



Company: Noble
 Lease/Well: Fru/Fru197-28A5
 Location:
 Rig Name: Production
 State/County: Colorado/Rio Blanco
 Latitude: 39.93
 GRID North is 1.80 Degrees West of True North
 VS-Azi: 0.00 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : KB = 0 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: fru#197-28a5.ut
 Minimum Curvature Method
 Report Date/Time: 9/20/2010 / 11:57

Vaughn Energy Services
 Rifle, Colorado
 970-456-2071
 Garry Fowler
 Fru197-28A5

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	****
200.00	1.10	114.82	199.99	-0.81	1.75	-0.81	1.93	114.82	0.55
400.00	4.70	173.97	399.72	-9.77	4.36	-9.77	10.70	155.95	2.12
600.00	7.92	180.41	598.49	-31.71	5.12	-31.71	32.12	170.82	1.65
800.00	10.16	185.29	795.99	-63.06	3.40	-63.06	63.15	176.92	1.18
1000.00	11.65	188.48	992.38	-100.60	-1.21	-100.60	100.61	180.69	0.80
1200.00	14.28	200.87	1187.30	-143.63	-12.97	-143.63	144.22	185.16	1.91
1400.00	17.63	212.82	1379.62	-192.17	-38.19	-192.17	195.93	191.24	2.34
1600.00	20.93	214.49	1568.38	-247.08	-74.85	-247.08	258.17	196.85	1.67
1800.00	24.76	217.84	1752.66	-309.62	-120.79	-309.62	332.34	201.31	2.02
2000.00	24.89	218.84	1934.18	-375.48	-172.88	-375.48	413.36	204.72	0.22
2200.00	25.01	216.20	2115.53	-442.38	-224.24	-442.38	495.97	206.88	0.56
2400.00	25.05	215.57	2296.74	-510.94	-273.84	-510.94	579.69	208.19	0.13
2600.00	25.93	216.60	2477.27	-580.48	-324.55	-580.48	665.05	209.21	0.49
2800.00	26.65	216.25	2656.58	-651.76	-377.15	-651.76	753.01	210.06	0.37
3000.00	25.92	216.28	2835.90	-723.17	-429.54	-723.17	841.12	210.71	0.37
3200.00	25.91	215.16	3015.79	-794.12	-480.56	-794.12	928.21	211.18	0.25
3400.00	24.85	215.32	3196.49	-864.13	-530.02	-864.13	1013.73	211.52	0.53
3600.00	24.76	214.90	3378.05	-932.76	-578.27	-932.76	1097.47	211.80	0.10
3800.00	24.67	212.24	3559.73	-1002.42	-624.50	-1002.42	1181.04	211.92	0.56
4000.00	24.58	212.02	3741.54	-1072.99	-668.82	-1072.99	1264.37	211.94	0.06
4200.00	24.51	214.45	3923.47	-1142.47	-714.35	-1142.47	1347.42	212.02	0.51
4400.00	24.47	215.19	4105.48	-1210.53	-761.70	-1210.53	1430.23	212.18	0.15
4600.00	24.43	215.86	4287.55	-1277.90	-809.79	-1277.90	1512.87	212.36	0.14
4800.00	24.39	219.65	4469.68	-1343.21	-860.38	-1343.21	1595.14	212.64	0.78
5000.00	24.38	218.72	4651.84	-1407.21	-912.54	-1407.21	1677.19	212.96	0.19
5200.00	24.38	217.55	4834.01	-1472.14	-963.52	-1472.14	1759.42	213.20	0.24
5400.00	24.32	216.68	5016.22	-1537.89	-1013.28	-1537.89	1841.70	213.38	0.18
5600.00	23.29	216.06	5199.20	-1602.88	-1061.15	-1602.88	1922.31	213.51	0.53
5800.00	20.29	216.83	5384.90	-1662.61	-1105.22	-1662.61	1996.44	213.61	1.51
6000.00	14.97	214.80	5575.44	-1711.61	-1140.78	-1711.61	2056.94	213.68	2.67
6200.00	12.17	208.85	5769.84	-1751.30	-1165.70	-1751.30	2103.79	213.65	1.56
6400.00	8.63	210.54	5966.53	-1782.69	-1183.50	-1782.69	2139.78	213.58	1.78

