



**Scientific
Drilling**

Survey Certification

7327 West Barton Road
Casper, WY 82604
(307)-472-6621 Fax (307) 472-5439

Operator	K.P. Kauffman
Well Name & No.	Edkam #2-23
County & State	Weld County, CO
SDI Job No.	410913K54007
Rig	Halliburton Truck 118527
Survey Date	9-Sep-2013

I, Steven F. Gottschalk, having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 0 feet to a measured depth of 7110 feet is true and correct as determined from all available records.


Signature

24-Sep-2013
Date

Steven F. Gottschalk
Rockies Region Well Planner
Scientific Drilling - Rocky Mountain District

KP Kauffman Co, Inc.

Weld County, CO

Ed Kam

Edkam #2-23

OH

Design: OH

Standard Survey Report

23 September, 2013



Scientific Drilling

www.scientificdrilling.com



Scientific Drilling International

Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well Edkam #2-23
Project:	Weld County, CO	TVD Reference:	GL 4700' & KB 10' @ 4710.00ft (hALLIBURTON 118527)
Site:	Ed Kam	MD Reference:	GL 4700' & KB 10' @ 4710.00ft (hALLIBURTON 118527)
Well:	Edkam #2-23	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Casper District

Project	Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		Ed Kam			
Site Position:		Northing:	1,362,025.56 usft	Latitude:	40° 19' 30.360 N
From:	Lat/Long	Easting:	3,192,678.06 usft	Longitude:	104° 48' 32.184 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.45 °

Well	Edkam #2-23, 2241' FNL, 1909' FWL, SEC 8 T4N R66W					
Well Position	+N/-S	0.00 ft	Northing:	1,363,236.65 usft	Latitude:	40° 19' 42.240 N
	+E/-W	0.00 ft	Easting:	3,193,817.33 usft	Longitude:	104° 48' 17.352 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	4,700.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	9/9/2013	8.61	66.90	52,786

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	291.82	

Survey Program	Date	9/23/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
100.16	7,110.00	Survey #1 Surface Gyros (OH)	SDI Standard Keeper 103	SDI Standard Wireline Keeper ver 1.0.3	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.16	0.48	348.45	100.16	0.41	-0.08	0.23	0.48	0.48	0.00	
First SDI Gyro Survey										
125.06	0.51	338.91	125.06	0.62	-0.14	0.36	0.35	0.12	-38.31	
150.23	0.48	339.91	150.23	0.82	-0.22	0.51	0.12	-0.12	3.97	
175.72	0.48	337.44	175.72	1.02	-0.30	0.66	0.08	0.00	-9.69	
201.09	0.49	335.99	201.09	1.22	-0.38	0.81	0.06	0.04	-5.72	
225.63	0.46	337.64	225.62	1.40	-0.46	0.95	0.13	-0.12	6.72	
250.65	0.52	341.58	250.64	1.60	-0.54	1.10	0.27	0.24	15.75	

