



Gyroscopic Survey Report
for
K.P. Kauffman

Well Location	Weld County, Colorado
Well Name	George H Gerhardt No. 4
Rig Number	KPK Well Service
Survey Date	8/15/2014
Latitude	40.1289210°N
Longitude	104.8454870°W
North Reference	True North
Grid Correction	None
Depth Reference	Ground Level (4885.00 ft)
Calculation Method	Minimum Curvature
Section (VS) Ref	0.00N (ft), 0.00E (ft), 54.05Azim (deg)
Definitive Survey	GEORGE H GERHARDT #4
Operator(s)	Jon Valenzuela

Well Notes

Well Name:		George H Gerhardt No. 4							
Survey:		GEORGE H GERHARDT #4							
Survey Date:		8/15/2014							
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
97.13	0.15	294.25	97.13	-0.06	0.05	-0.12	0.16	0.13	294.25
111.14	0.30	303.42	111.14	-0.09	0.08	-0.17	1.11	0.18	296.10
136.07	0.23	319.63	136.07	-0.11	0.16	-0.25	0.41	0.30	301.64
160.46	0.13	334.89	160.46	-0.11	0.22	-0.30	0.47	0.37	306.38
187.44	0.13	291.65	187.44	-0.12	0.26	-0.34	0.35	0.43	307.29
211.20	0.19	279.31	211.20	-0.17	0.27	-0.40	0.30	0.49	304.25
234.95	0.26	288.88	234.95	-0.22	0.30	-0.49	0.33	0.58	301.17
262.04	0.25	315.14	262.04	-0.27	0.36	-0.59	0.43	0.69	301.24
284.83	0.12	15.68	284.83	-0.26	0.42	-0.62	0.94	0.75	303.94
311.90	0.05	128.74	311.89	-0.23	0.44	-0.60	0.56	0.75	305.97
335.21	0.05	255.61	335.21	-0.24	0.43	-0.60	0.41	0.74	305.29
362.35	0.16	329.27	362.35	-0.25	0.46	-0.64	0.56	0.78	305.71
385.11	0.14	353.72	385.11	-0.23	0.51	-0.66	0.29	0.83	308.02
412.13	0.10	35.90	412.13	-0.19	0.56	-0.64	0.35	0.86	311.22
435.45	0.04	109.29	435.45	-0.17	0.58	-0.62	0.42	0.85	312.83
461.85	0.15	295.74	461.85	-0.18	0.59	-0.65	0.74	0.88	312.43
485.13	0.15	354.27	485.13	-0.18	0.63	-0.68	0.62	0.93	313.10
512.06	0.13	63.98	512.06	-0.13	0.68	-0.65	0.59	0.94	316.24
534.72	0.10	41.35	534.72	-0.08	0.71	-0.62	0.25	0.94	318.93
561.66	0.10	204.35	561.66	-0.08	0.70	-0.61	0.71	0.93	319.04
584.85	0.13	258.16	584.85	-0.12	0.68	-0.64	0.47	0.94	316.51
611.77	0.04	6.09	611.77	-0.15	0.68	-0.67	0.56	0.96	315.34
634.57	0.03	91.75	634.57	-0.14	0.69	-0.67	0.20	0.96	315.92
661.58	0.12	200.37	661.58	-0.15	0.66	-0.67	0.50	0.94	314.63
684.94	0.17	246.80	684.94	-0.21	0.63	-0.71	0.54	0.95	311.28
711.95	0.16	297.22	711.95	-0.27	0.63	-0.78	0.53	1.00	308.65
734.54	0.04	291.95	734.54	-0.29	0.64	-0.82	0.51	1.04	308.16
761.02	0.09	168.42	761.02	-0.30	0.63	-0.82	0.47	1.04	307.23
787.94	0.20	189.62	787.94	-0.34	0.56	-0.83	0.42	1.00	304.06
810.25	0.19	207.82	810.25	-0.40	0.49	-0.85	0.28	0.98	299.87
836.96	0.17	242.61	836.96	-0.48	0.43	-0.91	0.42	1.01	295.37
859.88	0.13	214.41	859.88	-0.54	0.39	-0.95	0.37	1.03	292.44
886.37	0.04	153.20	886.37	-0.57	0.36	-0.97	0.43	1.03	290.52
912.99	0.26	183.57	912.98	-0.61	0.29	-0.97	0.86	1.01	286.90
935.31	0.25	197.28	935.30	-0.68	0.20	-0.98	0.28	1.00	281.33

