

# Noble Energy

CO, Weld County (NAD 83 NZ)  
Sec 25 Twn 37 N Rng 75 W  
Wells Ranch AE19-631 Original Hole  
05-123-39636  
H&P330



A Schlumberger Company

## Final Survey Report

7-Jan-2015

Well Coordinates: NAD83 Colorado State Plane, Northern Zone, US Feet

N 40° 28' 9.76800"	W 104° 21' 21.13200"
1415812.59 usFt	3318318.1 usFt

Ground Level:	4786.00 ft MSL
TVD Reference:	KB 30ft @ 4816.00 ft MSL
Local Coordinate Origin:	Wells Ranch AE19-631 well head
Vertical Section Azimuth:	265.944 ° (Grid North)
North Reference:	Grid North

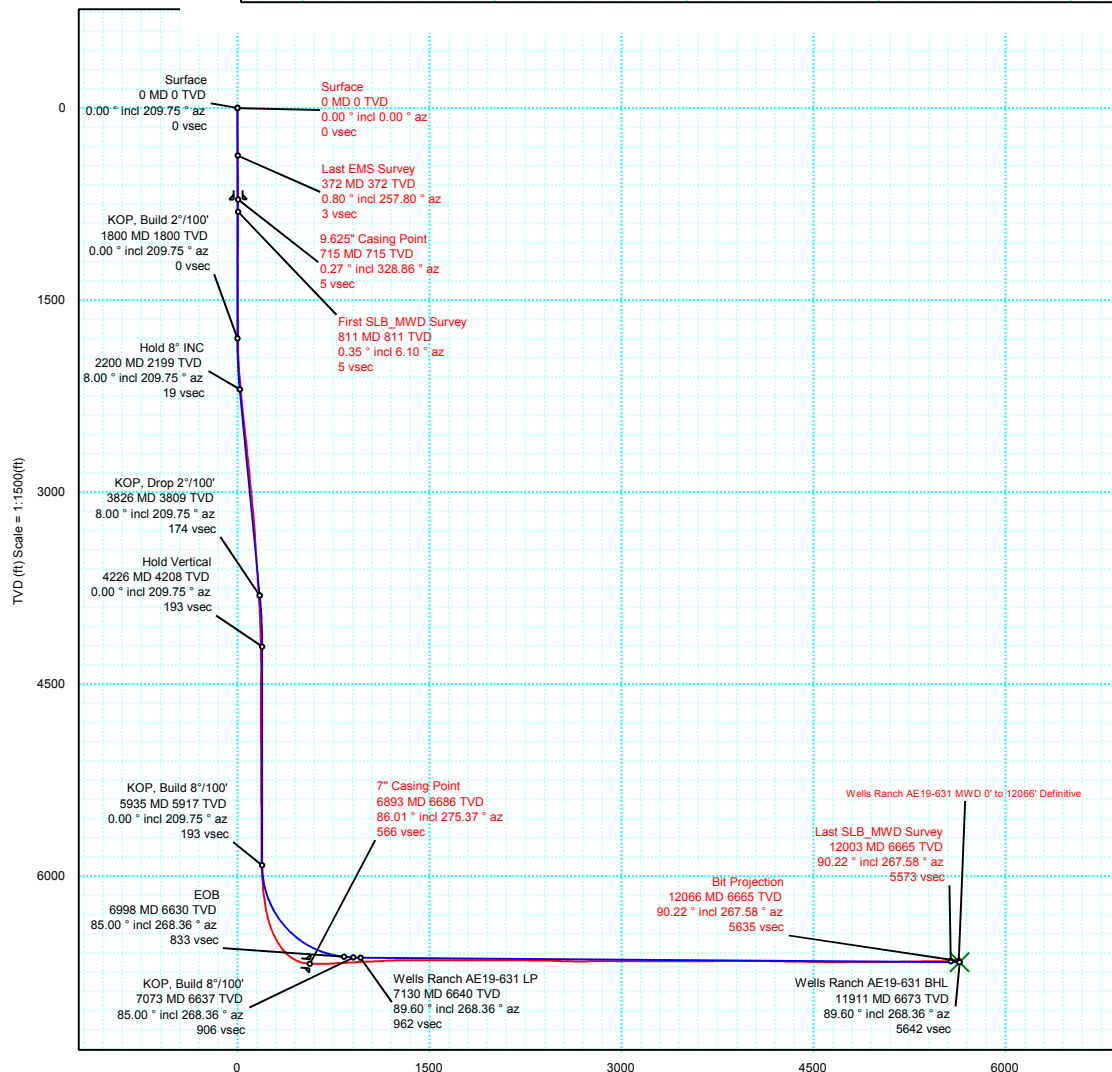
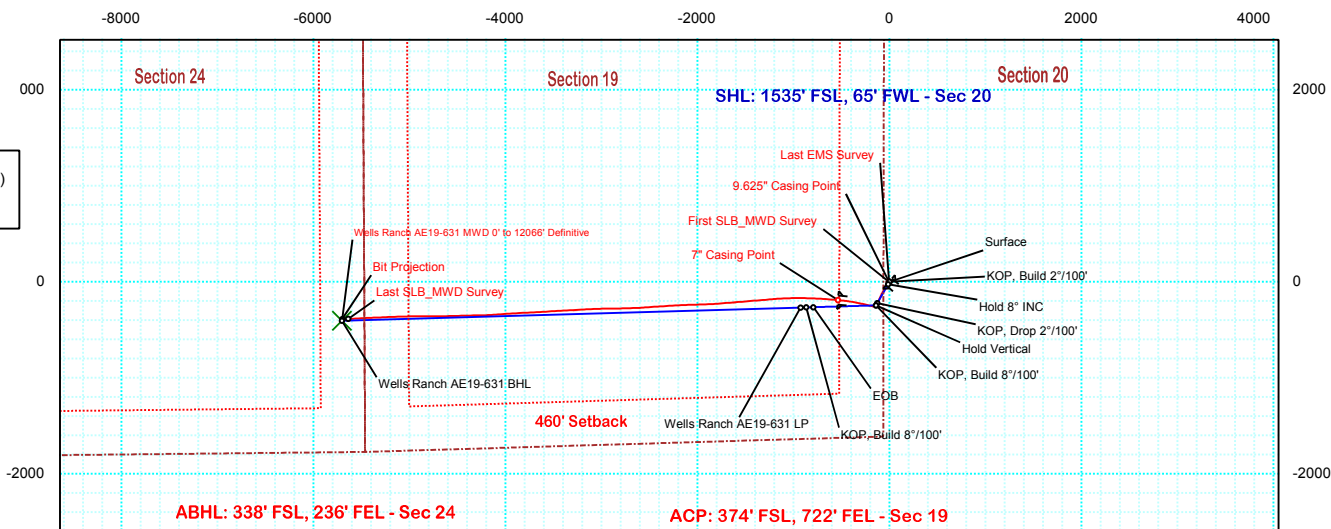
DOX Version: 2.8