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Casper District

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
275.30	0.51	340.53	275.29	1.81	-0.61	1.24	0.06	-0.04	-4.26	
300.51	0.58	337.59	300.50	2.04	-0.70	1.40	0.30	0.28	-11.66	
325.16	0.56	346.95	325.15	2.27	-0.77	1.56	0.39	-0.08	37.97	
350.19	0.58	347.86	350.18	2.51	-0.83	1.70	0.09	0.08	3.64	
375.15	0.71	342.93	375.14	2.78	-0.90	1.87	0.57	0.52	-19.75	
400.04	0.64	356.42	400.03	3.07	-0.95	2.02	0.70	-0.28	54.20	
426.07	0.74	355.32	426.05	3.38	-0.97	2.16	0.39	0.38	-4.23	
450.70	0.76	355.63	450.68	3.70	-1.00	2.30	0.08	0.08	1.26	
475.13	0.71	2.07	475.11	4.02	-1.01	2.43	0.39	-0.20	26.36	
501.09	0.74	1.41	501.07	4.35	-1.00	2.54	0.12	0.12	-2.54	
525.24	0.75	0.84	525.22	4.66	-0.99	2.65	0.05	0.04	-2.36	
551.44	0.78	356.92	551.41	5.01	-1.00	2.79	0.23	0.11	-14.96	
576.10	0.80	2.57	576.07	5.35	-1.00	2.91	0.33	0.08	22.91	
600.84	0.73	9.06	600.81	5.68	-0.97	3.01	0.45	-0.28	26.23	
625.51	0.79	351.94	625.48	6.00	-0.96	3.13	0.95	0.24	-69.40	
650.19	0.65	351.44	650.15	6.31	-1.01	3.28	0.57	-0.57	-2.03	
675.31	0.60	353.11	675.27	6.58	-1.05	3.42	0.21	-0.20	6.65	
700.05	0.55	348.32	700.01	6.82	-1.09	3.54	0.28	-0.20	-19.36	
726.25	0.47	345.86	726.21	7.05	-1.14	3.68	0.32	-0.31	-9.39	
750.98	0.52	337.36	750.94	7.25	-1.21	3.82	0.36	0.20	-34.37	
775.79	0.36	341.99	775.75	7.43	-1.27	3.94	0.66	-0.64	18.66	
800.51	0.36	343.25	800.47	7.58	-1.32	4.04	0.03	0.00	5.10	
825.23	0.40	332.52	825.19	7.73	-1.38	4.16	0.33	0.16	-43.41	
851.10	0.38	335.53	851.06	7.89	-1.46	4.29	0.11	-0.08	11.64	
875.85	0.26	340.21	875.81	8.02	-1.51	4.38	0.50	-0.48	18.91	
901.04	0.28	342.34	901.00	8.13	-1.55	4.46	0.09	0.08	8.46	
925.80	0.44	341.23	925.76	8.28	-1.60	4.56	0.65	0.65	-4.48	
950.54	0.39	339.81	950.50	8.44	-1.66	4.68	0.21	-0.20	-5.74	
975.36	0.49	334.21	975.31	8.62	-1.73	4.81	0.44	0.40	-22.56	
1,000.09	0.43	333.51	1,000.04	8.80	-1.82	4.96	0.24	-0.24	-2.83	
1,026.01	0.37	332.96	1,025.96	8.96	-1.90	5.10	0.23	-0.23	-2.12	
1,050.80	0.40	320.43	1,050.75	9.10	-1.99	5.23	0.36	0.12	-50.54	
1,075.50	0.35	318.38	1,075.45	9.22	-2.10	5.38	0.21	-0.20	-8.30	
1,100.28	0.45	314.10	1,100.23	9.34	-2.22	5.53	0.42	0.40	-17.27	
1,126.11	0.27	320.15	1,126.06	9.46	-2.33	5.68	0.71	-0.70	23.42	
1,151.00	0.23	327.92	1,150.95	9.55	-2.40	5.77	0.21	-0.16	31.22	
1,175.72	0.33	324.64	1,175.67	9.65	-2.46	5.87	0.41	0.40	-13.27	
1,200.47	0.29	308.77	1,200.42	9.75	-2.55	5.99	0.38	-0.16	-64.12	
1,225.24	0.24	316.87	1,225.19	9.82	-2.64	6.10	0.25	-0.20	32.70	
1,250.16	0.31	319.52	1,250.11	9.91	-2.72	6.21	0.29	0.28	10.63	
1,275.65	0.31	303.16	1,275.60	10.00	-2.82	6.34	0.35	0.00	-64.18	
1,301.04	0.24	297.24	1,300.99	10.07	-2.92	6.46	0.30	-0.28	-23.32	

