



Company: Noble Energy  
 Lease/Well: National Hog Farm / 42-21  
 Location: S-21 T-5N R-63W  
 Rig Name: Production  
 State/County: Colorado/ Weld County  
 Latitude: 40.39, Longitude: -104.43  
 GRID North is 0.69 Degrees East of True North  
 VS-Azi: 0.00 Degrees



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: 6/15/2011 / 13:32

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	0.73	287.64	100.00	0.19	-0.61	0.19	0.64	287.64	0.73
200.00	1.15	291.83	199.98	0.76	-2.15	0.76	2.28	289.49	0.43
300.00	0.71	304.72	299.97	1.49	-3.59	1.49	3.89	292.49	0.49
400.00	0.84	294.96	399.96	2.15	-4.77	2.15	5.23	294.28	0.19
500.00	0.98	301.84	499.95	2.91	-6.16	2.91	6.81	295.29	0.17
600.00	1.07	308.50	599.93	3.94	-7.62	3.94	8.58	297.37	0.15
700.00	0.89	286.95	699.92	4.75	-9.10	4.75	10.26	297.60	0.41
800.00	1.07	308.97	799.90	5.57	-10.56	5.57	11.94	297.79	0.41
900.00	0.97	304.56	899.89	6.63	-11.98	6.63	13.70	298.96	0.13
1000.00	0.97	309.44	999.87	7.65	-13.33	7.65	15.37	299.84	0.08
1100.00	0.89	306.46	1099.86	8.64	-14.61	8.64	16.97	300.62	0.09
1200.00	1.45	299.07	1199.84	9.72	-16.34	9.72	19.01	300.75	0.58
1300.00	1.22	297.25	1299.81	10.82	-18.39	10.82	21.34	300.48	0.24
1400.00	1.35	291.94	1399.79	11.75	-20.42	11.75	23.56	299.91	0.18
1500.00	1.25	282.53	1499.76	12.42	-22.58	12.42	25.77	298.82	0.24
1600.00	1.22	283.09	1599.74	12.90	-24.68	12.90	27.85	297.60	0.03
1700.00	0.62	247.43	1699.73	12.93	-26.21	12.93	29.23	296.26	0.80
1800.00	0.45	203.49	1799.72	12.36	-26.87	12.36	29.58	294.71	0.43
1900.00	0.57	180.03	1899.72	11.51	-27.03	11.51	29.38	293.07	0.24
2000.00	0.62	164.30	1999.71	10.50	-26.88	10.50	28.86	291.33	0.17
2100.00	0.44	224.14	2099.71	9.69	-27.00	9.69	28.69	289.75	0.55
2200.00	0.43	236.53	2199.71	9.21	-27.58	9.21	29.08	288.47	0.10
2300.00	0.54	224.99	2299.70	8.67	-28.23	8.67	29.53	287.08	0.15
2400.00	0.52	230.15	2399.70	8.05	-28.91	8.05	30.01	285.56	0.05
2500.00	0.66	181.41	2499.69	7.19	-29.27	7.19	30.14	283.80	0.50
2600.00	0.25	287.45	2599.69	6.68	-29.49	6.68	30.24	282.76	0.77
2700.00	0.05	316.90	2699.69	6.77	-29.73	6.77	30.49	282.84	0.21
2800.00	0.11	290.71	2799.69	6.84	-29.84	6.84	30.62	282.90	0.07
2900.00	0.06	320.00	2899.69	6.91	-29.97	6.91	30.75	282.99	0.06
3000.00	0.09	256.77	2999.69	6.94	-30.08	6.94	30.87	282.99	0.08
3100.00	1.04	246.98	3099.68	6.57	-30.99	6.57	31.68	281.96	0.96
3200.00	1.54	233.55	3199.66	5.41	-32.91	5.41	33.35	279.34	0.58
3300.00	2.36	238.53	3299.60	3.54	-35.74	3.54	35.92	275.66	0.83
3400.00	2.61	234.91	3399.51	1.16	-39.36	1.16	39.38	271.68	0.30

