



Gyroscopic Survey Report
for
K.P. KAFFMAN
1675 BROADWAY SUITE 2800
DENVER, CO 80202

Well Location	WELD COUNTY, CO
Well Name	CARL A MILLER B-2
Rig Number	NABORS 3312
Survey Date	5/30/2014
Latitude	40.0747000°N
Longitude	104.9216000°W
North Reference	True North
Grid Correction	None
Depth Reference	GROUND LEVEL (5066.00 ft)
Calculation Method	Minimum Curvature
Section (VS) Ref	0.00N (ft), 0.00E (ft), 225.75Azim (deg)
Definitive Survey	CARL A MILLER #B-2
Operator(s)	C JAQUES

Well Notes



Scientific Drilling Survey Report

Well Name: CARLA MILLER B-2
Survey: CARLA MILLER #B-2
Survey Date: 5/30/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Closure Distance ft	Closure Direction deg
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid	0.00	0.00
100.00	0.16	3.68	100.00	-0.10	0.14	0.01	0.16	0.14	3.68
126.05	0.17	29.67	126.05	-0.17	0.21	0.03	0.29	0.21	8.30
150.84	0.21	5.12	150.84	-0.24	0.28	0.05	0.36	0.29	10.46
175.19	0.23	10.48	175.19	-0.31	0.38	0.07	0.13	0.38	9.84
200.09	0.16	97.32	200.09	-0.37	0.42	0.11	1.10	0.43	14.47
225.89	0.23	80.72	225.89	-0.44	0.43	0.20	0.36	0.47	24.79
250.46	0.23	52.62	250.46	-0.53	0.46	0.28	0.46	0.54	31.60
275.75	0.25	92.64	275.75	-0.61	0.49	0.38	0.65	0.62	37.68
300.61	0.22	74.03	300.61	-0.69	0.50	0.48	0.32	0.69	43.67
325.50	0.19	67.57	325.50	-0.78	0.53	0.56	0.15	0.78	46.74
350.76	0.05	76.43	350.76	-0.83	0.55	0.62	0.56	0.83	48.22
375.94	0.06	58.32	375.94	-0.85	0.56	0.64	0.08	0.85	48.77
400.35	0.04	196.43	400.35	-0.86	0.56	0.65	0.41	0.86	49.24
425.75	0.07	247.08	425.75	-0.83	0.54	0.63	0.21	0.83	49.26
450.59	0.09	306.17	450.58	-0.82	0.55	0.60	0.31	0.82	47.68
475.79	0.12	294.07	475.79	-0.80	0.57	0.57	0.15	0.80	44.71
501.07	0.13	257.77	501.07	-0.77	0.58	0.51	0.32	0.77	41.74
525.22	0.28	216.54	525.22	-0.69	0.52	0.45	0.83	0.69	40.80
550.54	0.18	252.86	550.54	-0.59	0.46	0.38	0.68	0.59	39.18
575.86	0.29	211.52	575.86	-0.49	0.39	0.30	0.78	0.50	37.61
600.70	0.33	232.04	600.70	-0.36	0.29	0.21	0.47	0.36	35.89
626.03	0.49	215.75	626.02	-0.18	0.16	0.09	0.79	0.19	29.76
650.17	0.44	208.22	650.17	0.01	0.00	-0.01	0.34	0.01	252.55
675.59	0.43	226.68	675.58	0.20	-0.15	-0.13	0.55	0.20	219.35
700.92	0.44	223.34	700.92	0.39	-0.29	-0.26	0.12	0.39	222.11
726.36	0.43	205.76	726.35	0.58	-0.45	-0.37	0.53	0.58	219.67
750.13	0.40	211.78	750.12	0.74	-0.60	-0.45	0.23	0.75	217.16
775.53	0.45	200.88	775.52	0.92	-0.77	-0.53	0.37	0.93	214.96
800.95	0.34	204.84	800.94	1.08	-0.93	-0.60	0.43	1.10	213.02
826.08	0.41	207.49	826.07	1.23	-1.07	-0.67	0.28	1.27	212.15
851.13	0.43	203.21	851.12	1.40	-1.24	-0.75	0.15	1.45	211.28
875.22	0.47	195.99	875.21	1.57	-1.42	-0.82	0.28	1.64	209.93
900.78	0.38	199.23	900.77	1.74	-1.60	-0.87	0.35	1.82	208.65
926.09	0.61	189.33	926.08	1.92	-1.81	-0.92	0.95	2.03	207.01
951.09	0.47	218.14	951.08	2.13	-2.02	-1.01	1.19	2.26	206.49