Survey Report

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Survey Date:		8/15/2014							
MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Closure Distance ft	Closure Direction deg
962.05	0.19	225.47	962.04	-0.77	0.11	-1.03	0.44	1.04	276.09
984.99	0.15	240.49	984.99	-0.84	0.07	-1.09	0.28	1.09	273.61
1011.00	0.06	190.74	1011.00	-0.88	0.04	-1.12	0.45	1.12	271.96
1037.13	0.09	167.78	1037.12	-0.90	0.00	-1.12	0.15	1.12	270.22
1060.19	0.08	198.53	1060.18	-0.92	-0.03	-1.12	0.20	1.12	268.54
1086.11	0.28	203.04	1086.11	-0.99	-0.10	-1.15	0.76	1.15	264.87
1112.59	0.13	239.96	1112.59	-1.07	-0.18	-1.20	0.71	1.21	261.60
1135.06	0.12	272.99	1135.06	-1.12	-0.19	-1.25	0.32	1.26	261.39
1161.32	0.05	274.40	1161.31	-1.15	-0.19	-1.29	0.26	1.30	261.76
1186.95	0.12	181.48	1186.95	-1.18	-0.21	-1.30	0.51	1.32	260.75
1212.88	0.16	201.66	1212.88	-1.22	-0.27	-1.31	0.23	1.34	258.35
1235.68	0.14	202.62	1235.67	-1.27	-0.32	-1.33	0.08	1.37	256.34
1261.87	0.24	212.82	1261.86	-1.35	-0.40	-1.38	0.40	1.43	253.83
1287.34	0.20	232.76	1287.33	-1.44	-0.47	-1.44	0.34	1.51	251.93
1312.93	0.26	213.99	1312.93	-1.54	-0.54	-1.51	0.37	1.60	250.15
1335.98	0.06	269.06	1335.97	-1.60	-0.59	-1.55	0.99	1.65	249.23
1361.81	0.07	212.25	1361.80	-1.62	-0.60	-1.57	0.23	1.68	249.08
1384.51	0.12	175.40	1384.50	-1.65	-0.63	-1.57	0.34	1.70	248.05
1411.24	0.25	215.63	1411.24	-1.71	-0.71	-1.60	0.65	1.75	246.18
1437.78	0.26	238.99	1437.77	-1.83	-0.79	-1.69	0.39	1.86	245.06
1460.02	0.20	253.05	1460.01	-1.92	-0.82	-1.77	0.37	1.95	245.06
1486.54	0.12	266.10	1486.54	-1.98	-0.84	-1.84	0.33	2.03	245.53
1512.94	0.18	291.23	1512.93	-2.03	-0.83	-1.91	0.32	2.08	246.60
1535.67	0.12	261.20	1535.66	-2.07	-0.82	-1.96	0.42	2.13	247.42
1561.56	0.08	219.17	1561.56	-2.11	-0.83	-2.00	0.30	2.17	247.37
1587.94	0.18	231.23	1587.93	-2.17	-0.87	-2.04	0.42	2.22	246.86
1610.76	0.27	240.17	1610.76	-2.26	-0.92	-2.12	0.40	2.31	246.46
1636.55	0.25	238.20	1636.54	-2.37	-0.98	-2.22	0.08	2.43	246.11
1659.17	0.20	244.66	1659.16	-2.46	-1.03	-2.30	0.23	2.52	245.93
1685.74	0.22	269.18	1685.74	-2.55	-1.05	-2.39	0.35	2.61	246.36
1712.19	0.19	268.61	1712.19	-2.63	-1.05	-2.49	0.14	2.70	247.13
1734.30	0.11	271.18	1734.29	-2.68	-1.05	-2.54	0.35	2.75	247.58
1760.76	0.22	252.35	1760.75	-2.74	-1.06	-2.62	0.46	2.83	247.87
1787.25	0.09	242.92	1787.25	-2.81	-1.09	-2.68	0.51	2.90	247.91
1809.94	0.22	216.43	1809.93	-2.87	-1.13	-2.72	0.64	2.95	247.45
1835.06	0.23	215.50	1835.06	-2.96	-1.21	-2.78	0.03	3.03	246.49