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	2.61	233.90	3499.40	-1.49	-43.06	-1.49	43.09	268.01	0.05
3600.00	2.61	229.28	3599.30	-4.32	-46.62	-4.32	46.82	264.71	0.21
3700.00	2.46	231.19	3699.20	-7.15	-50.02	-7.15	50.53	261.86	0.17
3800.00	2.22	230.99	3799.12	-9.72	-53.20	-9.72	54.08	259.65	0.25
3900.00	1.94	235.77	3899.05	-11.89	-56.11	-11.89	57.36	258.04	0.33
4000.00	1.41	217.43	3999.01	-13.82	-58.26	-13.82	59.88	256.65	0.75
4100.00	1.85	214.62	4098.97	-16.13	-59.93	-16.13	62.06	254.94	0.44
4200.00	1.51	211.70	4198.93	-18.58	-61.53	-18.58	64.28	253.20	0.35
4300.00	1.51	205.66	4298.89	-20.88	-62.80	-20.88	66.18	251.61	0.16
4400.00	2.22	196.47	4398.84	-23.93	-63.91	-23.93	68.25	249.48	0.77
4500.00	2.73	184.67	4498.74	-28.16	-64.66	-28.16	70.52	246.47	0.72
4600.00	2.79	183.22	4598.63	-32.96	-64.99	-32.96	72.87	243.11	0.09
4700.00	2.40	183.17	4698.53	-37.49	-65.24	-37.49	75.24	240.12	0.39
4800.00	2.53	160.46	4798.44	-41.66	-64.62	-41.66	76.88	237.19	0.98
4900.00	1.98	168.01	4898.36	-45.43	-63.52	-45.43	78.09	234.43	0.62
5000.00	1.55	184.84	4998.31	-48.46	-63.28	-48.46	79.70	232.55	0.67
5100.00	1.19	204.54	5098.28	-50.76	-63.82	-50.76	81.55	231.51	0.58
5200.00	0.80	250.95	5198.27	-51.93	-64.91	-51.93	83.13	231.34	0.87
5300.00	0.96	261.18	5298.26	-52.29	-66.40	-52.29	84.52	231.78	0.23
5400.00	1.02	276.42	5398.24	-52.32	-68.12	-52.32	85.89	232.47	0.27
5500.00	1.59	279.93	5498.22	-51.98	-70.37	-51.98	87.49	233.55	0.58
5600.00	1.27	287.84	5598.18	-51.40	-72.79	-51.40	89.11	234.77	0.38
5700.00	1.99	295.83	5698.14	-50.31	-75.41	-50.31	90.65	236.29	0.75
5800.00	2.21	295.87	5798.08	-48.71	-78.70	-48.71	92.56	238.24	0.22
5900.00	1.84	293.30	5898.01	-47.24	-81.91	-47.24	94.55	240.03	0.38
6000.00	1.54	273.41	5997.97	-46.52	-84.73	-46.52	96.66	241.23	0.66
6100.00	1.65	269.56	6097.93	-46.45	-87.51	-46.45	99.07	242.04	0.15
6200.00	0.99	255.69	6197.91	-46.67	-89.79	-46.67	101.19	242.53	0.73
6300.00	1.30	265.90	6297.89	-46.97	-91.75	-46.97	103.08	242.89	0.37
6400.00	1.58	232.49	6397.86	-47.89	-93.98	-47.89	105.48	243.00	0.87
6500.00	1.53	227.93	6497.82	-49.63	-96.07	-49.63	108.13	242.68	0.13
6600.00	0.96	246.58	6597.80	-50.85	-97.83	-50.85	110.26	242.53	0.69
6700.00	1.32	219.11	6697.78	-52.08	-99.32	-52.08	112.15	242.33	0.64
6800.00	1.19	223.56	6797.75	-53.72	-100.76	-53.72	114.19	241.94	0.16
6900.00	0.91	238.53	6897.74	-54.89	-102.15	-54.89	115.96	241.75	0.39

HORIZONTAL DISPLACEMENT IS  
115.96 FEET AT 241.75 DEGREES