Schlumberger

Rasberry 2-32C Final Surveys Report

noble energy

Report Date:	October 28, 2008	Survey / DLS Computation Method:	Minimum Curvature / Lubinski
Client:	Noble Energy	Vertical Section Azimuth:	247.550°
Field:	CO, Garfield County (NAD 27 CZ) Noble Energy 2006	Vertical Section Origin:	N 0.000 ft, E 0.000 ft
Structure / Slot:	Noble 02-8S-96W (2H Nauroth Pad) / Rasberry 2-32C	TVD Reference Datum:	RKB
Well:	Rasberry 2-32C	TVD Reference Elevation:	5740.6 ft relative to MSL
Borehole:	Original Hole	Sea Bed / Ground Level Elevation:	5719.600 ft relative to MSL
UWI/API#:		Magnetic Declination:	10.742°
Survey Name / Date:	Rasberry 2-32C Final Surveys 0' to 6550' (DMAG) / June 27, 2008	Total Field Strength:	52490.512 nT
Tort / AHD / DDI / ERD ratio:	99.096° / 1566.68 ft / 5.217 / 0.254	Magnetic Dip:	65.745°
Grid Coordinate System:	NAD27 Colorado State Planes, Central Zone, US Feet	Declination Date:	June 27, 2008
Location Lat/Long:	N 39 22 56.107, W 108 4 12.457	Magnetic Declination Model:	BGGM 2008
Location Grid N/E Y/X:	N 574380.180 ftUS, E 1273614.938 ftUS	North Reference:	Grid North
Grid Convergence Angle:	-1.62095226°	Total Corr Mag North -> Grid North:	+12.363°
Grid Scale Factor:	0.99994793	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
Surface	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	574380.18	1273614.94	N 39 22 56.107	W 108 4 12.457
Begin SLB MWD Surveys	168.00	1.20	5.74	167.99	-0.83	1.75	0.18	0.71	574381.93	1273615.11	N 39 22 56.124	W 108 4 12.456
	198.00	1.21	8.64	197.98	-1.14	2.38	0.25	0.21	574382.56	1273615.19	N 39 22 56.131	W 108 4 12.455
	227.00	1.43	349.27	226.97	-1.37	3.03	0.23	1.70	574383.21	1273615.17	N 39 22 56.137	W 108 4 12.455
	319.00	1.60	317.52	318.94	-1.17	5.11	-0.85	0.92	574385.29	1273614.09	N 39 22 56.157	W 108 4 12.470
	410.00	2.04	296.41	409.90	0.33	6.77	-3.16	0.87	574386.95	1273611.78	N 39 22 56.173	W 108 4 12.500
	504.00	3.79	285.55	503.77	3.88	8.34	-7.65	1.94	574388.52	1273607.29	N 39 22 56.187	W 108 4 12.558
	597.00	6.20	272.90	596.42	10.84	9.42	-15.63	2.83	574389.60	1273599.31	N 39 22 56.196	W 108 4 12.660
	692.00	9.07	262.95	690.57	22.70	8.76	-28.18	3.32	574388.94	1273586.76	N 39 22 56.186	W 108 4 12.819
	787.00	11.45	259.85	784.04	39.14	6.18	-44.90	2.57	574386.36	1273570.04	N 39 22 56.156	W 108 4 13.031
	882.00	14.28	259.94	876.65	59.80	2.47	-65.72	2.98	574382.65	1273549.22	N 39 22 56.113	W 108 4 13.295
	977.00	17.50	256.51	968.01	85.36	-2.91	-91.15	3.53	574377.27	1273523.79	N 39 22 56.053	W 108 4 13.617
	1073.00	20.26	253.46	1058.84	116.15	-11.01	-121.13	3.05	574369.17	1273493.81	N 39 22 55.964	W 108 4 13.995
	1168.00	22.53	250.97	1147.29	150.69	-21.63	-154.11	2.57	574358.55	1273460.84	N 39 22 55.850	W 108 4 14.411
	1264.00	24.18	249.18	1235.42	188.70	-34.61	-189.88	1.87	574345.57	1273425.07	N 39 22 55.712	W 108 4 14.862
	1359.00	26.49	245.11	1321.28	229.33	-50.45	-227.29	3.04	574329.73	1273387.66	N 39 22 55.545	W 108 4 15.332
	1454.00	29.03	242.02	1405.35	273.45	-70.18	-266.87	3.07	574310.00	1273348.08	N 39 22 55.339	W 108 4 15.829
	1549.00	31.66	241.59	1487.32	321.20	-92.87	-309.16	2.78	574287.32	1273305.79	N 39 22 55.103	W 108 4 16.359
	1644.00	32.29	239.99	1567.91	371.15	-117.42	-353.07	1.11	574262.77	1273261.89	N 39 22 54.848	W 108 4 16.910
	1740.00	33.64	239.14	1648.45	422.88	-143.88	-398.10	1.49	574236.30	1273216.86	N 39 22 54.574	W 108 4 17.473
	1835.00	33.65	238.23	1727.54	474.88	-171.24	-443.07	0.53	574208.95	1273171.90	N 39 22 54.291	W 108 4 18.036
	1930.00	34.32	236.86	1806.31	527.17	-199.74	-487.87	1.07	574180.45	1273127.09	N 39 22 53.997	W 108 4 18.596
	2025.00	33.99	239.22	1884.93	579.76	-227.97	-533.11	1.44	574152.22	1273081.86	N 39 22 53.706	W 108 4 19.162
	2120.00	34.34	242.60	1963.54	632.74	-253.89	-579.72	2.03	574126.30	1273035.25	N 39 22 53.436	W 108 4 19.746