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Survey: GEORGE H GERHARDT #4
Survey Date: 8/15/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Closure Distance ft	Closure Direction deg
1861.50	0.29	240.26	1861.49	-3.08	-1.29	-2.87	0.48	3.14	245.87
1887.93	0.24	265.90	1887.92	-3.19	-1.32	-2.98	0.48	3.26	246.09
1911.20	0.30	282.02	1911.19	-3.28	-1.31	-3.09	0.41	3.36	246.99
1936.40	0.31	311.62	1936.39	-3.33	-1.26	-3.21	0.62	3.45	248.64
1962.71	0.33	338.28	1962.70	-3.33	-1.14	-3.29	0.56	3.48	250.91
1985.39	0.28	341.39	1985.38	-3.30	-1.03	-3.33	0.21	3.48	252.89
2010.83	0.32	339.31	2010.82	-3.26	-0.90	-3.38	0.14	3.49	255.06
2036.76	0.32	343.00	2036.76	-3.22	-0.76	-3.42	0.08	3.51	257.40
2062.71	0.21	326.71	2062.70	-3.19	-0.66	-3.47	0.49	3.53	259.30
2085.06	0.31	346.38	2085.05	-3.17	-0.56	-3.51	0.58	3.55	260.90
2110.29	0.39	357.39	2110.28	-3.10	-0.41	-3.53	0.40	3.55	263.36
2136.22	0.41	2.30	2136.21	-2.99	-0.23	-3.53	0.17	3.53	266.27
2162.13	0.45	5.63	2162.11	-2.86	-0.04	-3.51	0.17	3.51	269.43
2187.92	0.51	17.33	2187.91	-2.70	0.18	-3.47	0.46	3.47	272.91
2209.66	0.63	6.94	2209.64	-2.54	0.39	-3.42	0.72	3.45	276.47
2235.53	0.73	19.66	2235.52	-2.31	0.68	-3.35	0.68	3.42	281.53
2261.30	0.77	23.58	2261.29	-2.03	1.00	-3.23	0.25	3.38	287.14
2287.16	0.76	16.43	2287.14	-1.74	1.32	-3.11	0.37	3.38	292.98
2308.77	0.97	25.26	2308.75	-1.47	1.62	-2.99	1.13	3.40	298.46
2334.62	0.96	24.10	2334.59	-1.09	2.02	-2.81	0.09	3.46	305.64
2360.45	0.99	29.91	2360.42	-0.70	2.41	-2.61	0.41	3.55	312.66
2386.34	1.08	31.65	2386.31	-0.27	2.81	-2.37	0.36	3.68	319.83
2411.49	1.12	36.07	2411.45	0.18	3.21	-2.10	0.37	3.84	326.78
2437.19	1.09	50.99	2437.15	0.67	3.57	-1.76	1.12	3.98	333.68
2459.49	1.19	43.34	2459.45	1.11	3.87	-1.44	0.81	4.13	339.58
2485.26	1.09	47.92	2485.21	1.61	4.23	-1.08	0.53	4.36	345.73
2511.01	1.02	44.28	2510.96	2.08	4.56	-0.73	0.38	4.61	350.85
2537.55	1.03	46.16	2537.49	2.55	4.89	-0.40	0.14	4.91	355.35
2560.85	1.04	42.11	2560.78	2.96	5.19	-0.10	0.32	5.19	358.84
2587.97	1.10	45.39	2587.90	3.46	5.56	0.24	0.32	5.56	2.52
2610.65	1.10	44.74	2610.57	3.89	5.86	0.55	0.06	5.89	5.38
2637.77	1.00	47.00	2637.69	4.38	6.21	0.91	0.38	6.27	8.32
2661.04	1.05	45.23	2660.96	4.79	6.50	1.21	0.26	6.61	10.54
2683.77	0.94	42.94	2683.68	5.18	6.78	1.48	0.51	6.94	12.35
2710.88	0.95	49.93	2710.79	5.63	7.09	1.81	0.43	7.32	14.31
2737.88	1.01	49.67	2737.78	6.09	7.39	2.16	0.23	7.70	16.31