Scientific Drilling Survey Report

Well Name:		CARLA MILLER B-2							
Survey:		CARLA MILLER #B-2							
Survey Date:		5/30/2014							
MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Closure Distance ft	Closure Direction deg
975.24	0.48	211.41	975.23	2.33	-2.19	-1.12	0.24	2.46	207.17
1000.28	0.41	216.81	1000.26	2.52	-2.35	-1.23	0.33	2.65	207.66
1026.51	0.40	226.34	1026.50	2.70	-2.49	-1.35	0.27	2.83	208.55
1050.09	0.48	218.53	1050.07	2.88	-2.62	-1.47	0.45	3.01	209.36
1075.12	0.42	228.47	1075.10	3.08	-2.76	-1.61	0.39	3.20	210.20
1100.18	0.47	217.76	1100.16	3.28	-2.91	-1.74	0.39	3.39	210.92
1125.17	0.47	235.48	1125.15	3.48	-3.05	-1.89	0.58	3.58	211.79
1150.21	0.62	227.88	1150.19	3.71	-3.20	-2.07	0.68	3.81	212.97
1175.43	0.52	226.60	1175.41	3.97	-3.37	-2.26	0.38	4.05	213.85
1200.09	0.52	225.95	1200.07	4.19	-3.52	-2.42	0.02	4.27	214.50
1225.01	0.56	229.53	1224.99	4.43	-3.68	-2.60	0.21	4.50	215.19
1250.62	0.64	228.84	1250.60	4.70	-3.86	-2.80	0.30	4.77	215.97
1275.50	0.70	222.86	1275.48	4.99	-4.06	-3.01	0.36	5.05	216.53
1301.16	0.73	238.21	1301.13	5.30	-4.26	-3.25	0.76	5.36	217.36
1325.24	0.70	248.30	1325.21	5.59	-4.40	-3.52	0.54	5.63	218.69
1350.33	0.61	237.33	1350.30	5.86	-4.52	-3.78	0.61	5.89	219.85
1376.04	0.67	236.53	1376.00	6.15	-4.68	-4.02	0.23	6.17	220.64
1400.40	0.60	232.94	1400.36	6.41	-4.84	-4.24	0.33	6.43	221.23
1426.01	0.48	223.75	1425.98	6.65	-5.00	-4.42	0.59	6.67	221.50
1450.47	0.64	222.87	1450.43	6.89	-5.17	-4.59	0.65	6.91	221.56
1475.46	0.55	233.73	1475.42	7.15	-5.34	-4.78	0.57	7.17	221.79
1501.08	0.50	243.88	1501.04	7.38	-5.47	-4.98	0.41	7.39	222.32
1525.56	0.60	243.29	1525.52	7.61	-5.57	-5.19	0.41	7.61	222.96
1550.93	0.70	242.67	1550.89	7.88	-5.70	-5.45	0.36	7.89	223.68
1576.20	0.68	222.03	1576.16	8.18	-5.89	-5.68	0.98	8.18	224.00
1600.92	0.61	242.81	1600.87	8.45	-6.06	-5.90	0.98	8.45	224.25
1625.13	0.70	222.72	1625.08	8.72	-6.22	-6.11	1.00	8.72	224.50
1651.12	0.63	238.19	1651.08	9.02	-6.41	-6.34	0.73	9.02	224.68
1675.55	0.54	229.95	1675.50	9.27	-6.56	-6.55	0.52	9.27	224.94
1700.33	0.56	222.03	1700.28	9.50	-6.72	-6.72	0.32	9.50	224.97
1725.85	0.55	241.31	1725.80	9.74	-6.88	-6.91	0.73	9.75	225.13
1750.53	0.54	250.36	1750.48	9.96	-6.97	-7.12	0.35	9.96	225.60
1775.00	0.54	239.90	1774.95	10.18	-7.07	-7.33	0.40	10.18	226.04
1801.44	0.57	247.37	1801.38	10.42	-7.18	-7.56	0.31	10.43	226.47
1825.14	0.42	229.06	1825.08	10.62	-7.28	-7.73	0.92	10.62	226.72
1850.72	0.55	252.35	1850.67	10.83	-7.38	-7.92	0.90	10.83	227.01