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
6600.00	6.17	214.31	6164.85	-1804.49	-1197.18	-1804.49	2165.50	213.56	1.25
6800.00	2.42	206.53	6364.25	-1817.15	-1205.12	-1817.15	2180.44	213.55	1.89
7000.00	0.98	97.57	6564.19	-1821.15	-1205.31	-1821.15	2183.89	213.50	1.45
7200.00	0.77	111.12	6764.17	-1821.86	-1202.36	-1821.86	2182.86	213.42	0.15
7400.00	0.35	110.63	6964.16	-1822.56	-1200.54	-1822.56	2182.43	213.37	0.21
7600.00	0.31	109.65	7164.15	-1822.96	-1199.45	-1822.96	2182.17	213.34	0.02
7800.00	0.99	110.39	7364.14	-1823.75	-1197.31	-1823.75	2181.65	213.29	0.34
8000.00	1.23	111.71	7564.10	-1825.14	-1193.70	-1825.14	2180.84	213.19	0.12
8200.00	0.92	122.28	7764.07	-1826.79	-1190.35	-1826.79	2180.39	213.09	0.18
8400.00	0.94	130.58	7964.04	-1828.72	-1187.74	-1828.72	2180.58	213.00	0.07
8600.00	0.98	152.25	8164.01	-1831.31	-1185.70	-1831.31	2181.64	212.92	0.18
8800.00	1.20	150.22	8363.98	-1834.64	-1183.86	-1834.64	2183.44	212.83	0.11
9000.00	1.23	150.69	8563.93	-1838.33	-1181.77	-1838.33	2185.41	212.73	0.02
9200.00	1.30	148.64	8763.88	-1842.14	-1179.54	-1842.14	2187.41	212.63	0.04
9400.00	1.42	139.87	8963.83	-1845.97	-1176.76	-1845.97	2189.15	212.52	0.12
9600.00	1.42	132.03	9163.77	-1849.52	-1173.32	-1849.52	2190.30	212.39	0.10
9800.00	1.44	131.26	9363.70	-1852.84	-1169.59	-1852.84	2191.11	212.26	0.01
10000.00	1.36	132.69	9563.64	-1856.10	-1165.96	-1856.10	2191.94	212.14	0.05
10200.00	1.35	131.51	9763.59	-1859.27	-1162.46	-1859.27	2192.76	212.01	0.01
10400.00	1.33	131.15	9963.53	-1862.36	-1158.94	-1862.36	2193.52	211.89	0.01
10600.00	1.30	130.93	10163.48	-1865.37	-1155.49	-1865.37	2194.25	211.78	0.02
10800.00	1.54	130.02	10363.42	-1868.58	-1151.71	-1868.58	2195.01	211.65	0.12
11000.00	1.57	131.32	10563.35	-1872.12	-1147.60	-1872.12	2195.86	211.51	0.02
11200.00	1.86	135.51	10763.26	-1876.24	-1143.27	-1876.24	2197.12	211.36	0.16
11400.00	2.14	141.83	10963.14	-1881.49	-1138.69	-1881.49	2199.23	211.18	0.18
11600.00	1.62	149.47	11163.03	-1886.86	-1134.95	-1886.86	2201.89	211.03	0.29
11800.00	1.44	193.72	11362.96	-1891.74	-1134.11	-1891.74	2205.65	210.94	0.58
12000.00	1.28	212.65	11562.91	-1896.06	-1135.91	-1896.06	2210.28	210.93	0.24
12200.00	0.95	213.83	11762.87	-1899.32	-1138.04	-1899.32	2214.17	210.93	0.16
12363.00	0.93	211.84	11925.85	-1901.57	-1139.49	-1901.57	2216.85	210.93	0.02

HORIZONTAL DISPLACEMENT IS
2216.85 FEET AT 210.93 DEGREES