

**VES**

VAUGHN ENERGY SERVICES

Company: NOBLE ENERGY  
Lease/Well: 70 RANCH USX BB/ #9-15

Location:

Rig Name: PRODUCTION

State/County: COLORADO/WELD COUNTY

Latitude: 40.40

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\_ed.ut

Minimum Curvature Method

Report Date/Time: 5/17/2011 / 16:29

Vaughn Energy Services

Rifle, Colorado

303-489-9231

Jay Hinman

70 Ranch USX BB 9-15/05-123-28084

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	0.41	76.14	100.00	0.09	0.34	0.09	0.35	76.14	0.41
200.00	0.14	79.60	200.00	0.19	0.81	0.19	0.84	76.66	0.26
300.00	0.16	64.24	300.00	0.28	1.06	0.28	1.10	75.41	0.04
400.00	0.31	73.22	400.00	0.42	1.45	0.42	1.51	73.98	0.15
500.00	0.23	75.24	500.00	0.55	1.91	0.55	1.98	74.01	0.08
600.00	0.26	79.78	599.99	0.64	2.32	0.64	2.41	74.64	0.03
700.00	0.77	76.67	699.99	0.83	3.20	0.83	3.31	75.41	0.52
800.00	0.64	67.84	799.98	1.20	4.38	1.20	4.54	74.67	0.17
900.00	0.58	61.43	899.98	1.65	5.34	1.65	5.59	72.79	0.09
1000.00	0.77	59.89	999.97	2.23	6.36	2.23	6.74	70.67	0.18
1100.00	0.49	45.35	1099.96	2.87	7.25	2.87	7.80	68.40	0.31
1200.00	0.64	50.93	1199.96	3.52	7.99	3.52	8.73	66.19	0.15
1300.00	0.42	64.85	1299.95	4.03	8.75	4.03	9.64	65.27	0.25
1400.00	0.38	75.88	1399.95	4.27	9.40	4.27	10.32	65.59	0.09
1500.00	0.13	95.57	1499.95	4.34	9.83	4.34	10.74	66.20	0.26
1600.00	0.15	111.44	1599.95	4.28	10.06	4.28	10.93	66.97	0.04
1700.00	0.34	129.84	1699.95	4.04	10.41	4.04	11.17	68.79	0.21
1800.00	0.36	121.41	1799.95	3.69	10.91	3.69	11.51	71.33	0.05
1900.00	0.30	115.97	1899.95	3.41	11.41	3.41	11.91	73.39	0.06
2000.00	0.21	96.79	1999.95	3.27	11.84	3.27	12.28	74.57	0.12
2100.00	0.21	78.62	2099.94	3.28	12.20	3.28	12.64	74.95	0.07
2200.00	0.18	47.33	2199.94	3.42	12.50	3.42	12.96	74.68	0.11
2300.00	0.62	338.52	2299.94	4.04	12.41	4.04	13.05	71.98	0.58
2400.00	0.60	315.79	2399.94	4.92	11.85	4.92	12.83	67.45	0.24
2500.00	0.69	305.84	2499.93	5.65	10.99	5.65	12.36	62.79	0.15
2600.00	0.68	300.55	2599.92	6.31	9.99	6.31	11.81	57.72	0.06
2700.00	0.60	293.62	2699.92	6.82	8.99	6.82	11.29	52.82	0.12
2800.00	0.60	275.26	2799.91	7.08	8.00	7.08	10.68	48.48	0.19
2900.00	0.41	276.88	2899.91	7.17	7.12	7.17	10.11	44.81	0.19
3000.00	0.32	277.35	2999.91	7.25	6.49	7.25	9.73	41.85	0.09
3100.00	0.17	286.01	3099.90	7.33	6.07	7.33	9.51	39.64	0.15
3200.00	0.87	292.68	3199.90	7.66	5.22	7.66	9.27	34.28	0.70
3300.00	1.80	296.25	3299.87	8.65	3.11	8.65	9.19	19.80	0.93
3400.00	2.01	294.88	3399.82	10.08	0.12	10.08	10.08	0.67	0.21

