



Ramos 1-23B Final (Gyro + MWD_DMAG) Survey Report

Report Date: November 20, 2006	Survey / DLS Computation Method: Minimum Curvature / Lubinski
Client: Noble Energy, Inc.	Vertical Section Azimuth: 37.480°
Field: CO, Garfield County (NAD 27 CZ) Noble Energy 2006	Vertical Section Origin: N 0.000 ft, E 0.000 ft
Structure / Slot: Noble 01-8S-96W (1K Ramos Pad) Nabors 457 / Ramos 01-23B	TVD Reference Datum: RKB
Well: Ramos 01-23B	TVD Reference Elevation: 5934.0 ft relative to MSL
Borehole: Original Hole	Sea Bed / Ground Level Elevation: 5920.000 ft relative to MSL
UWI/API#:	Magnetic Declination: 10.979°
Survey Name / Date: Ramos 1-23B Surveys (Gyro + MWD_DMAG) 13-Nov-06 / November 13, 2006	Total Field Strength: 52644.504 nT
Tort / AHD / DDI / ERD ratio: 68.396° / 800.45 ft / 4.744 / 0.124	Magnetic Dip: 65.786°
Grid Coordinate System: NAD27 Colorado State Planes, Central Zone, US Feet	Declination Date: November 13, 2006
Location Lat/Long: N 39 22 35.951, W 108 3 38.836	Magnetic Declination Model: BGGM 2006
Location Grid N/E Y/X: N 572267.250 ftUS, E 1276196.240 ftUS	North Reference: Grid North
Grid Convergence Angle: -1.61506218°	Total Corr Mag North -> Grid North: +12.594°
Grid Scale Factor: 0.99994745	Local Coordinates Referenced To: Well Head

