



Company/Rig: NOBLE ENERGY / CORETECH  
WELL/API#: WELLS RANCH USX AA 19-16/05-123-26435  
DECLINATION: 8.23 Degrees  
TD AS DRILLED: 6932 Feet  
COUNTY/STATE: WELD/COLORADO  
VS-Azi: 0.000 Degrees  
Latitude: 40.46645, Longitude: -104.47258  
Grid North = True North -0.66 degs (NAD 27)  
Grid Convergence Applied = -0.66 degs



DEPTH REFERENCE : RKB=SURFACE ELEVATION=4654

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro\_run01-01-de\_01.ut

Minimum Curvature Method

Report Date/Time: 10/15/2015 / 13:01

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: BRIAN BREWBAKER / Wells Ranch USX AA 19-16

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
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	****
100.000	0.568	315.878	99.998	0.356	-0.345	0.356	0.495	315.878	0.568
200.000	0.553	299.046	199.994	0.946	-1.112	0.946	1.460	310.381	0.165
300.000	0.503	295.628	299.989	1.370	-1.930	1.370	2.367	305.373	0.060
400.000	0.533	299.166	399.985	1.786	-2.731	1.786	3.264	303.186	0.044
500.000	0.539	296.788	499.981	2.225	-3.557	2.225	4.196	302.025	0.023
600.000	0.929	302.339	599.973	2.871	-4.662	2.871	5.475	301.622	0.396
700.000	0.870	302.695	699.960	3.714	-5.986	3.714	7.045	301.820	0.059
800.000	1.121	265.208	799.946	4.043	-7.600	4.043	8.608	298.012	0.683
900.000	1.282	256.844	899.924	3.707	-9.664	3.707	10.351	290.983	0.238
1000.000	1.450	245.550	999.896	2.928	-11.906	2.928	12.261	283.816	0.317
1100.000	1.472	242.822	1099.863	1.818	-14.201	1.818	14.316	277.294	0.073
1200.000	1.393	243.267	1199.832	0.684	-16.429	0.684	16.443	272.385	0.080
1300.000	1.249	246.254	1299.805	-0.301	-18.512	-0.301	18.514	269.067	0.159
1400.000	1.104	252.064	1399.784	-1.037	-20.426	-1.037	20.453	267.093	0.188
1500.000	1.083	266.733	1499.766	-1.388	-22.287	-1.388	22.330	266.437	0.280
1600.000	0.809	272.048	1599.753	-1.416	-23.936	-1.416	23.977	266.614	0.288
1700.000	0.680	285.740	1699.744	-1.230	-25.212	-1.230	25.242	267.207	0.219
1800.000	0.486	294.099	1799.739	-0.896	-26.171	-0.896	26.186	268.039	0.212

