

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Ocoma B / 31-23

Location: S-31 T-5N R-64W

Rig Name: Production

State/County: Colorado / Weld County

Latitude: 40.35, Longitude: -104.59

GRID North is 0.59 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: 4/11/2011 / 20:39

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	0.02	251.80	100.00	-0.01	-0.02	-0.01	0.02	251.80	0.02
200.00	0.54	218.81	200.00	-0.38	-0.34	-0.38	0.51	221.34	0.52
300.00	0.45	201.99	299.99	-1.12	-0.78	-1.12	1.36	214.98	0.17
400.00	0.38	223.94	399.99	-1.72	-1.16	-1.72	2.07	213.96	0.17
500.00	0.44	80.63	499.99	-1.89	-1.00	-1.89	2.14	207.93	0.78
600.00	0.82	62.02	599.98	-1.50	0.01	-1.50	1.50	179.64	0.42
700.00	0.74	68.73	699.98	-0.93	1.24	-0.93	1.55	126.68	0.12
800.00	0.67	66.05	799.97	-0.45	2.38	-0.45	2.42	100.80	0.08
900.00	0.48	20.84	899.96	0.17	3.06	0.17	3.07	86.76	0.47
1000.00	0.83	46.65	999.96	1.06	3.74	1.06	3.89	74.15	0.45
1100.00	0.49	33.15	1099.95	1.92	4.50	1.92	4.89	66.90	0.37
1200.00	0.55	3.13	1199.95	2.76	4.76	2.76	5.51	59.88	0.28
1300.00	0.43	31.98	1299.94	3.57	4.99	3.57	6.13	54.44	0.27
1400.00	0.81	45.42	1399.94	4.38	5.69	4.38	7.18	52.41	0.40
1500.00	0.37	5.70	1499.93	5.19	6.22	5.19	8.10	50.16	0.57
1600.00	0.58	25.87	1599.93	5.96	6.47	5.96	8.80	47.35	0.27
1700.00	0.95	0.64	1699.92	7.25	6.70	7.25	9.87	42.76	0.50
1800.00	0.87	13.83	1799.91	8.82	6.89	8.82	11.19	38.02	0.23
1900.00	0.09	49.02	1899.90	9.61	7.14	9.61	11.97	36.60	0.80
2000.00	0.30	80.69	1999.90	9.70	7.45	9.70	12.24	37.53	0.23
2100.00	0.28	321.11	2099.90	9.93	7.56	9.93	12.48	37.28	0.50
2200.00	0.11	175.89	2199.90	10.03	7.42	10.03	12.47	36.49	0.37
2300.00	0.20	292.97	2299.90	10.00	7.26	10.00	12.36	35.99	0.27
2400.00	0.34	331.38	2399.90	10.33	6.96	10.33	12.45	33.97	0.22
2500.00	0.19	284.60	2499.90	10.62	6.66	10.62	12.54	32.08	0.25
2600.00	0.56	155.29	2599.90	10.22	6.70	10.22	12.23	33.26	0.69
2700.00	0.51	196.95	2699.89	9.36	6.78	9.36	11.56	35.92	0.38
2800.00	0.53	202.00	2799.89	8.51	6.48	8.51	10.69	37.28	0.05
2900.00	0.62	198.68	2899.88	7.57	6.13	7.57	9.74	39.01	0.10
3000.00	0.59	202.51	2999.88	6.58	5.76	6.58	8.74	41.21	0.05
3100.00	0.63	204.97	3099.87	5.60	5.33	5.60	7.73	43.59	0.05
3200.00	0.33	158.23	3199.87	4.82	5.20	4.82	7.09	47.17	0.47
3300.00	0.14	240.27	3299.87	4.49	5.20	4.49	6.87	49.21	0.35
3400.00	0.26	159.58	3399.87	4.21	5.18	4.21	6.67	50.86	0.28