<b>Borehole:</b> Original Hole	<b>Well:</b> Wells Ranch AE19-631	<b>Field:</b> CO, Weld County (NAD 83 NZ)	<b>Structure:</b> Noble 20-06N-62W (Wells Ranch AE19 Pad) - H&P 330
<b>Gravity &amp; Magnetic Parameters</b> Model: BGGM 2014 Dip: 67.041° Date: 17-Dec-2014 MagDec: 8.274° FS: 52727.596nT Gravity FS: 999.058mgn (9.80665 Based)		<b>Surface Location</b> NAD83 Colorado State Plane, Northern Zone, US Feet Lat: N 40 28 9.77 Northing: 1415889.08ftU Grid Conv: 0.7393° Lon: W 104 21 21.13 Easting: S 3318317.11ftU Scale Fact: 0.99996411	
		<b>Miscellaneous</b> Slot: Wells Ranch AE19-631 TVD Ref: KB 30ft(4816ft above MSL) Plan: Wells Ranch AE19-631 MWD 0' to 12066' Definitive	

PvA

EW (ft) Scale = 1:2000(ft)

Grid North  
Tot Corr (M->G 7.535°)  
Mag Dec (8.274°)  
Grid Conv (0.739°)



Vertical Section (ft) Azim = 256.52° Scale = 1:1500(ft) Origin = 0N/-S, 0E/-W

## Wells Ranch AE19-631 MWD 0' to 12066' Definitive Survey Report

(Def Survey)

**Report Date:** January 07, 2015 - 10:38 AM  
**Client:** Noble Energy  
**Field:** CO, Weld County (NAD 83 NZ)  
**Structure / Slot:** Noble 20-06N-62W (Wells Ranch AE19 Pad) - H&P 330 / Wells Ranch AE19-631  
**Well:** Wells Ranch AE19-631  
**Borehole:** Original Hole  
**UWI / API#:** Unknown / Unknown  
**Survey Name:** Wells Ranch AE19-631 MWD 0' to 12066' Definitive  
**Survey Date:** December 21, 2014  
**Tort / AHD / DDI / ERD Ratio:** 194.867 ° / 5888.345 ft / 6.316 / 0.881  
**Coordinate Reference System:** NAD83 Colorado State Plane, Northern Zone, US Feet  
**Location Lat / Long:** N 40° 28' 9.76800", W 104° 21' 21.13200"  
**Location Grid N/E Y/X:** N 1415889.083 ftUS, E 3318317.108 ftUS  
**CRS Grid Convergence Angle:** 0.7393 °  
**Grid Scale Factor:** 0.99996411  
**Version / Patch:** 2.8.572.0

