Company/Rig: Noble Energy Inc/Production
WELL/API#: Connell C 4-19/05-123-27356
DECLINATION: 8.13 Degrees
TD AS DRILLED: 7053'
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.34535, Longitude: -104.55995
Grid North = True North -0.61 degs (NAD 27)
Grid Correction Applied = -0.61 degs

DEPTH REFERENCE : RKB=GL/Elevation= 4697'

DRILLOG MS GYRO SURVEY CALCULATIONS
Filename: msgyro_run01-01-de_01.ut
Minimum Curvature Method
Report Date/Time: 3/10/2017 / 13:13

Lat/Long Obtained By Handheld GPS at Wellhead
North Reference: Grid
Denver, Colorado
303-853-4976
Surveyor: Jason Kinchelow / Connell C 4-19

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	0.511	261.854	99.999	-0.063	-0.442	-0.063	0.446	261.854	0.511
200.000	0.746	235.997	199.993	-0.490	-1.423	-0.490	1.505	250.983	0.362
300.000	0.565	252.618	299.986	-1.001	-2.432	-1.001	2.630	247.622	0.261
400.000	0.740	248.324	399.980	-1.387	-3.502	-1.387	3.767	248.395	0.181
500.000	0.748	282.390	499.972	-1.485	-4.740	-1.485	4.967	252.602	0.436
600.000	1.035	317.434	599.960	-0.680	-5.989	-0.680	6.027	263.525	0.603
700.000	1.012	308.613	699.944	0.537	-7.290	0.537	7.310	274.210	0.159
800.000	1.196	320.174	799.926	1.889	-8.649	1.889	8.853	282.324	0.288
900.000	1.201	312.995	899.904	3.406	-10.084	3.406	10.643	288.662	0.150
1000.000	1.250	310.870	999.881	4.834	-11.675	4.834	12.636	292.492	0.067
1100.000	1.377	310.034	1099.855	6.320	-13.419	6.320	14.833	295.220	0.128
1200.000	1.370	306.829	1199.826	7.810	-15.296	7.810	17.175	297.048	0.077
1300.000	1.504	303.227	1299.795	9.246	-17.351	9.246	19.661	298.051	0.161
1400.000	1.393	306.124	1399.763	10.682	-19.431	10.682	22.174	298.798	0.133
1500.000	1.359	300.402	1499.734	11.998	-21.436	11.998	24.565	299.237	0.141
1600.000	1.303	301.483	1599.707	13.192	-23.428	13.192	26.887	299.383	0.062

