

Navajo Lake 14-1 MBH MWD 0' to 4856' - TN Azimuth Survey Report

Report Date	July 11, 2007	Survey / DLS Computation Method	Minimum Curvature / Lubinski
Client	Energren Resources	Vertical Section Azimuth	146 640°
Field	NM, San Juan County (NAD 83 WZ) 2005-2007	Vertical Section Origin	N 0 000 ft, E 0 000 ft
Structure / Slot	Energren 10-32N-06W (Navajo Lake 14-1) / Navajo Lake 14-1	TVD Reference Datum	Rotary Table
Well	Navajo Lake 14-1	TVD Reference Elevation	6197 0 ft relative to MSL
Borehole	Mother Bore Hole	Sea Bed / Ground Level Elevation	6182 000 ft relative to MSL
UWI/API#		Magnetic Declination:	10.328°
Survey Name / Date	Navajo Lake 14-1 MBH MWD 0' to 4856' - TN Azimuth / June 3, 2007	Total Field Strength:	51334 309 nT
Tort / AHD / DDI / ERD ratio	152 523° / 3250 81 ft / 5 923 / 1.131	Magnetic Dip:	63 866°
Grid Coordinate System	NAD83 New Mexico State Planes, Western Zone, US Feet	Declination Date:	June 03, 2007
Location Lat/Long	N 36 59 30 624, W 107 26 15 216	Magnetic Declination Model	BGGM 2007
Location Grid N/E/Y/X	N 2180602 268 ftUS, E 2838673 300 ftUS	North Reference:	True North
Grid Convergence Angle	+0 23813977°	Total Corr Mag North -> True North	+10 328°
Grid Scale Factor	0.99993195	Local Coordinates Referenced To	Well Head

RCVD AUG 9 '07

OIL CONS. DIV.

