



Gyroscopic Survey Report
for
K.P. KAUFFMAN

Well Location	MARTIN T. HART D#2
Well Name	MARTIN T. HART D#2
Rig Number	FMC 324
Survey Date	6/10/2014
Latitude	40.1151530°N
Longitude	104.8652040°W
North Reference	True North
Grid Correction	None
Depth Reference	GROUNDLEVEL (4959.00 ft)
Calculation Method	Minimum Curvature
Section (VS) Ref	0.00N (ft), 0.00E (ft), 302.53Azim (deg)
Definitive Survey	MARTIN T. HART D#2
Operator(s)	C JAQUES

Well Notes

Survey Report

Well Name: MARTIN T. HART D#2
Survey: MARTIN T. HART D#2
Survey Date: 6/10/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft	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
101.03	0.87	305.82	101.03	0.77	0.45	-0.62	0.86	0.77	305.82
125.40	0.48	304.97	125.39	1.05	0.62	-0.86	1.59	1.06	305.73
150.01	0.41	301.14	150.00	1.25	0.72	-1.02	0.32	1.25	305.35
175.02	0.43	306.21	175.01	1.43	0.82	-1.17	0.17	1.43	305.14
200.41	0.35	315.93	200.40	1.60	0.94	-1.30	0.41	1.61	305.73
225.65	0.47	313.22	225.64	1.78	1.07	-1.43	0.49	1.79	306.61
251.02	0.39	306.57	251.01	1.97	1.19	-1.58	0.38	1.98	306.95
275.48	0.32	320.04	275.47	2.12	1.29	-1.69	0.45	2.13	307.36
300.72	0.35	336.89	300.71	2.25	1.42	-1.77	0.40	2.27	308.71
325.84	0.35	337.70	325.83	2.38	1.56	-1.83	0.04	2.40	310.46
350.95	0.37	329.15	350.94	2.51	1.70	-1.90	0.22	2.55	311.84
375.43	0.29	322.47	375.42	2.64	1.82	-1.98	0.37	2.68	312.58
400.30	0.26	334.45	400.29	2.75	1.92	-2.04	0.25	2.80	313.24
425.31	0.20	358.96	425.29	2.82	2.01	-2.06	0.47	2.88	314.27
450.72	0.17	17.69	450.71	2.86	2.09	-2.05	0.27	2.93	315.51
475.11	0.18	351.55	475.09	2.89	2.16	-2.05	0.33	2.98	316.55
500.96	0.08	322.07	500.94	2.93	2.22	-2.07	0.46	3.03	317.04
525.11	0.15	32.63	525.10	2.95	2.26	-2.06	0.60	3.06	317.63
550.42	0.14	358.37	550.41	2.97	2.32	-2.04	0.34	3.09	318.60
575.86	0.19	355.03	575.85	3.01	2.39	-2.05	0.21	3.15	319.43
600.25	0.20	14.78	600.23	3.05	2.47	-2.04	0.28	3.21	320.49
625.38	0.23	27.36	625.37	3.07	2.56	-2.01	0.22	3.25	321.95
650.82	0.22	52.36	650.81	3.06	2.64	-1.94	0.39	3.28	323.62
675.84	0.32	34.12	675.83	3.04	2.73	-1.87	0.52	3.30	325.60
700.66	0.30	10.17	700.64	3.06	2.85	-1.82	0.52	3.38	327.46
726.35	0.28	44.95	726.33	3.07	2.96	-1.76	0.67	3.44	329.22
750.73	0.25	28.27	750.72	3.06	3.04	-1.69	0.33	3.48	330.91
775.34	0.28	33.06	775.33	3.07	3.14	-1.64	0.14	3.54	332.49
800.83	0.23	34.63	800.81	3.07	3.23	-1.57	0.20	3.60	334.05
825.42	0.31	330.38	825.40	3.12	3.33	-1.58	1.19	3.69	334.64
850.11	0.25	327.19	850.10	3.23	3.43	-1.64	0.25	3.81	334.47
875.14	0.15	344.70	875.12	3.30	3.51	-1.68	0.45	3.89	334.45
900.93	0.27	12.81	900.91	3.35	3.60	-1.67	0.59	3.97	335.08
925.67	0.16	299.93	925.65	3.40	3.68	-1.69	1.09	4.05	335.29
950.05	0.32	290.05	950.04	3.51	3.72	-1.79	0.65	4.13	334.35