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
1900.000	1.065	232.967	1899.731	-1.282	-27.300	-1.282	27.330	267.310	0.933
2000.000	1.542	226.667	1999.705	-2.766	-29.020	-2.766	29.152	264.556	0.497
2100.000	1.510	216.941	2099.669	-4.742	-30.791	-4.742	31.154	261.245	0.261
2200.000	2.047	199.243	2199.622	-7.480	-32.171	-7.480	33.029	256.910	0.762
2300.000	1.873	191.980	2299.563	-10.765	-33.099	-10.765	34.805	251.984	0.303
2400.000	1.605	185.689	2399.517	-13.756	-33.577	-13.756	36.285	247.721	0.329
2500.000	1.592	186.353	2499.478	-16.530	-33.869	-16.530	37.688	243.985	0.023
2600.000	1.529	188.518	2599.441	-19.230	-34.220	-19.230	39.253	240.667	0.087
2700.000	1.430	187.943	2699.408	-21.784	-34.590	-21.784	40.878	237.798	0.100
2800.000	1.480	181.074	2799.376	-24.311	-34.787	-24.311	42.440	235.052	0.181
2900.000	1.504	176.017	2899.342	-26.912	-34.720	-26.912	43.928	232.221	0.134
3000.000	1.499	172.897	2999.308	-29.518	-34.467	-29.518	45.380	229.422	0.082
3100.000	1.256	153.958	3099.279	-31.801	-33.824	-31.801	46.426	226.766	0.513
3200.000	1.436	128.033	3199.252	-33.557	-32.356	-33.557	46.616	223.956	0.629
3300.000	1.868	125.099	3299.211	-35.266	-30.036	-35.266	46.324	220.421	0.440
3400.000	2.524	140.575	3399.138	-37.904	-27.305	-37.904	46.715	215.768	0.879
3500.000	2.998	144.501	3499.021	-41.734	-24.388	-41.734	48.337	210.300	0.510
3600.000	3.210	144.531	3598.875	-46.143	-21.245	-46.143	50.799	204.722	0.212
3700.000	3.198	147.857	3698.718	-50.785	-18.136	-50.785	53.926	199.653	0.186
3800.000	2.812	147.400	3798.581	-55.213	-15.331	-55.213	57.302	195.518	0.386
3900.000	2.891	148.899	3898.457	-59.439	-12.706	-59.439	60.782	192.067	0.108
4000.000	2.650	143.519	3998.340	-63.457	-10.029	-63.457	64.245	188.981	0.354
4100.000	2.255	135.546	4098.249	-66.721	-7.277	-66.721	67.116	186.224	0.521
4200.000	1.749	130.301	4198.187	-69.112	-4.735	-69.112	69.274	183.919	0.538
4300.000	1.251	128.046	4298.153	-70.773	-2.711	-70.773	70.824	182.193	0.501
4400.000	1.154	113.354	4398.131	-71.845	-0.926	-71.845	71.851	180.739	0.322
4500.000	1.848	88.485	4498.097	-72.201	1.609	-72.201	72.219	178.723	0.936
4600.000	2.220	65.418	4598.035	-71.353	4.982	-71.353	71.526	176.006	0.891
4700.000	2.427	55.193	4697.954	-69.338	8.483	-69.338	69.855	173.025	0.463
4800.000	2.661	51.411	4797.855	-66.681	12.036	-66.681	67.759	169.768	0.288
4900.000	2.099	52.589	4897.768	-64.121	15.305	-64.121	65.922	166.575	0.565
5000.000	1.653	55.531	4997.715	-62.192	17.948	-62.192	64.730	163.902	0.456
5100.000	1.148	70.263	5097.685	-61.038	20.080	-61.038	64.256	161.790	0.616
5200.000	1.077	78.660	5197.666	-60.515	21.944	-60.515	64.371	160.068	0.178
5300.000	1.742	81.122	5297.635	-60.096	24.367	-60.096	64.848	157.929	0.667
5400.000	1.667	86.177	5397.591	-59.764	27.320	-59.764	65.713	155.433	0.168
5500.000	1.626	79.936	5497.550	-59.419	30.168	-59.419	66.639	153.082	0.184
5600.000	1.500	91.774	5597.513	-59.212	32.873	-59.212	67.725	150.962	0.346
5700.000	1.524	91.597	5697.478	-59.289	35.510	-59.289	69.110	149.082	0.024
5800.000	1.519	90.202	5797.443	-59.331	38.164	-59.331	70.545	147.250	0.037

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
5900.000	1.487	80.578	5897.408	-59.123	40.769	-59.123	71.817	145.412	0.254
6000.000	1.697	89.657	5997.370	-58.902	43.529	-58.902	73.241	143.536	0.327
6100.000	1.804	86.012	6097.323	-58.784	46.579	-58.784	75.001	141.608	0.154
6200.000	2.037	77.026	6197.267	-58.275	49.880	-58.275	76.708	139.438	0.380
6300.000	2.488	75.192	6297.189	-57.322	53.710	-57.322	78.553	136.863	0.457
6400.000	2.798	72.763	6397.083	-56.044	58.139	-56.044	80.753	133.949	0.329
6500.000	3.172	68.588	6496.947	-54.311	63.045	-54.311	83.213	130.744	0.432
6600.000	3.466	60.293	6596.780	-51.803	68.247	-51.803	85.680	127.200	0.563
6650.000	3.474	58.398	6646.688	-50.260	70.850	-50.260	86.866	125.351	0.230