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	572267.25	1276196.24	N 39 22 35.951	W 108 3 38.836
First Gyro Survey	148.00	3.50	159.00	147.91	-2.36	-4.22	1.62	2.36	572263.03	1276197.86	N 39 22 35.910	W 108 3 38.814
	240.00	5.25	122.00	239.65	-3.43	-9.07	6.20	3.51	572258.18	1276202.44	N 39 22 35.863	W 108 3 38.754
Last Gyro Survey	301.00	5.50	112.00	300.39	-2.38	-11.65	11.27	1.59	572255.60	1276207.51	N 39 22 35.839	W 108 3 38.689
Start SLB MWD Survey	336.00	5.03	118.52	335.24	-1.70	-13.01	14.18	2.17	572254.24	1276210.42	N 39 22 35.827	W 108 3 38.651
8 5/8" CSG	366.00	5.35	113.22	365.12	-1.15	-14.19	16.62	1.92	572253.06	1276212.86	N 39 22 35.816	W 108 3 38.620
	457.00	6.00	109.58	455.67	1.36	-17.45	25.00	0.82	572249.80	1276221.24	N 39 22 35.786	W 108 3 38.512
	549.00	5.73	113.07	547.19	3.98	-20.86	33.75	0.49	572246.39	1276229.99	N 39 22 35.755	W 108 3 38.399
	641.00	6.37	113.25	638.68	6.38	-24.68	42.67	0.70	572242.57	1276238.91	N 39 22 35.719	W 108 3 38.284
	732.00	8.87	106.25	728.87	10.16	-28.64	54.04	2.93	572238.62	1276250.28	N 39 22 35.683	W 108 3 38.138
	823.00	9.88	87.88	818.67	17.68	-30.31	68.59	3.45	572236.94	1276264.82	N 39 22 35.671	W 108 3 37.953
	915.00	10.77	74.49	909.19	29.58	-27.72	84.76	2.77	572239.53	1276280.99	N 39 22 35.701	W 108 3 37.748
	1007.00	11.10	73.17	999.52	43.63	-22.86	101.52	0.45	572244.39	1276297.75	N 39 22 35.754	W 108 3 37.536
	1099.00	10.91	69.96	1089.83	58.17	-17.31	118.17	0.70	572249.94	1276314.41	N 39 22 35.813	W 108 3 37.326
	1226.00	11.93	65.49	1214.32	79.90	-7.74	141.41	1.06	572259.51	1276337.64	N 39 22 35.914	W 108 3 37.034
	1382.00	12.76	61.86	1366.71	109.83	7.07	171.27	0.73	572274.32	1276367.50	N 39 22 36.069	W 108 3 36.659
	1418.00	13.33	55.73	1401.78	117.39	11.28	178.21	4.15	572278.53	1276374.44	N 39 22 36.112	W 108 3 36.572
	1485.00	13.88	52.12	1466.91	132.50	20.57	190.93	1.51	572287.82	1276387.16	N 39 22 36.208	W 108 3 36.413
	1580.00	14.19	50.58	1559.07	154.87	34.96	208.93	0.51	572302.21	1276405.15	N 39 22 36.355	W 108 3 36.189
	1690.00	14.57	48.88	1665.62	181.57	52.62	229.77	0.51	572319.87	1276426.00	N 39 22 36.535	W 108 3 35.931
	1793.00	13.95	41.50	1765.46	206.66	70.44	247.76	1.86	572337.69	1276443.98	N 39 22 36.716	W 108 3 35.708
	1889.00	13.38	36.24	1858.74	229.31	88.07	261.99	1.42	572355.31	1276458.22	N 39 22 36.894	W 108 3 35.533
	1985.00	13.29	31.35	1952.16	251.38	106.45	274.30	1.18	572373.70	1276470.52	N 39 22 37.079	W 108 3 35.383
	2081.00	14.41	23.66	2045.37	273.96	126.82	284.83	2.24	572394.06	1276481.06	N 39 22 37.284	W 108 3 35.256
	2174.00	14.81	20.44	2135.37	296.56	148.56	293.63	0.97	572415.80	1276489.85	N 39 22 37.501	W 108 3 35.152
	2271.00	14.46	17.76	2229.22	319.81	171.71	301.65	0.79	572438.95	1276497.88	N 39 22 37.732	W 108 3 35.058
	2367.00	14.09	16.23	2322.26	341.99	194.34	308.57	0.55	572461.58	1276504.80	N 39 22 37.957	W 108 3 34.978
	2463.00	14.12	15.63	2415.36	363.74	216.84	315.00	0.16	572484.08	1276511.22	N 39 22 38.181	W 108 3 34.905
	2559.00	14.93	17.44	2508.29	386.23	239.91	321.86	0.97	572507.15	1276518.08	N 39 22 38.411	W 108 3 34.825
	2655.00	15.53	17.90	2600.92	409.96	263.94	329.51	0.64	572531.18	1276525.74	N 39 22 38.651	W 108 3 34.737
	2760.00	15.29	17.69	2702.15	436.23	290.51	338.04	0.23	572557.74	1276534.26	N 39 22 38.916	W 108 3 34.638
	2846.00	14.90	16.86	2785.18	457.25	311.89	344.69	0.52	572579.12	1276540.91	N 39 22 39.129	W 108 3 34.561
	2942.00	13.95	16.49	2878.15	479.60	334.80	351.56	0.99	572602.03	1276547.78	N 39 22 39.357	W 108 3 34.481
	3037.00	12.52	18.98	2970.63	500.06	355.52	358.16	1.62	572622.75	1276554.38	N 39 22 39.563	W 108 3 34.405
	3133.00	12.29	26.82	3064.39	519.97	374.48	366.15	1.77	572641.71	1276562.37	N 39 22 39.753	W 108 3 34.310
	3226.00	13.20	28.44	3155.10	540.18	392.65	375.68	1.05	572659.88	1276571.89	N 39 22 39.935	W 108 3 34.195
	3324.00	12.26	28.09	3250.69	561.50	411.67	385.90	0.96	572678.89	1276582.12	N 39 22 40.126	W 108 3 34.072
	3420.00	10.99	27.84	3344.72	580.58	428.75	394.98	1.32	572695.98	1276591.20	N 39 22 40.297	W 108 3 33.962
	3515.00	10.57	28.10	3438.04	598.10	444.44	403.31	0.45	572711.67	1276599.53	N 39 22 40.455	W 108 3 33.862
	3610.00	8.45	22.03	3531.73	613.43	458.60	410.03	2.47	572725.83	1276606.25	N 39 22 40.596	W 108 3 33.782
	3704.00	6.24	10.50	3624.96	624.64	470.03	413.55	2.81	572737.25	1276609.77	N 39 22 40.710	W 108 3 33.741