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Casper District

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
1,325.40	0.21	299.52	1,325.35	10.11	-3.01	6.55	0.13	-0.12	9.36
1,350.95	0.21	288.04	1,350.90	10.15	-3.09	6.64	0.16	0.00	-44.93
1,375.33	0.16	264.45	1,375.28	10.16	-3.17	6.72	0.37	-0.21	-96.76
1,400.92	0.14	276.03	1,400.87	10.16	-3.24	6.78	0.14	-0.08	45.25
1,425.19	0.17	286.68	1,425.14	10.17	-3.30	6.85	0.17	0.12	43.88
1,450.76	0.12	303.40	1,450.71	10.20	-3.36	6.91	0.25	-0.20	65.39
1,475.12	0.11	294.92	1,475.07	10.22	-3.40	6.96	0.08	-0.04	-34.81
1,500.69	0.15	274.62	1,500.64	10.23	-3.46	7.01	0.24	0.16	-79.39
1,525.15	0.13	271.34	1,525.10	10.24	-3.52	7.07	0.09	-0.08	-13.41
1,550.66	0.13	288.75	1,550.61	10.25	-3.57	7.13	0.15	0.00	68.25
1,575.21	0.15	284.39	1,575.16	10.26	-3.63	7.19	0.09	0.08	-17.76
1,600.67	0.17	275.57	1,600.62	10.28	-3.70	7.26	0.12	0.08	-34.64
1,625.50	0.20	261.76	1,625.45	10.27	-3.78	7.33	0.22	0.12	-55.62
1,650.66	0.25	259.13	1,650.61	10.26	-3.88	7.41	0.20	0.20	-10.45
1,675.89	0.23	255.02	1,675.84	10.23	-3.98	7.50	0.10	-0.08	-16.29
1,701.10	0.24	242.73	1,701.05	10.20	-4.08	7.57	0.20	0.04	-48.75
1,725.15	0.24	228.51	1,725.10	10.14	-4.16	7.63	0.25	0.00	-59.13
1,751.54	0.27	231.55	1,751.49	10.06	-4.25	7.69	0.12	0.11	11.52
1,775.15	0.28	213.15	1,775.10	9.98	-4.32	7.72	0.37	0.04	-77.93
1,800.40	0.29	213.57	1,800.35	9.88	-4.39	7.75	0.04	0.04	1.66
1,825.57	0.29	217.76	1,825.52	9.77	-4.47	7.78	0.08	0.00	16.65
1,850.77	0.34	194.39	1,850.72	9.65	-4.53	7.79	0.54	0.20	-92.74
1,876.03	0.33	220.94	1,875.98	9.52	-4.59	7.80	0.61	-0.04	105.11
1,901.26	0.39	195.22	1,901.20	9.39	-4.66	7.82	0.68	0.24	-101.94
1,926.25	0.46	182.94	1,926.19	9.20	-4.69	7.77	0.46	0.28	-49.14
1,950.11	0.41	180.26	1,950.05	9.02	-4.69	7.71	0.23	-0.21	-11.23
1,975.30	0.37	176.66	1,975.24	8.85	-4.69	7.64	0.19	-0.16	-14.29
2,000.56	0.37	195.02	2,000.50	8.69	-4.71	7.60	0.47	0.00	72.68
2,025.88	0.45	185.99	2,025.82	8.51	-4.74	7.56	0.41	0.32	-35.66
2,051.07	0.53	175.77	2,051.01	8.30	-4.74	7.48	0.47	0.32	-40.57
2,076.03	0.54	169.99	2,075.97	8.07	-4.71	7.37	0.22	0.04	-23.16
2,101.03	0.55	165.94	2,100.97	7.84	-4.66	7.24	0.16	0.04	-16.20
2,125.82	0.52	164.46	2,125.76	7.61	-4.60	7.10	0.13	-0.12	-5.97
2,150.60	0.57	161.43	2,150.54	7.39	-4.53	6.95	0.23	0.20	-12.23
2,175.78	0.54	152.92	2,175.71	7.16	-4.44	6.78	0.35	-0.12	-33.80
2,200.27	0.53	155.57	2,200.20	6.96	-4.34	6.61	0.11	-0.04	10.82
2,225.08	0.62	150.33	2,225.01	6.73	-4.23	6.43	0.42	0.36	-21.12
2,251.05	0.77	145.50	2,250.98	6.47	-4.06	6.17	0.62	0.58	-18.60
2,275.53	0.85	141.40	2,275.46	6.19	-3.85	5.88	0.40	0.33	-16.75
2,300.33	0.92	142.98	2,300.26	5.89	-3.62	5.55	0.30	0.28	6.37
2,327.00	1.00	141.36	2,326.92	5.54	-3.34	5.16	0.32	0.30	-6.07
2,351.17	1.09	138.96	2,351.09	5.20	-3.06	4.77	0.41	0.37	-9.93

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Design:	OH	Database:	Casper District

