



Gyroscopic Survey Report
for
KPK

Well Location	WELD
Well Name	GRAHAM UNIT #2
Rig Number	
Survey Date	11/4/2014
Latitude	40.0633980°N
Longitude	104.9577100°W
North Reference	True North
Grid Correction	None
Depth Reference	GL (5061.00 ft)
Calculation Method	Minimum Curvature
Section (VS) Ref	0.00N (ft), 0.00E (ft), 314.69Azim (deg)
Definitive Survey	GRAHAM UNIT #2 (05-123-09687)
Operator(s)	C KIRBY

Well Notes

API-05-123-09687

Survey Report

Well Name: GRAHAM UNIT #2
Survey: GRAHAM UNIT #2 (05-123-09687)
Survey Date: 11/4/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	Closure Distance ft	Closure Direction deg	DLS %/100ft
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid
86.82	0.21	35.38	86.82	0.03	0.13	0.09	0.16	35.38	0.24
120.49	0.30	40.96	120.49	0.04	0.24	0.18	0.31	36.98	0.28
147.62	0.32	14.64	147.62	0.08	0.37	0.25	0.45	33.91	0.53
174.46	0.26	19.24	174.46	0.15	0.50	0.29	0.58	29.91	0.23
195.73	0.24	25.47	195.73	0.18	0.59	0.32	0.67	28.84	0.15
222.69	0.33	52.49	222.69	0.19	0.69	0.41	0.80	30.82	0.58
248.64	0.27	15.12	248.64	0.21	0.79	0.48	0.93	31.51	0.77
271.70	0.23	0.41	271.70	0.27	0.89	0.50	1.02	29.31	0.31
299.78	0.32	56.70	299.78	0.29	0.99	0.56	1.14	29.73	0.96
322.47	0.34	44.37	322.47	0.28	1.07	0.66	1.26	31.81	0.33
346.06	0.29	30.94	346.06	0.30	1.17	0.74	1.39	32.40	0.37
373.28	0.33	44.42	373.28	0.31	1.29	0.83	1.54	32.93	0.29
396.86	0.29	37.05	396.86	0.32	1.38	0.92	1.66	33.54	0.22
424.83	0.34	20.15	424.83	0.36	1.52	0.99	1.81	33.08	0.36
447.64	0.27	40.70	447.63	0.40	1.62	1.05	1.93	32.85	0.56
471.07	0.36	31.49	471.06	0.42	1.73	1.12	2.06	33.01	0.46
497.64	0.29	35.42	497.63	0.45	1.85	1.20	2.21	33.02	0.29
521.55	0.23	44.52	521.54	0.46	1.93	1.27	2.32	33.32	0.30
549.58	0.40	41.97	549.57	0.46	2.05	1.38	2.47	33.91	0.61
572.33	0.30	30.91	572.32	0.48	2.16	1.46	2.60	34.09	0.53
595.86	0.24	50.29	595.86	0.49	2.24	1.53	2.71	34.31	0.45
623.15	0.39	27.44	623.14	0.51	2.36	1.62	2.86	34.41	0.69
646.56	0.27	31.40	646.55	0.55	2.48	1.68	2.99	34.17	0.53
674.58	0.24	37.75	674.58	0.57	2.58	1.75	3.12	34.18	0.13
697.24	0.31	35.60	697.23	0.58	2.67	1.82	3.23	34.26	0.28
720.76	0.20	28.77	720.75	0.61	2.75	1.87	3.33	34.22	0.47
747.90	0.27	34.30	747.89	0.63	2.85	1.93	3.44	34.15	0.27
771.42	0.25	344.71	771.42	0.68	2.94	1.95	3.53	33.51	0.93
799.31	0.23	14.12	799.30	0.77	3.06	1.95	3.62	32.48	0.45
822.08	0.31	355.19	822.07	0.84	3.16	1.95	3.72	31.68	0.52
849.98	0.23	325.88	849.97	0.95	3.29	1.91	3.80	30.22	0.57
872.75	0.15	322.21	872.74	1.02	3.35	1.87	3.84	29.19	0.35
896.11	0.33	309.71	896.10	1.12	3.42	1.80	3.86	27.79	0.79
924.11	0.21	313.71	924.10	1.25	3.50	1.70	3.89	25.91	0.44
946.74	0.23	322.39	946.73	1.34	3.57	1.64	3.93	24.75	0.18

