



Company: Noble Energy  
Lease/Well: Wells Ranch USX AA/13-6  
Location: S-13 T-6N R-63W  
Rig Name: Production Well  
State/County: Colorado/Weld  
Latitude: 40.49, Longitude: -104.39  
GRID North is 0.72 Degrees East of True North  
VS-Azi: 0.00 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : Ground Elevation

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro\_run01-01\_ed.ut

Minimum Curvature Method

Report Date/Time: 7/27/2011 / 12:08

Vaughn Energy Services

Henderson, CO

866-835-8333

Surveyor: Daniel Miller

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.32	2.66	100.00	0.27	0.01	0.27	0.28	2.66	0.32
200.00	0.30	31.80	200.00	0.77	0.16	0.77	0.79	11.86	0.15
300.00	0.48	314.91	300.00	1.28	0.00	1.28	1.28	0.18	0.50
400.00	0.46	321.93	399.99	1.89	-0.54	1.89	1.97	344.14	0.06
500.00	0.22	41.35	499.99	2.35	-0.66	2.35	2.44	344.38	0.47
600.00	0.43	112.29	599.99	2.35	-0.18	2.35	2.36	355.52	0.41
700.00	0.35	115.03	699.99	2.08	0.44	2.08	2.13	11.80	0.08
800.00	0.31	117.74	799.99	1.83	0.95	1.83	2.06	27.50	0.03
900.00	0.43	133.46	899.98	1.44	1.47	1.44	2.06	45.52	0.15
1000.00	0.45	146.73	999.98	0.85	1.96	0.85	2.14	66.50	0.10
1100.00	0.65	151.99	1099.98	0.02	2.44	0.02	2.44	89.58	0.20
1200.00	0.61	152.41	1199.97	-0.95	2.95	-0.95	3.10	107.89	0.05
1300.00	0.56	162.15	1299.97	-1.89	3.35	-1.89	3.85	119.40	0.11
1400.00	0.56	161.35	1399.96	-2.82	3.66	-2.82	4.62	127.62	0.01
1500.00	0.51	164.53	1499.96	-3.71	3.93	-3.71	5.41	133.36	0.06
1600.00	0.34	157.95	1599.95	-4.42	4.16	-4.42	6.07	136.71	0.18
1700.00	0.42	156.33	1699.95	-5.03	4.42	-5.03	6.69	138.67	0.08
1800.00	0.51	155.11	1799.95	-5.76	4.75	-5.76	7.47	140.49	0.09
1900.00	0.50	153.07	1899.94	-6.56	5.14	-6.56	8.33	141.91	0.02
2000.00	0.94	187.78	1999.94	-7.75	5.22	-7.75	9.35	146.03	0.60
2100.00	1.42	179.75	2099.92	-9.80	5.12	-9.80	11.06	152.42	0.51
2200.00	1.62	176.35	2199.88	-12.44	5.21	-12.44	13.49	157.26	0.22
2300.00	1.63	176.19	2299.84	-15.26	5.40	-15.26	16.19	160.52	0.01
2400.00	1.70	172.25	2399.80	-18.15	5.69	-18.15	19.02	162.59	0.14
2500.00	1.55	174.35	2499.76	-20.96	6.02	-20.96	21.81	163.96	0.16
2600.00	1.10	175.80	2599.73	-23.25	6.23	-23.25	24.07	165.01	0.45
2700.00	0.93	180.18	2699.72	-25.02	6.30	-25.02	25.80	165.88	0.19
2800.00	0.41	155.13	2799.71	-26.16	6.44	-26.16	26.94	166.16	0.59
2900.00	0.34	148.03	2899.71	-26.74	6.75	-26.74	27.58	165.83	0.08
3000.00	0.19	140.11	2999.71	-27.12	7.02	-27.12	28.02	165.49	0.16
3100.00	0.25	114.24	3099.70	-27.34	7.33	-27.34	28.31	165.00	0.11
3200.00	0.29	84.70	3199.70	-27.41	7.77	-27.41	28.49	164.17	0.14
3300.00	0.57	34.61	3299.70	-26.98	8.31	-26.98	28.23	162.89	0.44
3400.00	0.30	40.87	3399.70	-26.37	8.76	-26.37	27.79	161.63	0.27