DIST. 3

Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	Sub-Sea TVD (ft)	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	-6197 00	0 00	0 00	0 00	0 00	0 00	2180602 27	2838673 30	N 36 59 30 624	W 107 26 15 216
Begin MWD - True North	444 47	0 45	356 37	-5752 53	444.47	-1 52	1 74	-0.11	0 10	2180604 01	2838673 18	N 36 59 30.641	W 107 26 15 217
(Bad Svys)	505 13	0 31	51 01	-5691.88	505 12	-1 74	2 08	0 00	0 61	2180604 35	2838673 29	N 36 59 30.645	W 107 26 15 216
	566 00	1 28	112 74	-5631 01	565.99	-1.19	1 92	0 76	1.91	2180604 19	2838674 05	N 36 59 30.643	W 107 26 15 207
	624 00	2 56	125.65	-5573 05	623 95	0 56	0 92	2.41	2.32	2180603.20	2838675 70	N 36 59 30 633	W 107 26 15 186
	687 00	4 29	128 87	-5510.16	686.84	4.11	-1 38	5.39	2 76	2180600.91	2838678 69	N 36 59 30.610	W 107 26 15 150
	747 00	5 97	133 68	-5450 40	746.60	9 29	-4.94	9 39	2 89	2180597 36	2838682.71	N 36 59 30 575	W 107 26 15 100
	807 00	7 31	137.65	-5390.81	806 19	16 10	-9.92	14 22	2 36	2180592 41	2838687.56	N 36 59 30.526	W 107 26 15 041
	869 00	8 67	139 17	-5329 41	867 59	24 63	-16 37	19 93	2 22	2180585.98	2838693 30	N 36 59 30 462	W 107 26 14 970
	926 00	10 06	142 31	-5273 17	923 83	33.86	-23 56	25.78	2 60	2180578 81	2838699 18	N 36 59 30 391	W 107 26 14 898
	993.00	11 06	144 08	-5207.31	989 69	46.11	-33 40	33 13	1 57	2180569.01	2838706.57	N 36 59 30 294	W 107 26 14 808
	1052 00	12 38	146.33	-5149 54	1047 46	58 09	-43 24	39 96	2 37	2180559.19	2838713 43	N 36 59 30 196	W 107 26 14 723
	1112 00	13 45	146 21	-5091 05	1105 95	71.50	-54 40	47 40	1 78	2180548 07	2838720 93	N 36 59 30 086	W 107 26 14 632
	1173 00	14.12	148 37	-5031.81	1165 19	86.03	-66 63	55.25	1.38	2180535 87	2838728 83	N 36 59 29 965	W 107 26 14.535
	1235 00	14 91	149 52	-4971.79	1225.21	101.56	-79.94	63.26	1 36	2180522 60	2838736.89	N 36 59 29 834	W 107 26 14 436
Begin MWD (Good)	1290 00	17 17	151 45	-4918 94	1278 06	116.72	-93 17	70 73	4 22	2180509 40	2838744 42	N 36 59 29 703	W 107 26 14 344
	1351 00	22.53	159 25	-4861 57	1335 43	137 11	-112 03	79.19	9.78	2180490 58	2838752 95	N 36 59 29 516	W 107 26 14 240
	1412 00	28 90	164 41	-4806 63	1390 37	162 58	-137.18	87 30	11 06	2180465 46	2838761 16	N 36 59 29 268	W 107 26 14.140
	1473 00	36 38	169.25	-4755 29	1441 71	193.37	-169 20	94 64	12 98	2180433 47	2838768 64	N 36 59 28 951	W 107 26 14 049
	1536 00	44 26	172 68	-4707 29	1489 71	230 43	-209 43	100 94	12 99	2180393.27	2838775 10	N 36 59 28 553	W 107 26 13 972
	1596 00	50 93	176 59	-4666 84	1530 16	269 48	-253.51	105 00	12 11	2180349 21	2838779 35	N 36 59 28 117	W 107 26 13 922
	1659 00	54 09	181 77	-4628 49	1568 51	311 56	-303 46	105 67	8 23	2180299.27	2838780 22	N 36 59 27 624	W 107 26 13 914
	1721 00	56 62	181 88	-4593.25	1603 75	353 25	-354.43	104 04	4 08	2180248.29	2838778 81	N 36 59 27 120	W 107 26 13 934
	1782 00	59 49	182.57	-4560 97	1636 03	395.34	-406 15	102 03	4.80	2180196.57	2838777 01	N 36 59 26.608	W 107 26 13 958
	1843 00	62 18	182 61	-4531 25	1665 75	438 45	-459 36	99.62	4 41	2180143 36	2838774.82	N 36 59 26 082	W 107 26 13 988