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
	3800.00	4.45	16.75	3720.54	632.77	478.73	415.58	1.96	572745.95	1276611.80	N 39 22 40.797	W 108 3 33.718
	3895.00	3.02	8.76	3815.34	638.42	484.73	417.02	1.60	572751.95	1276613.24	N 39 22 40.856	W 108 3 33.702
	3992.00	1.58	341.36	3912.26	641.40	488.52	416.98	1.83	572755.75	1276613.20	N 39 22 40.894	W 108 3 33.704
	4086.00	1.20	327.59	4006.23	642.46	490.58	416.04	0.54	572757.80	1276612.26	N 39 22 40.914	W 108 3 33.716
	4182.00	1.32	305.19	4102.21	642.77	492.07	414.60	0.52	572759.29	1276610.82	N 39 22 40.928	W 108 3 33.735
	4279.00	0.60	270.71	4199.20	642.42	492.72	413.18	0.92	572759.94	1276609.40	N 39 22 40.934	W 108 3 33.754
	4435.00	0.88	252.85	4355.18	640.95	492.37	411.22	0.23	572759.60	1276607.44	N 39 22 40.930	W 108 3 33.779
	4566.00	1.28	260.42	4486.16	639.06	491.83	408.81	0.32	572759.06	1276605.03	N 39 22 40.924	W 108 3 33.809
	4756.00	1.77	239.21	4676.09	634.78	489.98	404.20	0.39	572757.20	1276600.42	N 39 22 40.905	W 108 3 33.867
	4883.00	1.20	219.05	4803.05	631.63	487.94	401.68	0.60	572755.17	1276597.90	N 39 22 40.884	W 108 3 33.898
	5042.00	1.45	207.41	4962.01	627.98	484.86	399.70	0.23	572752.09	1276595.92	N 39 22 40.853	W 108 3 33.922
	5232.00	0.58	252.48	5151.98	624.83	482.44	397.68	0.59	572749.66	1276593.90	N 39 22 40.828	W 108 3 33.947
	5422.00	0.88	225.60	5341.96	622.60	481.13	395.72	0.24	572748.35	1276591.94	N 39 22 40.815	W 108 3 33.972
	5613.00	1.09	223.76	5532.94	619.34	478.79	393.41	0.11	572746.01	1276589.63	N 39 22 40.791	W 108 3 34.000
	5804.00	2.12	212.34	5723.86	614.01	474.49	390.27	0.56	572741.72	1276586.49	N 39 22 40.748	W 108 3 34.039
	5997.00	0.22	93.05	5916.82	610.67	471.46	388.73	1.16	572738.68	1276584.95	N 39 22 40.717	W 108 3 34.057
	6189.00	1.98	243.51	6108.78	607.90	469.96	386.13	1.13	572737.18	1276582.35	N 39 22 40.702	W 108 3 34.090
	6380.00	2.85	241.78	6299.61	600.60	466.24	378.99	0.46	572733.47	1276575.21	N 39 22 40.663	W 108 3 34.179
Last SLB MWD Survey	6480.00	2.70	240.20	6399.49	596.16	463.90	374.76	0.17	572731.12	1276570.98	N 39 22 40.639	W 108 3 34.232
Proj TD	6540.00	2.61	239.22	6459.43	593.59	462.49	372.36	0.17	572729.72	1276568.58	N 39 22 40.624	W 108 3 34.263

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)

EQU Freq

Survey Tool Type

Borehole -> Survey

0.00	14.00	Act-Stns	SLB_NSG+SSHOT-Depth Only	Original Hole -> Ramos 1-23B Surveys (Gyro + MWD_DMAG) 13-Nov-06
14.00	301.00	Act-Stns	SLB_NSG+SSHOT	Original Hole -> Ramos 1-23B Surveys (Gyro + MWD_DMAG) 13-Nov-06
301.00	6480.00	Act-Stns	SLB_MWD+DMAG	Original Hole -> Ramos 1-23B Surveys (Gyro + MWD_DMAG) 13-Nov-06
6480.00	6540.00	Act-Stns	SLB_BLIND+TREND	Original Hole -> Ramos 1-23B Surveys (Gyro + MWD_DMAG) 13-Nov-06