

VES

VAUGHN ENERGY SERVICES

Company: NOBLE ENERGY

Lease/Well: 70 RANCH/ #22-21

Location:

Rig Name: PRODUCTION

State/County: COLORADO/WELD COUNTY

Latitude: 40.38

GRID North is 0.69 Degrees East of True North

VS-Azi: 0.00 Degrees

GTI

GYRO TECHNOLOGIES INC

FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : GL

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: run1-01.ut

Minimum Curvature Method

Report Date/Time: 5/19/2011 / 15:04

Vaughn Energy Services

Rifle, Colorado

303-489-9231

Jay Hinman

70 Ranch 22-21/05-123-23851

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	0.39	323.40	100.00	0.27	-0.20	0.27	0.34	323.40	0.39
200.00	0.36	336.29	200.00	0.83	-0.53	0.83	0.98	327.48	0.09
300.00	0.42	353.43	299.99	1.47	-0.69	1.47	1.63	334.77	0.13
400.00	0.40	1.55	399.99	2.18	-0.73	2.18	2.30	341.57	0.06
500.00	0.58	358.91	499.99	3.03	-0.73	3.03	3.12	346.52	0.19
600.00	0.63	353.39	599.98	4.08	-0.80	4.08	4.16	348.92	0.07
700.00	0.59	353.95	699.98	5.14	-0.92	5.14	5.22	349.89	0.03
800.00	0.58	355.87	799.97	6.16	-1.01	6.16	6.24	350.71	0.03
900.00	0.58	2.04	899.97	7.17	-1.03	7.17	7.24	351.86	0.06
1000.00	0.67	358.44	999.96	8.27	-1.02	8.27	8.33	352.94	0.10
1100.00	0.49	354.19	1099.96	9.28	-1.08	9.28	9.34	353.35	0.18
1200.00	0.31	3.18	1199.95	9.97	-1.11	9.97	10.03	353.64	0.20
1300.00	0.48	10.12	1299.95	10.65	-1.02	10.65	10.70	354.52	0.18
1400.00	0.25	14.47	1399.95	11.28	-0.89	11.28	11.31	355.47	0.23
1500.00	0.18	355.30	1499.95	11.65	-0.85	11.65	11.68	355.82	0.10
1600.00	0.27	344.15	1599.95	12.03	-0.93	12.03	12.07	355.58	0.10
1700.00	0.28	322.94	1699.95	12.45	-1.14	12.45	12.50	354.78	0.10
1800.00	0.44	290.32	1799.94	12.78	-1.65	12.78	12.88	352.66	0.26
1900.00	1.00	279.95	1899.94	13.06	-2.87	13.06	13.38	347.60	0.57
2000.00	0.85	266.40	1999.92	13.17	-4.47	13.17	13.91	341.25	0.27
2100.00	1.33	257.13	2099.90	12.86	-6.34	12.86	14.34	333.75	0.51
2200.00	1.20	256.23	2199.88	12.35	-8.49	12.35	14.99	325.50	0.13
2300.00	1.53	259.23	2299.85	11.86	-10.82	11.86	16.05	317.61	0.34
2400.00	1.72	246.76	2399.81	11.01	-13.51	11.01	17.43	309.19	0.40
2500.00	1.66	251.09	2499.77	9.95	-16.26	9.95	19.06	301.46	0.14
2600.00	1.79	255.47	2599.72	9.09	-19.15	9.09	21.19	295.39	0.18
2700.00	1.69	261.98	2699.68	8.49	-22.12	8.49	23.69	291.00	0.22
2800.00	1.55	253.05	2799.64	7.89	-24.88	7.89	26.10	287.60	0.29
2900.00	1.29	249.83	2899.61	7.11	-27.22	7.11	28.14	284.64	0.27
3000.00	1.01	254.13	2999.59	6.48	-29.13	6.48	29.84	282.54	0.29
3100.00	0.63	259.49	3099.58	6.14	-30.52	6.14	31.13	281.37	0.39
3200.00	1.07	261.30	3199.56	5.90	-31.99	5.90	32.53	280.44	0.44
3300.00	1.23	276.58	3299.54	5.88	-33.98	5.88	34.48	279.81	0.35
3400.00	1.19	283.47	3399.52	6.24	-36.06	6.24	36.59	279.82	0.15