	1905 00	65.16	182 51	-4503 75	1693 25	483.45	-514 86	97 14	4 81	2180087 85	2838772.57	N 36 59 25 533	W 107 26 14 019
	1970 00	67 87	181.07	-4477 85	1719 15	532 19	-574.44	95 29	4 64	2180028 27	2838770 97	N 36 59 24 944	W 107 26 14 042
	2030 00	67 31	181.14	-4454.98	1742 02	577 92	-629.90	94.22	0 94	2179972 81	2838770 13	N 36 59 24 396	W 107 26 14 055
	2095 00	67 83	181.20	-4430 18	1766.82	627.42	-689.97	92 99	0 80	2179912.74	2838769.15	N 36 59 23 802	W 107 26 14.070
	2156 00	69 28	180 33	-4407 87	1789 13	674 42	-746.74	92 23	2 72	2179855.97	2838768 63	N 36 59 23 241	W 107 26 14 079
	2218 00	68.80	179 92	-4385 70	1811 30	722 71	-804.64	92 11	0.99	2179798 08	2838768 74	N 36 59 22 668	W 107 26 14 081
	2279 00	69 17	179 77	-4363.82	1833.18	770 35	-861.58	92.26	0.65	2179741 14	2838769 13	N 36 59 22 105	W 107 26 14 079
	2342 00	68 91	179 49	-4341 28	1855 72	819 70	-920 41	92 64	0.59	2179682 31	2838769 76	N 36 59 21 524	W 107 26 14.074
	2403 00	68 31	180 02	-4319 04	1877 96	867.27	-977 21	92 88	1 27	2179625 52	2838770 24	N 36 59 20 962	W 107 26 14 071
	2470 00	68 20	180 73	-4294 22	1902 78	919.03	-1039 44	92 48	1.00	2179563 30	2838770 09	N 36 59 20 347	W 107 26 14 076
	2531 00	67 93	180.15	-4271 43	1925 57	966 05	-1096 02	92 04	0 99	2179506 72	2838769 89	N 36 59 19 787	W 107 26 14 082
	2588 00	65 59	177 02	-4248 93	1948 07	1010 47	-1148 37	93 32	6 50	2179454.38	2838771 39	N 36 59 19 270	W 107 26 14 066
	2650 00	66 19	172 11	-4223 59	1973 41	1060 46	-1204 68	98 69	7 29	2179398 09	2838776 98	N 36 59 18 713	W 107 26 14 000
	2709 00	67 62	168.13	-4200.44	1996 56	1110 22	-1258 13	108 01	6.66	2179344 69	2838786 53	N 36 59 18 184	W 107 26 13 885
	2768 00	68 28	164.03	-4178.29	2018.71	1161 78	-1311 19	121 16	6 54	2179291 68	2838799 90	N 36 59 17 660	W 107 26 13 723
	2830 00	68 37	161 78	-4155 38	2041 62	1217 08	-1366 26	138.10	3 38	2179236 69	2838817 06	N 36 59 17 115	W 107 26 13 514
	2895 00	66 84	157 92	-4130.61	2066.39	1275 57	-1422 67	158 78	5 97	2179180 37	2838837 98	N 36 59 16 557	W 107 26 13 259
	2955 00	66 97	156 22	-4107 08	2089 92	1329 85	-1473 49	180 29	2 62	2179129.64	2838859.70	N 36 59 16 055	W 107 26 12 994
	3021 00	67 30	153 27	-4081.43	2115.57	1390 05	-1528 49	206.23	4 15	2179074.76	2838885 87	N 36 59 15.511	W 107 26 12.674
	3082 00	67 87	150 13	-4058 16	2138 84	1446 21	-1578 13	232 96	4 85	2179025 23	2838912.80	N 36 59 15 020	W 107 26 12 345
	3144 00	68 13	147 01	-4034 93	2162 07	1503 65	-1627 17	262 93	4 68	2178976 32	2838942 98	N 36 59 14 535	W 107 26 11 975
	3215 00	65 90	143 76	-4007 20	2189 80	1568 98	-1680 96	300.04	5.26	2178922.69	2838980 31	N 36 59 14 004	W 107 26 11 518
	3278 00	65 26	141 40	-3981 15	2215 85	1626 20	-1726 52	334 89	3 56	2178877 28	2839015 34	N 36 59 13 553	W 107 26 11 088
	3336 00	65 00	139 10	-3956 76	2240 24	1678 49	-1766 97	368 54	3 63	2178836 97	2839049 15	N 36 59 13 153	W 107 26 10 674
	3400 00	65 00	136 68	-3929.71	2267 29	1735 81	-1810 00	407 43	3 43	2178794 11	2839088 22	N 36 59 12 728	W 107 26 10 194