Well Name:		MARTIN T. HART D#2							
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Survey Date:		6/10/2014							
MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft	Closure Distance ft	Closure Direction deg
975.93	0.26	302.56	975.91	3.63	3.78	-1.90	0.32	4.23	333.25
1000.75	0.30	282.71	1000.73	3.75	3.82	-2.02	0.42	4.32	332.19
1025.27	0.35	272.80	1025.26	3.88	3.84	-2.15	0.31	4.40	330.70
1050.12	0.41	284.94	1050.11	4.03	3.87	-2.32	0.39	4.51	329.07
1075.14	0.49	285.56	1075.12	4.22	3.92	-2.50	0.32	4.65	327.41
1100.30	0.54	275.60	1100.28	4.43	3.96	-2.73	0.41	4.80	325.44
1125.36	0.52	274.02	1125.34	4.63	3.98	-2.96	0.09	4.96	323.37
1150.94	0.50	272.65	1150.92	4.83	3.99	-3.19	0.09	5.11	321.40
1175.71	0.60	284.99	1175.68	5.05	4.03	-3.42	0.61	5.28	319.68
1200.30	0.33	287.09	1200.27	5.24	4.08	-3.61	1.09	5.45	318.51
1225.31	0.62	287.22	1225.28	5.44	4.14	-3.81	1.16	5.63	317.41
1250.39	0.52	272.49	1250.37	5.67	4.19	-4.05	0.71	5.83	315.94
1275.38	0.46	265.67	1275.36	5.85	4.19	-4.27	0.34	5.98	314.46
1300.41	0.52	277.01	1300.38	6.03	4.19	-4.48	0.45	6.13	313.11
1325.10	0.54	279.13	1325.07	6.24	4.22	-4.70	0.11	6.32	311.93
1350.36	0.64	288.64	1350.33	6.48	4.29	-4.95	0.57	6.55	310.88
1375.68	0.65	278.27	1375.64	6.75	4.35	-5.23	0.46	6.81	309.77
1400.65	0.56	271.36	1400.62	6.99	4.38	-5.49	0.47	7.02	308.55
1425.03	0.56	271.32	1424.99	7.19	4.38	-5.73	0.02	7.22	307.41
1450.03	0.58	271.59	1449.99	7.40	4.39	-5.98	0.11	7.42	306.28
1475.68	0.57	274.06	1475.64	7.62	4.40	-6.24	0.11	7.63	305.22
1500.31	0.68	272.56	1500.27	7.86	4.42	-6.50	0.44	7.86	304.19
1525.49	0.59	258.52	1525.45	8.08	4.40	-6.78	0.70	8.08	302.98
1550.73	0.63	255.66	1550.69	8.27	4.34	-7.04	0.20	8.27	301.65
1575.38	0.60	256.03	1575.34	8.45	4.27	-7.29	0.12	8.45	300.37
1600.07	0.56	260.78	1600.03	8.63	4.22	-7.54	0.24	8.64	299.26
1626.19	0.72	265.34	1626.14	8.85	4.19	-7.83	0.64	8.88	298.15
1650.15	0.69	266.82	1650.10	9.09	4.17	-8.12	0.15	9.13	297.17
1675.93	0.69	258.76	1675.88	9.33	4.13	-8.43	0.37	9.39	296.10
1700.76	0.63	255.51	1700.71	9.53	4.07	-8.71	0.25	9.61	295.03
1725.40	0.65	261.21	1725.35	9.73	4.01	-8.98	0.26	9.83	294.07
1750.13	0.66	262.95	1750.08	9.94	3.97	-9.26	0.09	10.07	293.23
1775.95	0.79	273.94	1775.90	10.21	3.97	-9.58	0.74	10.37	292.49
1801.08	0.84	274.95	1801.02	10.53	3.99	-9.94	0.20	10.71	291.90
1825.82	0.78	270.88	1825.76	10.83	4.01	-10.29	0.33	11.04	291.31
1850.30	0.88	272.92	1850.24	11.13	4.02	-10.64	0.42	11.37	290.72