Scientific Drilling Survey Report

Well Name:		CARLA MILLER B-2							
Survey:		CARLA MILLER #B-2							
Survey Date:		5/30/2014							
MD	Inc	Azim	TVD	VS	+N/-S	+E/-W	DLS	Closure Distance	Closure Direction
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg
1875.34	0.45	238.82	1875.28	11.02	-7.47	-8.12	0.61	11.03	227.38
1900.71	0.47	260.92	1900.65	11.21	-7.54	-8.30	0.70	11.21	227.77
1925.66	0.42	275.19	1925.60	11.35	-7.54	-8.50	0.49	11.36	228.40
1950.28	0.39	272.52	1950.22	11.47	-7.53	-8.67	0.15	11.48	229.01
1975.64	0.40	276.22	1975.58	11.58	-7.52	-8.84	0.12	11.61	229.63
2001.01	0.46	265.48	2000.94	11.72	-7.52	-9.03	0.40	11.75	230.24
2026.07	0.32	301.66	2026.01	11.81	-7.49	-9.20	1.11	11.86	230.84
2051.41	0.37	284.98	2051.35	11.87	-7.43	-9.33	0.44	11.93	231.48
2075.29	0.40	262.49	2075.23	11.98	-7.42	-9.49	0.65	12.05	231.98
2100.69	0.35	273.87	2100.63	12.10	-7.43	-9.66	0.37	12.18	232.44
2126.13	0.29	281.76	2126.07	12.19	-7.41	-9.80	0.27	12.28	232.90
2150.37	0.41	304.93	2150.31	12.24	-7.35	-9.93	0.74	12.35	233.50
2176.21	0.38	282.93	2176.15	12.30	-7.28	-10.09	0.59	12.44	234.20
2200.47	0.50	277.60	2200.40	12.41	-7.24	-10.27	0.53	12.57	234.82
2225.49	0.31	247.06	2225.42	12.54	-7.25	-10.45	1.14	12.72	235.22
2251.16	0.36	296.35	2251.10	12.64	-7.25	-10.58	1.10	12.82	235.60
2275.52	0.61	273.30	2275.46	12.75	-7.20	-10.78	1.28	12.96	236.24
2300.61	0.47	294.16	2300.54	12.88	-7.15	-11.00	0.95	13.13	236.97
2325.58	0.38	280.39	2325.51	12.96	-7.10	-11.18	0.54	13.24	237.59
2351.12	0.42	269.00	2351.05	13.08	-7.08	-11.36	0.35	13.39	238.05
2375.84	0.47	301.74	2375.77	13.17	-7.03	-11.54	1.04	13.51	238.63
2400.26	0.57	293.92	2400.19	13.24	-6.93	-11.73	0.50	13.63	239.43
2425.91	0.62	270.29	2425.84	13.39	-6.88	-11.99	0.98	13.82	240.16
2450.17	0.67	254.61	2450.09	13.60	-6.91	-12.26	0.75	14.07	240.58
2476.12	0.49	274.85	2476.04	13.81	-6.94	-12.51	1.03	14.31	240.97
2500.05	0.55	288.37	2499.97	13.93	-6.90	-12.72	0.57	14.47	241.53
2525.77	0.52	280.94	2525.69	14.05	-6.84	-12.96	0.29	14.65	242.17
2550.64	0.73	269.35	2550.56	14.23	-6.82	-13.23	0.96	14.88	242.73
2575.82	0.50	271.35	2575.74	14.42	-6.82	-13.49	0.93	15.12	243.20
2600.95	0.76	250.53	2600.87	14.65	-6.87	-13.76	1.36	15.38	243.47
2625.96	0.46	250.32	2625.88	14.89	-6.96	-14.01	1.18	15.64	243.59
2650.67	0.53	278.90	2650.59	15.05	-6.98	-14.22	1.02	15.84	243.87
2675.81	0.65	267.96	2675.72	15.23	-6.96	-14.48	0.66	16.06	244.31
2700.94	0.78	262.68	2700.85	15.47	-6.99	-14.79	0.57	16.36	244.70
2725.05	0.56	252.91	2724.96	15.71	-7.05	-15.06	1.01	16.63	244.93
2750.29	0.46	243.87	2750.20	15.91	-7.13	-15.27	0.51	16.85	244.99