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
2,375.89	1.11	138.30	2,375.80	4.84	-2.75	4.35	0.10	0.08	-2.67	
2,400.03	1.06	136.61	2,399.94	4.50	-2.44	3.94	0.25	-0.21	-7.00	
2,426.12	1.05	138.61	2,426.02	4.15	-2.11	3.50	0.15	-0.04	7.67	
2,450.97	1.09	139.82	2,450.87	3.80	-1.81	3.09	0.18	0.16	4.87	
2,475.89	1.14	140.31	2,475.79	3.43	-1.50	2.66	0.20	0.20	1.97	
2,500.71	1.10	138.02	2,500.60	3.06	-1.18	2.23	0.24	-0.16	-9.23	
2,525.63	1.15	139.83	2,525.52	2.69	-0.86	1.80	0.25	0.20	7.26	
2,550.53	1.19	134.54	2,550.41	2.32	-0.51	1.34	0.46	0.16	-21.24	
2,575.11	1.05	135.72	2,574.99	1.98	-0.18	0.90	0.58	-0.57	4.80	
2,600.06	1.05	139.61	2,599.93	1.64	0.13	0.49	0.29	0.00	15.59	
2,625.16	1.05	139.77	2,625.03	1.29	0.43	0.08	0.01	0.00	0.64	
2,650.56	1.06	141.09	2,650.42	0.93	0.73	-0.33	0.10	0.04	5.20	
2,675.38	1.08	146.23	2,675.24	0.56	1.00	-0.72	0.39	0.08	20.71	
2,700.26	1.12	145.45	2,700.11	0.16	1.27	-1.12	0.17	0.16	-3.14	
2,725.12	1.14	152.22	2,724.97	-0.26	1.52	-1.51	0.54	0.08	27.23	
2,751.25	1.13	159.73	2,751.09	-0.73	1.73	-1.88	0.57	-0.04	28.74	
2,775.76	1.23	162.44	2,775.60	-1.21	1.90	-2.21	0.47	0.41	11.06	
2,800.65	1.22	173.03	2,800.48	-1.72	2.01	-2.51	0.91	-0.04	42.55	
2,825.62	1.28	182.19	2,825.45	-2.27	2.03	-2.73	0.83	0.24	36.68	
2,850.52	1.35	187.27	2,850.34	-2.84	1.98	-2.90	0.55	0.28	20.40	
2,875.41	1.35	189.82	2,875.22	-3.42	1.90	-3.03	0.24	0.00	10.25	
2,900.38	1.37	192.86	2,900.19	-4.00	1.78	-3.14	0.30	0.08	12.17	
2,925.36	1.41	195.45	2,925.16	-4.58	1.63	-3.22	0.30	0.16	10.37	
2,951.09	1.44	197.35	2,950.88	-5.20	1.45	-3.28	0.22	0.12	7.38	
2,975.22	1.43	200.38	2,975.00	-5.77	1.26	-3.31	0.32	-0.04	12.56	
3,000.95	1.37	199.30	3,000.73	-6.36	1.04	-3.33	0.25	-0.23	-4.20	
3,025.46	1.39	201.55	3,025.23	-6.91	0.84	-3.35	0.24	0.08	9.18	
3,051.13	1.27	204.58	3,050.89	-7.46	0.60	-3.33	0.54	-0.47	11.80	
3,075.71	1.30	212.08	3,075.47	-7.95	0.34	-3.27	0.69	0.12	30.51	
3,100.22	1.32	221.41	3,099.97	-8.39	0.01	-3.13	0.87	0.08	38.07	
3,125.14	1.29	220.46	3,124.88	-8.82	-0.36	-2.94	0.15	-0.12	-3.81	
3,150.51	1.25	223.26	3,150.25	-9.24	-0.74	-2.75	0.29	-0.16	11.04	
3,175.27	1.25	227.46	3,175.00	-9.62	-1.12	-2.53	0.37	0.00	16.96	
3,201.18	1.24	232.18	3,200.91	-9.98	-1.55	-2.27	0.40	-0.04	18.22	
3,225.84	1.17	238.12	3,225.56	-10.28	-1.98	-1.98	0.58	-0.28	24.09	
3,250.25	1.23	236.94	3,249.96	-10.55	-2.41	-1.69	0.27	0.25	-4.83	
3,276.16	1.25	239.31	3,275.87	-10.85	-2.89	-1.35	0.21	0.08	9.15	
3,300.90	1.30	240.90	3,300.60	-11.12	-3.36	-1.01	0.25	0.20	6.43	
3,325.71	1.29	239.46	3,325.41	-11.40	-3.85	-0.67	0.14	-0.04	-5.80	
3,350.46	1.23	240.39	3,350.15	-11.68	-4.32	-0.33	0.26	-0.24	3.76	
3,375.25	1.18	248.59	3,374.93	-11.90	-4.79	0.02	0.72	-0.20	33.08	
3,400.06	1.22	250.39	3,399.74	-12.08	-5.28	0.41	0.22	0.16	7.26	

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Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well Edkam #2-23
Project:	Weld County, CO	TVD Reference:	GL 4700' & KB 10' @ 4710.00ft (hALLIBURTON 118527)
Site:	Ed Kam	MD Reference:	GL 4700' & KB 10' @ 4710.00ft (hALLIBURTON 118527)
Well:	Edkam #2-23	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Casper District

