Company: NOBLE
Lease/Well: RICHARDSON V/# 03-15 JI
Location:
Rig Name: PRODUCTION
State/County: COLORADO/WELDCOUNTY
Latitude: 40.15
GRID North is 0.41 Degrees East of True North
VS-Azi: 0.00 Degrees

FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : KB =GL

DRILLOG MS GYRO SURVEY CALCULATIONS
Filename: run1-01_ed.ut
Minimum Curvature Method
Report Date/Time: 4/14/2011 / 14:39

Vaughn Energy Services
Rifle, Colorado
970-456-2071
Garry Fowler
Richardson V 03-15 JI/05-123-19999

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	0.89	233.37	100.00	-0.46	-0.62	-0.46	0.78	233.37	0.89
200.00	1.46	236.72	199.97	-1.63	-2.31	-1.63	2.83	234.88	0.57
300.00	1.61	238.45	299.94	-3.06	-4.58	-3.06	5.51	236.22	0.16
400.00	1.81	271.38	399.90	-3.76	-7.36	-3.76	8.26	242.92	0.99
500.00	2.74	278.50	499.82	-3.37	-11.30	-3.37	11.80	253.41	0.97
600.00	3.72	281.34	599.66	-2.38	-16.85	-2.38	17.02	261.97	0.98
700.00	4.59	285.72	699.39	-0.66	-23.88	-0.66	23.89	268.43	0.93
800.00	5.48	287.54	799.01	1.87	-32.28	1.87	32.34	273.31	0.90
900.00	6.04	294.83	898.50	5.51	-41.61	5.51	41.98	277.55	0.92
1000.00	5.97	291.49	997.95	9.63	-51.23	9.63	52.12	280.65	0.36
1100.00	5.76	288.63	1097.43	13.14	-60.82	13.14	62.23	282.19	0.36
1200.00	5.56	283.87	1196.94	15.90	-70.28	15.90	72.06	282.75	0.51
1300.00	5.61	280.57	1296.47	17.96	-79.78	17.96	81.78	282.69	0.32
1400.00	5.40	284.17	1396.01	20.01	-89.14	20.01	91.36	282.65	0.40
1500.00	5.52	274.93	1495.56	21.57	-98.49	21.57	100.83	282.35	0.89
1600.00	5.33	280.09	1595.11	22.80	-107.86	22.80	110.24	281.93	0.52
1700.00	5.32	278.16	1694.68	24.27	-117.02	24.27	119.51	281.72	0.18
1800.00	5.10	281.03	1794.27	25.78	-125.97	25.78	128.58	281.57	0.34
1900.00	4.68	271.83	1893.90	26.76	-134.42	26.76	137.06	281.26	0.89
2000.00	4.54	278.96	1993.58	27.51	-142.41	27.51	145.04	280.93	0.59
2100.00	4.27	276.12	2093.28	28.52	-150.02	28.52	152.71	280.76	0.35
2200.00	3.82	270.88	2193.04	28.97	-157.05	28.97	159.70	280.45	0.58
2300.00	3.06	269.86	2292.85	29.01	-163.05	29.01	165.61	280.09	0.77
2400.00	2.29	261.52	2392.75	28.71	-167.68	28.71	170.12	279.72	0.86
2500.00	2.10	249.53	2492.67	27.78	-171.38	27.78	173.61	279.21	0.49
2600.00	1.96	249.95	2592.61	26.55	-174.70	26.55	176.71	278.64	0.14
2700.00	2.03	245.01	2692.55	25.21	-177.92	25.21	179.69	278.07	0.18
2800.00	1.64	250.74	2792.50	24.00	-180.87	24.00	182.45	277.56	0.43
2900.00	1.97	247.25	2892.45	22.86	-183.81	22.86	185.22	277.09	0.35
3000.00	1.86	253.36	2992.39	21.73	-186.95	21.73	188.21	276.63	0.23
3100.00	2.45	261.18	3092.32	20.94	-190.62	20.94	191.76	276.27	0.65

