

VES

VAUGHN ENERGY SERVICES

Company: NOBLE ENERGY

Lease/Well: SPIKE STATE GWS C/ #24-15

Location:

Rig Name: PRODUCTION

State/County: COLORADO/WELD COUNTY

Latitude: 40.28

GRID North is 0.66 Degrees East of True North

VS-Azi: 0.00 Degrees

GTI

GYRO TECHNOLOGIES INC

FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : GL

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: run2-01.ut

Minimum Curvature Method

Report Date/Time: 5/20/2011 / 16:00

Vaughn Energy Services

Rifle, Colorado

303-489-9231

Jay Hinman

Spike State GWS C 24-15/05-123-15815

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	0.24	99.53	100.00	-0.03	0.21	-0.03	0.21	99.53	0.24
200.00	0.14	81.86	200.00	-0.05	0.53	-0.05	0.53	95.61	0.12
300.00	0.32	77.32	300.00	0.03	0.92	0.03	0.92	88.39	0.18
400.00	0.29	87.28	400.00	0.10	1.45	0.10	1.45	86.08	0.06
500.00	0.25	97.15	500.00	0.08	1.91	0.08	1.91	87.48	0.06
600.00	0.22	81.31	599.99	0.09	2.32	0.09	2.32	87.86	0.07
700.00	0.30	92.23	699.99	0.11	2.77	0.11	2.77	87.80	0.09
800.00	0.24	92.96	799.99	0.09	3.24	0.09	3.24	88.50	0.05
900.00	0.14	101.60	899.99	0.05	3.57	0.05	3.57	89.20	0.11
1000.00	0.20	104.83	999.99	-0.02	3.86	-0.02	3.86	90.28	0.06
1100.00	0.13	94.36	1099.99	-0.07	4.14	-0.07	4.14	90.99	0.07
1200.00	0.33	99.05	1199.99	-0.13	4.54	-0.13	4.54	91.59	0.21
1300.00	0.19	102.49	1299.99	-0.21	4.99	-0.21	5.00	92.39	0.14
1400.00	0.25	118.36	1399.99	-0.35	5.35	-0.35	5.36	93.72	0.08
1500.00	0.10	128.02	1499.99	-0.50	5.60	-0.50	5.63	95.13	0.15
1600.00	0.20	142.88	1599.99	-0.70	5.78	-0.70	5.82	96.87	0.11
1700.00	0.23	157.99	1699.99	-1.02	5.96	-1.02	6.05	99.75	0.06
1800.00	0.41	173.04	1799.99	-1.57	6.08	-1.57	6.28	104.46	0.20
1900.00	0.28	184.38	1899.98	-2.17	6.10	-2.17	6.48	109.59	0.14
2000.00	0.55	198.17	1999.98	-2.88	5.93	-2.88	6.60	115.88	0.28
2100.00	0.66	205.50	2099.98	-3.86	5.53	-3.86	6.75	124.89	0.13
2200.00	0.77	217.97	2199.97	-4.91	4.87	-4.91	6.92	135.21	0.19
2300.00	0.75	226.64	2299.96	-5.89	3.98	-5.89	7.11	145.91	0.12
2400.00	0.96	247.24	2399.95	-6.66	2.73	-6.66	7.20	157.71	0.37
2500.00	1.01	256.58	2499.93	-7.19	1.10	-7.19	7.28	171.28	0.17
2600.00	1.16	265.73	2599.92	-7.47	-0.76	-7.47	7.51	185.78	0.23
2700.00	0.99	276.71	2699.90	-7.44	-2.62	-7.44	7.89	199.41	0.26
2800.00	1.08	272.09	2799.88	-7.31	-4.43	-7.31	8.55	211.21	0.12
2900.00	1.06	275.07	2899.86	-7.19	-6.29	-7.19	9.55	221.16	0.06
3000.00	1.03	275.96	2999.85	-7.02	-8.10	-7.02	10.72	229.09	0.03
3100.00	0.95	267.19	3099.83	-6.97	-9.82	-6.97	12.04	234.65	0.17
3200.00	0.82	250.66	3199.82	-7.24	-11.32	-7.24	13.44	237.39	0.28
3300.00	0.60	264.58	3299.81	-7.53	-12.51	-7.53	14.60	238.97	0.28
3400.00	0.69	271.40	3399.81	-7.56	-13.64	-7.56	15.59	240.98	0.12

