



Company: NOBLE ENERGY
Well: SPIKE STATE GWS C 24-16

Rig Name: PRODUCTION
State/County: COLORADO/WELD
Latitude: 40.29, Longitude: -104.49
GRID North is 0.65 Degrees East of True North
VS-Azi: 0.00 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Service Company : VAUGHN ENERGY SERVICES

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01_ed.ut
Minimum Curvature Method
Report Date/Time: 5/25/2011 / 23:07

Vaughn Energy Services
Denver, Colorado
800-606-4976
Surveyor: Nick Campbell

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	0.25	250.58	100.00	-0.07	-0.21	-0.07	0.22	250.58	0.25
200.00	0.29	157.99	200.00	-0.38	-0.32	-0.38	0.50	220.50	0.39
300.00	0.42	159.74	300.00	-0.96	-0.10	-0.96	0.96	186.00	0.14
400.00	0.35	165.23	399.99	-1.60	0.11	-1.60	1.60	176.21	0.08
500.00	0.57	159.28	499.99	-2.36	0.36	-2.36	2.39	171.33	0.22
600.00	0.55	180.28	599.99	-3.31	0.53	-3.31	3.35	170.84	0.21
700.00	0.63	178.73	699.98	-4.35	0.54	-4.35	4.38	172.87	0.08
800.00	0.81	170.87	799.97	-5.60	0.67	-5.60	5.63	173.19	0.21
900.00	0.95	173.14	899.96	-7.12	0.88	-7.12	7.17	172.95	0.14
1000.00	0.86	169.01	999.95	-8.67	1.12	-8.67	8.75	172.63	0.11
1100.00	0.92	192.98	1099.94	-10.20	1.08	-10.20	10.25	173.93	0.38
1200.00	0.76	209.97	1199.93	-11.56	0.57	-11.56	11.57	177.18	0.30
1300.00	0.73	183.56	1299.92	-12.77	0.20	-12.77	12.78	179.11	0.34
1400.00	0.60	161.68	1399.91	-13.91	0.32	-13.91	13.91	178.68	0.29
1500.00	0.71	156.84	1499.91	-14.97	0.73	-14.97	14.99	177.21	0.13
1600.00	0.20	113.35	1599.90	-15.61	1.13	-15.61	15.65	175.85	0.58
1700.00	0.42	127.09	1699.90	-15.90	1.59	-15.90	15.98	174.30	0.24
1800.00	0.49	257.79	1799.90	-16.22	1.47	-16.22	16.28	174.83	0.83
1900.00	0.66	239.18	1899.89	-16.60	0.56	-16.60	16.61	178.06	0.25
2000.00	1.20	204.73	1999.88	-17.85	-0.37	-17.85	17.85	181.19	0.76
2100.00	0.94	224.78	2099.86	-19.38	-1.39	-19.38	19.43	184.09	0.46
2200.00	0.92	238.19	2199.85	-20.39	-2.65	-20.39	20.56	187.39	0.22
2300.00	0.69	251.27	2299.84	-21.01	-3.90	-21.01	21.36	190.51	0.29
2400.00	0.63	260.93	2399.83	-21.29	-5.01	-21.29	21.87	193.25	0.12
2500.00	0.70	286.52	2499.83	-21.20	-6.14	-21.20	22.07	196.15	0.30
2600.00	0.79	279.49	2599.82	-20.91	-7.40	-20.91	22.18	199.48	0.13
2700.00	0.70	272.65	2699.81	-20.77	-8.69	-20.77	22.51	202.69	0.13
2800.00	0.61	282.29	2799.80	-20.63	-9.81	-20.63	22.85	205.44	0.14
2900.00	0.54	274.17	2899.80	-20.48	-10.80	-20.48	23.16	207.79	0.11