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
3,426.09	1.15	247.53	3,425.76	-12.28	-5.78	0.80	0.35	-0.27	-10.99	
3,450.89	1.15	248.55	3,450.56	-12.46	-6.24	1.16	0.08	0.00	4.11	
3,475.29	1.08	247.39	3,474.95	-12.64	-6.68	1.50	0.30	-0.29	-4.75	
3,500.13	1.14	257.52	3,499.79	-12.78	-7.14	1.87	0.82	0.24	40.78	
3,526.09	1.15	254.98	3,525.74	-12.91	-7.64	2.30	0.20	0.04	-9.78	
3,550.86	1.07	257.73	3,550.51	-13.02	-8.11	2.69	0.39	-0.32	11.10	
3,575.76	1.05	262.91	3,575.40	-13.10	-8.56	3.08	0.39	-0.08	20.80	
3,600.54	1.00	272.75	3,600.18	-13.11	-9.00	3.48	0.74	-0.20	39.71	
3,625.52	1.03	276.36	3,625.16	-13.08	-9.44	3.90	0.28	0.12	14.45	
3,650.21	1.01	270.78	3,649.84	-13.05	-9.88	4.32	0.41	-0.08	-22.60	
3,676.36	1.05	275.01	3,675.99	-13.03	-10.35	4.77	0.33	0.15	16.18	
3,700.74	1.04	272.50	3,700.36	-13.00	-10.79	5.19	0.19	-0.04	-10.30	
3,725.60	1.02	277.61	3,725.22	-12.96	-11.24	5.62	0.38	-0.08	20.56	
3,750.51	0.93	278.47	3,750.13	-12.90	-11.66	6.03	0.37	-0.36	3.45	
3,776.12	0.89	287.76	3,775.73	-12.81	-12.05	6.43	0.60	-0.16	36.27	
3,800.55	0.87	294.35	3,800.16	-12.67	-12.40	6.80	0.42	-0.08	26.98	
3,826.05	0.97	291.93	3,825.66	-12.51	-12.78	7.21	0.42	0.39	-9.49	
3,850.50	0.94	295.68	3,850.10	-12.35	-13.15	7.62	0.28	-0.12	15.34	
3,875.10	0.91	296.24	3,874.70	-12.18	-13.51	8.02	0.13	-0.12	2.28	
3,900.52	0.96	299.02	3,900.12	-11.98	-13.88	8.43	0.27	0.20	10.94	
3,925.03	1.05	299.24	3,924.62	-11.77	-14.25	8.85	0.37	0.37	0.90	
3,950.54	1.07	301.16	3,950.13	-11.54	-14.66	9.32	0.16	0.08	7.53	
3,976.02	1.01	304.48	3,975.61	-11.29	-15.05	9.77	0.33	-0.24	13.03	
4,000.14	0.98	305.06	3,999.72	-11.05	-15.39	10.18	0.13	-0.12	2.40	
4,025.73	1.05	304.03	4,025.31	-10.79	-15.77	10.63	0.28	0.27	-4.03	
4,050.18	1.03	311.30	4,049.75	-10.52	-16.12	11.05	0.55	-0.08	29.73	
4,075.83	1.09	312.77	4,075.40	-10.20	-16.47	11.50	0.26	0.23	5.73	
4,100.81	1.08	299.66	4,100.38	-9.93	-16.85	11.95	0.99	-0.04	-52.48	
4,126.58	1.09	303.22	4,126.14	-9.67	-17.26	12.43	0.26	0.04	13.81	
4,150.70	1.05	303.50	4,150.26	-9.42	-17.64	12.87	0.17	-0.17	1.16	
4,175.01	1.11	300.48	4,174.56	-9.18	-18.03	13.32	0.34	0.25	-12.42	
4,200.68	1.06	301.96	4,200.23	-8.93	-18.44	13.80	0.22	-0.19	5.77	
4,225.17	1.06	305.29	4,224.71	-8.68	-18.82	14.25	0.25	0.00	13.60	
4,250.57	1.06	309.31	4,250.11	-8.39	-19.19	14.70	0.29	0.00	15.83	
4,276.23	1.09	307.74	4,275.76	-8.09	-19.57	15.16	0.16	0.12	-6.12	
4,300.21	1.09	311.15	4,299.74	-7.80	-19.92	15.60	0.27	0.00	14.22	
4,325.88	1.10	308.45	4,325.41	-7.49	-20.30	16.06	0.20	0.04	-10.52	
4,350.12	1.12	310.28	4,349.64	-7.19	-20.66	16.51	0.17	0.08	7.55	
4,376.27	1.12	307.03	4,375.79	-6.87	-21.06	17.00	0.24	0.00	-12.43	
4,400.75	1.18	308.85	4,400.26	-6.57	-21.45	17.47	0.29	0.25	7.43	
4,425.60	1.19	311.34	4,425.11	-6.24	-21.84	17.96	0.21	0.04	10.02	
4,451.21	1.19	303.84	4,450.71	-5.92	-22.26	18.47	0.61	0.00	-29.29	

