

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Kern D/2-1

Location: S31 T4N R63W

Rig Name: Production

State/County: Colorado/Weld

Latitude: 40.39, Longitude: -104.51

GRID North is 0.61 Degrees East of True North

VS-Azi: 0.00 Degrees

GTI

GYRO TECHNOLOGIES, INC

FIELD COPY ONLY (NOT DEFINITIVE)

Elevation : 4682

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: kernd2-1-01_ed.ut

Minimum Curvature Method

Report Date/Time: 12/30/2010 / 18:20

Vaughn Energy Services

Fort Worth, Texas

817-741-3610

Ray Seago

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	0.64	70.10	100.00	0.19	0.53	0.19	0.56	70.10	0.64
200.00	0.68	83.14	199.99	0.45	1.65	0.45	1.71	74.61	0.16
300.00	0.66	85.34	299.98	0.57	2.81	0.57	2.87	78.52	0.03
400.00	0.80	75.96	399.98	0.79	4.07	0.79	4.14	79.03	0.18
500.00	1.01	83.10	499.96	1.06	5.62	1.06	5.72	79.29	0.24
600.00	1.11	98.57	599.95	1.03	7.45	1.03	7.52	82.16	0.30
700.00	1.22	93.03	699.93	0.83	9.48	0.83	9.51	85.02	0.16
800.00	1.22	94.68	799.90	0.68	11.60	0.68	11.62	86.63	0.04
900.00	1.24	82.35	899.88	0.74	13.74	0.74	13.76	86.92	0.27
1000.00	1.29	85.07	999.86	0.98	15.94	0.98	15.97	86.48	0.07
1100.00	1.31	77.49	1099.83	1.32	18.17	1.32	18.22	85.83	0.17
1200.00	1.34	72.00	1199.80	1.93	20.40	1.93	20.49	84.58	0.13
1300.00	1.25	73.25	1299.78	2.61	22.56	2.61	22.71	83.40	0.10
1400.00	1.13	71.60	1399.76	3.24	24.54	3.24	24.75	82.49	0.13
1500.00	1.23	83.59	1499.74	3.67	26.54	3.67	26.79	82.14	0.27
1600.00	1.00	64.09	1599.72	4.17	28.39	4.17	28.70	81.65	0.44
1700.00	1.01	54.22	1699.70	5.07	29.90	5.07	30.32	80.38	0.17
1800.00	0.89	61.96	1799.69	5.95	31.30	5.95	31.86	79.24	0.18
1900.00	0.83	80.80	1899.68	6.43	32.71	6.43	33.33	78.87	0.29
2000.00	0.80	92.64	1999.67	6.52	34.12	6.52	34.73	79.18	0.17
2100.00	1.02	116.31	2099.65	6.09	35.60	6.09	36.12	80.29	0.43
2200.00	1.72	124.89	2199.63	4.84	37.63	4.84	37.94	82.66	0.73
2300.00	1.63	130.09	2299.58	3.07	39.94	3.07	40.06	85.61	0.17
2400.00	2.12	130.71	2399.53	0.95	42.44	0.95	42.45	88.72	0.48
2500.00	2.51	127.34	2499.45	-1.59	45.58	-1.59	45.60	91.99	0.41
2600.00	2.73	132.80	2599.34	-4.53	49.06	-4.53	49.27	95.28	0.34
2700.00	2.99	144.78	2699.22	-8.28	52.32	-8.28	52.97	99.00	0.65
2800.00	2.89	150.11	2799.09	-12.60	55.08	-12.60	56.50	102.88	0.29
2900.00	2.63	149.62	2898.97	-16.76	57.49	-16.76	59.89	106.25	0.26
3000.00	2.33	158.65	2998.88	-20.63	59.39	-20.63	62.87	109.16	0.49
3100.00	2.00	144.74	3098.81	-23.95	61.14	-23.95	65.66	111.39	0.62
3200.00	1.56	135.58	3198.76	-26.34	63.10	-26.34	68.38	112.66	0.52
3300.00	1.09	101.69	3298.73	-27.51	64.98	-27.51	70.56	112.95	0.90