Well Name: GRAHAM UNIT #2
Survey: GRAHAM UNIT #2 (05-123-09687)
Survey Date: 11/4/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	Closure Distance ft	Closure Direction deg	DLS %/100ft
974.72	0.34	296.64	974.70	1.47	3.65	1.53	3.96	22.81	0.60
997.36	0.25	295.90	997.35	1.59	3.70	1.43	3.97	21.12	0.40
1020.62	0.37	305.38	1020.60	1.71	3.77	1.32	3.99	19.35	0.53
1048.60	0.33	290.12	1048.58	1.87	3.85	1.17	4.02	16.97	0.35
1071.33	0.21	297.11	1071.31	1.97	3.89	1.08	4.03	15.46	0.58
1098.90	0.41	286.89	1098.89	2.10	3.94	0.94	4.05	13.39	0.75
1121.12	0.32	285.93	1121.11	2.23	3.98	0.80	4.06	11.41	0.40
1148.71	0.32	296.60	1148.69	2.37	4.03	0.66	4.09	9.29	0.22
1171.69	0.37	286.91	1171.68	2.49	4.08	0.53	4.12	7.42	0.34
1198.50	0.23	290.80	1198.48	2.62	4.13	0.40	4.15	5.53	0.55
1221.42	0.43	285.41	1221.41	2.74	4.17	0.27	4.18	3.76	0.91
1248.90	0.39	272.65	1248.88	2.89	4.20	0.08	4.20	1.11	0.37
1270.83	0.36	294.79	1270.82	3.02	4.23	-0.06	4.23	359.24	0.67
1298.30	0.44	274.24	1298.28	3.18	4.28	-0.24	4.28	356.77	0.60
1320.62	0.41	284.87	1320.60	3.31	4.30	-0.40	4.32	354.63	0.39
1348.07	0.57	282.99	1348.05	3.51	4.36	-0.63	4.40	351.74	0.60
1370.33	0.57	280.50	1370.31	3.70	4.40	-0.85	4.48	349.08	0.11
1397.77	0.58	289.83	1397.75	3.94	4.48	-1.11	4.61	346.02	0.34
1420.65	0.74	282.66	1420.63	4.17	4.55	-1.37	4.75	343.26	0.80
1447.33	0.72	280.59	1447.30	4.46	4.62	-1.70	4.92	339.77	0.13
1473.99	0.67	285.86	1473.96	4.73	4.69	-2.02	5.10	336.73	0.30
1496.12	0.76	282.55	1496.09	4.97	4.76	-2.28	5.28	334.35	0.42
1523.36	0.63	285.41	1523.33	5.25	4.84	-2.60	5.49	331.70	0.50
1546.32	0.84	290.46	1546.29	5.51	4.93	-2.88	5.71	329.68	0.97
1572.93	0.89	283.67	1572.89	5.87	5.04	-3.27	6.01	327.08	0.44
1595.73	0.86	289.01	1595.69	6.18	5.14	-3.60	6.28	324.99	0.38
1623.05	1.00	293.17	1623.01	6.58	5.30	-4.02	6.65	322.87	0.55
1649.49	0.98	289.56	1649.45	7.00	5.47	-4.44	7.05	320.93	0.24
1672.38	0.90	295.61	1672.33	7.35	5.61	-4.79	7.38	319.54	0.57
1698.78	1.00	292.44	1698.73	7.76	5.79	-5.18	7.77	318.16	0.43
1721.65	0.94	289.93	1721.59	8.11	5.93	-5.54	8.12	316.92	0.32
1748.64	1.03	296.45	1748.58	8.54	6.11	-5.97	8.54	315.68	0.55
1774.51	1.08	292.58	1774.44	8.99	6.31	-6.40	8.99	314.58	0.33
1795.80	1.03	295.69	1795.73	9.36	6.47	-6.76	9.36	313.74	0.36
1822.79	0.99	301.96	1822.72	9.82	6.70	-7.18	9.82	313.02	0.43
1845.64	1.06	307.61	1845.56	10.22	6.93	-7.52	10.23	312.70	0.54