Well Name: CARLA MILLER B-2
Survey: CARLA MILLER #B-2
Survey Date: 5/30/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Closure Distance ft	Closure Direction deg
2775.27	0.51	261.53	2775.18	16.10	-7.19	-15.47	0.63	17.06	245.09
2801.73	0.88	239.63	2801.64	16.39	-7.31	-15.77	1.70	17.38	245.13
2825.17	0.95	230.94	2825.08	16.76	-7.52	-16.07	0.65	17.75	244.92
2850.05	0.65	256.73	2849.95	17.09	-7.68	-16.37	1.84	18.08	244.86
2875.26	0.65	248.94	2875.16	17.34	-7.77	-16.64	0.35	18.36	244.98
2900.56	0.34	291.60	2900.46	17.50	-7.79	-16.85	1.81	18.56	245.18
2925.38	0.48	235.54	2925.28	17.63	-7.82	-17.00	1.62	18.71	245.30
2950.42	0.64	235.48	2950.32	17.88	-7.96	-17.20	0.66	18.95	245.17
2975.66	0.78	238.84	2975.55	18.18	-8.13	-17.46	0.57	19.26	245.04
3000.91	0.61	247.72	3000.80	18.47	-8.27	-17.74	0.80	19.57	245.01
3025.35	0.37	252.95	3025.24	18.66	-8.34	-17.93	1.00	19.78	245.06
3050.75	0.69	232.26	3050.64	18.89	-8.46	-18.13	1.45	20.00	244.99
3076.14	1.11	245.62	3076.02	19.27	-8.65	-18.47	1.85	20.40	244.90
3100.49	0.51	223.10	3100.37	19.60	-8.83	-18.76	2.74	20.74	244.80
3126.04	0.62	254.46	3125.92	19.84	-8.95	-18.98	1.27	20.98	244.75
3150.13	1.17	247.97	3150.01	20.18	-9.08	-19.33	2.28	21.35	244.85
3175.25	0.67	235.02	3175.13	20.56	-9.26	-19.69	2.13	21.75	244.82
3201.08	0.40	268.53	3200.95	20.78	-9.35	-19.90	1.56	21.98	244.84
3226.06	0.51	221.90	3225.94	20.95	-9.43	-20.06	1.49	22.17	244.82
3250.83	1.13	256.79	3250.71	21.27	-9.57	-20.37	3.12	22.51	244.84
3275.56	1.02	244.52	3275.43	21.69	-9.72	-20.81	1.04	22.97	244.97
3300.41	0.96	225.73	3300.27	22.11	-9.96	-21.16	1.32	23.38	244.79
3326.18	1.24	252.92	3326.04	22.57	-10.19	-21.58	2.27	23.87	244.72
3350.87	1.40	267.95	3350.72	23.03	-10.28	-22.14	1.53	24.41	245.09
3375.77	1.35	246.35	3375.62	23.53	-10.41	-22.71	2.08	24.98	245.37
3400.62	1.24	237.71	3400.46	24.07	-10.67	-23.21	0.90	25.54	245.30
3425.58	1.52	235.85	3425.41	24.66	-11.00	-23.71	1.12	26.14	245.11
3450.36	1.89	262.86	3450.19	25.31	-11.24	-24.39	3.53	26.85	245.26
3475.77	0.98	236.73	3475.59	25.86	-11.41	-24.99	4.32	27.47	245.46
3500.74	0.99	231.48	3500.55	26.29	-11.66	-25.34	0.36	27.89	245.28
3525.43	1.17	252.18	3525.23	26.73	-11.87	-25.74	1.73	28.35	245.24
3550.63	1.10	264.35	3550.44	27.15	-11.98	-26.23	1.00	28.83	245.46
3575.35	0.93	238.22	3575.14	27.53	-12.10	-26.64	1.97	29.26	245.56
3600.39	1.04	216.28	3600.18	27.95	-12.39	-26.94	1.55	29.66	245.30
3625.57	1.12	223.48	3625.36	28.42	-12.76	-27.25	0.62	30.08	244.91
3650.83	1.34	234.90	3650.61	28.96	-13.10	-27.66	1.30	30.60	244.65