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MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft	Closure Distance ft	Closure Direction deg
1875.11	0.76	269.56	1875.04	11.44	4.03	-10.99	0.51	11.71	290.15
1901.10	0.78	275.81	1901.03	11.74	4.05	-11.34	0.34	12.04	289.65
1926.16	0.75	279.71	1926.09	12.04	4.09	-11.67	0.25	12.37	289.33
1951.35	0.78	283.83	1951.27	12.36	4.16	-12.00	0.25	12.70	289.14
1975.18	0.89	286.85	1975.11	12.69	4.26	-12.33	0.49	13.05	289.04
2000.02	0.82	288.75	1999.94	13.05	4.37	-12.69	0.27	13.42	289.00
2025.61	0.81	285.38	2025.53	13.40	4.48	-13.04	0.19	13.78	288.95
2050.50	0.84	282.31	2050.41	13.74	4.56	-13.39	0.21	14.14	288.82
2075.42	0.89	303.77	2075.34	14.10	4.71	-13.72	1.30	14.51	288.94
2100.72	0.97	306.79	2100.63	14.51	4.94	-14.06	0.37	14.90	289.38
2126.03	0.98	303.85	2125.93	14.94	5.19	-14.41	0.21	15.32	289.82
2149.20	1.04	302.68	2149.10	15.35	5.42	-14.75	0.25	15.71	290.17
2174.50	1.04	304.32	2174.40	15.81	5.67	-15.13	0.12	16.16	290.54
2199.73	1.11	309.43	2199.63	16.28	5.95	-15.51	0.46	16.61	291.00
2224.98	1.05	314.94	2224.87	16.75	6.27	-15.86	0.46	17.06	291.58
2248.55	1.14	317.10	2248.44	17.18	6.60	-16.17	0.40	17.47	292.19
2274.90	1.05	321.19	2274.78	17.67	6.98	-16.50	0.44	17.92	292.92
2298.89	1.07	328.53	2298.77	18.08	7.34	-16.76	0.57	18.29	293.65
2324.10	0.98	326.32	2323.98	18.48	7.72	-17.00	0.38	18.67	294.42
2349.99	1.14	331.08	2349.86	18.91	8.13	-17.25	0.70	19.07	295.23
2374.38	1.03	330.67	2374.25	19.32	8.53	-17.47	0.43	19.44	296.02
2399.57	1.01	328.52	2399.43	19.72	8.92	-17.70	0.18	19.82	296.74
2424.29	1.03	335.29	2424.14	20.10	9.30	-17.90	0.49	20.18	297.46
2449.37	0.97	341.57	2449.23	20.45	9.71	-18.07	0.48	20.51	298.26
2474.52	0.92	344.73	2474.37	20.77	10.11	-18.19	0.29	20.81	299.07
2499.57	0.93	347.72	2499.42	21.06	10.50	-18.28	0.19	21.08	299.87
2524.67	0.92	347.78	2524.51	21.35	10.90	-18.37	0.02	21.36	300.68
2549.71	0.88	6.83	2549.55	21.57	11.29	-18.39	1.21	21.58	301.54
2574.81	0.93	1.54	2574.65	21.76	11.68	-18.36	0.39	21.76	302.47
2599.35	0.98	1.70	2599.18	21.97	12.09	-18.35	0.21	21.98	303.39
2624.55	0.94	7.59	2624.38	22.17	12.52	-18.32	0.43	22.18	304.34
2649.53	0.95	7.02	2649.36	22.35	12.92	-18.26	0.04	22.37	305.29
2674.56	0.98	11.09	2674.38	22.51	13.34	-18.20	0.30	22.56	306.24
2699.55	0.99	8.59	2699.37	22.68	13.76	-18.12	0.18	22.76	307.21
2724.55	0.97	12.01	2724.37	22.84	14.19	-18.05	0.25	22.95	308.17
2749.49	1.02	11.48	2749.30	23.00	14.61	-17.96	0.20	23.15	309.13