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	1.04	167.57	3499.86	3.11	5.45	3.11	6.28	60.27	0.78
3600.00	1.86	163.50	3599.83	0.68	6.11	0.68	6.14	83.68	0.82
3700.00	2.74	159.59	3699.75	-3.11	7.40	-3.11	8.03	112.83	0.90
3800.00	3.34	154.87	3799.61	-7.99	9.47	-7.99	12.39	130.15	0.65
3900.00	2.90	166.05	3899.46	-13.07	11.31	-13.07	17.29	139.13	0.75
4000.00	2.77	159.41	3999.34	-17.79	12.77	-17.79	21.90	144.32	0.35
4100.00	2.65	165.79	4099.23	-22.30	14.19	-22.30	26.43	147.53	0.32
4200.00	2.12	167.79	4199.14	-26.35	15.15	-26.35	30.39	150.10	0.55
4300.00	1.68	175.58	4299.08	-29.62	15.65	-29.62	33.50	152.14	0.50
4400.00	1.33	178.58	4399.05	-32.24	15.80	-32.24	35.90	153.90	0.37
4500.00	0.95	209.35	4499.03	-34.12	15.42	-34.12	37.44	155.68	0.71
4600.00	0.90	205.86	4599.02	-35.55	14.67	-35.55	38.46	157.57	0.07
4700.00	1.03	210.55	4699.00	-37.03	13.87	-37.03	39.54	159.46	0.15
4800.00	0.74	204.26	4798.99	-38.38	13.15	-38.38	40.58	161.08	0.30
4900.00	0.38	108.78	4898.99	-39.08	13.20	-39.08	41.25	161.34	0.86
5000.00	0.51	91.98	4998.98	-39.20	13.96	-39.20	41.61	160.40	0.19
5100.00	0.28	11.07	5098.98	-38.97	14.45	-38.97	41.57	159.65	0.55
5200.00	0.29	319.90	5198.98	-38.54	14.34	-38.54	41.12	159.59	0.25
5300.00	0.67	325.66	5298.98	-37.87	13.85	-37.87	40.32	159.91	0.38
5400.00	0.92	342.13	5398.97	-36.63	13.28	-36.63	38.96	160.07	0.34
5500.00	1.32	318.62	5498.95	-35.01	12.27	-35.01	37.09	160.68	0.60
5600.00	1.56	288.79	5598.92	-33.70	10.23	-33.70	35.22	163.12	0.78
5700.00	1.51	296.39	5698.88	-32.68	7.76	-32.68	33.59	166.65	0.21
5800.00	0.72	317.88	5798.86	-31.63	6.15	-31.63	32.22	168.99	0.88
5900.00	0.69	348.72	5898.86	-30.57	5.61	-30.57	31.08	169.60	0.38
6000.00	0.08	2.10	5998.85	-29.91	5.50	-29.91	30.41	169.59	0.60
6100.00	0.36	37.33	6098.85	-29.58	5.69	-29.58	30.13	169.11	0.30
6200.00	0.28	116.98	6198.85	-29.44	6.10	-29.44	30.07	168.29	0.42
6300.00	0.12	77.12	6298.85	-29.53	6.42	-29.53	30.22	167.73	0.20
6400.00	0.19	86.22	6398.85	-29.49	6.69	-29.49	30.24	167.22	0.07
6500.00	0.41	48.55	6498.85	-29.25	7.12	-29.25	30.10	166.31	0.28
6600.00	0.33	73.87	6598.85	-28.93	7.66	-28.93	29.93	165.16	0.18
6700.00	0.34	70.67	6698.85	-28.76	8.22	-28.76	29.91	164.04	0.02
6800.00	0.24	69.55	6798.84	-28.58	8.70	-28.58	29.88	163.07	0.10
6900.00	0.30	69.17	6898.84	-28.42	9.14	-28.42	29.85	162.17	0.06
7000.00	0.71	66.52	6998.84	-28.08	9.96	-28.08	29.79	160.48	0.41
<div> <div>HORIZONTAL DISPLACEMENT IS</div> <div>29.79 FEET AT 160.48 DEGREES</div> </div>									