<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	2.20	283.90	3499.75	11.28	-3.33	11.28	11.76	343.54	0.44
3600.00	2.75	289.09	3599.66	12.52	-7.46	12.52	14.58	329.21	0.60
3700.00	3.37	291.25	3699.51	14.37	-12.47	14.37	19.03	319.06	0.63
3800.00	3.37	305.88	3799.34	17.16	-17.59	17.16	24.57	314.30	0.86
3900.00	3.38	295.58	3899.17	20.15	-22.62	20.15	30.30	311.69	0.61
4000.00	3.62	287.21	3998.98	22.36	-28.30	22.36	36.06	308.31	0.56
4100.00	3.61	286.67	4098.79	24.19	-34.32	24.19	41.99	305.18	0.04
4200.00	3.87	288.78	4198.57	26.18	-40.53	26.18	48.25	302.86	0.30
4300.00	3.85	290.60	4298.35	28.45	-46.87	28.45	54.82	301.26	0.12
4400.00	3.83	291.19	4398.12	30.84	-53.12	30.84	61.43	300.13	0.04
4500.00	3.48	289.39	4497.92	33.05	-59.10	33.05	67.72	299.22	0.37
4600.00	3.18	291.17	4597.75	35.06	-64.55	35.06	73.46	298.51	0.31
4700.00	2.95	289.60	4697.61	36.93	-69.56	36.93	78.76	297.96	0.25
4800.00	2.63	287.16	4797.49	38.47	-74.18	38.47	83.56	297.41	0.34
4900.00	2.61	288.90	4897.38	39.88	-78.52	39.88	88.07	296.93	0.08
5000.00	2.31	297.20	4997.29	41.54	-82.46	41.54	92.33	296.74	0.47
5100.00	2.10	303.04	5097.22	43.46	-85.79	43.46	96.17	296.87	0.30
5200.00	1.70	314.47	5197.16	45.50	-88.39	45.50	99.41	297.24	0.55
5300.00	1.48	327.77	5297.12	47.63	-90.14	47.63	101.95	297.85	0.43
5400.00	1.18	336.26	5397.10	49.66	-91.24	49.66	103.88	298.56	0.36
5500.00	0.79	349.56	5497.08	51.28	-91.78	51.28	105.13	299.19	0.45
5600.00	0.69	21.62	5597.07	52.52	-91.68	52.52	105.66	299.81	0.42
5700.00	0.63	46.67	5697.07	53.46	-91.06	53.46	105.59	300.42	0.29
5800.00	0.70	54.39	5797.06	54.19	-90.16	54.19	105.20	301.01	0.11
5900.00	0.55	67.26	5897.05	54.73	-89.23	54.73	104.68	301.52	0.20
6000.00	0.39	54.86	5997.05	55.11	-88.51	55.11	104.26	301.91	0.19
6100.00	0.58	50.39	6097.05	55.63	-87.84	55.63	103.97	302.35	0.19
6200.00	0.46	59.15	6197.04	56.16	-87.10	56.16	103.64	302.81	0.14
6300.00	0.59	66.05	6297.04	56.58	-86.29	56.58	103.18	303.25	0.14
6400.00	0.62	73.76	6397.03	56.93	-85.30	56.93	102.56	303.72	0.09
6500.00	0.36	65.77	6497.03	57.21	-84.50	57.21	102.05	304.10	0.26
6600.00	0.50	44.49	6597.03	57.66	-83.90	57.66	101.80	304.50	0.21
6700.00	0.53	25.13	6697.02	58.39	-83.40	58.39	101.81	305.00	0.18
6720.00	0.42	14.82	6717.02	58.54	-83.34	58.54	101.85	305.09	0.71
HORIZONTAL DISPLACEMENT IS 101.85 FEET AT 305.09 DEGREES									