




**Scientific
Drilling**

Survey Certification

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

Operator	KP Kauffman Co, Inc.
Well Name & No.	David Howard B-5
County & State	Weld County, CO
SDI Job No.	411113K77776
Rig	Halliburton 1668
Survey Date	4-Nov-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 3,370.37 feet is true and correct as determined from all available records.


Signature

25-Nov-2013

Date

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

KP Kauffman Co, Inc.

Weld County, CO

David Howard

David Howard B-5

OH

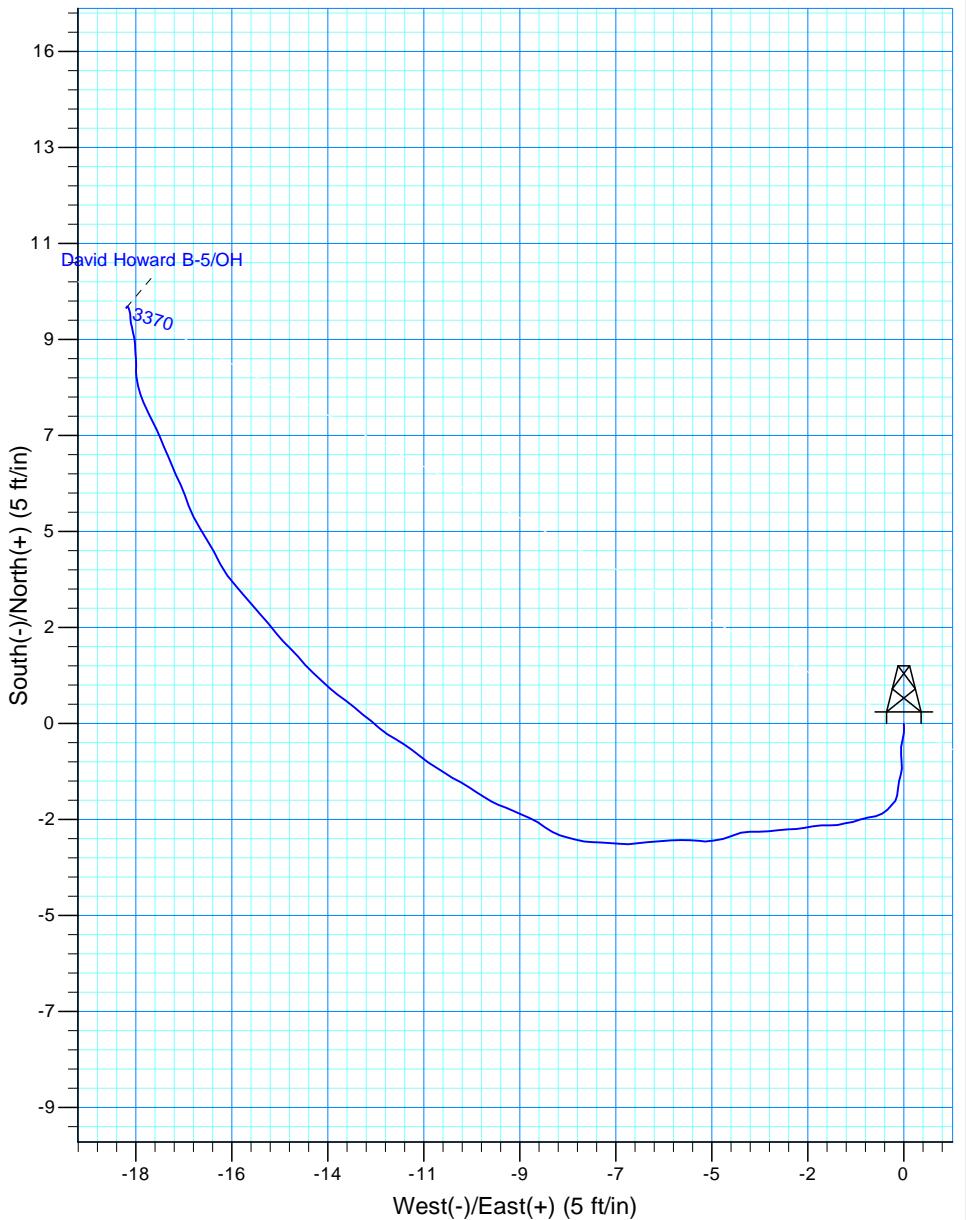
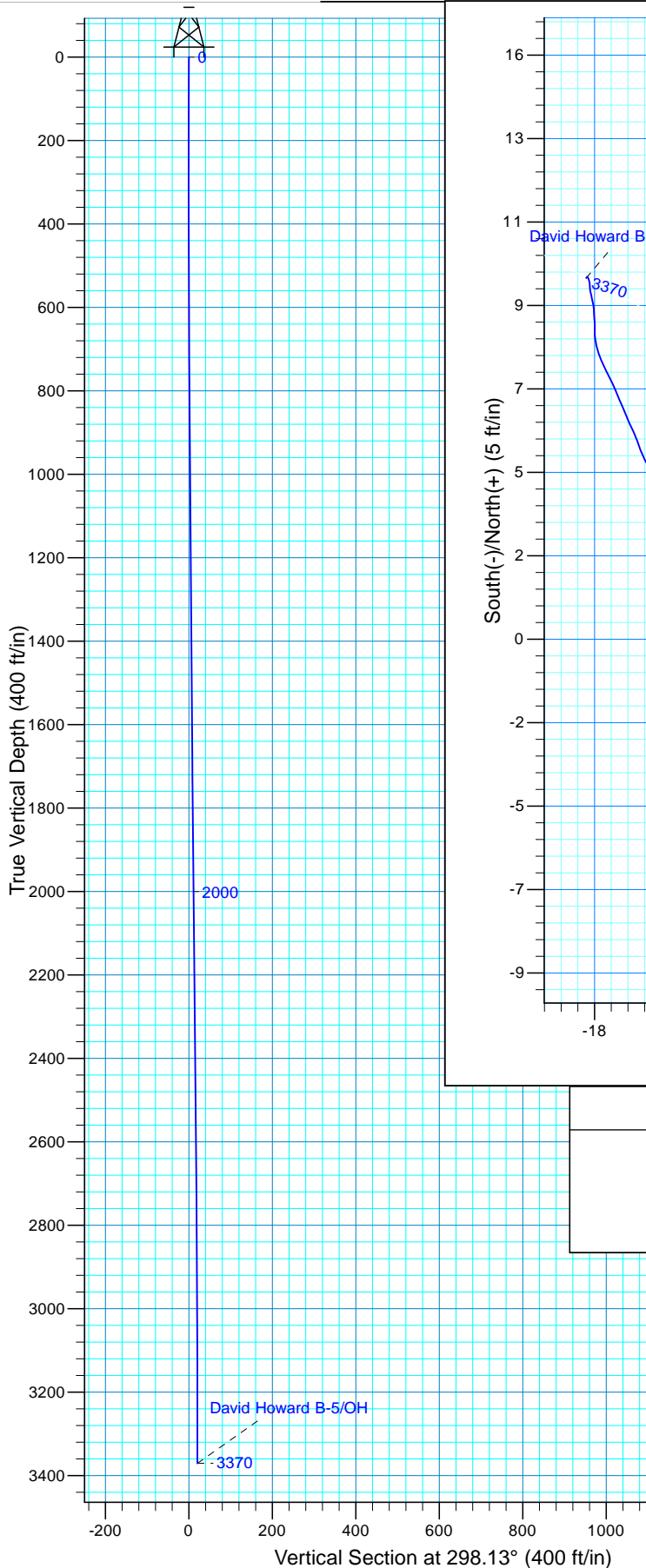
Design: OH

