- Shape	()	()	()	()	()	()	()		

### Directional Difficulty Index

Average Dogleg over Survey:	1.70 °/100usft	Maximum Dogleg over Survey:	14.57 °/100usft at 6,965.00 usft
Net Tortosity applicable to Plans:	0.91 °/100usft	Directional Difficulty Index:	6.585

### Audit Info

**North Reference Sheet for Sec. 11-T6N-R63W (Wells Ranch PAD) - Wells Ranch AA11-615 - Original Wellbore**

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

Vertical Depths are relative to KB @ 4856.00usft (HP 343). Northing and Easting are relative to Wells Ranch AA11-615

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: 0.99996596

Grid Coordinates of Well: 1,425,302.24 usft N, 3,307,306.44 usft E

Geographical Coordinates of Well: 40° 29' 44.16" N, 104° 23' 42.07" W

Grid Convergence at Surface is: 0.71°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,840.00usft  
the Bottom Hole Displacement is 7,198.74usft in the Direction of 266.88° (Grid).

Magnetic Convergence at surface is: -7.65° (15 May 2015, , BGGM2015)