Scientific Drilling International

Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well Edkam #2-23
Project:	Weld County, CO	TVD Reference:	GL 4700' & KB 10' @ 4710.00ft (hALLIBURTON 118527)
Site:	Ed Kam	MD Reference:	GL 4700' & KB 10' @ 4710.00ft (hALLIBURTON 118527)
Well:	Edkam #2-23	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Casper District

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
4,475.46	1.11	300.93	4,474.96	-5.66	-22.67	18.95	0.41	-0.33	-12.00	
4,501.00	1.00	302.69	4,500.49	-5.41	-23.07	19.41	0.45	-0.43	6.89	
4,525.39	0.79	320.91	4,524.88	-5.16	-23.36	19.77	1.44	-0.86	74.70	
4,550.71	0.67	315.69	4,550.20	-4.92	-23.57	20.05	0.54	-0.47	-20.62	
4,576.10	0.66	310.82	4,575.58	-4.72	-23.79	20.33	0.23	-0.04	-19.18	
4,600.11	0.65	306.97	4,599.59	-4.55	-24.00	20.59	0.19	-0.04	-16.03	
4,626.03	0.59	322.42	4,625.51	-4.35	-24.20	20.85	0.68	-0.23	59.61	
4,650.98	0.65	307.57	4,650.46	-4.16	-24.39	21.09	0.69	0.24	-59.52	
4,675.59	0.57	304.17	4,675.07	-4.01	-24.60	21.35	0.36	-0.33	-13.82	
4,700.57	0.60	313.51	4,700.05	-3.85	-24.80	21.59	0.40	0.12	37.39	
4,725.60	0.64	313.04	4,725.08	-3.67	-25.00	21.84	0.16	0.16	-1.88	
4,750.54	0.61	312.03	4,750.01	-3.48	-25.20	22.10	0.13	-0.12	-4.05	
4,775.50	0.62	311.42	4,774.97	-3.30	-25.40	22.35	0.05	0.04	-2.44	
4,800.45	0.74	310.29	4,799.92	-3.11	-25.62	22.63	0.48	0.48	-4.53	
4,825.51	0.67	307.42	4,824.98	-2.92	-25.86	22.92	0.31	-0.28	-11.45	
4,850.42	0.58	314.93	4,849.89	-2.74	-26.07	23.18	0.49	-0.36	30.15	
4,875.35	0.65	305.32	4,874.82	-2.57	-26.27	23.43	0.50	0.28	-38.55	
4,901.10	0.65	305.42	4,900.56	-2.40	-26.51	23.72	0.00	0.00	0.39	
4,924.25	0.72	310.10	4,923.71	-2.23	-26.73	23.98	0.39	0.30	20.22	
4,949.75	0.71	311.59	4,949.21	-2.02	-26.97	24.28	0.08	-0.04	5.84	
4,974.52	0.69	310.13	4,973.98	-1.82	-27.20	24.57	0.11	-0.08	-5.89	
4,999.86	0.72	309.51	4,999.32	-1.62	-27.44	24.87	0.12	0.12	-2.45	
5,023.85	0.73	306.02	5,023.30	-1.44	-27.68	25.16	0.19	0.04	-14.55	
5,048.60	0.69	305.23	5,048.05	-1.26	-27.92	25.46	0.17	-0.16	-3.19	
5,074.83	0.65	312.27	5,074.28	-1.07	-28.16	25.75	0.35	-0.15	26.84	
5,098.80	0.69	305.47	5,098.25	-0.89	-28.38	26.02	0.37	0.17	-28.37	
5,124.54	0.82	310.40	5,123.99	-0.68	-28.65	26.34	0.56	0.51	19.15	
5,149.85	0.76	307.17	5,149.30	-0.46	-28.92	26.68	0.30	-0.24	-12.76	
5,174.18	0.72	304.71	5,173.62	-0.28	-29.17	26.98	0.21	-0.16	-10.11	
5,199.54	0.70	308.09	5,198.98	-0.09	-29.43	27.28	0.18	-0.08	13.33	
5,224.77	0.80	309.78	5,224.21	0.11	-29.68	27.60	0.41	0.40	6.70	
5,249.00	0.79	303.51	5,248.44	0.32	-29.95	27.92	0.36	-0.04	-25.88	
5,273.98	0.71	308.46	5,273.41	0.51	-30.22	28.24	0.41	-0.32	19.82	
5,299.00	0.81	311.41	5,298.43	0.72	-30.47	28.56	0.43	0.40	11.79	
5,324.29	0.73	303.14	5,323.72	0.93	-30.74	28.88	0.54	-0.32	-32.70	
5,349.96	0.92	312.86	5,349.39	1.16	-31.03	29.24	0.92	0.74	37.87	
5,373.75	0.83	313.42	5,373.17	1.40	-31.29	29.57	0.38	-0.38	2.35	
5,399.65	0.87	314.24	5,399.07	1.67	-31.57	29.93	0.16	0.15	3.17	
5,424.79	0.88	306.10	5,424.21	1.92	-31.86	30.29	0.50	0.04	-32.38	
5,449.29	0.85	313.28	5,448.71	2.15	-32.15	30.65	0.46	-0.12	29.31	
5,473.89	0.99	315.35	5,473.30	2.43	-32.43	31.01	0.58	0.57	8.41	
5,499.88	0.82	316.71	5,499.29	2.72	-32.72	31.38	0.66	-0.65	5.23	