Well Name: GRAHAM UNIT #2
 Survey: GRAHAM UNIT #2 (05-123-09687)
 Survey Date: 11/4/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	Closure Distance ft	Closure Direction deg	DLS %/100ft
1872.09	0.96	306.33	1872.01	10.68	7.22	-7.89	10.69	312.45	0.38
1898.52	0.99	314.28	1898.43	11.13	7.51	-8.23	11.14	312.36	0.52
1924.51	1.07	315.08	1924.42	11.60	7.84	-8.56	11.61	312.46	0.30
1947.05	1.07	310.98	1946.96	12.02	8.12	-8.87	12.03	312.48	0.34
1973.64	0.96	316.97	1973.54	12.49	8.45	-9.21	12.50	312.53	0.58
1999.65	1.05	317.33	1999.55	12.95	8.78	-9.52	12.95	312.69	0.34
2021.95	1.04	317.77	2021.85	13.35	9.08	-9.80	13.36	312.84	0.05
2047.92	0.95	316.61	2047.82	13.80	9.41	-10.10	13.81	312.98	0.37
2074.59	0.99	319.92	2074.48	14.25	9.75	-10.40	14.26	313.15	0.27
2096.79	0.98	320.11	2096.68	14.63	10.04	-10.65	14.64	313.33	0.07
2122.66	0.98	318.67	2122.54	15.07	10.38	-10.94	15.08	313.50	0.09
2148.44	0.99	321.47	2148.31	15.51	10.72	-11.22	15.52	313.69	0.20
2174.36	0.98	314.16	2174.24	15.96	11.05	-11.52	15.96	313.81	0.49
2195.89	1.03	310.32	2195.76	16.34	11.30	-11.80	16.34	313.77	0.38
2221.79	0.90	326.35	2221.66	16.77	11.62	-12.09	16.77	313.87	1.16
2248.39	0.94	333.99	2248.25	17.18	11.99	-12.30	17.18	314.27	0.49
2274.87	1.03	327.82	2274.73	17.61	12.39	-12.52	17.61	314.69	0.52
2296.46	0.93	327.83	2296.32	17.97	12.70	-12.72	17.97	314.96	0.44
2322.91	0.91	333.72	2322.77	18.38	13.07	-12.92	18.38	315.32	0.37
2349.47	0.88	333.54	2349.32	18.77	13.44	-13.11	18.77	315.72	0.09
2370.93	0.98	334.44	2370.77	19.10	13.75	-13.26	19.11	316.04	0.45
2397.81	0.98	331.74	2397.65	19.54	14.16	-13.47	19.55	316.44	0.17
2421.19	0.86	326.79	2421.03	19.90	14.49	-13.66	19.91	316.68	0.61
2449.24	0.91	344.87	2449.08	20.30	14.88	-13.83	20.32	317.08	1.01
2471.84	1.08	349.90	2471.68	20.63	15.26	-13.92	20.66	317.64	0.85
2499.02	1.02	342.47	2498.85	21.05	15.75	-14.04	21.09	318.29	0.55
2522.55	0.97	339.88	2522.38	21.42	16.13	-14.17	21.47	318.71	0.29
2545.32	0.94	1.02	2545.14	21.72	16.50	-14.23	21.79	319.22	1.54
2573.21	1.00	358.53	2573.03	22.05	16.97	-14.23	22.15	320.02	0.24
2596.57	0.88	353.24	2596.39	22.34	17.36	-14.26	22.46	320.59	0.61
2623.77	0.83	7.23	2623.59	22.63	17.76	-14.26	22.77	321.24	0.79
2647.09	0.83	5.08	2646.90	22.84	18.09	-14.22	23.01	321.83	0.14
2674.98	0.88	13.25	2674.79	23.08	18.50	-14.16	23.30	322.58	0.47
2697.46	0.86	8.41	2697.26	23.27	18.84	-14.09	23.53	323.20	0.33
2720.61	0.78	9.92	2720.42	23.46	19.17	-14.04	23.76	323.78	0.36
2747.36	0.58	14.37	2747.16	23.63	19.48	-13.97	23.97	324.35	0.80

