

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Quinby MD / 12-3

Location: S-12 T-1S R-69W

Rig Name: Production

State/County: Colorado / Boulder County

Latitude: 39.98, Longitude: -105.06

GRID North is 0.28 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: 6/16/2011 / 12:40

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	0.72	327.21	100.00	0.53	-0.34	0.53	0.63	327.21	0.72
200.00	1.18	322.15	199.98	1.88	-1.32	1.88	2.29	324.93	0.47
300.00	1.00	311.52	299.97	3.27	-2.60	3.27	4.18	321.48	0.27
400.00	1.13	342.36	399.95	4.79	-3.55	4.79	5.96	323.42	0.58
500.00	0.33	323.49	499.94	5.96	-4.02	5.96	7.19	325.97	0.83
600.00	0.49	348.62	599.94	6.60	-4.28	6.60	7.87	327.08	0.24
700.00	0.87	316.00	699.93	7.57	-4.88	7.57	9.01	327.15	0.52
800.00	0.79	264.25	799.92	8.04	-6.09	8.04	10.09	322.84	0.73
900.00	0.75	265.43	899.91	7.92	-7.43	7.92	10.86	316.81	0.04
1000.00	1.17	296.22	999.90	8.32	-9.01	8.32	12.26	312.72	0.65
1100.00	1.07	306.08	1099.88	9.32	-10.68	9.32	14.17	311.11	0.22
1200.00	2.00	317.50	1199.84	11.16	-12.61	11.16	16.84	311.50	0.98
1300.00	1.74	326.69	1299.79	13.72	-14.63	13.72	20.05	313.16	0.40
1400.00	1.73	322.18	1399.74	16.18	-16.39	16.18	23.03	314.63	0.14
1500.00	1.52	313.33	1499.70	18.28	-18.28	18.28	25.85	315.01	0.33
1600.00	1.77	298.72	1599.66	19.93	-20.60	19.93	28.66	314.06	0.48
1700.00	1.63	292.66	1699.62	21.22	-23.26	21.22	31.48	312.38	0.23
1800.00	1.32	286.38	1799.59	22.09	-25.67	22.09	33.87	310.71	0.34
1900.00	1.42	289.85	1899.56	22.84	-27.95	22.84	36.10	309.25	0.13
2000.00	1.45	290.13	1999.53	23.70	-30.31	23.70	38.47	308.02	0.03
2100.00	1.64	290.03	2099.49	24.62	-32.84	24.62	41.05	306.86	0.19
2200.00	1.54	291.36	2199.45	25.60	-35.44	25.60	43.72	305.85	0.11
2300.00	1.35	330.33	2299.42	27.12	-37.28	27.12	46.10	306.04	0.98
2400.00	0.77	318.87	2399.40	28.65	-38.30	28.65	47.83	306.80	0.62
2500.00	0.81	332.80	2499.39	29.78	-39.06	29.78	49.11	307.32	0.20
2600.00	0.77	299.22	2599.39	30.73	-39.97	30.73	50.41	307.56	0.46
2700.00	0.52	234.79	2699.38	30.79	-40.92	30.79	51.21	306.96	0.72
2800.00	0.95	224.87	2799.37	29.94	-41.88	29.94	51.48	305.57	0.45
2900.00	1.21	250.42	2899.35	29.00	-43.46	29.00	52.25	303.72	0.54
3000.00	1.23	234.30	2999.33	28.02	-45.32	28.02	53.29	301.73	0.34
3100.00	0.91	240.71	3099.31	27.01	-46.89	27.01	54.11	299.94	0.34
3200.00	1.29	211.24	3199.30	25.66	-48.16	25.66	54.57	298.05	0.67
3300.00	1.05	210.16	3299.28	23.91	-49.21	23.91	54.71	295.91	0.24
3400.00	1.28	215.03	3399.26	22.20	-50.31	22.20	54.99	293.81	0.25