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
3500.00	0.58	137.39	3499.70	-26.55	9.27	-26.55	28.12	160.75	0.68
3600.00	0.85	145.39	3599.69	-27.53	10.03	-27.53	29.30	159.98	0.29
3700.00	0.97	146.10	3699.68	-28.84	10.92	-28.84	30.84	159.25	0.12
3800.00	0.97	148.30	3799.66	-30.26	11.84	-30.26	32.49	158.63	0.04
3900.00	1.26	156.69	3899.64	-31.99	12.72	-31.99	34.43	158.32	0.34
4000.00	1.16	173.66	3999.62	-34.01	13.27	-34.01	36.51	158.69	0.37
4100.00	0.99	200.00	4099.60	-35.84	13.08	-35.84	38.15	159.94	0.52
4200.00	1.08	236.79	4199.59	-37.17	12.00	-37.17	39.06	162.11	0.66
4300.00	1.22	266.21	4299.57	-37.76	10.14	-37.76	39.09	164.96	0.60
4400.00	1.43	274.63	4399.54	-37.73	7.83	-37.73	38.53	168.27	0.29
4500.00	1.26	293.41	4499.51	-37.19	5.58	-37.19	37.60	171.47	0.47
4600.00	1.01	338.30	4599.50	-35.94	4.25	-35.94	36.19	173.26	0.89
4700.00	0.82	14.97	4699.48	-34.43	4.10	-34.43	34.67	173.20	0.60
4800.00	0.57	34.27	4799.48	-33.33	4.57	-33.33	33.64	172.19	0.34
4900.00	0.44	68.47	4899.47	-32.77	5.21	-32.77	33.18	170.97	0.32
5000.00	0.28	101.16	4999.47	-32.68	5.81	-32.68	33.19	169.93	0.25
5100.00	0.41	135.63	5099.47	-32.98	6.29	-32.98	33.58	169.19	0.24
5200.00	0.76	153.80	5199.46	-33.83	6.83	-33.83	34.51	168.58	0.39
5300.00	0.90	142.75	5299.45	-35.04	7.60	-35.04	35.86	167.76	0.21
5400.00	1.12	123.38	5399.44	-36.21	8.90	-36.21	37.29	166.20	0.41
5500.00	1.54	124.26	5499.41	-37.50	10.82	-37.50	39.03	163.90	0.41
5600.00	2.03	122.66	5599.36	-39.21	13.42	-39.21	41.45	161.11	0.49
5700.00	2.87	122.13	5699.27	-41.50	17.03	-41.50	44.86	157.69	0.84
5800.00	6.40	123.30	5798.93	-45.89	23.82	-45.89	51.71	152.57	3.53
5900.00	3.42	134.11	5898.55	-51.03	30.62	-51.03	59.51	149.04	3.11
6000.00	1.29	149.21	5998.46	-54.07	33.33	-54.07	63.52	148.35	2.20
6100.00	0.29	202.14	6098.45	-55.27	33.82	-55.27	64.80	148.54	1.14
6200.00	0.40	285.43	6198.45	-55.41	33.38	-55.41	64.69	148.93	0.47
6300.00	0.82	292.97	6298.44	-55.04	32.38	-55.04	63.85	149.53	0.43
6400.00	1.06	297.86	6398.43	-54.32	30.90	-54.32	62.49	150.37	0.25
6450.00	0.82	295.69	6448.42	-53.95	30.16	-53.95	61.81	150.79	0.50

HORIZONTAL DISPLACEMENT IS  
61.81 FEET AT 150.79 DEGREES