Survey Report

Well Name: GRAHAM UNIT #2
Survey: GRAHAM UNIT #2 (05-123-09687)
Survey Date: 11/4/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	Closure Distance ft	Closure Direction deg	DLS %/100ft
2774.58	0.56	26.46	2774.38	23.74	19.73	-13.88	24.12	324.87	0.45
2797.23	0.60	31.61	2797.02	23.81	19.93	-13.77	24.22	325.36	0.29
2823.47	0.46	10.53	2823.26	23.90	20.15	-13.68	24.36	325.83	0.90
2849.58	0.51	13.26	2849.38	24.02	20.37	-13.63	24.51	326.21	0.19
2871.94	0.49	19.40	2871.74	24.11	20.55	-13.58	24.63	326.55	0.25
2898.62	0.65	19.08	2898.41	24.22	20.81	-13.49	24.80	327.04	0.58
2920.80	0.69	23.66	2920.59	24.32	21.05	-13.40	24.95	327.52	0.30
2946.47	0.41	6.48	2946.26	24.44	21.28	-13.32	25.11	327.95	1.25
2972.61	0.51	19.04	2972.40	24.54	21.48	-13.27	25.25	328.29	0.53
2998.86	0.47	23.30	2998.65	24.63	21.69	-13.19	25.39	328.69	0.19
3021.20	0.49	18.51	3020.99	24.71	21.87	-13.13	25.50	329.02	0.21
3048.70	0.54	17.67	3048.49	24.82	22.10	-13.05	25.67	329.44	0.16
3072.08	0.45	11.63	3071.87	24.92	22.29	-13.00	25.81	329.75	0.44
3098.95	0.28	51.43	3098.73	24.97	22.44	-12.93	25.90	330.05	1.09
3122.22	0.32	49.89	3122.01	24.96	22.51	-12.83	25.92	330.32	0.17
3149.21	0.32	48.44	3149.00	24.95	22.61	-12.72	25.94	330.64	0.03
3172.32	0.36	52.36	3172.10	24.93	22.70	-12.61	25.97	330.94	0.21
3199.86	0.32	44.10	3199.65	24.92	22.81	-12.49	26.01	331.29	0.23
3222.35	0.38	73.80	3222.14	24.89	22.88	-12.38	26.01	331.59	0.84
3249.10	0.23	27.55	3248.88	24.86	22.95	-12.27	26.02	331.87	1.04
3271.53	0.18	16.48	3271.31	24.89	23.02	-12.23	26.07	332.01	0.28
3299.06	0.28	79.92	3298.84	24.87	23.07	-12.16	26.08	332.22	0.94
3321.51	0.19	71.15	3321.30	24.82	23.10	-12.07	26.06	332.42	0.43
3349.03	0.24	8.11	3348.81	24.83	23.17	-12.01	26.10	332.59	0.83
3372.08	0.16	116.03	3371.86	24.83	23.20	-11.98	26.11	332.69	1.40
3398.94	0.18	108.57	3398.72	24.76	23.17	-11.91	26.05	332.80	0.12
3422.13	0.31	14.93	3421.91	24.76	23.22	-11.86	26.07	332.95	1.57
3449.61	0.41	16.35	3449.39	24.84	23.38	-11.81	26.20	333.20	0.37
3472.01	0.02	84.29	3471.80	24.88	23.46	-11.78	26.25	333.33	1.79
3499.40	0.12	105.82	3499.19	24.85	23.45	-11.75	26.23	333.39	0.38
3521.75	0.33	18.14	3521.53	24.86	23.51	-11.71	26.26	333.52	1.54
3549.05	0.20	309.00	3548.84	24.94	23.61	-11.72	26.36	333.60	1.16
3574.59	0.26	85.42	3574.37	24.94	23.64	-11.70	26.38	333.67	1.65
3597.14	0.07	61.56	3596.92	24.91	23.65	-11.64	26.36	333.80	0.88
3624.11	0.26	305.33	3623.89	24.96	23.70	-11.67	26.42	333.77	1.11
3645.94	0.18	226.18	3645.72	25.02	23.70	-11.74	26.45	333.65	1.32