<i>Measured Depth FT</i>	<i>Incl Angle Deg</i>	<i>Drift Direction Deg</i>	<i>TVD FT</i>	<i>+N/-S FT</i>	<i>+E/-W FT</i>	<i>Vertical Section FT</i>	<i>Closure Distance FT</i>	<i>Closure Direction Deg</i>	<i>Dogleg Severity Deg/100</i>
3500.00	1.48	290.26	3499.50	6.93	-38.27	6.93	38.89	280.26	0.33
3600.00	1.72	300.30	3599.46	8.13	-40.77	8.13	41.58	281.28	0.37
3700.00	1.72	295.19	3699.41	9.53	-43.43	9.53	44.46	282.38	0.15
3800.00	2.43	284.29	3799.35	10.69	-46.84	10.69	48.05	282.86	0.81
3900.00	2.51	276.98	3899.25	11.48	-51.07	11.48	52.35	282.67	0.32
4000.00	2.76	263.44	3999.15	11.47	-55.63	11.47	56.80	281.65	0.67
4100.00	3.11	259.88	4099.02	10.72	-60.69	10.72	61.63	280.02	0.40
4200.00	2.85	257.62	4198.88	9.71	-65.79	9.71	66.50	278.40	0.29
4300.00	2.67	255.42	4298.77	8.60	-70.46	8.60	70.99	276.96	0.21
4400.00	2.13	260.45	4398.68	7.70	-74.54	7.70	74.94	275.90	0.58
4500.00	1.73	256.16	4498.62	7.03	-77.84	7.03	78.15	275.16	0.43
4600.00	1.36	253.28	4598.59	6.33	-80.44	6.33	80.69	274.50	0.37
4700.00	1.08	249.89	4698.56	5.66	-82.47	5.66	82.66	273.93	0.29
4800.00	0.92	231.25	4798.55	4.84	-83.98	4.84	84.12	273.30	0.36
4900.00	0.81	222.36	4898.54	3.81	-85.08	3.81	85.17	272.56	0.18
5000.00	0.55	212.66	4998.53	2.88	-85.82	2.88	85.87	271.92	0.28
5100.00	0.28	200.99	5098.53	2.25	-86.17	2.25	86.20	271.49	0.29
5200.00	0.44	184.64	5198.52	1.64	-86.29	1.64	86.30	271.09	0.19
5300.00	0.55	166.62	5298.52	0.79	-86.21	0.79	86.21	270.52	0.19
5400.00	1.38	155.63	5398.51	-0.78	-85.60	-0.78	85.60	269.48	0.84
5500.00	1.92	144.67	5498.46	-3.24	-84.13	-3.24	84.19	267.79	0.63
5600.00	2.08	138.41	5598.40	-5.96	-81.96	-5.96	82.18	265.84	0.27
5700.00	2.38	124.68	5698.33	-8.50	-79.05	-8.50	79.51	263.86	0.61
5800.00	2.35	110.00	5798.24	-10.38	-75.42	-10.38	76.14	262.17	0.60
5900.00	2.40	96.90	5898.16	-11.33	-71.42	-11.33	72.32	260.99	0.54
6000.00	2.47	83.51	5998.07	-11.34	-67.20	-11.34	68.15	260.42	0.57
6100.00	2.52	71.10	6097.98	-10.38	-62.98	-10.38	63.83	260.64	0.54
6200.00	1.77	66.23	6197.90	-9.05	-59.48	-9.05	60.16	261.35	0.77
6300.00	1.24	74.07	6297.87	-8.13	-57.03	-8.13	57.61	261.89	0.57
6400.00	0.92	87.17	6397.85	-7.79	-55.20	-7.79	55.74	261.96	0.40
6500.00	0.44	91.72	6497.85	-7.76	-54.02	-7.76	54.57	261.82	0.48
6520.00	0.46	100.16	6517.84	-7.78	-53.86	-7.78	54.42	261.78	0.35

HORIZONTAL DISPLACEMENT IS
54.42 FEET AT 261.78 DEGREES