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MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Closure Distance ft	Closure Direction deg
2761.15	0.95	47.43	2761.06	6.48	7.65	2.46	0.33	8.04	17.82
2783.90	0.96	48.30	2783.80	6.86	7.91	2.74	0.09	8.37	19.12
2810.27	0.87	48.81	2810.17	7.28	8.18	3.06	0.35	8.74	20.48
2837.98	0.89	51.73	2837.87	7.70	8.46	3.38	0.19	9.11	21.81
2861.35	0.87	51.59	2861.24	8.06	8.68	3.67	0.08	9.42	22.90
2887.51	0.98	48.23	2887.40	8.49	8.95	3.99	0.46	9.80	24.02
2910.43	0.89	49.17	2910.32	8.86	9.20	4.27	0.40	10.14	24.90
2936.94	0.95	47.99	2936.82	9.28	9.48	4.59	0.23	10.54	25.83
2959.29	0.98	47.75	2959.16	9.66	9.74	4.87	0.14	10.89	26.58
2985.80	1.01	50.90	2985.67	10.12	10.04	5.22	0.22	11.31	27.48
3012.36	0.97	47.62	3012.23	10.57	10.33	5.57	0.26	11.74	28.31
3035.41	0.95	46.28	3035.28	10.96	10.60	5.85	0.12	12.10	28.90
3061.83	1.03	48.38	3061.70	11.41	10.91	6.19	0.34	12.54	29.56
3087.61	1.06	47.90	3087.47	11.88	11.22	6.54	0.12	12.99	30.22
3110.65	0.98	43.60	3110.51	12.29	11.51	6.83	0.49	13.38	30.69
3137.14	0.88	46.45	3136.99	12.71	11.81	7.14	0.42	13.80	31.13
3159.36	0.88	38.40	3159.21	13.05	12.06	7.37	0.56	14.13	31.40
3185.92	0.84	47.87	3185.76	13.43	12.35	7.64	0.56	14.52	31.72
3212.45	0.82	46.72	3212.29	13.82	12.61	7.92	0.08	14.89	32.12
3235.14	0.81	49.72	3234.98	14.14	12.83	8.16	0.20	15.20	32.45
3261.17	0.81	53.96	3261.00	14.50	13.06	8.45	0.23	15.55	32.90
3287.60	0.93	55.72	3287.43	14.91	13.29	8.78	0.48	15.92	33.44
3310.28	0.85	56.00	3310.11	15.26	13.49	9.07	0.36	16.25	33.92
3337.02	0.94	54.27	3336.85	15.68	13.73	9.41	0.36	16.64	34.44
3362.74	0.99	55.58	3362.56	16.11	13.98	9.77	0.21	17.05	34.95
3385.79	0.96	52.68	3385.61	16.51	14.21	10.09	0.25	17.42	35.38
3412.31	1.02	57.90	3412.13	16.96	14.47	10.46	0.39	17.85	35.88
3434.41	1.05	53.98	3434.22	17.36	14.69	10.79	0.36	18.23	36.31
3460.88	1.05	47.65	3460.69	17.85	15.00	11.17	0.44	18.70	36.68
3487.28	1.04	49.05	3487.09	18.33	15.32	11.53	0.10	19.17	36.97
3510.05	1.00	48.72	3509.86	18.73	15.58	11.84	0.20	19.57	37.22
3536.69	1.00	46.47	3536.49	19.19	15.90	12.18	0.15	20.03	37.46
3562.64	0.97	48.51	3562.43	19.64	16.20	12.51	0.17	20.47	37.68
3585.89	1.19	59.60	3585.68	20.07	16.45	12.87	1.30	20.89	38.03
3609.45	1.11	55.47	3609.24	20.55	16.71	13.27	0.49	21.33	38.45
3636.02	1.19	63.43	3635.80	21.08	16.98	13.72	0.66	21.83	38.95