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
3000.00	0.29	263.95	2999.80	-20.48	-11.51	-20.48	23.49	209.35	0.26
3100.00	0.39	233.45	3099.80	-20.70	-12.03	-20.70	23.94	210.16	0.20
3200.00	0.31	120.29	3199.79	-21.04	-12.07	-21.04	24.26	209.84	0.58
3300.00	0.50	152.87	3299.79	-21.56	-11.64	-21.56	24.50	208.35	0.29
3400.00	0.48	56.76	3399.79	-21.72	-11.09	-21.72	24.39	207.05	0.73
3500.00	0.56	142.63	3499.79	-21.89	-10.45	-21.89	24.25	205.51	0.71
3600.00	1.00	100.99	3599.78	-22.44	-9.29	-22.44	24.29	202.49	0.69
3700.00	0.78	99.90	3699.77	-22.73	-7.77	-22.73	24.02	198.87	0.22
3800.00	0.73	37.11	3799.76	-22.34	-6.71	-22.34	23.32	196.73	0.79
3900.00	0.92	54.18	3899.75	-21.36	-5.68	-21.36	22.10	194.88	0.31
4000.00	1.03	357.18	3999.74	-19.99	-5.07	-19.99	20.62	194.23	0.93
4100.00	0.91	322.49	4099.72	-18.47	-5.59	-18.47	19.30	196.85	0.59
4200.00	0.97	327.17	4199.71	-17.13	-6.53	-17.13	18.33	200.88	0.10
4300.00	1.51	299.04	4299.69	-15.78	-8.15	-15.78	17.76	207.32	0.80
4400.00	2.89	292.04	4399.61	-14.19	-11.64	-14.19	18.35	219.36	1.40
4500.00	4.04	289.59	4499.43	-12.06	-17.29	-12.06	21.08	235.10	1.16
4600.00	3.61	284.46	4599.20	-10.10	-23.65	-10.10	25.72	246.88	0.54
4700.00	3.60	291.89	4699.01	-8.14	-29.62	-8.14	30.72	254.63	0.47
4800.00	3.25	287.16	4798.83	-6.13	-35.24	-6.13	35.77	260.13	0.45
4900.00	3.09	291.28	4898.67	-4.32	-40.46	-4.32	40.69	263.91	0.28
5000.00	2.82	285.64	4998.54	-2.67	-45.35	-2.67	45.43	266.63	0.40
5100.00	2.33	295.54	5098.44	-1.13	-49.55	-1.13	49.57	268.69	0.66
5200.00	1.99	318.85	5198.37	1.05	-52.53	1.05	52.54	271.15	0.93
5300.00	2.18	294.04	5298.31	3.14	-55.41	3.14	55.50	273.24	0.92
5400.00	1.86	311.52	5398.25	4.99	-58.36	4.99	58.58	274.88	0.69
5500.00	2.31	333.65	5498.18	7.86	-60.47	7.86	60.98	277.41	0.91
5600.00	1.44	324.82	5598.13	10.69	-62.08	10.69	63.00	279.77	0.91
5700.00	1.64	344.88	5698.09	13.10	-63.18	13.10	64.52	281.71	0.57
5800.00	2.03	4.03	5798.04	16.25	-63.43	16.25	65.48	284.37	0.72
5900.00	1.13	6.58	5898.00	18.99	-63.19	18.99	65.99	286.73	0.91
6000.00	1.94	12.94	5997.97	21.62	-62.70	21.62	66.32	289.02	0.83
6100.00	2.11	9.61	6097.90	25.08	-62.02	25.08	66.90	292.02	0.21
6200.00	1.90	7.79	6197.84	28.54	-61.48	28.54	67.78	294.90	0.22
6300.00	1.99	17.41	6297.78	31.84	-60.74	31.84	68.58	297.66	0.34
6400.00	2.04	23.64	6397.72	35.12	-59.51	35.12	69.10	300.55	0.23
6500.00	2.52	15.72	6497.64	38.88	-58.19	38.88	69.99	303.74	0.57
6600.00	2.85	22.02	6597.53	43.30	-56.67	43.30	71.32	307.39	0.44
6700.00	2.82	24.06	6697.41	47.86	-54.73	47.86	72.70	311.17	0.11
6800.00	3.34	14.62	6797.27	52.92	-52.99	52.92	74.89	314.96	0.72
6900.00	3.35	16.16	6897.10	58.54	-51.44	58.54	77.93	318.69	0.09
6911.00	3.38	15.75	6908.08	59.16	-51.27	59.16	78.28	319.09	0.33
HORIZONTAL DISPLACEMENT IS 78.28 FEET AT 319.09 DEGREES									