	2216.00	36.30	244.15	2041.87	688.09	-278.75	-629.34	2.24	574101.45	1272985.64	N 39 22 53.177	W 108 4 20.368
	2311.00	37.32	243.52	2117.93	744.89	-303.85	-680.42	1.14	574076.35	1272934.55	N 39 22 52.915	W 108 4 21.010
	2406.00	38.26	243.55	2193.01	802.96	-329.79	-732.53	0.99	574050.41	1272882.44	N 39 22 52.644	W 108 4 21.664
	2448.35	38.31	246.17	2226.25	829.16	-340.94	-756.28	3.83	574039.26	1272858.70	N 39 22 52.527	W 108 4 21.962
	2457.00	38.89	245.33	2233.01	834.56	-343.15	-761.20	9.04	574037.04	1272853.78	N 39 22 52.504	W 108 4 22.024
8 5/8" Casing Point	*2525.00*	*38.93*	*245.80*	*2285.92*	*877.24*	*-360.82*	*-800.09*	*0.43*	*574019.38*	*1272814.90*	*N 39 22 52.318*	*W 108 4 22.512*
	2530.00	38.93	245.83	2289.81	880.38	-362.11	-802.95	0.43	574018.09	1272812.03	N 39 22 52.305	W 108 4 22.548
	2720.00	38.04	245.66	2438.54	998.56	-410.68	-910.75	0.47	573969.52	1272704.23	N 39 22 51.795	W 108 4 23.903
	2815.00	34.83	246.25	2514.96	1054.95	-433.68	-962.27	3.40	573946.53	1272652.72	N 39 22 51.553	W 108 4 24.551
	2910.00	31.71	243.88	2594.38	1107.00	-455.60	-1009.53	3.56	573924.60	1272605.46	N 39 22 51.323	W 108 4 25.144
	3005.00	29.71	250.06	2676.08	1155.46	-474.63	-1054.09	3.93	573905.58	1272560.90	N 39 22 51.123	W 108 4 25.705
	3101.00	27.46	249.15	2760.37	1201.35	-490.62	-1097.15	2.39	573889.59	1272517.85	N 39 22 50.953	W 108 4 26.247
	3196.00	23.94	248.48	2845.96	1242.53	-505.49	-1135.56	3.72	573874.72	1272479.44	N 39 22 50.795	W 108 4 26.731
	3289.00	20.82	251.50	2931.95	1277.90	-517.66	-1168.79	3.57	573862.55	1272446.21	N 39 22 50.666	W 108 4 27.149
	3384.00	17.90	251.91	3021.56	1309.31	-527.55	-1198.69	3.08	573852.66	1272416.31	N 39 22 50.560	W 108 4 27.526
	3480.00	15.98	255.11	3113.40	1337.12	-535.53	-1225.49	2.22	573844.68	1272389.52	N 39 22 50.473	W 108 4 27.865
	3606.00	13.07	257.20	3235.36	1368.36	-543.15	-1256.15	2.35	573837.06	1272358.86	N 39 22 50.389	W 108 4 28.252
	3670.00	12.14	256.54	3297.81	1382.15	-546.32	-1269.75	1.47	573833.89	1272345.26	N 39 22 50.354	W 108 4 28.424
	3734.00	11.48	257.87	3360.46	1395.06	-549.22	-1282.52	1.12	573830.99	1272332.49	N 39 22 50.322	W 108 4 28.586
	3797.00	10.40	255.55	3422.31	1406.86	-551.96	-1294.16	1.85	573828.25	1272320.85	N 39 22 50.292	W 108 4 28.733
	3860.00	9.42	257.08	3484.37	1417.57	-554.53	-1304.69	1.61	573825.68	1272310.32	N 39 22 50.263	W 108 4 28.866
	3987.00	8.41	262.88	3609.84	1436.78	-558.00	-1324.04	1.06	573822.21	1272290.97	N 39 22 50.224	W 108 4 29.111
	4114.00	6.67	264.95	3735.74	1452.78	-559.80	-1340.60	1.39	573820.41	1272274.41	N 39 22 50.201	W 108 4 29.321
	4241.00	6.14	267.49	3861.94	1466.20	-560.75	-1354.73	0.47	573819.46	1272260.28	N 39 22 50.188	W 108 4 29.501
	4368.00	4.71	264.36	3988.37	1477.58	-561.56	-1366.71	1.15	573818.65	1272248.30	N 39 22 50.177	W 108 4 29.653
	4495.00	4.56	257.32	4114.96	1487.54	-563.18	-1376.82	0.46	573817.03	1272238.19	N 39 22 50.158	W 108 4 29.781
	4619.00	3.30	263.23	4238.66	1495.84	-564.68	-1385.18	1.07	573815.53	1272229.84	N 39 22 50.141	W 108 4 29.887
	4745.00	2.07	294.67	4364.53	1500.88	-564.16	-1390.84	1.49	573816.05	1272224.17	N 39 22 50.144	W 108 4 29.959
	4872.00	1.66	105.02	4491.51	1500.98	-563.68	-1391.15	2.93	573816.53	1272223.86	N 39 22 50.149	W 108 4 29.963
	5125.00	0.49	121.13	4744.46	1497.43	-565.19	-1386.69	0.47	573815.02	1272228.33	N 39 22 50.135	W 108 4 29.906
	5252.00	0.45	180.27	4871.45	1497.30	-565.97	-1386.22	0.37	573814.24	1272228.79	N 39 22 50.128	W 108 4 29.900
	5442.00	0.82	188.26	5061.44	1498.28	-568.06	-1386.42	0.20	573812.15	1272228.59	N 39 22 50.107	W 108 4 29.902
	5632.00	1.26	215.85	5251.41	1500.75	-571.10	-1387.84	0.34	573809.11	1272227.17	N 39 22 50.076	W 108 4 29.919
	5822.00	1.02	220.75	5441.37	1504.04	-574.07	-1390.17	0.14	573806.14	1272224.84	N 39 22 50.046	W 108 4 29.947