**Survey / DLS Computation:** Minimum Curvature / Lubinski  
**Vertical Section Azimuth:** 265.944 ° (Grid North)  
**Vertical Section Origin:** 0.000 ft, 0.000 ft  
**TVD Reference Datum:** KB 30ft  
**TVD Reference Elevation:** 4816.000 ft above MSL  
**Seabed / Ground Elevation:** 4786.000 ft above MSL  
**Magnetic Declination:** 8.274 °  
**Total Gravity Field Strength:** 999.0582mgn (9.80665 Based)  
**Gravity Model:** GARM  
**Total Magnetic Field Strength:** 52727.596 nT  
**Magnetic Dip Angle:** 67.041 °  
**Declination Date:** December 17, 2014  
**Magnetic Declination Model:** BGGM 2014  
**North Reference:** Grid North  
**Grid Convergence Used:** 0.7393 °  
**Total Corr Mag North->Grid North:** 7.5343 °  
**Local Coord Referenced To:** Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
Surface	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	257.8M
Last EMS	372.00	0.80	257.80	371.99	2.57	-0.55	-2.54	2.60	257.80	0.22	328.86M
Survey											
9.625" Casing	715.00	0.27	328.86	714.97	5.32	-0.35	-5.30	5.32	266.21	0.22	6.1M
Point											
First SLB_MWD	811.00	0.35	6.10	810.97	5.37	0.14	-5.39	5.39	271.45	0.22	6.9M
Survey	903.00	0.44	6.90	902.97	5.25	0.77	-5.32	5.37	278.20	0.10	20.03M
	996.00	0.44	20.03	995.97	5.04	1.46	-5.15	5.36	285.78	0.11	31.78M
	1088.00	0.35	31.78	1087.97	4.73	2.03	-4.88	5.29	292.54	0.13	4.72M
	1181.00	0.35	4.72	1180.96	4.52	2.55	-4.71	5.36	298.44	0.18	27.1M
	1202.00	0.44	27.10	1201.96	4.47	2.69	-4.67	5.39	299.92	0.84	338.29M
	1295.00	0.44	338.29	1294.96	4.39	3.34	-4.64	5.72	305.73	0.39	346.21M
	1389.00	0.26	346.21	1388.96	4.54	3.88	-4.82	6.19	308.81	0.20	340.71M
	1481.00	0.44	340.71	1480.96	4.67	4.42	-4.99	6.66	311.51	0.20	327.54M
	1572.00	0.26	327.54	1571.96	4.86	4.92	-5.22	7.17	313.33	0.22	320.38M
	1665.00	0.53	320.38	1664.95	5.21	5.43	-5.60	7.80	314.09	0.29	323.66M
	1758.00	0.44	323.66	1757.95	5.65	6.05	-6.09	8.58	314.80	0.10	190.45M
	1852.00	1.23	190.45	1851.94	6.09	5.35	-6.49	8.41	309.50	1.66	216.52M
	1943.00	3.43	216.52	1942.87	8.11	2.20	-8.28	8.57	284.86	2.62	205.3M
	2036.00	5.80	205.30	2035.56	12.22	-4.29	-11.95	12.69	250.26	2.72	209.09M
	2129.00	7.39	209.09	2127.94	17.80	-13.76	-16.86	21.77	230.78	1.77	209.22M
	2222.00	7.74	209.22	2220.13	24.50	-24.45	-22.83	33.45	223.03	0.38	207.3M
	2316.00	7.47	207.30	2313.30	31.16	-35.41	-28.72	45.59	219.05	0.39	212.2M
	2409.00	8.97	212.20	2405.35	38.59	-46.92	-35.36	58.75	217.00	1.78	119.64L
	2501.00	8.79	210.06	2496.25	46.77	-59.07	-42.70	72.89	215.86	0.41	1.34L