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
3400.00	1.03	111.06	3398.72	-28.02	66.74	-28.02	72.39	112.78	0.18
3500.00	1.50	79.24	3498.69	-28.10	68.87	-28.10	74.38	112.20	0.83
3600.00	2.04	66.58	3598.65	-27.15	71.80	-27.15	76.76	110.71	0.66
3700.00	2.27	48.31	3698.58	-25.12	74.91	-25.12	79.01	108.54	0.72
3800.00	2.24	33.26	3798.50	-22.17	77.46	-22.17	80.57	105.97	0.59
3900.00	2.22	13.69	3898.42	-18.65	78.99	-18.65	81.17	103.29	0.76
4000.00	1.87	355.77	3998.36	-15.14	79.33	-15.14	80.76	100.81	0.72
4100.00	1.89	349.75	4098.31	-11.89	78.92	-11.89	79.81	98.57	0.20
4200.00	1.70	331.88	4198.26	-8.97	77.93	-8.97	78.44	96.56	0.59
4300.00	1.76	331.51	4298.21	-6.31	76.50	-6.31	76.76	94.72	0.07
4400.00	1.54	317.45	4398.17	-3.97	74.85	-3.97	74.96	93.03	0.46
4500.00	1.63	318.76	4498.13	-1.90	73.00	-1.90	73.03	91.49	0.09
4600.00	1.73	315.69	4598.09	0.24	71.01	0.24	71.01	89.80	0.14
4700.00	1.82	313.30	4698.04	2.41	68.80	2.41	68.84	87.99	0.12
4800.00	1.73	306.86	4798.00	4.41	66.44	4.41	66.58	86.20	0.22
4900.00	1.60	307.67	4897.95	6.17	64.12	6.17	64.42	84.51	0.12
5000.00	1.66	309.71	4997.91	7.95	61.90	7.95	62.41	82.68	0.08
5100.00	1.95	329.77	5097.86	10.35	59.93	10.35	60.81	80.20	0.69
5200.00	2.02	339.00	5197.80	13.47	58.44	13.47	59.97	77.02	0.33
5300.00	1.71	342.03	5297.75	16.53	57.34	16.53	59.68	73.92	0.33
5400.00	1.47	358.89	5397.71	19.23	56.86	19.23	60.02	71.31	0.52
5500.00	1.09	356.42	5497.69	21.46	56.78	21.46	60.70	69.30	0.39
5600.00	1.00	358.96	5597.67	23.27	56.70	23.27	61.29	67.68	0.10
5700.00	0.51	354.57	5697.66	24.59	56.64	24.59	61.75	66.53	0.49
5800.00	0.59	27.00	5797.66	25.49	56.84	25.49	62.29	65.84	0.32
5900.00	0.27	67.44	5897.66	26.04	57.29	26.04	62.93	65.55	0.43
6000.00	0.37	86.26	5997.65	26.16	57.83	26.16	63.47	65.66	0.14
6100.00	0.72	52.83	6097.65	26.56	58.65	26.56	64.38	65.64	0.46
6200.00	1.05	56.14	6197.64	27.45	59.91	27.45	65.90	65.39	0.33
6300.00	1.08	44.35	6297.62	28.63	61.33	28.63	67.69	64.97	0.22
6400.00	0.78	39.24	6397.61	29.84	62.42	29.84	69.19	64.45	0.31
6500.00	0.56	80.50	6497.60	30.45	63.34	30.45	70.28	64.33	0.52
6600.00	0.44	24.32	6597.60	30.88	63.98	30.88	71.04	64.24	0.48
6700.00	0.53	34.85	6697.59	31.61	64.40	31.61	71.74	63.86	0.13
6800.00	0.66	68.78	6797.59	32.20	65.21	32.20	72.72	63.72	0.37
HORIZONTAL DISPLACEMENT IS 72.72 FEET AT 63.72 DEGREES									