

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Oster / 3-1614

Location: S-3 T-4N R-64W

Rig Name: Production

State/County: Colorado / Weld County

Latitude: 40.34, Longitude: -104.58

GRID North is 0.60 Degrees East of True North

VS-Azi: 0.00 Degrees

GTI

GYRO TECHNOLOGIES, INC

FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = Ground Level

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: inrun_ed.ut

Minimum Curvature Method

Report Date/Time: 3/22/2011 / 11:29

Vaughn Energy Services

Denver, CO

720-215-1841

Robert Davis

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	0.83	352.98	100.00	0.72	-0.09	0.72	0.72	352.98	0.83
200.00	0.32	25.59	199.99	1.69	-0.06	1.69	1.69	358.12	0.58
300.00	0.18	72.65	299.99	1.98	0.21	1.98	2.00	6.15	0.24
400.00	0.14	193.44	399.99	1.91	0.33	1.91	1.94	9.89	0.28
500.00	0.06	291.49	499.99	1.81	0.26	1.81	1.83	8.19	0.16
600.00	0.10	40.56	599.99	1.90	0.27	1.90	1.92	8.18	0.13
700.00	0.20	74.21	699.99	2.01	0.50	2.01	2.07	13.98	0.13
800.00	0.21	76.62	799.99	2.10	0.85	2.10	2.27	21.98	0.01
900.00	0.22	106.80	899.99	2.09	1.21	2.09	2.41	30.11	0.11
1000.00	0.21	122.14	999.99	1.93	1.55	1.93	2.48	38.76	0.06
1100.00	0.19	132.56	1099.99	1.72	1.83	1.72	2.51	46.68	0.04
1200.00	0.19	159.65	1199.99	1.46	2.01	1.46	2.48	53.99	0.09
1300.00	0.23	186.44	1299.99	1.11	2.04	1.11	2.32	61.56	0.10
1400.00	0.27	227.23	1399.99	0.75	1.85	0.75	1.99	67.94	0.18
1500.00	0.32	231.20	1499.98	0.41	1.46	0.41	1.51	74.18	0.06
1600.00	0.36	235.16	1599.98	0.05	0.98	0.05	0.98	86.83	0.04
1700.00	0.19	210.95	1699.98	-0.27	0.63	-0.27	0.68	113.16	0.20
1800.00	0.21	172.96	1799.98	-0.59	0.57	-0.59	0.82	136.20	0.13
1900.00	0.46	227.78	1899.98	-1.04	0.29	-1.04	1.08	164.55	0.38
2000.00	0.49	218.44	1999.98	-1.65	-0.28	-1.65	1.67	189.57	0.08
2100.00	0.50	227.94	2099.97	-2.28	-0.87	-2.28	2.44	200.88	0.08
2200.00	0.45	239.08	2199.97	-2.77	-1.53	-2.77	3.17	208.92	0.11
2300.00	0.27	294.37	2299.97	-2.88	-2.08	-2.88	3.55	215.93	0.37
2400.00	0.27	326.37	2399.97	-2.58	-2.43	-2.58	3.55	223.31	0.15
2500.00	0.35	7.08	2499.96	-2.08	-2.53	-2.08	3.27	230.55	0.23
2600.00	0.19	355.45	2599.96	-1.61	-2.50	-1.61	2.98	237.24	0.17
2700.00	0.21	346.19	2699.96	-1.26	-2.56	-1.26	2.86	243.71	0.04
2800.00	0.24	342.56	2799.96	-0.89	-2.67	-0.89	2.81	251.63	0.03
2900.00	0.24	349.49	2899.96	-0.48	-2.77	-0.48	2.81	260.18	0.03
3000.00	0.06	10.89	2999.96	-0.22	-2.80	-0.22	2.80	265.52	0.18
3100.00	0.04	284.84	3099.96	-0.16	-2.82	-0.16	2.82	266.80	0.07
3200.00	0.35	338.56	3199.96	0.13	-2.96	0.13	2.96	272.55	0.33
3300.00	0.56	346.74	3299.96	0.89	-3.18	0.89	3.30	285.66	0.23
3400.00	0.79	339.27	3399.95	2.01	-3.54	2.01	4.07	299.63	0.24