Survey Report

Well Name: GRAHAM UNIT #2
Survey: GRAHAM UNIT #2 (05-123-09687)
Survey Date: 11/4/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	Closure Distance ft	Closure Direction deg	DLS °/100ft
3672.93	0.42	221.83	3672.71	25.01	23.60	-11.84	26.40	333.37	0.90
3698.46	0.43	225.12	3698.24	25.01	23.46	-11.97	26.34	332.98	0.10
3720.98	0.45	223.76	3720.76	25.01	23.34	-12.09	26.28	332.62	0.12
3747.21	0.35	228.98	3746.99	25.01	23.21	-12.22	26.23	332.24	0.41
3774.03	0.49	241.29	3773.81	25.05	23.10	-12.38	26.21	331.81	0.62
3796.62	0.50	243.38	3796.39	25.11	23.01	-12.56	26.21	331.38	0.08
3822.70	0.64	237.01	3822.47	25.18	22.88	-12.78	26.21	330.81	0.58
3849.36	0.63	234.59	3849.14	25.23	22.72	-13.02	26.18	330.17	0.11
3872.04	0.66	232.36	3871.82	25.27	22.56	-13.23	26.16	329.62	0.18
3898.07	0.75	236.04	3897.84	25.33	22.38	-13.49	26.13	328.92	0.39
3924.91	0.91	233.20	3924.67	25.39	22.15	-13.80	26.10	328.07	0.61
3947.43	1.02	239.80	3947.19	25.47	21.94	-14.12	26.09	327.24	0.69
3973.53	1.04	245.52	3973.29	25.62	21.73	-14.54	26.14	326.22	0.40
3995.89	1.13	243.25	3995.65	25.76	21.55	-14.92	26.21	325.30	0.46
4021.97	1.20	243.64	4021.72	25.93	21.31	-15.39	26.29	324.16	0.26
4048.73	1.41	248.28	4048.47	26.15	21.06	-15.95	26.42	322.87	0.88
4070.96	1.50	253.92	4070.70	26.40	20.88	-16.48	26.60	321.72	0.76
4097.13	1.62	261.15	4096.86	26.79	20.73	-17.18	26.92	320.36	0.89
4123.67	1.63	268.36	4123.39	27.27	20.66	-17.92	27.35	319.06	0.77
4145.53	1.85	278.84	4145.23	27.77	20.71	-18.58	27.82	318.10	1.77
4172.03	1.90	284.18	4171.72	28.50	20.88	-19.43	28.52	317.06	0.68
4198.76	1.92	282.74	4198.44	29.26	21.09	-20.29	29.27	316.10	0.20
4224.74	1.93	279.94	4224.40	29.99	21.26	-21.15	29.99	315.15	0.37
4247.67	1.88	281.57	4247.32	30.62	21.40	-21.90	30.62	314.34	0.33
4270.82	1.70	284.50	4270.46	31.23	21.56	-22.60	31.24	313.65	0.85
4297.53	1.50	289.17	4297.16	31.89	21.78	-23.32	31.91	313.04	0.90
4320.66	1.42	293.21	4320.28	32.43	21.99	-23.87	32.45	312.65	0.57
4347.97	1.30	301.46	4347.58	33.05	22.29	-24.45	33.08	312.35	0.84
4374.24	1.32	303.67	4373.85	33.64	22.61	-24.95	33.67	312.18	0.20
4396.83	1.25	312.67	4396.43	34.14	22.92	-25.35	34.17	312.12	0.94
4423.21	1.25	315.25	4422.80	34.71	23.32	-25.76	34.75	312.15	0.21
4445.81	1.13	316.69	4445.40	35.18	23.66	-26.09	35.22	312.20	0.52
4472.86	1.03	322.67	4472.45	35.69	24.04	-26.42	35.72	312.30	0.56
4499.17	0.97	325.96	4498.75	36.15	24.42	-26.69	36.17	312.46	0.32
4521.73	0.96	321.24	4521.31	36.52	24.73	-26.92	36.55	312.57	0.36
4547.02	0.95	324.61	4546.59	36.94	25.06	-27.17	36.96	312.69	0.23

Well Name: GRAHAM UNIT #2
Survey: GRAHAM UNIT #2 (05-123-09687)
Survey Date: 11/4/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	Closure Distance ft	Closure Direction deg	DLS °/100ft
4574.04	0.86	330.52	4573.61	37.36	25.42	-27.40	37.37	312.85	0.46
4596.10	0.89	327.06	4595.66	37.68	25.71	-27.57	37.70	312.99	0.26
4623.10	0.90	339.38	4622.67	38.08	26.08	-27.76	38.09	313.21	0.71
4649.95	0.98	333.16	4649.52	38.49	26.48	-27.94	38.50	313.47	0.47
4672.04	0.99	332.49	4671.60	38.85	26.82	-28.11	38.86	313.65	0.09
4699.07	1.04	329.45	4698.62	39.31	27.24	-28.35	39.31	313.86	0.27
4721.80	1.05	328.20	4721.35	39.71	27.60	-28.56	39.72	314.02	0.10
4748.12	0.99	321.97	4747.67	40.17	27.98	-28.83	40.17	314.15	0.47
4773.27	0.90	333.94	4772.81	40.58	28.33	-29.05	40.58	314.28	0.86
4798.36	0.91	322.82	4797.90	40.96	28.67	-29.26	40.96	314.42	0.70
4824.58	0.78	328.26	4824.12	41.34	28.98	-29.48	41.34	314.52	0.57
4847.74	0.77	326.73	4847.27	41.65	29.25	-29.65	41.65	314.61	0.10
4869.71	0.75	323.55	4869.24	41.93	29.49	-29.81	41.93	314.69	0.21