<i>Measured Depth FT</i>	<i>Incl Angle Deg</i>	<i>Drift Direction Deg</i>	<i>TVD FT</i>	<i>+N/-S FT</i>	<i>+E/-W FT</i>	<i>Vertical Section FT</i>	<i>Closure Distance FT</i>	<i>Closure Direction Deg</i>	<i>Dogleg Severity Deg/100</i>
3500.00	0.47	287.51	3499.80	-7.43	-14.63	-7.43	16.40	243.08	0.27
3600.00	0.67	300.31	3599.80	-7.01	-15.52	-7.01	17.03	245.70	0.24
3700.00	0.50	312.86	3699.79	-6.42	-16.34	-6.42	17.56	248.57	0.22
3800.00	0.75	323.95	3799.79	-5.59	-17.05	-5.59	17.94	251.83	0.28
3900.00	1.25	322.40	3899.77	-4.21	-18.09	-4.21	18.58	256.91	0.50
4000.00	1.21	315.43	3999.75	-2.59	-19.50	-2.59	19.67	262.42	0.15
4100.00	1.28	314.56	4099.72	-1.06	-21.03	-1.06	21.06	267.11	0.07
4200.00	1.20	309.33	4199.70	0.38	-22.63	0.38	22.64	270.97	0.14
4300.00	1.44	307.75	4299.67	1.82	-24.44	1.82	24.50	274.25	0.24
4400.00	1.45	301.64	4399.64	3.25	-26.51	3.25	26.71	276.99	0.15
4500.00	1.52	310.62	4499.61	4.78	-28.59	4.78	28.99	279.48	0.24
4600.00	1.67	301.76	4599.57	6.40	-30.83	6.40	31.49	281.73	0.29
4700.00	1.54	304.97	4699.53	7.94	-33.17	7.94	34.11	283.46	0.16
4800.00	1.48	310.79	4799.50	9.55	-35.25	9.55	36.52	285.16	0.17
4900.00	1.64	305.23	4899.46	11.22	-37.39	11.22	39.04	286.70	0.22
5000.00	1.77	303.50	4999.42	12.90	-39.85	12.90	41.89	287.93	0.14
5100.00	2.01	300.06	5099.36	14.63	-42.66	14.63	45.10	288.93	0.26
5200.00	2.26	307.89	5199.29	16.72	-45.73	16.72	48.69	290.08	0.38
5300.00	2.47	307.18	5299.21	19.23	-49.00	19.23	52.64	291.43	0.21
5400.00	3.03	311.83	5399.09	22.29	-52.69	22.29	57.21	292.93	0.60
5500.00	3.23	313.35	5498.94	25.99	-56.71	25.99	62.38	294.62	0.21
5600.00	3.10	319.75	5598.79	29.98	-60.50	29.98	67.52	296.36	0.38
5700.00	2.67	322.45	5698.66	33.89	-63.66	33.89	72.12	298.03	0.45
5800.00	2.18	330.22	5798.57	37.38	-66.02	37.38	75.87	299.52	0.59
5900.00	2.01	333.60	5898.51	40.60	-67.74	40.60	78.98	300.94	0.20
6000.00	1.51	342.70	5998.46	43.43	-68.92	43.43	81.46	302.22	0.58
6100.00	1.49	327.91	6098.43	45.79	-70.00	45.79	83.64	303.19	0.39
6200.00	1.19	334.87	6198.40	47.83	-71.13	47.83	85.72	303.92	0.34
6300.00	1.29	345.90	6298.38	49.87	-71.85	49.87	87.46	304.77	0.26
6400.00	1.29	344.36	6398.35	52.05	-72.43	52.05	89.19	305.70	0.04
6500.00	1.05	332.73	6498.33	53.95	-73.15	53.95	90.89	306.41	0.33
6600.00	1.16	347.56	6598.31	55.75	-73.79	55.75	92.48	307.07	0.30
6700.00	1.19	342.43	6698.29	57.73	-74.32	57.73	94.11	307.84	0.11
6850.00	1.33	331.06	6848.25	60.73	-75.63	60.73	97.00	308.76	0.19
HORIZONTAL DISPLACEMENT IS 97.00 FEET AT 308.76 DEGREES									