	2596.00	9.06	210.02	2590.09	55.04	-71.83	-50.08	87.56	214.88	0.28	145.02L
	2691.00	8.88	209.20	2683.93	63.25	-84.71	-57.40	102.32	214.12	0.23	162.81L
	2786.00	8.44	208.27	2777.85	71.00	-97.25	-64.28	116.57	213.46	0.49	157.52R
	2880.00	8.27	208.76	2870.85	78.35	-109.25	-70.80	130.18	212.95	0.20	14.26L
	2975.00	8.35	208.62	2964.85	85.78	-121.29	-77.39	143.88	212.54	0.09	0.93L
	3070.00	8.44	208.61	3058.84	93.26	-133.47	-84.03	157.72	212.19	0.09	126.66L
	3164.00	8.18	206.08	3151.85	100.34	-145.53	-90.28	171.26	211.81	0.48	143.71L
	3259.00	7.83	204.17	3245.92	106.80	-157.51	-95.90	184.40	211.34	0.46	200.42M
	3354.00	6.77	200.42	3340.15	112.18	-168.66	-100.50	196.33	210.79	1.22	202.92M
	3449.00	6.33	202.92	3434.53	116.87	-178.73	-104.49	207.03	210.31	0.55	202.31M
	3544.00	6.16	202.31	3528.97	121.51	-188.27	-108.47	217.28	209.95	0.19	198.5M
	3639.00	6.24	198.50	3623.41	125.76	-197.88	-112.04	227.40	209.52	0.44	197.15M
	3734.00	6.60	197.15	3717.82	129.71	-207.99	-115.29	237.81	209.00	0.41	197.57M
	3829.00	7.12	197.57	3812.14	133.86	-218.82	-118.68	248.93	208.47	0.55	198.98M
	3924.00	6.33	198.98	3906.48	138.08	-229.39	-122.16	259.89	208.04	0.85	202.76M
	4018.00	4.40	202.76	4000.07	141.73	-237.61	-125.24	268.60	207.79	2.09	213.98M
	4113.00	2.02	213.98	4094.91	144.41	-242.36	-127.58	273.89	207.76	2.58	198.57M
	4208.00	1.76	198.57	4189.86	146.00	-245.13	-128.98	277.00	207.75	0.60	197.47M
	4302.00	1.32	197.47	4283.83	146.95	-247.54	-129.77	279.49	207.67	0.47	31.67M
	4397.00	0.18	31.67	4378.82	147.27	-248.45	-130.02	280.42	207.62	1.57	49.58M
	4492.00	0.35	49.58	4473.82	146.95	-248.14	-129.72	280.00	207.60	0.20	62.16M
	4586.00	0.44	62.16	4567.82	146.38	-247.78	-129.18	279.43	207.54	0.13	71.03M
	4680.00	0.44	71.03	4661.81	145.70	-247.50	-128.52	278.88	207.44	0.07	250.58M
	4774.00	0.44	250.58	4755.81	145.70	-247.50	-128.52	278.88	207.44	0.94	227.9M
	4868.00	0.44	227.90	4849.81	146.34	-247.86	-129.13	279.48	207.52	0.18	221.54M
	4962.00	0.44	221.54	4943.81	146.88	-248.37	-129.64	280.17	207.56	0.05	214.55M
	5057.00	0.44	214.55	5038.80	147.37	-248.95	-130.08	280.88	207.59	0.06	278.63M
	5151.00	0.79	278.63	5132.80	148.22	-249.15	-130.93	281.45	207.72	0.76	321.4M
	5246.00	0.53	321.40	5227.79	149.11	-248.70	-131.85	281.49	207.93	0.57	318.95M
	5340.00	0.09	318.95	5321.79	149.40	-248.31	-132.17	281.29	208.03	0.47	204.06M
	5435.00	0.26	204.06	5416.79	149.55	-248.45	-132.31	281.48	208.04	0.33	178.59M