Scientific Drilling International

Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well Edkam #2-23
Project:	Weld County, CO	TVD Reference:	GL 4700' & KB 10' @ 4710.00ft (hALLIBURTON 118527)
Site:	Ed Kam	MD Reference:	GL 4700' & KB 10' @ 4710.00ft (hALLIBURTON 118527)
Well:	Edkam #2-23	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Casper District

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
5,524.79	0.86	324.98	5,524.20	3.01	-32.95	31.70	0.51	0.16	33.20	
5,548.94	0.82	325.87	5,548.34	3.30	-33.15	32.00	0.17	-0.17	3.69	
5,573.96	0.92	330.98	5,573.36	3.62	-33.34	32.30	0.51	0.40	20.42	
5,599.46	0.90	333.68	5,598.86	3.98	-33.53	32.61	0.19	-0.08	10.59	
5,624.54	0.99	331.11	5,623.93	4.35	-33.72	32.92	0.40	0.36	-10.25	
5,650.00	0.94	331.64	5,649.39	4.72	-33.93	33.25	0.20	-0.20	2.08	
5,673.95	0.95	334.10	5,673.34	5.07	-34.11	33.55	0.17	0.04	10.27	
5,699.62	1.05	330.17	5,699.00	5.47	-34.32	33.89	0.47	0.39	-15.31	
5,724.64	1.11	332.88	5,724.02	5.88	-34.54	34.26	0.31	0.24	10.83	
5,749.25	0.88	337.70	5,748.63	6.27	-34.72	34.57	0.99	-0.93	19.59	
5,774.23	0.96	335.70	5,773.60	6.64	-34.88	34.85	0.35	0.32	-8.01	
5,799.73	0.91	339.07	5,799.10	7.02	-35.04	35.14	0.29	-0.20	13.22	
5,824.68	0.91	337.65	5,824.05	7.39	-35.19	35.42	0.09	0.00	-5.69	
5,849.33	1.00	336.48	5,848.69	7.77	-35.35	35.71	0.37	0.37	-4.75	
5,874.44	0.94	334.40	5,873.80	8.16	-35.53	36.01	0.28	-0.24	-8.28	
5,899.38	0.85	323.20	5,898.74	8.49	-35.73	36.32	0.79	-0.36	-44.91	
5,924.96	0.79	325.17	5,924.31	8.79	-35.94	36.63	0.26	-0.23	7.70	
5,949.42	0.83	320.75	5,948.77	9.06	-36.15	36.93	0.30	0.16	-18.07	
5,974.12	0.69	313.42	5,973.47	9.30	-36.37	37.22	0.69	-0.57	-29.68	
5,998.71	0.70	313.52	5,998.06	9.51	-36.59	37.50	0.04	0.04	0.41	
6,023.69	0.75	318.76	6,023.03	9.74	-36.80	37.79	0.33	0.20	20.98	
6,049.81	0.78	314.85	6,049.15	9.99	-37.04	38.10	0.23	0.11	-14.97	
6,074.29	0.88	313.96	6,073.63	10.24	-37.30	38.43	0.41	0.41	-3.64	
6,099.23	0.78	315.69	6,098.57	10.49	-37.55	38.76	0.41	-0.40	6.94	
6,124.00	0.75	309.80	6,123.34	10.72	-37.80	39.07	0.34	-0.12	-23.78	
6,149.54	0.78	310.81	6,148.87	10.94	-38.06	39.39	0.13	0.12	3.95	
6,174.15	0.76	306.84	6,173.48	11.14	-38.31	39.71	0.23	-0.08	-16.13	
6,199.95	0.81	313.98	6,199.28	11.37	-38.58	40.04	0.43	0.19	27.67	
6,224.81	0.90	302.32	6,224.14	11.60	-38.87	40.40	0.79	0.36	-46.90	
6,249.25	0.86	310.17	6,248.57	11.82	-39.18	40.76	0.52	-0.16	32.12	
6,273.73	0.89	308.94	6,273.05	12.06	-39.46	41.12	0.14	0.12	-5.02	
6,299.60	0.88	305.80	6,298.92	12.30	-39.78	41.50	0.19	-0.04	-12.14	
6,324.41	0.88	311.33	6,323.72	12.54	-40.08	41.87	0.34	0.00	22.29	
6,349.85	1.00	299.07	6,349.16	12.78	-40.42	42.27	0.92	0.47	-48.19	
6,374.64	0.97	305.08	6,373.95	13.00	-40.78	42.69	0.43	-0.12	24.24	
6,399.44	0.98	304.29	6,398.74	13.24	-41.13	43.10	0.07	0.04	-3.19	
6,424.02	1.07	302.23	6,423.32	13.48	-41.49	43.53	0.40	0.37	-8.38	
6,449.83	1.10	303.24	6,449.12	13.75	-41.91	44.01	0.14	0.12	3.91	
6,474.27	1.05	303.35	6,473.56	14.00	-42.29	44.46	0.20	-0.20	0.45	
6,499.56	1.05	305.11	6,498.85	14.26	-42.67	44.92	0.13	0.00	6.96	
6,524.44	1.04	307.36	6,523.72	14.53	-43.04	45.35	0.17	-0.04	9.04	
6,549.83	0.97	299.44	6,549.11	14.77	-43.41	45.79	0.61	-0.28	-31.19	