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
	6073.00	2.00	221.22	5692.28	1509.96	-579.06	-1394.51	0.39	573801.15	1272220.50	N 39 22 49.996	W 108 4 30.001
	6264.00	2.32	220.66	5883.15	1516.39	-584.50	-1399.23	0.17	573795.71	1272215.78	N 39 22 49.941	W 108 4 30.059
	6455.00	2.60	223.66	6073.97	1523.80	-590.57	-1404.74	0.16	573789.64	1272210.27	N 39 22 49.879	W 108 4 30.127
Last SLB MWD Survey	6480.00	2.73	225.78	6098.94	1524.87	-591.39	-1405.56	0.65	573788.82	1272209.46	N 39 22 49.871	W 108 4 30.137
Projection to TD	6550.00	2.73	225.79	6168.87	1527.97	-593.72	-1407.95	0.00	573786.49	1272207.07	N 39 22 49.847	W 108 4 30.166

Survey Type: Definitive 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	21.00	Act-Stns	SLB_MWD-INC_ONLY-Depth Only	Original Hole -> Rasberry 2-32C Final Surveys 0' to 6550' (DMAG)
21.00	198.00	Act-Stns	SLB_MWD-INC_ONLY	Original Hole -> Rasberry 2-32C Final Surveys 0' to 6550' (DMAG)
198.00	1644.00	Act-Stns	SLB_MWD+DMAG	Original Hole -> Rasberry 2-32C Final Surveys 0' to 6550' (DMAG)
1644.00	1835.00	Act-Stns	SLB_MWD-INC_ONLY	Original Hole -> Rasberry 2-32C Final Surveys 0' to 6550' (DMAG)
1835.00	2448.35	Act-Stns	SLB_MWD+DMAG	Original Hole -> Rasberry 2-32C Final Surveys 0' to 6550' (DMAG)
2448.35	2720.00	Act-Stns	SLB_MWD-INC_ONLY	Original Hole -> Rasberry 2-32C Final Surveys 0' to 6550' (DMAG)
2720.00	2815.00	Act-Stns	SLB_MWD+DMAG	Original Hole -> Rasberry 2-32C Final Surveys 0' to 6550' (DMAG)
2815.00	2910.00	Act-Stns	SLB_MWD-INC_ONLY	Original Hole -> Rasberry 2-32C Final Surveys 0' to 6550' (DMAG)
2910.00	6480.00	Act-Stns	SLB_MWD+DMAG	Original Hole -> Rasberry 2-32C Final Surveys 0' to 6550' (DMAG)
6480.00	6550.00	Act-Stns	SLB_BLIND+TREND	Original Hole -> Rasberry 2-32C Final Surveys 0' to 6550' (DMAG)

*Italicized stations are NOT used in position calculations.