Survey Report

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MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft	Closure Distance ft	Closure Direction deg
2773.94	1.02	12.22	2773.74	23.15	15.04	-17.87	0.06	23.35	310.08
2799.94	1.06	9.48	2799.74	23.32	15.50	-17.78	0.25	23.59	311.07
2823.99	1.01	8.00	2823.79	23.50	15.93	-17.71	0.21	23.82	311.96
2849.96	1.00	5.45	2849.76	23.70	16.38	-17.66	0.18	24.09	312.84
2874.78	0.92	6.51	2874.57	23.88	16.79	-17.62	0.30	24.34	313.62
2899.56	0.85	3.15	2899.35	24.06	17.17	-17.59	0.35	24.58	314.32
2924.23	0.87	357.21	2924.02	24.26	17.54	-17.58	0.37	24.84	314.93
2948.93	0.68	354.01	2948.71	24.46	17.88	-17.61	0.81	25.09	315.43
2974.37	0.68	350.34	2974.15	24.65	18.17	-17.65	0.17	25.33	315.84
2998.57	0.60	348.80	2998.36	24.84	18.44	-17.70	0.33	25.56	316.17
3024.35	0.47	333.54	3024.13	25.02	18.67	-17.77	0.73	25.77	316.40
3048.85	0.45	326.19	3048.63	25.20	18.84	-17.87	0.26	25.96	316.51
3074.59	0.41	324.36	3074.37	25.37	18.99	-17.98	0.15	26.16	316.57
3099.04	0.33	315.22	3098.82	25.52	19.12	-18.08	0.41	26.31	316.59
3124.64	0.41	318.65	3124.41	25.68	19.24	-18.19	0.31	26.48	316.60
3149.08	0.39	315.55	3148.86	25.85	19.36	-18.31	0.10	26.65	316.60
3174.58	0.40	307.07	3174.36	26.02	19.48	-18.44	0.23	26.82	316.57
3198.95	0.34	290.41	3198.72	26.18	19.55	-18.58	0.50	26.97	316.47
3224.40	0.36	302.20	3224.17	26.33	19.62	-18.71	0.30	27.12	316.36
3249.40	0.37	311.19	3249.17	26.49	19.72	-18.84	0.23	27.27	316.30
3274.17	0.35	304.10	3273.94	26.64	19.81	-18.96	0.21	27.43	316.25
3299.69	0.44	308.55	3299.46	26.82	19.92	-19.11	0.39	27.60	316.19
3324.49	0.42	300.19	3324.26	27.00	20.02	-19.26	0.27	27.78	316.11
3348.95	0.39	298.93	3348.73	27.18	20.11	-19.41	0.14	27.95	316.01
3374.61	0.41	291.87	3374.38	27.35	20.18	-19.57	0.22	28.11	315.88
3399.80	0.43	284.06	3399.57	27.53	20.24	-19.75	0.24	28.28	315.71
3424.06	0.49	286.81	3423.83	27.72	20.29	-19.93	0.27	28.45	315.51
3449.60	0.41	285.02	3449.37	27.91	20.35	-20.13	0.34	28.62	315.31
3473.83	0.49	296.04	3473.60	28.09	20.42	-20.30	0.49	28.79	315.16
3499.31	0.56	285.89	3499.08	28.32	20.50	-20.52	0.45	29.00	314.97
3523.84	0.56	275.58	3523.60	28.54	20.54	-20.75	0.41	29.20	314.71
3548.80	0.62	277.09	3548.57	28.77	20.57	-21.01	0.22	29.40	314.40
3574.17	0.66	267.56	3573.93	29.02	20.58	-21.29	0.45	29.61	314.03
3599.02	0.65	259.88	3598.79	29.24	20.55	-21.57	0.36	29.79	313.61
3624.32	0.68	259.93	3624.08	29.45	20.50	-21.86	0.09	29.97	313.16
3649.63	0.72	257.30	3649.39	29.68	20.44	-22.16	0.22	30.15	312.68