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3675.90	0.57	262.08	3675.68	29.34	-13.29	-28.02	3.48	31.01	244.63
3701.18	0.39	197.24	3700.96	29.52	-13.39	-28.17	2.11	31.19	244.58
3726.37	0.70	234.42	3726.15	29.75	-13.56	-28.32	1.82	31.40	244.42
3751.18	0.70	187.88	3750.96	30.02	-13.80	-28.46	2.23	31.63	244.14
3775.27	0.52	152.03	3775.05	30.16	-14.04	-28.43	1.70	31.71	243.72
3800.53	0.54	231.42	3800.30	30.31	-14.21	-28.47	2.70	31.82	243.47
3825.83	0.20	89.25	3825.60	30.40	-14.29	-28.52	2.81	31.90	243.39
3850.98	0.72	129.62	3850.75	30.35	-14.39	-28.36	2.31	31.80	243.10
3875.92	0.75	149.63	3875.69	30.38	-14.63	-28.15	1.03	31.73	242.54
3900.29	0.70	178.86	3900.06	30.52	-14.92	-28.07	1.52	31.79	242.01
3925.04	0.17	58.20	3924.81	30.58	-15.05	-28.04	3.23	31.82	241.77
3950.01	0.78	100.38	3949.78	30.45	-15.06	-27.84	2.67	31.65	241.59
3975.01	0.46	123.53	3974.78	30.33	-15.15	-27.59	1.62	31.47	241.23
4000.88	0.53	116.74	4000.64	30.27	-15.26	-27.39	0.38	31.35	240.88
4025.64	0.50	111.45	4025.40	30.19	-15.35	-27.19	0.23	31.22	240.56
4050.48	0.36	111.85	4050.25	30.11	-15.42	-27.01	0.57	31.10	240.29
4075.33	0.35	104.71	4075.09	30.04	-15.47	-26.87	0.19	31.00	240.08
4101.24	0.28	100.21	4101.01	29.96	-15.50	-26.73	0.29	30.90	239.90
4126.13	0.38	88.68	4125.89	29.87	-15.50	-26.59	0.49	30.78	239.76
4150.96	0.32	81.47	4150.73	29.75	-15.49	-26.44	0.29	30.65	239.63
4175.36	0.46	85.44	4175.13	29.62	-15.47	-26.28	0.57	30.50	239.51
4200.08	0.58	117.35	4199.84	29.51	-15.52	-26.07	1.25	30.34	239.22
4226.12	0.70	127.53	4225.88	29.44	-15.68	-25.82	0.63	30.21	238.73
4250.94	0.69	129.53	4250.70	29.40	-15.87	-25.59	0.11	30.11	238.19
4275.85	0.62	127.15	4275.60	29.37	-16.05	-25.37	0.32	30.01	237.68
4300.83	0.68	137.08	4300.58	29.35	-16.24	-25.16	0.53	29.94	237.16
4325.57	0.62	133.58	4325.32	29.35	-16.44	-24.96	0.31	29.89	236.63
4350.51	0.79	139.24	4350.26	29.35	-16.66	-24.75	0.72	29.83	236.05
4376.55	0.62	137.69	4376.30	29.37	-16.90	-24.54	0.64	29.79	235.45
4400.86	0.64	143.28	4400.61	29.39	-17.11	-24.37	0.27	29.77	234.93
4425.42	0.45	146.72	4425.17	29.43	-17.30	-24.23	0.82	29.77	234.48
4450.31	0.49	144.97	4450.06	29.46	-17.46	-24.12	0.18	29.78	234.09
4475.46	0.42	141.96	4475.21	29.49	-17.62	-24.00	0.31	29.78	233.71
4500.99	1.14	159.65	4500.73	29.60	-17.94	-23.86	2.94	29.85	233.06
4526.21	1.01	154.56	4525.94	29.78	-18.37	-23.67	0.62	29.96	232.19
4551.15	0.93	150.16	4550.88	29.90	-18.75	-23.48	0.45	30.04	231.40



Scientific Drilling Survey Report

Well Name: CARLA MILLER B-2
Survey: CARLA MILLER #B-2
Survey Date: 5/30/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Closure Distance ft	Closure Direction deg
4576.32	0.81	150.97	4576.05	29.99	-19.08	-23.29	0.46	30.11	230.68
4600.54	0.80	156.96	4600.27	30.10	-19.38	-23.14	0.35	30.19	230.05
4625.67	0.87	162.49	4625.39	30.25	-19.73	-23.01	0.42	30.31	229.39
4651.02	1.10	170.80	4650.74	30.48	-20.15	-22.92	1.07	30.52	228.67
4675.73	1.16	184.49	4675.45	30.80	-20.64	-22.90	1.11	30.83	227.97
4701.10	1.07	189.23	4700.81	31.18	-21.12	-22.96	0.51	31.20	227.38
4725.52	0.63	196.20	4725.23	31.48	-21.48	-23.03	1.83	31.49	227.00
4750.93	0.85	194.54	4750.64	31.77	-21.79	-23.12	0.88	31.77	226.69
4776.21	0.91	177.52	4775.92	32.06	-22.18	-23.15	1.06	32.06	226.24
4801.14	1.15	196.66	4800.84	32.41	-22.61	-23.22	1.66	32.41	225.75