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	1.67	205.10	3499.22	19.97	-51.57	19.97	55.30	291.17	0.47
3600.00	1.72	207.11	3599.18	17.31	-52.87	17.31	55.63	288.13	0.07
3700.00	1.20	206.95	3699.15	15.05	-54.02	15.05	56.08	285.56	0.51
3800.00	1.02	225.53	3799.13	13.49	-55.14	13.49	56.76	283.74	0.40
3900.00	0.84	239.74	3899.11	12.49	-56.41	12.49	57.78	282.48	0.29
4000.00	0.48	259.90	3999.11	12.04	-57.46	12.04	58.71	281.84	0.43
4100.00	0.67	264.95	4099.10	11.92	-58.46	11.92	59.66	281.52	0.20
4200.00	1.21	271.75	4199.09	11.90	-60.09	11.90	61.26	281.20	0.55
4300.00	1.01	281.04	4299.07	12.10	-62.01	12.10	63.18	281.04	0.27
4400.00	1.43	292.38	4399.05	12.75	-64.03	12.75	65.29	281.26	0.49
4500.00	1.26	292.11	4499.02	13.64	-66.21	13.64	67.60	281.64	0.18
4600.00	1.37	286.68	4598.99	14.39	-68.37	14.39	69.87	281.89	0.17
4700.00	1.39	274.58	4698.96	14.83	-70.72	14.83	72.26	281.84	0.29
4800.00	1.47	271.80	4798.93	14.97	-73.21	14.97	74.73	281.55	0.10
4900.00	1.62	253.50	4898.90	14.61	-75.84	14.61	77.24	280.90	0.51
5000.00	1.38	240.61	4998.86	13.62	-78.25	13.62	79.42	279.87	0.41
5100.00	1.13	245.69	5098.84	12.62	-80.20	12.62	81.18	278.94	0.27
5200.00	0.93	267.10	5198.82	12.17	-81.91	12.17	82.81	278.45	0.43
5300.00	1.16	263.00	5298.81	12.01	-83.73	12.01	84.59	278.16	0.24
5400.00	0.77	282.15	5398.79	12.02	-85.39	12.02	86.23	278.02	0.50
5500.00	1.20	284.58	5498.78	12.43	-87.07	12.43	87.95	278.13	0.43
5600.00	0.75	258.79	5598.76	12.57	-88.72	12.57	89.61	278.06	0.62
5700.00	1.07	259.69	5698.75	12.27	-90.28	12.27	91.11	277.74	0.32
5800.00	1.04	248.87	5798.73	11.78	-92.05	11.78	92.80	277.29	0.20
5900.00	0.94	285.40	5898.72	11.67	-93.68	11.67	94.41	277.10	0.63
6000.00	1.05	299.54	5998.70	12.33	-95.27	12.33	96.06	277.38	0.27
6100.00	1.08	307.69	6098.69	13.36	-96.81	13.36	97.72	277.86	0.15
6200.00	1.48	298.82	6198.66	14.56	-98.68	14.56	99.75	278.39	0.45
6300.00	1.40	323.66	6298.63	16.16	-100.54	16.16	101.83	279.13	0.62
6400.00	1.51	328.05	6398.60	18.27	-101.96	18.27	103.58	280.16	0.16
6500.00	0.88	342.64	6498.58	20.12	-102.89	20.12	104.84	281.06	0.70
6600.00	1.39	12.81	6598.56	22.03	-102.85	22.03	105.18	282.09	0.77
6700.00	0.93	23.78	6698.54	23.95	-102.25	23.95	105.02	283.19	0.50
6800.00	0.41	351.97	6798.53	25.05	-101.97	25.05	105.00	283.80	0.63
6900.00	0.58	286.77	6898.53	25.55	-102.51	25.55	105.64	283.99	0.55
7000.00	0.40	309.30	6998.52	25.92	-103.26	25.92	106.46	284.09	0.26
7100.00	0.30	278.46	7098.52	26.18	-103.80	26.18	107.05	284.16	0.21
7200.00	0.45	263.78	7198.52	26.18	-104.45	26.18	107.68	284.07	0.17
7300.00	0.53	264.49	7298.52	26.09	-105.29	26.09	108.48	283.92	0.08
7400.00	1.01	267.56	7398.51	26.01	-106.63	26.01	109.76	283.71	0.49
7500.00	1.01	263.98	7498.49	25.88	-108.39	25.88	111.43	283.43	0.06
7600.00	1.06	284.13	7598.48	26.01	-110.16	26.01	113.19	283.29	0.36
7700.00	0.71	330.52	7698.47	26.78	-111.36	26.78	114.53	283.52	0.77
7800.00	1.64	340.26	7798.44	28.67	-112.15	28.67	115.75	284.34	0.94
7900.00	2.43	337.48	7898.38	31.97	-113.44	31.97	117.86	285.74	0.80
8000.00	3.33	336.86	7998.25	36.60	-115.39	36.60	121.06	287.60	0.90
HORIZONTAL DISPLACEMENT IS 121.06 FEET AT 287.60 DEGREES									