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (%100ft)	TF (°)
	5529.00	0.53	178.59	5510.79	149.67	-249.08	-132.38	282.07	207.99	0.34	215.05M
	5624.00	0.44	215.05	5605.79	149.92	-249.82	-132.58	282.82	207.96	0.33	166.17M
	5719.00	0.44	166.17	5700.78	150.09	-250.47	-132.71	283.45	207.92	0.38	304.6M
	5813.00	0.18	304.60	5794.78	150.14	-250.74	-132.74	283.71	207.90	0.62	274.62M
	5908.00	1.23	274.62	5889.78	151.27	-250.57	-133.88	284.09	208.12	1.13	258.22M
	6002.00	3.52	258.22	5983.69	155.12	-251.08	-137.71	286.36	208.74	2.52	266.89M
	6097.00	4.75	266.89	6078.44	161.95	-251.89	-144.49	290.39	209.84	1.45	263.92M
	6192.00	7.56	263.92	6172.88	172.13	-252.76	-154.64	296.31	211.46	2.98	265.91M
	6286.00	10.46	265.91	6265.71	186.84	-254.03	-169.30	305.27	213.68	3.10	39.53R
	6380.00	18.29	284.36	6356.75	209.42	-250.97	-192.15	316.08	217.44	9.55	3.63R
	6474.00	26.29	285.50	6443.65	243.08	-241.73	-226.55	331.30	223.14	8.52	18.53L
	6569.00	33.94	280.97	6525.78	288.59	-231.05	-272.94	357.60	229.75	8.40	2.74R
	6664.00	46.25	281.78	6598.31	347.45	-218.95	-332.79	398.36	236.66	12.97	8.97L
	6759.00	62.87	278.88	6653.21	422.19	-205.32	-408.69	457.37	243.33	17.67	8.75L
	6842.00	79.76	276.28	6679.71	498.93	-195.08	-486.35	524.02	248.14	20.56	8.31L
7" Casing Point	6893.00	86.01	275.37	6686.02	548.77	-189.95	-536.67	569.30	250.51	12.39	8.2L
	6933.00	90.92	274.66	6687.09	588.24	-186.45	-576.49	605.90	252.08	12.39	83.73L
	7025.00	91.01	273.84	6685.54	679.26	-179.64	-668.23	691.95	254.95	0.90	16.63L
	7117.00	92.95	273.26	6682.36	770.39	-173.94	-759.99	779.64	257.11	2.20	77.4L
	7210.00	93.39	271.28	6677.22	862.68	-170.27	-852.77	869.60	258.71	2.18	105.86L
	7303.00	93.12	270.33	6671.94	955.19	-168.96	-945.61	960.59	259.87	1.06	111.65L
	7397.00	92.07	267.69	6667.68	1048.95	-170.59	-1039.49	1053.39	260.68	3.02	16.58L
	7490.00	93.21	267.35	6663.40	1141.82	-174.60	-1132.30	1145.69	261.23	1.28	126.58L
	7582.00	91.36	264.86	6659.73	1233.73	-180.85	-1224.01	1237.30	261.60	3.37	153.29R
	7676.00	89.69	265.70	6658.87	1327.72	-188.58	-1317.68	1331.11	261.86	1.99	57.53L
	7771.00	90.04	265.15	6659.09	1422.71	-196.16	-1412.38	1425.93	262.09	0.69	170.18L
	7866.00	89.52	265.06	6659.46	1517.70	-204.27	-1507.03	1520.81	262.28	0.56	0.94L
	7961.00	90.13	265.05	6659.75	1612.69	-212.46	-1601.67	1615.70	262.44	0.64	102.14R
	8055.00	89.96	265.84	6659.67	1706.69	-219.92	-1695.38	1709.58	262.61	0.86	19.4L
	8150.00	90.84	265.53	6659.01	1801.68	-227.07	-1790.10	1804.45	262.77	0.98	128.43R
	8245.00	89.34	267.42	6658.86	1896.67	-232.91	-1884.92	1899.25	262.96	2.54	55.31R
	8339.00	89.79	268.07	6659.58	1990.62	-236.61	-1978.84	1992.94	263.18	0.84	28.49R
	8434.00	90.84	268.64	6659.05	2085.53	-239.34	-2073.80	2087.56	263.42	1.26	129.34L
	8528.00	89.52	267.03	6658.76	2179.48	-242.89	-2167.73	2181.29	263.61	2.21	130.16L
	8622.00	89.25	266.71	6659.77	2273.46	-248.02	-2261.58	2275.14	263.74	0.45	0.5L
	8717.00	90.40	266.70	6660.06	2368.45	-253.48	-2356.42	2370.01	263.86	1.21	171.02L
	8812.00	87.49	266.24	6661.81	2463.42	-259.33	-2451.21	2464.89	263.96	3.10	64.48L
	8906.00	88.02	265.13	6665.49	2557.34	-266.39	-2544.87	2558.78	264.02	1.31	63.47R
	9000.00	89.60	268.29	6667.44	2651.30	-271.79	-2638.68	2652.64	264.12	3.76	37.78L
	9095.00	90.40	267.67	6667.44	2746.24	-275.13	-2733.62	2747.43	264.25	1.07	99.07R
	9189.00	90.13	269.36	6667.01	2840.14	-277.57	-2827.59	2841.18	264.39	1.82	14.21R
