

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Frank / 1

Location: S-12 T-4N R-64W

Rig Name: Production

State/County: Colorado / Weld County

Latitude: 40.33, Longitude: -104.49

GRID North is 0.65 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: 3/24/2011 / 19:10

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	0.24	228.25	100.00	-0.14	-0.16	-0.14	0.21	228.25	0.24
200.00	0.29	124.81	200.00	-0.42	-0.11	-0.42	0.43	194.31	0.41
300.00	0.60	184.29	300.00	-1.08	0.06	-1.08	1.08	176.90	0.51
400.00	0.84	202.25	399.99	-2.27	-0.26	-2.27	2.29	186.43	0.33
500.00	0.75	218.72	499.98	-3.46	-0.94	-3.46	3.58	195.22	0.24
600.00	0.52	240.33	599.97	-4.19	-1.74	-4.19	4.54	202.56	0.33
700.00	0.57	234.66	699.97	-4.70	-2.54	-4.70	5.34	208.36	0.07
800.00	0.46	237.36	799.96	-5.21	-3.28	-5.21	6.15	212.22	0.11
900.00	0.93	195.85	899.96	-6.21	-3.84	-6.21	7.30	211.76	0.66
1000.00	1.57	208.95	999.93	-8.18	-4.72	-8.18	9.45	210.00	0.69
1100.00	1.88	209.12	1099.89	-10.81	-6.18	-10.81	12.45	209.77	0.31
1200.00	1.44	219.13	1199.85	-13.21	-7.77	-13.21	15.33	210.46	0.53
1300.00	1.61	231.67	1299.81	-15.05	-9.66	-15.05	17.89	212.69	0.38
1400.00	1.79	242.32	1399.77	-16.65	-12.15	-16.65	20.61	216.12	0.36
1500.00	2.12	253.61	1499.71	-17.90	-15.31	-17.90	23.56	220.54	0.51
1600.00	2.34	256.60	1599.63	-18.90	-19.08	-18.90	26.85	225.27	0.25
1700.00	2.78	265.46	1699.53	-19.56	-23.48	-19.56	30.56	230.20	0.59
1800.00	2.88	268.95	1799.41	-19.80	-28.40	-19.80	34.62	235.11	0.20
1900.00	2.63	274.75	1899.30	-19.66	-33.19	-19.66	38.57	239.36	0.37
2000.00	2.76	285.36	1999.19	-18.83	-37.79	-18.83	42.22	243.51	0.51
2100.00	2.95	299.21	2099.06	-16.94	-42.35	-16.94	45.62	248.20	0.71
2200.00	2.19	310.69	2198.96	-14.44	-46.05	-14.44	48.26	252.59	0.91
2300.00	1.88	320.95	2298.90	-11.92	-48.53	-11.92	49.97	256.21	0.48
2400.00	1.58	330.37	2398.86	-9.44	-50.25	-9.44	51.13	259.36	0.41
2500.00	1.33	346.29	2498.82	-7.12	-51.20	-7.12	51.70	262.09	0.47
2600.00	1.22	349.74	2598.80	-4.95	-51.67	-4.95	51.90	264.53	0.14
2700.00	1.09	352.19	2698.78	-2.96	-51.99	-2.96	52.07	266.74	0.14
2800.00	0.52	349.70	2798.77	-1.57	-52.20	-1.57	52.22	268.27	0.57
2900.00	0.23	302.14	2898.77	-1.02	-52.45	-1.02	52.46	268.89	0.40
3000.00	0.24	155.20	2998.77	-1.10	-52.53	-1.10	52.54	268.80	0.45
3100.00	0.25	278.63	3098.77	-1.26	-52.66	-1.26	52.68	268.63	0.43
3200.00	0.96	352.88	3198.76	-0.39	-52.99	-0.39	52.99	269.58	0.92
3300.00	0.98	351.77	3298.75	1.28	-53.21	1.28	53.23	271.38	0.03
3400.00	1.19	347.48	3398.73	3.14	-53.56	3.14	53.65	273.36	0.23

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	1.31	350.71	3498.70	5.29	-53.97	5.29	54.23	275.60	0.14
3600.00	1.19	348.27	3598.68	7.44	-54.37	7.44	54.87	277.79	0.13
3700.00	1.01	344.54	3698.66	9.31	-54.81	9.31	55.60	279.64	0.20
3800.00	0.69	1.61	3798.65	10.76	-55.03	10.76	56.07	281.06	0.41
3900.00	0.27	358.26	3898.65	11.59	-55.02	11.59	56.23	281.90	0.42
4000.00	0.82	10.09	3998.64	12.54	-54.90	12.54	56.32	282.86	0.56
4100.00	1.35	7.59	4098.62	14.41	-54.62	14.41	56.49	284.78	0.53
4200.00	1.72	18.41	4198.59	17.00	-54.00	17.00	56.61	287.47	0.47
4300.00	0.99	3.71	4298.56	19.28	-53.47	19.28	56.84	289.83	0.80
4400.00	0.22	316.78	4398.55	20.29	-53.54	20.29	57.26	290.75	0.85
4500.00	0.92	219.04	4498.55	19.81	-54.19	19.81	57.69	290.08	0.98
4600.00	1.12	198.42	4598.53	18.25	-55.00	18.25	57.95	288.36	0.42
4700.00	0.91	187.96	4698.52	16.53	-55.42	16.53	57.84	286.61	0.28
4800.00	1.27	194.36	4798.50	14.68	-55.81	14.68	57.70	284.74	0.38
4900.00	1.44	193.23	4898.47	12.38	-56.37	12.38	57.71	282.39	0.18
5000.00	1.28	202.32	4998.44	10.12	-57.08	10.12	57.97	280.06	0.27
5100.00	0.80	231.95	5098.43	8.66	-58.05	8.66	58.70	278.48	0.71
5200.00	0.53	157.66	5198.42	7.80	-58.43	7.80	58.94	277.61	0.83
5300.00	0.81	163.58	5298.42	6.70	-58.05	6.70	58.44	276.58	0.29
5400.00	0.66	139.64	5398.41	5.58	-57.48	5.58	57.75	275.55	0.34
5500.00	1.13	124.45	5498.40	4.59	-56.29	4.59	56.48	274.66	0.53
5600.00	0.68	117.77	5598.38	3.75	-54.96	3.75	55.08	273.91	0.47
5700.00	0.82	119.18	5698.37	3.13	-53.81	3.13	53.90	273.33	0.15
5800.00	0.81	123.51	5798.36	2.39	-52.59	2.39	52.65	272.60	0.06
5900.00	0.80	107.89	5898.35	1.78	-51.34	1.78	51.37	271.99	0.22
6000.00	1.05	102.15	5998.34	1.38	-49.77	1.38	49.79	271.58	0.27
6100.00	1.41	84.41	6098.32	1.30	-47.65	1.30	47.67	271.57	0.52
6200.00	1.76	94.06	6198.28	1.31	-44.89	1.31	44.91	271.67	0.44
6300.00	1.42	79.68	6298.24	1.43	-42.14	1.43	42.17	271.94	0.53
6400.00	1.35	107.42	6398.21	1.29	-39.80	1.29	39.82	271.86	0.67
6500.00	1.04	106.01	6498.19	0.69	-37.80	0.69	37.81	271.04	0.32
6600.00	0.88	100.45	6598.18	0.30	-36.17	0.30	36.17	270.47	0.18
HORIZONTAL DISPLACEMENT IS 36.17 FEET AT 270.47 DEGREES									