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3674.41	0.81	255.06	3674.16	29.90	20.36	-22.49	0.36	30.33	312.16
3699.56	0.77	261.13	3699.31	30.15	20.29	-22.82	0.37	30.54	311.63
3724.67	0.76	259.26	3724.42	30.40	20.23	-23.15	0.11	30.74	311.15
3749.87	0.74	261.48	3749.62	30.64	20.17	-23.48	0.14	30.95	310.67
3774.92	0.72	258.35	3774.66	30.88	20.12	-23.79	0.17	31.16	310.22
3799.57	0.78	259.51	3799.32	31.11	20.06	-24.11	0.23	31.36	309.76
3824.85	0.89	259.96	3824.59	31.38	19.99	-24.47	0.47	31.60	309.25
3849.48	0.85	263.87	3849.22	31.66	19.94	-24.84	0.30	31.85	308.75
3874.43	0.95	261.45	3874.16	31.96	19.89	-25.23	0.43	32.12	308.25
3899.32	0.93	263.64	3899.06	32.28	19.83	-25.63	0.17	32.41	307.73
3924.29	0.92	264.67	3924.02	32.59	19.79	-26.03	0.07	32.70	307.25
3949.17	1.04	270.41	3948.89	32.94	19.78	-26.46	0.62	33.03	306.78
3974.07	1.05	271.05	3973.79	33.33	19.78	-26.91	0.06	33.40	306.32
3998.97	0.98	274.11	3998.69	33.71	19.80	-27.35	0.36	33.77	305.91
4024.87	1.08	282.30	4024.59	34.13	19.87	-27.81	0.68	34.18	305.55
4049.64	1.19	279.77	4049.35	34.59	19.96	-28.29	0.51	34.62	305.21
4073.61	1.28	286.51	4073.31	35.07	20.08	-28.79	0.72	35.10	304.89
4099.08	1.32	285.40	4098.77	35.63	20.24	-29.35	0.18	35.65	304.59
4124.62	1.41	289.98	4124.31	36.22	20.43	-29.93	0.55	36.24	304.31
4149.95	1.38	290.57	4149.64	36.82	20.64	-30.51	0.13	36.83	304.08
4173.94	1.37	290.77	4173.62	37.39	20.84	-31.05	0.05	37.40	303.88
4198.99	1.53	290.17	4198.66	38.00	21.07	-31.64	0.62	38.01	303.65
4223.41	1.52	295.56	4223.07	38.64	21.32	-32.24	0.59	38.65	303.47
4249.80	1.64	295.95	4249.45	39.36	21.63	-32.89	0.44	39.37	303.33
4274.29	1.61	295.35	4273.93	40.05	21.93	-33.52	0.14	40.06	303.20
4299.46	1.72	293.96	4299.09	40.78	22.24	-34.18	0.47	40.78	303.05
4324.66	1.73	294.31	4324.28	41.53	22.55	-34.87	0.06	41.53	302.88
4349.53	1.77	298.09	4349.14	42.28	22.88	-35.55	0.49	42.28	302.77
4374.85	1.75	301.61	4374.44	43.06	23.27	-36.23	0.43	43.06	302.71
4398.45	1.83	301.87	4398.03	43.80	23.66	-36.86	0.35	43.80	302.70
4424.76	1.94	299.09	4424.33	44.66	24.10	-37.60	0.52	44.66	302.65
4449.89	1.74	298.77	4449.44	45.46	24.49	-38.31	0.77	45.46	302.59
4474.95	1.89	303.36	4474.49	46.26	24.90	-38.99	0.82	46.26	302.56
4499.99	1.73	303.78	4499.52	47.05	25.33	-39.64	0.63	47.05	302.58
4524.91	1.64	302.94	4524.43	47.78	25.74	-40.26	0.35	47.78	302.59
4548.93	1.73	300.88	4548.44	48.49	26.11	-40.86	0.42	48.49	302.58



Well Name: MARTIN T. HART D#2

Survey: MARTIN T. HART D#2

Survey Date: 6/10/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft	Closure Distance ft	Closure Direction deg
4573.70	1.54	299.93	4573.20	49.19	26.47	-41.47	0.77	49.19	302.55
4598.90	1.51	302.08	4598.39	49.86	26.81	-42.04	0.25	49.86	302.53
4624.00	1.39	304.07	4623.48	50.49	27.16	-42.57	0.50	50.49	302.54
4649.13	1.17	317.54	4648.61	51.05	27.52	-43.00	1.47	51.05	302.62
4674.66	1.44	289.32	4674.13	51.61	27.82	-43.48	2.70	51.61	302.61
4699.14	1.48	304.32	4698.60	52.23	28.10	-44.03	1.57	52.23	302.54
4724.30	1.32	316.48	4723.75	52.84	28.49	-44.50	1.35	52.84	302.63
4749.36	0.98	296.80	4748.81	53.33	28.80	-44.89	2.06	53.33	302.68
4773.90	1.15	294.80	4773.34	53.78	28.99	-45.30	0.72	53.78	302.62
4796.05	1.15	287.03	4795.49	54.22	29.15	-45.71	0.70	54.22	302.53