



## Ramos 1-23A Final Surveys (Gyro + MWD\_DMAG) Report

<p><b>Report Date:</b> December 18, 2006  <b>Client:</b> Noble Energy, Inc.  <b>Field:</b> CO, Garfield County (NAD 27 CZ) Noble Energy 2006  <b>Structure / Slot:</b> Noble 01-8S-96W (1K Ramos Pad) Nabors 457 / Ramos 01-23A  <b>Well:</b> Ramos 01-23A  <b>Borehole:</b> Original Hole  <b>UWI/API#:</b>  <b>Survey Name / Date:</b> Ramos 1-23A Surveys (Gyro + MWD_DMAG) 31-Oct-06 / October 31, 2006  <b>Tort / AHD / DDI / ERD ratio:</b> 67.540° / 1002.40 ft / 4.839 / 0.155  <b>Grid Coordinate System:</b> NAD27 Colorado State Planes, Central Zone, US Feet  <b>Location Lat/Long:</b> N 39 22 36.105, W 108 3 38.789  <b>Location Grid N/E Y/X:</b> N 572282.660 ftUS, E 1276200.380 ftUS  <b>Grid Convergence Angle:</b> -1.61505392°  <b>Grid Scale Factor:</b> 0.99994746</p>	<p><b>Survey / DLS Computation Method:</b> Minimum Curvature / Lubinski  <b>Vertical Section Azimuth:</b> 21.350°  <b>Vertical Section Origin:</b> N 0.000 ft, E 0.000 ft  <b>TVD Reference Datum:</b> RKB  <b>TVD Reference Elevation:</b> 5934.0 ft relative to MSL  <b>Sea Bed / Ground Level Elevation:</b> 5920.000 ft relative to MSL  <b>Magnetic Declination:</b> 10.983°  <b>Total Field Strength:</b> 52648.058 nT  <b>Magnetic Dip:</b> 65.787°  <b>Declination Date:</b> October 31, 2006  <b>Magnetic Declination Model:</b> BGGM 2006  <b>North Reference:</b> Grid North  <b>Total Corr Mag North -&gt; Grid North:</b> +12.598°  <b>Local Coordinates Referenced To:</b> Well Head</p>
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Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	DLS (deg/100 ft)	Northing (ftUS)	Easting (ftUS)	Latitude	Longitude
Tie-In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	572282.66	1276200.38	N 39 22 36.105	W 108 3 38.789
	113.00	1.93	60.86	112.98	1.47	0.93	1.66	1.71	572283.59	1276202.04	N 39 22 36.114	W 108 3 38.768
	205.00	3.21	65.48	204.88	4.51	2.75	5.36	1.41	572285.41	1276205.74	N 39 22 36.133	W 108 3 38.722
	296.00	5.01	61.41	295.65	9.38	5.71	11.17	2.00	572288.37	1276211.55	N 39 22 36.164	W 108 3 38.649
	492.00	8.76	70.67	490.20	25.67	14.75	32.77	1.99	572297.41	1276233.15	N 39 22 36.260	W 108 3 38.377
Last Gyro Survey	522.00	9.04	71.99	519.84	28.65	16.23	37.17	1.16	572298.89	1276237.55	N 39 22 36.275	W 108 3 38.322
	614.00	10.25	63.07	610.55	39.35	22.18	51.34	2.09	572304.83	1276251.72	N 39 22 36.338	W 108 3 38.144
	706.00	11.46	50.73	700.91	53.42	31.67	65.72	2.84	572314.33	1276266.10	N 39 22 36.436	W 108 3 37.964
	796.00	12.91	39.80	788.89	70.75	45.06	79.08	3.02	572327.71	1276279.45	N 39 22 36.572	W 108 3 37.799
	889.00	14.21	33.69	879.30	91.76	62.54	92.06	2.08	572345.19	1276292.44	N 39 22 36.748	W 108 3 37.640
	980.00	16.05	26.25	967.15	115.21	83.12	103.82	2.94	572365.77	1276304.20	N 39 22 36.955	W 108 3 37.497
	1071.00	17.91	22.07	1054.19	141.74	107.37	114.65	2.44	572390.02	1276315.02	N 39 22 37.197	W 108 3 37.368
	1166.00	19.27	18.91	1144.23	172.01	135.74	125.22	1.78	572418.39	1276325.59	N 39 22 37.481	W 108 3 37.244