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	0.79	327.08	3499.94	3.23	-4.15	3.23	5.26	307.88	0.17
3600.00	0.77	332.71	3599.93	4.40	-4.83	4.40	6.54	312.33	0.08
3700.00	0.64	316.91	3699.92	5.41	-5.52	5.41	7.73	314.39	0.23
3800.00	0.64	308.11	3799.92	6.16	-6.35	6.16	8.85	314.15	0.10
3900.00	0.81	310.40	3899.91	6.97	-7.33	6.97	10.11	313.56	0.17
4000.00	0.87	304.38	3999.90	7.85	-8.49	7.85	11.56	312.76	0.11
4100.00	1.03	316.58	4099.88	8.93	-9.73	8.93	13.21	312.54	0.26
4200.00	1.07	313.66	4199.87	10.22	-11.02	10.22	15.03	312.85	0.07
4300.00	0.99	310.41	4299.85	11.43	-12.35	11.43	16.83	312.77	0.10
4400.00	1.03	297.02	4399.84	12.39	-13.81	12.39	18.56	311.91	0.24
4500.00	0.91	306.07	4499.82	13.27	-15.25	13.27	20.22	311.02	0.20
4600.00	0.96	313.89	4599.81	14.32	-16.50	14.32	21.84	310.95	0.14
4700.00	1.04	287.82	4699.79	15.18	-17.97	15.18	23.52	310.19	0.46
4800.00	1.00	308.86	4799.78	16.00	-19.51	16.00	25.23	309.36	0.37
4900.00	1.18	309.40	4899.76	17.20	-20.99	17.20	27.13	309.34	0.18
5000.00	1.33	312.84	4999.74	18.64	-22.63	18.64	29.32	309.48	0.17
5100.00	1.53	309.11	5099.71	20.27	-24.52	20.27	31.81	309.59	0.22
5200.00	1.46	309.54	5199.67	21.93	-26.54	21.93	34.42	309.57	0.07
5300.00	1.57	310.34	5299.64	23.63	-28.57	23.63	37.07	309.60	0.12
5400.00	1.94	315.12	5399.59	25.72	-30.81	25.72	40.13	309.85	0.40
5500.00	2.14	309.14	5499.53	28.09	-33.45	28.09	43.68	310.03	0.29
5600.00	2.22	303.87	5599.45	30.35	-36.50	30.35	47.47	309.74	0.22
5700.00	2.05	289.98	5699.38	32.04	-39.79	32.04	51.08	308.84	0.54
5800.00	1.91	275.64	5799.33	32.81	-43.13	32.81	54.20	307.26	0.51
5900.00	1.92	261.93	5899.27	32.74	-46.45	32.74	56.83	305.18	0.46
6000.00	2.54	247.11	5999.19	31.65	-50.15	31.65	59.30	302.25	0.85
6100.00	1.90	232.26	6099.12	29.77	-53.51	29.77	61.23	299.09	0.86
6200.00	1.35	207.00	6199.08	27.71	-55.35	27.71	61.90	296.59	0.89
6300.00	0.58	188.12	6299.07	26.16	-55.95	26.16	61.77	295.05	0.82
6400.00	0.60	137.89	6399.06	25.27	-55.68	25.27	61.14	294.41	0.50
6500.00	0.58	83.12	6499.06	24.94	-54.83	24.94	60.24	294.46	0.54
6600.00	0.62	117.24	6599.05	24.75	-53.85	24.75	59.27	294.69	0.35
6700.00	0.26	79.17	6699.05	24.55	-53.15	24.55	58.54	294.79	0.44
HORIZONTAL DISPLACEMENT IS 58.54 FEET AT 294.79 DEGREES									