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
3200.00	2.36	264.80	3192.23	20.42	-194.78	20.42	195.84	275.99	0.17
3300.00	2.07	268.48	3292.16	20.19	-198.63	20.19	199.66	275.80	0.32
3400.00	1.87	275.56	3392.10	20.30	-202.06	20.30	203.08	275.74	0.32
3500.00	1.60	282.41	3492.05	20.76	-205.05	20.76	206.10	275.78	0.34
3600.00	1.36	290.29	3592.02	21.47	-207.53	21.47	208.63	275.91	0.32
3700.00	1.06	290.81	3692.00	22.21	-209.50	22.21	210.67	276.05	0.29
3800.00	0.79	288.67	3791.98	22.76	-211.02	22.76	212.25	276.15	0.27
3900.00	0.83	265.95	3891.98	22.93	-212.40	22.93	213.64	276.16	0.32
4000.00	0.81	263.50	3991.96	22.80	-213.82	22.80	215.04	276.09	0.04
4100.00	0.95	265.44	4091.95	22.65	-215.35	22.65	216.54	276.00	0.15
4200.00	1.62	236.33	4191.93	21.80	-217.36	21.80	218.45	275.73	0.91
4300.00	1.61	222.93	4291.89	19.98	-219.50	19.98	220.40	275.20	0.38
4400.00	2.06	225.70	4391.84	17.70	-221.74	17.70	222.45	274.56	0.45
4500.00	1.87	229.46	4491.78	15.38	-224.27	15.38	224.79	273.92	0.23
4600.00	1.93	254.50	4591.73	13.87	-227.13	13.87	227.56	273.49	0.83
4700.00	1.88	254.82	4691.67	12.99	-230.34	12.99	230.70	273.23	0.05
4800.00	1.13	237.01	4791.64	12.03	-232.75	12.03	233.06	272.96	0.88
4900.00	1.07	257.99	4891.62	11.30	-234.48	11.30	234.75	272.76	0.40
5000.00	1.13	248.25	4991.60	10.74	-236.31	10.74	236.56	272.60	0.20
5100.00	0.67	280.17	5091.59	10.47	-237.80	10.47	238.03	272.52	0.67
5200.00	0.39	281.51	5191.58	10.64	-238.70	10.64	238.94	272.55	0.28
5300.00	0.50	287.16	5291.58	10.84	-239.45	10.84	239.69	272.59	0.12
5400.00	0.36	291.68	5391.58	11.08	-240.15	11.08	240.41	272.64	0.14
5500.00	0.48	283.48	5491.57	11.30	-240.86	11.30	241.12	272.68	0.14
5600.00	0.13	270.37	5591.57	11.39	-241.38	11.39	241.65	272.70	0.36
5700.00	0.34	343.86	5691.57	11.68	-241.58	11.68	241.86	272.77	0.32
5800.00	0.32	33.08	5791.57	12.19	-241.51	12.19	241.82	272.89	0.27
5900.00	0.95	40.75	5891.56	13.06	-240.81	13.06	241.17	273.10	0.63
6000.00	0.88	42.69	5991.55	14.25	-239.75	14.25	240.17	273.40	0.07
6100.00	1.21	49.37	6091.53	15.50	-238.43	15.50	238.93	273.72	0.34
6200.00	0.89	48.22	6191.52	16.71	-237.05	16.71	237.64	274.03	0.31
6300.00	1.06	52.33	6291.50	17.79	-235.73	17.79	236.41	274.32	0.18
6400.00	0.58	50.05	6391.49	18.68	-234.61	18.68	235.36	274.55	0.48
6500.00	0.60	36.61	6491.49	19.43	-233.91	19.43	234.72	274.75	0.14
6600.00	0.62	22.81	6591.48	20.35	-233.39	20.35	234.28	274.98	0.15
6700.00	0.41	40.61	6691.48	21.11	-232.95	21.11	233.91	275.18	0.26
6800.00	0.36	10.54	6791.48	21.69	-232.66	21.69	233.67	275.33	0.20
6900.00	0.29	353.60	6891.47	22.25	-232.63	22.25	233.70	275.46	0.12
7000.00	0.15	54.53	6991.47	22.59	-232.55	22.59	233.65	275.55	0.26
7100.00	0.32	4.35	7091.47	22.94	-232.43	22.94	233.55	275.64	0.25
7200.00	0.14	29.20	7191.47	23.32	-232.35	23.32	233.51	275.73	0.20
7300.00	0.33	12.61	7291.47	23.71	-232.22	23.71	233.43	275.83	0.20
7400.00	0.43	74.57	7391.47	24.09	-231.79	24.09	233.04	275.93	0.40
7500.00	0.62	72.91	7491.46	24.35	-230.91	24.35	232.19	276.02	0.18
7600.00	0.60	54.80	7591.46	24.81	-229.97	24.81	231.30	276.16	0.19
7700.00	0.45	36.10	7691.45	25.43	-229.31	25.43	230.71	276.33	0.23
7800.00	0.59	51.03	7791.45	26.08	-228.67	26.08	230.15	276.51	0.20
7830.00	0.77	32.12	7821.45	26.35	-228.44	26.35	229.96	276.58	0.93

HORIZONTAL DISPLACEMENT IS
229.96 FEET AT 276.58 DEGREES