VES Survey Date: 2/27/2017

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
1700.000	1.349	302.643	1699.680	14.421	-25.389	14.421	29.199	299.597	0.053
1800.000	1.730	305.945	1799.644	15.942	-27.602	15.942	31.875	300.009	0.391
1900.000	2.095	301.481	1899.588	17.782	-30.383	17.782	35.204	300.339	0.394
2000.000	2.494	292.037	1999.508	19.553	-33.958	19.553	39.185	299.933	0.549
2100.000	2.302	283.384	2099.421	20.834	-37.929	20.834	43.274	298.780	0.409
2200.000	2.010	266.906	2199.351	21.204	-41.634	21.204	46.723	296.990	0.682
2300.000	1.390	256.393	2299.307	20.824	-44.565	20.824	49.190	295.046	0.691
2400.000	1.158	251.583	2399.282	20.220	-46.702	20.220	50.891	293.410	0.256
2500.000	1.187	254.405	2499.261	19.622	-48.658	19.622	52.466	291.962	0.065
2600.000	1.030	261.430	2599.242	19.210	-50.545	19.210	54.072	290.809	0.208
2700.000	1.075	255.234	2699.225	18.837	-52.340	18.837	55.627	289.793	0.122
2800.000	1.110	258.276	2799.207	18.401	-54.196	18.401	57.234	288.754	0.068
2900.000	1.109	255.595	2899.189	17.963	-56.082	17.963	58.889	287.760	0.052
3000.000	0.953	262.856	2999.172	17.619	-57.845	17.619	60.469	286.940	0.204
3100.000	1.035	284.928	3099.158	17.748	-59.542	17.748	62.131	286.598	0.389
3200.000	1.098	295.269	3199.140	18.390	-61.281	18.390	63.981	286.704	0.202
3300.000	1.524	324.967	3299.115	19.888	-62.911	19.888	65.980	287.543	0.788
3400.000	2.066	343.854	3399.067	22.709	-64.176	22.709	68.075	289.486	0.795
3500.000	2.153	2.760	3499.000	26.317	-64.587	26.317	69.743	292.169	0.698
3600.000	2.512	20.164	3598.918	30.250	-63.741	30.250	70.555	295.388	0.790
3700.000	2.855	27.016	3698.809	34.525	-61.855	34.525	70.838	299.169	0.469
3800.000	3.081	23.474	3798.675	39.209	-59.653	39.209	71.385	303.316	0.291
3900.000	2.487	10.428	3898.557	43.807	-58.190	43.807	72.836	306.974	0.865
4000.000	1.749	358.028	3998.489	47.466	-57.850	47.466	74.830	309.369	0.864
4100.000	1.254	355.169	4098.454	50.081	-57.994	50.081	76.626	310.812	0.500
4200.000	0.978	340.319	4198.435	51.976	-58.374	51.976	78.160	311.681	0.397
4300.000	1.032	337.376	4298.420	53.611	-59.008	53.611	79.725	312.256	0.075
4400.000	1.477	352.972	4398.396	55.722	-59.512	55.722	81.527	313.116	0.557
4500.000	1.283	335.106	4498.367	58.016	-60.141	58.016	83.564	313.970	0.469
4600.000	0.599	311.833	4598.353	59.381	-61.002	59.381	85.131	314.228	0.770
4700.000	0.701	257.373	4698.348	59.596	-61.988	59.596	85.989	313.873	0.601
4800.000	0.796	243.002	4798.339	59.147	-63.204	59.147	86.562	313.101	0.210
4900.000	0.933	254.977	4898.328	58.620	-64.609	58.620	87.239	312.218	0.226
5000.000	0.998	230.433	4998.314	57.854	-66.066	57.854	87.817	311.209	0.415
5100.000	0.811	243.362	5098.302	56.982	-67.371	56.982	88.237	310.225	0.276
5200.000	0.861	228.567	5198.291	56.167	-68.567	56.167	88.635	309.323	0.221
5300.000	0.668	221.432	5298.282	55.233	-69.516	55.233	88.787	308.468	0.215
5400.000	0.941	161.669	5398.274	54.016	-69.644	54.016	88.136	307.797	0.836
5500.000	0.703	113.533	5498.265	52.991	-68.823	52.991	86.860	307.595	0.705

VES Survey Date: 2/27/2017

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
5600.000	0.719	114.632	5598.257	52.485	-67.691	52.485	85.654	307.789	0.021
5700.000	0.689	133.314	5698.250	51.811	-66.683	51.811	84.445	307.846	0.230
5800.000	0.449	92.448	5798.245	51.381	-65.854	51.381	83.527	307.963	0.457
5900.000	0.501	95.259	5898.242	51.325	-65.026	51.325	82.841	308.284	0.057
6000.000	0.448	176.015	5998.239	50.894	-64.563	50.894	82.211	308.248	0.616
6100.000	0.386	189.572	6098.237	50.172	-64.592	50.172	81.789	307.839	0.116
6200.000	0.366	185.781	6198.234	49.523	-64.680	49.523	81.462	307.440	0.032
6300.000	0.492	184.541	6298.232	48.777	-64.746	48.777	81.064	306.993	0.126
6400.000	0.570	179.001	6398.227	47.853	-64.772	47.853	80.531	306.457	0.093
6500.000	0.852	155.737	6498.220	46.678	-64.458	46.678	79.584	305.911	0.398
6600.000	1.057	148.753	6598.206	45.212	-63.674	45.212	78.093	305.377	0.236
6700.000	1.034	158.261	6698.189	43.585	-62.861	43.585	76.493	304.736	0.175

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