	9284.00	90.92	269.56	6666.14	2934.95	-278.46	-2922.58	2935.81	264.56	0.86	119.18L
	9378.00	89.87	267.68	6665.49	3028.84	-280.73	-3016.54	3029.58	264.68	2.29	34.19R
	9472.00	90.40	268.04	6665.27	3122.79	-284.24	-3110.48	3123.44	264.78	0.68	122L
	9566.00	89.60	266.76	6665.27	3216.76	-288.50	-3204.38	3217.34	264.86	1.61	HS
	9661.00	89.87	266.76	6665.71	3311.75	-293.87	-3299.22	3312.29	264.91	0.28	11.13L
	9755.00	90.48	266.64	6665.42	3405.74	-299.28	-3393.07	3406.24	264.96	0.66	175.24R
	9849.00	89.52	266.72	6665.42	3499.73	-304.73	-3486.91	3500.20	265.01	1.02	22.05L
	9943.00	90.31	266.40	6665.56	3593.72	-310.37	-3580.74	3594.16	265.05	0.91	109.11R
	10037.00	89.96	267.41	6665.34	3687.71	-315.44	-3674.60	3688.11	265.09	1.14	31.56L
	10132.00	90.66	266.98	6664.82	3782.68	-320.09	-3769.48	3783.05	265.15	0.86	175.6L
	10226.00	90.40	266.96	6663.95	3876.66	-325.06	-3863.35	3877.00	265.19	0.28	114.96L
	10320.00	90.13	266.38	6663.52	3970.66	-330.52	-3957.19	3970.97	265.23	0.68	51.84L
	10415.00	90.57	265.82	6662.94	4065.65	-336.98	-4051.97	4065.95	265.25	0.75	176.47L
	10509.00	88.46	265.69	6663.73	4159.64	-343.94	-4145.70	4159.94	265.26	2.25	79.96R
	10604.00	89.10	269.29	6665.76	4254.57	-348.10	-4240.57	4254.83	265.31	3.85	120.71L
	10698.00	88.72	268.65	6667.55	4348.42	-349.79	-4334.54	4348.63	265.39	0.79	11L
	10792.00	89.08	268.58	6669.35	4442.30	-352.06	-4428.49	4442.46	265.45	0.39	7.67L
	10887.00	89.60	268.51	6670.44	4537.20	-354.47	-4523.46	4537.32	265.52	0.55	177.99L
	10981.00	88.46	268.47	6672.04	4631.09	-356.95	-4617.41	4631.18	265.58	1.21	44.82R
	11076.00	89.96	269.96	6673.35	4725.92	-358.25	-4712.38	4725.98	265.65	2.23	10.3R
	11170.00	91.28	270.20	6672.33	4819.67	-358.12	-4806.38	4819.70	265.74	1.43	154.25L
	11265.00	89.87	269.52	6671.37	4914.44	-358.35	-4901.37	4914.45	265.82	1.65	37.61L
	11359.00	90.48	269.05	6671.09	5008.28	-359.52	-4995.36	5008.28	265.88	0.82	114.71L
	11454.00	89.96	267.92	6670.72	5103.18	-362.03	-5090.32	5103.18	265.93	1.31	4.4R
	11548.00	90.48	267.96	6670.36	5197.12	-365.41	-5184.26	5197.12	265.97	0.55	124.38L
	11644.00	90.22	267.58	6669.78	5293.07	-369.15	-5280.19	5293.08	266.00	0.48	3.07L
	11737.00	91.71	267.50	6668.21	5386.02	-373.14	-5373.09	5386.03	266.03	1.60	159.26L
	11833.00	90.31	266.97	6666.52	5481.98	-377.77	-5468.96	5481.99	266.05	1.56	23.46R
	11928.00	90.84	267.20	6665.56	5576.96	-382.60	-5563.83	5576.97	266.07	0.61	148.49R
Last SLB_MWD Survey	12003.00	90.22	267.58	6664.87	5651.93	-386.01	-5638.75	5651.94	266.08	0.97	HS
Bit Projection	12066.00	90.22	267.58	6664.63	5714.90	-388.67	-5701.69	5714.92	266.10	0.00	

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 \*\*\* 3-D 95.000% Confidence 2.7955 sigma  
Survey Program:

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey			
Surface	1	0.000	30.000	Act Stns	13.250	9.625	SLB_EMS-STD-Depth Only	Original Hole / Wells Ranch AE19-631 MWD 0' to 12066' Definitive			
Surface	1	30.000	715.000	1/98.425	13.250	9.625	SLB_EMS-STD	Original Hole / Wells Ranch AE19-631 MWD 0' to 12066' Definitive			
Intermediate	1	715.000	6842.000	Act Stns	8.750	7.000	SLB_MWD-STD	Original Hole / Wells Ranch AE19-631 MWD 0' to 12066' Definitive			
Production	1	6842.000	12003.000	Act Stns	6.125	4.500	SLB_MWD+IFR1+MS	Original Hole / Wells Ranch AE19-631 MWD 0' to 12066' Definitive			
Bit Projection	1	12003.000	12066.000	Act Stns	6.125	4.500	SLB_BLIND+TREND	Original Hole / Wells Ranch AE19-631 MWD 0' to 12066' Definitive			