

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Herbst / 1

Location: S-222 T-4N R-64W

Rig Name: Production

State/County: Colorado / Weld County

Latitude: 40.29, Longitude: -104.54

GRID North is 0.62 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: 3/15/2011 / 14:39

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	0.18	69.15	100.00	0.06	0.15	0.06	0.16	69.15	0.18
200.00	0.33	138.28	200.00	-0.10	0.48	-0.10	0.49	101.70	0.31
300.00	0.23	157.44	300.00	-0.50	0.75	-0.50	0.90	123.63	0.13
400.00	0.37	121.32	400.00	-0.85	1.10	-0.85	1.39	127.74	0.23
500.00	0.26	87.32	500.00	-1.01	1.60	-1.01	1.89	122.21	0.21
600.00	0.20	134.29	599.99	-1.12	1.95	-1.12	2.25	119.84	0.19
700.00	0.32	121.98	699.99	-1.39	2.31	-1.39	2.69	120.98	0.13
800.00	0.12	115.58	799.99	-1.58	2.64	-1.58	3.08	120.88	0.19
900.00	0.11	190.48	899.99	-1.72	2.72	-1.72	3.22	122.31	0.14
1000.00	0.33	66.15	999.99	-1.70	2.97	-1.70	3.42	119.76	0.41
1100.00	0.13	301.76	1099.99	-1.52	3.14	-1.52	3.49	115.83	0.42
1200.00	0.33	236.48	1199.99	-1.62	2.80	-1.62	3.23	120.03	0.30
1300.00	0.47	111.12	1299.99	-1.93	2.94	-1.93	3.52	123.21	0.72
1400.00	0.52	155.83	1399.99	-2.49	3.51	-2.49	4.31	125.31	0.38
1500.00	0.57	169.83	1499.98	-3.39	3.79	-3.39	5.08	131.82	0.14
1600.00	0.27	235.47	1599.98	-4.01	3.68	-4.01	5.44	137.45	0.52
1700.00	0.41	170.16	1699.98	-4.49	3.55	-4.49	5.72	141.73	0.39
1800.00	0.18	60.34	1799.98	-4.77	3.74	-4.77	6.06	141.86	0.50
1900.00	0.25	279.70	1899.98	-4.65	3.67	-4.65	5.93	141.73	0.40
2000.00	0.36	263.37	1999.98	-4.65	3.15	-4.65	5.62	145.94	0.14
2100.00	0.44	289.15	2099.97	-4.56	2.47	-4.56	5.19	151.58	0.19
2200.00	0.53	303.32	2199.97	-4.18	1.72	-4.18	4.52	157.65	0.15
2300.00	0.57	298.33	2299.96	-3.69	0.89	-3.69	3.80	166.43	0.06
2400.00	0.53	299.42	2399.96	-3.23	0.05	-3.23	3.23	179.14	0.05
2500.00	0.54	311.60	2499.96	-2.69	-0.71	-2.69	2.78	194.71	0.11
2600.00	0.52	323.90	2599.95	-2.01	-1.33	-2.01	2.41	213.44	0.12
2700.00	0.48	313.67	2699.95	-1.35	-1.90	-1.35	2.33	234.61	0.10
2800.00	0.42	337.98	2799.94	-0.72	-2.34	-0.72	2.45	252.98	0.20
2900.00	0.55	348.88	2899.94	0.09	-2.57	0.09	2.57	272.08	0.16
3000.00	0.68	324.15	2999.94	1.05	-3.01	1.05	3.19	289.17	0.30
3100.00	0.55	334.77	3099.93	1.96	-3.57	1.96	4.07	298.83	0.18
3200.00	0.65	289.95	3199.92	2.59	-4.31	2.59	5.03	301.02	0.47
3300.00	1.21	303.60	3299.91	3.37	-5.72	3.37	6.64	300.48	0.59
3400.00	1.44	311.02	3399.88	4.77	-7.54	4.77	8.93	302.33	0.29

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	1.39	342.46	3499.86	6.76	-8.86	6.76	11.14	307.33	0.77
3600.00	1.45	319.30	3599.83	8.87	-10.05	8.87	13.40	311.43	0.57
3700.00	0.77	326.67	3699.81	10.39	-11.24	10.39	15.31	312.74	0.70
3800.00	0.96	332.91	3799.79	11.70	-11.99	11.70	16.75	314.28	0.21
3900.00	1.10	325.33	3899.78	13.23	-12.92	13.23	18.49	315.68	0.19
4000.00	0.60	285.26	3999.77	14.16	-13.97	14.16	19.89	315.37	0.74
4100.00	0.51	288.40	4099.76	14.44	-14.90	14.44	20.75	314.09	0.10
4200.00	0.53	302.99	4199.76	14.83	-15.71	14.83	21.60	313.34	0.13
4300.00	0.26	299.62	4299.76	15.19	-16.30	15.19	22.28	312.99	0.27
4400.00	0.50	306.51	4399.75	15.57	-16.85	15.57	22.94	312.73	0.25
4500.00	0.31	347.41	4499.75	16.09	-17.26	16.09	23.60	312.98	0.34
4600.00	0.35	8.27	4599.75	16.66	-17.28	16.66	24.00	313.95	0.13
4700.00	0.46	13.92	4699.75	17.35	-17.14	17.35	24.39	315.36	0.12
4800.00	0.40	20.97	4799.75	18.07	-16.92	18.07	24.75	316.88	0.08
4900.00	0.25	24.57	4899.74	18.59	-16.70	18.59	24.99	318.07	0.14
5000.00	0.35	23.57	4999.74	19.08	-16.48	19.08	25.21	319.17	0.10
5100.00	0.19	64.89	5099.74	19.43	-16.21	19.43	25.31	320.17	0.25
5200.00	0.42	207.58	5199.74	19.18	-16.23	19.18	25.12	319.76	0.59
5300.00	0.36	121.71	5299.74	18.68	-16.13	18.68	24.69	319.19	0.53
5400.00	0.14	191.19	5399.74	18.40	-15.89	18.40	24.31	319.19	0.34
5500.00	0.62	208.24	5499.74	17.81	-16.17	17.81	24.06	317.77	0.49
5600.00	0.51	223.89	5599.73	17.01	-16.73	17.01	23.86	315.48	0.18
5700.00	0.32	347.13	5699.73	16.97	-17.11	16.97	24.09	314.76	0.74
5800.00	0.11	317.32	5799.73	17.31	-17.24	17.31	24.43	315.12	0.23
5900.00	0.18	351.69	5899.73	17.54	-17.33	17.54	24.66	315.35	0.11
6000.00	0.21	137.55	5999.73	17.57	-17.23	17.57	24.60	315.56	0.37
6100.00	0.12	94.45	6099.73	17.43	-17.01	17.43	24.35	315.70	0.14
6200.00	0.31	150.15	6199.73	17.18	-16.77	17.18	24.01	315.70	0.26
6300.00	0.20	201.17	6299.73	16.78	-16.70	16.78	23.68	315.15	0.24
6400.00	0.42	139.70	6399.72	16.34	-16.52	16.34	23.24	314.67	0.37
6500.00	0.47	132.59	6499.72	15.78	-15.98	15.78	22.46	314.63	0.07
6600.00	0.65	170.58	6599.72	14.94	-15.59	14.94	21.59	313.79	0.40
6700.00	0.78	180.67	6699.71	13.70	-15.50	13.70	20.69	311.46	0.18
6800.00	0.77	180.28	6799.70	12.34	-15.51	12.34	19.83	308.51	0.01
HORIZONTAL DISPLACEMENT IS 19.83 FEET AT 308.51 DEGREES									