Scientific Drilling International

Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well Edkam #2-23
Project:	Weld County, CO	TVD Reference:	GL 4700' & KB 10' @ 4710.00ft (hALLIBURTON 118527)
Site:	Ed Kam	MD Reference:	GL 4700' & KB 10' @ 4710.00ft (hALLIBURTON 118527)
Well:	Edkam #2-23	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Casper District

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,574.67	1.01	297.47	6,573.94	14.98	-43.79	46.22	0.21	0.16	-7.93
6,598.97	0.94	306.24	6,598.24	15.19	-44.14	46.62	0.68	-0.29	36.09
6,623.78	0.93	306.06	6,623.05	15.43	-44.46	47.01	0.04	-0.04	-0.73
6,649.46	0.99	304.33	6,648.72	15.68	-44.82	47.43	0.26	0.23	-6.74
6,674.27	1.03	312.00	6,673.53	15.95	-45.16	47.85	0.57	0.16	30.91
6,699.96	1.02	301.89	6,699.22	16.23	-45.52	48.29	0.70	-0.04	-39.35
6,724.73	1.06	304.71	6,723.98	16.47	-45.90	48.73	0.26	0.16	11.38
6,749.10	1.07	301.79	6,748.35	16.72	-46.28	49.18	0.23	0.04	-11.98
6,773.75	1.03	302.53	6,772.99	16.96	-46.66	49.62	0.17	-0.16	3.00
6,799.58	1.01	308.17	6,798.82	17.23	-47.04	50.07	0.40	-0.08	21.84
6,823.83	0.94	305.36	6,823.07	17.47	-47.37	50.47	0.35	-0.29	-11.59
6,849.09	0.92	300.23	6,848.32	17.70	-47.71	50.87	0.34	-0.08	-20.31
6,873.85	0.90	311.44	6,873.08	17.92	-48.03	51.25	0.72	-0.08	45.27
6,899.60	1.03	304.73	6,898.83	18.19	-48.37	51.66	0.67	0.50	-26.06
6,923.50	1.09	310.90	6,922.72	18.46	-48.72	52.09	0.54	0.25	25.82
6,949.31	1.15	311.17	6,948.53	18.79	-49.10	52.57	0.23	0.23	1.05
6,974.73	0.89	302.65	6,973.94	19.07	-49.46	53.00	1.18	-1.02	-33.52
6,999.85	0.79	306.82	6,999.06	19.28	-49.76	53.36	0.47	-0.40	16.60
7,024.33	0.89	305.50	7,023.54	19.49	-50.05	53.71	0.42	0.41	-5.39
7,049.63	0.77	312.57	7,048.83	19.72	-50.33	54.06	0.62	-0.47	27.94
7,074.54	0.88	314.43	7,073.74	19.96	-50.59	54.39	0.45	0.44	7.47
7,099.88	1.05	315.09	7,099.08	20.26	-50.90	54.78	0.67	0.67	2.60
7,108.90	1.28	320.87	7,108.10	20.40	-51.02	54.95	2.86	2.55	64.08
7,110.00	1.11	320.56	7,109.20	20.42	-51.03	54.97	15.47	-15.45	-28.18
Last SDI Gyro Survey									

Checked By: _____ Approved By: _____ Date: _____