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3659.38	1.31	65.71	3659.15	21.58	17.19	14.18	0.57	22.29	39.52
3686.59	1.36	59.39	3686.35	22.20	17.49	14.74	0.57	22.87	40.14
3709.36	1.34	56.66	3709.12	22.74	17.77	15.20	0.30	23.38	40.54
3736.54	1.36	57.82	3736.29	23.37	18.11	15.74	0.13	23.99	40.98
3759.58	1.40	63.84	3759.32	23.92	18.38	16.22	0.66	24.52	41.42
3786.30	1.23	61.26	3786.04	24.53	18.67	16.77	0.69	25.09	41.93
3812.83	1.26	63.44	3812.56	25.10	18.93	17.28	0.20	25.63	42.38
3835.37	1.37	58.76	3835.10	25.61	19.18	17.73	0.71	26.12	42.74
3862.08	1.37	65.92	3861.80	26.25	19.48	18.29	0.64	26.72	43.20
3885.02	1.49	72.40	3884.73	26.80	19.68	18.83	0.87	27.24	43.73
3911.12	1.62	69.67	3910.82	27.48	19.91	19.50	0.57	27.87	44.40
3937.80	1.58	68.85	3937.49	28.20	20.18	20.20	0.18	28.55	45.02
3960.77	1.65	66.96	3960.46	28.82	20.42	20.79	0.37	29.14	45.52
3987.58	1.59	65.09	3987.25	29.56	20.73	21.49	0.28	29.85	46.03
4009.88	1.57	67.71	4009.54	30.16	20.98	22.05	0.33	30.43	46.43
4036.60	1.59	65.31	4036.25	30.88	21.27	22.73	0.26	31.13	46.90
4059.48	1.44	63.94	4059.12	31.48	21.53	23.27	0.69	31.70	47.23
4085.98	1.43	72.62	4085.62	32.12	21.77	23.89	0.82	32.32	47.65
4111.90	1.50	70.10	4111.53	32.75	21.98	24.51	0.37	32.93	48.11
4134.76	1.62	69.52	4134.38	33.35	22.20	25.10	0.54	33.50	48.50
4160.89	1.67	68.28	4160.50	34.07	22.47	25.80	0.24	34.21	48.94
4186.52	1.68	71.06	4186.12	34.80	22.73	26.50	0.32	34.91	49.38
4212.85	1.71	63.58	4212.44	35.55	23.03	27.21	0.85	35.65	49.76
4235.62	1.65	67.81	4235.20	36.21	23.30	27.82	0.60	36.29	50.05
4262.19	1.52	66.55	4261.76	36.92	23.59	28.50	0.51	37.00	50.39
4283.79	1.49	68.14	4283.34	37.48	23.81	29.03	0.25	37.54	50.64
4310.95	1.43	69.90	4310.50	38.14	24.06	29.67	0.27	38.20	50.97
4337.57	1.52	68.09	4337.11	38.81	24.30	30.31	0.37	38.85	51.28
4360.35	1.68	71.59	4359.88	39.42	24.52	30.91	0.84	39.46	51.57
4386.23	1.61	77.76	4385.75	40.11	24.72	31.63	0.75	40.14	51.99
4412.77	1.50	76.73	4412.29	40.77	24.88	32.33	0.42	40.79	52.42
4435.49	1.58	69.20	4434.99	41.35	25.06	32.91	0.96	41.36	52.71
4460.81	1.39	77.45	4460.31	41.97	25.25	33.53	1.12	41.98	53.03
4487.27	1.48	73.21	4486.76	42.59	25.42	34.18	0.52	42.59	53.36
4509.96	1.37	66.83	4509.44	43.13	25.61	34.70	0.86	43.13	53.58
4535.36	1.49	74.80	4534.83	43.73	25.81	35.30	0.92	43.73	53.83



Well Name: George H Gerhardt No. 4
Survey: GEORGE H GERHARDT #4
Survey Date: 8/15/2014

MD	Inc	Azim	TVD	VS	+N/-S	+E/-W	DLS	Closure	Closure
ft	deg	deg	ft	ft	ft	ft	°/100ft	Distance	Direction
								ft	deg

4556.12	1.28	72.32	4555.59	44.20	25.95	35.78	1.03	44.20	54.05
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