Surface 1535/S 415/E Sec 10 32N6W
 Pilot BH 861/N 1159/W Sec 14 32N6W

Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	Sub-Sea TVD (ft)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	DLS (deg/100 ft)	Northing (ftUS)	Easting (ftUS)	Latitude	Longitude
	3464 00	63 73	134.24	-3902 02	2294.98	1792 41	-1851.12	447.89	3.97	2178753 15	2839128 85	N 36 59 12 321	W 107 26 9 696
	3527 00	63 35	132 77	-3873.94	2323 06	1847 33	-1889 95	488 80	2.17	2178714 50	2839169 91	N 36 59 11 937	W 107 26 9 191
	3588 00	62 67	131.23	-3846 26	2350.74	1899 92	-1926 32	529.19	2 51	2178678 30	2839210 45	N 36 59 11.578	W 107 26 8 694
	3653 00	62 63	128 67	-3816 39	2380 61	1955.22	-1963 39	573.44	3 50	2178641 42	2839254 86	N 36 59 11 211	W 107 26 8 148
	3713 00	62 74	127 06	-3788 86	2408.14	2005.69	-1996 11	615 53	2 39	2178608 88	2839297 07	N 36 59 10 888	W 107 26 7 630
	3779 00	63.33	124 60	-3758.93	2438 07	2060 67	-2030 54	663 22	3 44	2178574.65	2839344 90	N 36 59 10 547	W 107 26 7.042
	3842.00	63 26	122 35	-3730.61	2466 39	2112 41	-2061 58	710 16	3.19	2178543.81	2839391.97	N 36 59 10 240	W 107 26 6 463
	3906 00	63 79	118 63	-3702.07	2494 93	2163 82	-2090 63	759.51	5.27	2178514 96	2839441 44	N 36 59 9 953	W 107 26 5 855
	3968 00	64 57	117.17	-3675 07	2521 93	2212 75	-2116.74	808.83	2 46	2178489 05	2839490 87	N 36 59 9 695	W 107 26 5 247
	4031 00	65.74	114 55	-3648 59	2548 41	2261.86	-2141 67	860 27	4 21	2178464.34	2839542 41	N 36 59 9 448	W 107 26 4.613
	4090 00	66 93	111 78	-3624 91	2572.09	2306 92	-2162 92	909 95	4 75	2178443 30	2839592 17	N 36 59 9 238	W 107 26 4 001
	4158 00	66 72	111.58	-3598 15	2598.85	2358 15	-2186 01	968.04	0 41	2178420.45	2839650 35	N 36 59 9 010	W 107 26 3 285
	4220 00	66.91	110 78	-3573 74	2623 26	2404.57	-2206 61	1021.18	1 23	2178400 08	2839703 57	N 36 59 8 806	W 107 26 2 630
	4283 00	66 82	110 24	-3548 98	2648 02	2451.37	-2226 90	1075 45	0 80	2178380 01	2839757 92	N 36 59 8 605	W 107 26 1.961
	4342 00	66 57	110.69	-3525.64	2671.36	2495 11	-2245 85	1126 21	0 82	2178361 28	2839808.76	N 36 59 8.418	W 107 26 1 335
	4404 00	66 76	109 37	-3501.08	2695 92	2540 80	-2265.35	1179.70	1 98	2178342 00	2839862 32	N 36 59 8 225	W 107 26 0 676
	4464.00	66 61	109 00	-3477.34	2719.66	2584 54	-2283 45	1231 74	0 62	2178324 11	2839914 43	N 36 59 8 046	W 107 26 0 035
	4524 00	66 44	109.11	-3453 44	2743 56	2628 15	-2301.42	1283 75	0 33	2178306.36	2839966 52	N 36 59 7 869	W 107 25 59 394
	4586 00	66 40	108 80	-3428 63	2768 37	2673.12	-2319 88	1337 50	0.46	2178288 13	2840020 33	N 36 59 7 686	W 107 25 58 731
	4653 00	66 41	107.84	-3401.81	2795.19	2721.29	-2339 18	1395 78	1.31	2178269.08	2840078.69	N 36 59 7.495	W 107 25 58 013
	4715 00	66 47	107 76	-3377 03	2819 97	2765.56	-2356 55	1449 89	0 15	2178251 93	2840132 87	N 36 59 7 323	W 107 25 57.346
	4778.00	67 03	107 74	-3352.16	2844 84	2810 61	-2374 20	1505.02	0 89	2178234.51	2840188 07	N 36 59 7.149	W 107 25 56 667
Final MBH Survey	4810 00	67 43	107 45	-3339 78	2857.22	2833 53	-2383.12	1533 15	1.50	2178225.71	2840216 23	N 36 59 7 061	W 107 25 56 320
Projection to TD	4856 00	67.43	107 45	-3322 12	2874 88	2866.45	-2395 85	1573.67	0 00	2178213 14	2840256 80	N 36 59 6 935	W 107 25 55 821

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
0 00	15.00	Act-Stns	SLB_BLIND-Depth Only
15 00	444 47	Act-Stns	SLB_BLIND
444 47	1290 00	Act-Stns	SLB_MWD-INC_ONLY
1290 00	4856 00	Act-Stns	SLB_MWD-STD

Borehole -> Survey

Mother Bore Hole -> Navajo Lake 14-1 MBH MWD 0' to 4856' - TN Azimuth
Mother Bore Hole -> Navajo Lake 14-1 MBH MWD 0' to 4856' - TN Azimuth
Mother Bore Hole -> Navajo Lake 14-1 MBH MWD 0' to 4856' - TN Azimuth
Mother Bore Hole -> Navajo Lake 14-1 MBH MWD 0' to 4856' - TN Azimuth