

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy
 Lease/Well: UPV / 23-814
 Location: S-23 T-4N R-64W

Rig Name: Production
 State/County: Colorado / Weld County

Latitude: 40.30, Longitude: -104.51
 GRID North is 0.64 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: 2/18/2011 / 12:27

Vaughn Energy Services
 Fort Worth, Texas
 817-741-3610
 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	0.17	259.89	100.00	-0.03	-0.15	-0.03	0.15	259.89	0.17
200.00	0.38	225.28	200.00	-0.28	-0.53	-0.28	0.60	241.77	0.25
300.00	0.24	189.58	300.00	-0.72	-0.80	-0.72	1.07	227.87	0.23
400.00	0.59	197.49	399.99	-1.42	-0.99	-1.42	1.73	214.83	0.35
500.00	0.77	204.48	499.99	-2.52	-1.42	-2.52	2.90	209.38	0.20
600.00	0.98	184.67	599.98	-3.99	-1.77	-3.99	4.36	203.93	0.36
700.00	0.91	204.39	699.96	-5.56	-2.17	-5.56	5.97	201.29	0.33
800.00	0.81	187.83	799.95	-6.98	-2.59	-6.98	7.45	200.35	0.27
900.00	0.89	216.66	899.94	-8.31	-3.15	-8.31	8.88	200.76	0.43
1000.00	0.64	201.29	999.93	-9.45	-3.81	-9.45	10.19	201.99	0.32
1100.00	0.46	183.15	1099.93	-10.37	-4.04	-10.37	11.13	201.28	0.25
1200.00	0.25	219.75	1199.93	-10.94	-4.20	-10.94	11.72	201.02	0.30
1300.00	0.12	177.46	1299.93	-11.22	-4.34	-11.22	12.03	201.16	0.19
1400.00	0.07	128.21	1399.93	-11.36	-4.29	-11.36	12.14	200.69	0.09
1500.00	0.06	4.12	1499.93	-11.34	-4.24	-11.34	12.10	200.50	0.12
1600.00	0.54	27.42	1599.92	-10.87	-4.02	-10.87	11.58	200.29	0.48
1700.00	0.89	54.57	1699.92	-10.00	-3.17	-10.00	10.49	197.59	0.48
1800.00	1.41	32.48	1799.90	-8.51	-1.88	-8.51	8.71	192.44	0.68
1900.00	1.47	42.24	1899.86	-6.52	-0.35	-6.52	6.53	183.10	0.25
2000.00	1.32	46.60	1999.83	-4.78	1.35	-4.78	4.97	164.29	0.19
2100.00	1.25	41.25	2099.81	-3.17	2.90	-3.17	4.30	137.51	0.14
2200.00	1.27	42.30	2199.79	-1.53	4.37	-1.53	4.63	109.30	0.03
2300.00	0.74	35.68	2299.77	-0.19	5.49	-0.19	5.49	91.93	0.53
2400.00	0.65	39.17	2399.76	0.78	6.23	0.78	6.27	82.84	0.10
2500.00	0.53	92.31	2499.76	1.20	7.05	1.20	7.15	80.31	0.54
2600.00	0.52	57.44	2599.75	1.43	7.90	1.43	8.03	79.73	0.32
2700.00	0.54	85.21	2699.75	1.72	8.75	1.72	8.92	78.91	0.26
2800.00	0.37	120.37	2799.75	1.59	9.50	1.59	9.63	80.48	0.32
2900.00	0.56	77.31	2899.74	1.54	10.25	1.54	10.36	81.47	0.38
3000.00	0.43	103.85	2999.74	1.55	11.09	1.55	11.20	82.03	0.26
3100.00	1.40	120.94	3099.73	0.84	12.51	0.84	12.53	86.18	0.99
3200.00	2.25	115.45	3199.67	-0.63	15.32	-0.63	15.34	92.37	0.86
3300.00	1.53	121.73	3299.62	-2.18	18.23	-2.18	18.36	96.82	0.74
3400.00	0.75	98.46	3399.60	-2.98	20.01	-2.98	20.23	98.46	0.89

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	0.56	28.65	3499.59	-2.64	20.89	-2.64	21.06	97.20	0.77
3600.00	1.44	42.07	3599.58	-1.28	21.97	-1.28	22.01	93.33	0.90
3700.00	2.21	28.38	3699.53	1.35	23.72	1.35	23.76	86.74	0.88
3800.00	3.15	23.55	3799.42	5.56	25.74	5.56	26.33	77.81	0.96
3900.00	3.35	10.17	3899.26	10.95	27.35	10.95	29.46	68.17	0.78
4000.00	2.83	357.42	3999.11	16.30	27.76	16.30	32.19	59.57	0.86
4100.00	2.51	347.03	4099.00	20.90	27.15	20.90	34.27	52.41	0.58
4200.00	2.43	331.96	4198.91	24.91	25.67	24.91	35.76	45.86	0.65
4300.00	2.39	324.86	4298.82	28.48	23.47	28.48	36.91	39.48	0.30
4400.00	2.00	308.84	4398.75	31.29	20.90	31.29	37.63	33.75	0.72
4500.00	1.77	307.29	4498.70	33.32	18.32	33.32	38.02	28.80	0.24
4600.00	1.24	303.30	4598.66	34.84	16.19	34.84	38.42	24.92	0.54
4700.00	1.01	299.34	4698.64	35.87	14.52	35.87	38.70	22.04	0.24
4800.00	1.12	264.61	4798.63	36.21	12.78	36.21	38.40	19.43	0.65
4900.00	1.28	252.87	4898.61	35.79	10.74	35.79	37.36	16.70	0.29
5000.00	0.85	249.71	4998.59	35.20	8.97	35.20	36.33	14.30	0.43
5100.00	0.91	277.83	5098.58	35.05	7.49	35.05	35.84	12.05	0.43
5200.00	0.84	275.57	5198.57	35.23	5.97	35.23	35.73	9.61	0.08
5300.00	0.79	243.23	5298.56	34.99	4.62	34.99	35.30	7.52	0.46
5400.00	0.74	288.10	5398.55	34.88	3.39	34.88	35.05	5.55	0.59
5500.00	0.58	272.76	5498.54	35.11	2.27	35.11	35.18	3.70	0.24
5600.00	0.61	309.80	5598.54	35.47	1.35	35.47	35.50	2.18	0.38
5700.00	0.64	287.58	5698.53	35.98	0.41	35.98	35.98	0.65	0.24
5800.00	0.81	229.00	5798.52	35.69	-0.66	35.69	35.69	358.94	0.73
5900.00	1.04	257.20	5898.51	35.02	-2.08	35.02	35.08	356.60	0.50
6000.00	1.22	284.65	5998.49	35.09	-4.00	35.09	35.32	353.49	0.57
6100.00	1.90	277.31	6098.45	35.57	-6.68	35.57	36.19	349.37	0.70
6200.00	2.60	265.86	6198.38	35.62	-10.59	35.62	37.16	343.45	0.83
6300.00	1.85	255.63	6298.30	35.05	-14.42	35.05	37.90	337.64	0.85
6400.00	1.36	244.20	6398.26	34.13	-17.05	34.13	38.16	333.45	0.58
6500.00	1.51	266.11	6498.23	33.53	-19.44	33.53	38.75	329.89	0.57
6600.00	1.45	251.92	6598.20	33.04	-21.96	33.04	39.68	326.39	0.37
6700.00	1.05	276.80	6698.17	32.76	-24.08	32.76	40.66	323.68	0.67
HORIZONTAL DISPLACEMENT IS 40.66 FEET AT 323.68 DEGREES									