	1262.00	18.99	17.62	1234.93	203.42	165.61	135.08	0.53	572448.26	1276335.45	N 39 22 37.779	W 108 3 37.129
	1358.00	20.47	16.50	1325.29	235.74	196.59	144.57	1.59	572479.24	1276344.95	N 39 22 38.087	W 108 3 37.019
8 5/8" CSG	1453.00	21.53	16.94	1413.98	269.67	229.20	154.37	1.13	572511.85	1276354.74	N 39 22 38.412	W 108 3 36.906
	1490.00	20.44	18.66	1448.52	282.89	241.81	158.42	3.38	572524.46	1276358.79	N 39 22 38.538	W 108 3 36.860
	1550.00	20.55	18.64	1504.73	303.88	261.72	165.13	0.18	572544.36	1276365.51	N 39 22 38.736	W 108 3 36.781
	1605.00	20.65	18.63	1556.21	323.21	280.05	171.32	0.18	572562.70	1276371.69	N 39 22 38.919	W 108 3 36.709
	1701.00	18.32	19.47	1646.71	355.20	310.32	181.76	2.44	572592.97	1276382.13	N 39 22 39.221	W 108 3 36.587
	1796.00	17.32	18.80	1737.15	384.25	337.79	191.29	1.07	572620.43	1276391.66	N 39 22 39.495	W 108 3 36.475
	1891.00	16.29	22.28	1828.09	411.70	363.51	200.90	1.52	572646.15	1276401.27	N 39 22 39.752	W 108 3 36.362
	1985.00	15.79	25.87	1918.43	437.63	387.21	211.48	1.18	572669.85	1276411.85	N 39 22 39.989	W 108 3 36.236
	2081.00	16.95	26.97	2010.54	464.58	411.44	223.52	1.25	572694.08	1276423.89	N 39 22 40.232	W 108 3 36.092
	2177.00	18.21	28.26	2102.06	493.40	437.12	236.97	1.37	572719.76	1276437.34	N 39 22 40.489	W 108 3 35.930
	2273.00	17.96	27.34	2193.31	523.01	463.48	250.87	0.40	572746.12	1276451.24	N 39 22 40.754	W 108 3 35.762
	2369.00	17.44	26.18	2284.77	552.07	489.54	264.02	0.65	572772.17	1276464.38	N 39 22 41.015	W 108 3 35.604
	2465.00	17.05	24.85	2376.45	580.45	515.22	276.28	0.58	572797.85	1276476.65	N 39 22 41.272	W 108 3 35.457
	2561.00	17.49	24.70	2468.12	608.90	541.10	288.22	0.46	572823.73	1276488.59	N 39 22 41.531	W 108 3 35.315
	2780.00	17.55	24.87	2676.97	674.71	600.95	315.86	0.04	572883.58	1276516.22	N 39 22 42.130	W 108 3 34.984
	2900.00	16.98	22.72	2791.56	710.28	633.53	330.24	0.71	572916.16	1276530.60	N 39 22 42.456	W 108 3 34.813
	3008.00	14.47	22.08	2895.51	739.54	660.59	341.40	2.33	572943.21	1276541.76	N 39 22 42.726	W 108 3 34.680
	3136.00	12.70	22.25	3019.92	769.61	688.43	352.74	1.38	572971.05	1276553.10	N 39 22 43.004	W 108 3 34.546
	3232.00	12.33	21.23	3113.64	790.41	707.75	360.45	0.45	572990.37	1276560.81	N 39 22 43.197	W 108 3 34.455
	3328.00	10.77	22.68	3207.70	809.63	725.58	367.62	1.65	573008.20	1276567.98	N 39 22 43.376	W 108 3 34.370
	3423.00	9.46	22.79	3301.22	826.30	740.97	374.07	1.38	573023.59	1276574.43	N 39 22 43.529	W 108 3 34.293
	3519.00	8.90	22.13	3395.99	841.62	755.12	379.92	0.59	573037.74	1276580.28	N 39 22 43.671	W 108 3 34.224
	3615.00	7.99	20.45	3490.95	855.71	768.25	385.05	0.98	573050.87	1276585.41	N 39 22 43.802	W 108 3 34.163
	3709.00	7.81	20.52	3584.05	868.63	780.36	389.57	0.19	573062.97	1276589.93	N 39 22 43.923	W 108 3 34.110
	3803.00	6.87	19.68	3677.28	880.64	791.63	393.70	1.01	573074.25	1276594.06	N 39 22 44.035	W 108 3 34.062
	3899.00	6.64	19.69	3772.62	891.93	802.26	397.51	0.24	573084.88	1276597.86	N 39 22 44.142	W 108 3 34.017

Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	DLS (deg/100 ft)	Northing (ftUS)	Easting (ftUS)	Latitude	Longitude
	3994.00	4.21	15.48	3867.18	900.89	810.80	400.29	2.59	573093.41	1276600.65	N 39 22 44.227	W 108 3 33.985
	4090.00	2.48	12.80	3963.02	906.45	816.22	401.69	1.81	573098.83	1276602.05	N 39 22 44.281	W 108 3 33.969
	4186.00	1.06	342.80	4058.97	909.19	819.09	401.89	1.72	573101.71	1276602.24	N 39 22 44.309	W 108 3 33.967
	4281.00	1.20	328.57	4153.95	910.48	820.78	401.11	0.33	573103.40	1276601.47	N 39 22 44.325	W 108 3 33.978
	4471.00	1.22	299.60	4343.91	911.98	823.48	398.31	0.32	573106.09	1276598.67	N 39 22 44.351	W 108 3 34.014
	4613.00	1.41	279.40	4485.87	911.83	824.51	395.27	0.35	573107.12	1276595.63	N 39 22 44.361	W 108 3 34.053
	4693.00	1.32	272.65	4565.85	911.33	824.71	393.38	0.23	573107.33	1276593.74	N 39 22 44.362	W 108 3 34.078
	4790.00	1.40	271.49	4662.82	910.57	824.80	391.08	0.09	573107.41	1276591.44	N 39 22 44.362	W 108 3 34.107
	4863.00	1.54	247.52	4735.80	909.59	824.44	389.28	0.86	573107.06	1276589.64	N 39 22 44.358	W 108 3 34.130
	4979.00	1.20	238.09	4851.77	907.54	823.21	386.81	0.35	573105.82	1276587.17	N 39 22 44.345	W 108 3 34.161
	5074.00	1.14	230.18	4946.75	905.91	822.07	385.24	0.18	573104.69	1276585.60	N 39 22 44.334	W 108 3 34.180
	5170.00	1.73	232.97	5042.72	903.84	820.59	383.35	0.62	573103.21	1276583.71	N 39 22 44.319	W 108 3 34.204
	5267.00	1.09	197.49	5139.69	901.67	818.83	381.91	1.09	573101.44	1276582.26	N 39 22 44.301	W 108 3 34.222
	5360.00	1.07	219.89	5232.67	899.97	817.32	381.08	0.45	573099.93	1276581.44	N 39 22 44.286	W 108 3 34.232
	5584.00	2.00	241.18	5456.59	894.98	813.83	376.32	0.48	573096.44	1276576.68	N 39 22 44.250	W 108 3 34.291
	5745.00	1.73	237.80	5617.51	890.87	811.18	371.80	0.18	573093.80	1276572.16	N 39 22 44.222	W 108 3 34.348
	5835.00	1.96	244.43	5707.46	888.65	809.79	369.26	0.35	573092.41	1276569.62	N 39 22 44.208	W 108 3 34.379
	5964.00	1.52	278.73	5836.40	886.67	809.10	365.58	0.86	573091.72	1276565.94	N 39 22 44.200	W 108 3 34.426
	6031.00	1.60	280.42	5903.38	886.30	809.40	363.78	0.14	573092.02	1276564.14	N 39 22 44.203	W 108 3 34.449
	6128.00	2.16	280.92	6000.33	885.71	809.99	360.65	0.58	573092.61	1276561.01	N 39 22 44.208	W 108 3 34.489
	6223.00	2.49	266.16	6095.25	884.51	810.20	356.84	0.72	573092.81	1276557.20	N 39 22 44.209	W 108 3 34.538
	6317.00	2.32	259.55	6189.17	882.64	809.71	352.93	0.35	573092.33	1276553.29	N 39 22 44.203	W 108 3 34.587
Last MWD Survey	6550.00	2.46	244.69	6421.97	876.51	806.72	343.77	0.27	573089.34	1276544.13	N 39 22 44.171	W 108 3 34.703
Proj to TD	6610.00	2.48	240.93	6481.91	874.58	805.54	341.47	0.27	573088.16	1276541.83	N 39 22 44.158	W 108 3 34.732

**Survey Type:** Non-Def Survey

**Survey Error Model:** SLB ISCWSA version 24 \*\*\* 3-D 95.00% Confidence 2.7955 sigma

**Surveying Prog:**

**MD From ( ft )**

**MD To ( ft )**

**EOU Freq**

**Survey Tool Type**

**Borehole -> Survey**

0.00	14.00	Act-Stns	SLB_NSG+SSHOT-Depth Only	Original Hole -> Ramos 1-23A Surveys (Gyro + MWD_DMAG) 31-Oct-06
14.00	492.00	Act-Stns	SLB_NSG+SSHOT	Original Hole -> Ramos 1-23A Surveys (Gyro + MWD_DMAG) 31-Oct-06
492.00	6550.00	Act-Stns	SLB_MWD+DMAG	Original Hole -> Ramos 1-23A Surveys (Gyro + MWD_DMAG) 31-Oct-06
6550.00	6610.00	Act-Stns	SLB_BLIND+TREND	Original Hole -> Ramos 1-23A Surveys (Gyro + MWD_DMAG) 31-Oct-06