Standard Survey Report

25 November, 2013



Project: Weld County, CO
Site: David Howard
Well: David Howard B-5
Wellbore: OH
Design: OH



WELL DETAILS: David Howard B-5

Northing	Easting	Ground Level: 5021.00 Latitude	Longitude
1249478.34	3169987.52	40° 0' 59.788 N	104° 53' 35.095 W

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well David Howard B-5, True North
Vertical (TVD) Reference: GL 5021' @ 5021.00ft (Halliburton 1668)
Section (VS) Reference: Slot - (0.00N, 0.00E)
Measured Depth Reference: GL 5021' @ 5021.00ft (Halliburton 1668)
Calculation Method: Minimum Curvature
Local North: True
Location:

PROJECT DETAILS: Weld County, CO

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Northern Zone

Design: OH (David Howard B-5/OH)

Created By: Steve Gottschalk 17:39, November 25 2013

Scientific Drilling International

Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well David Howard B-5
Project:	Weld County, CO	TVD Reference:	GL 5021' @ 5021.00ft (Halliburton 1668)
Site:	David Howard	MD Reference:	GL 5021' @ 5021.00ft (Halliburton 1668)
Well:	David Howard B-5	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	David Howard				
Site Position:		Northing:	1,249,478.35 usft	Latitude:	40° 0' 59.788 N
From:	Lat/Long	Easting:	3,169,987.52 usft	Longitude:	104° 53' 35.095 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.39 °

Well	David Howard B-5, 1355' FSL, 1355, FEL, SEC 28 T1N R67W					
Well Position	+N/-S	0.00 ft	Northing:	1,249,478.34 usft	Latitude:	40° 0' 59.788 N
	+E/-W	0.00 ft	Easting:	3,169,987.52 usft	Longitude:	104° 53' 35.095 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	5,021.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	11/4/2013	8.62	66.63	52,588

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	298.13	

Survey Program	Date	11/25/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
99.73	3,370.37	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
99.73	0.13	177.30	99.73	-0.11	0.01	-0.06	0.13	0.13	0.00
First SDI Gyro Survey									
124.39	0.40	183.66	124.39	-0.23	0.00	-0.11	1.10	1.09	25.79
149.84	0.35	200.36	149.84	-0.39	-0.03	-0.16	0.47	-0.20	65.62
174.05	0.44	182.95	174.05	-0.55	-0.06	-0.20	0.62	0.37	-71.91
199.06	0.41	178.79	199.06	-0.74	-0.07	-0.29	0.17	-0.12	-16.63
224.32	0.37	174.70	224.32	-0.91	-0.06	-0.38	0.19	-0.16	-16.19
249.96	0.33	180.12	249.96	-1.06	-0.05	-0.46	0.20	-0.16	21.14
274.45	0.31	201.45	274.45	-1.20	-0.07	-0.50	0.49	-0.08	87.10
299.38	0.47	188.17	299.38	-1.36	-0.11	-0.54	0.73	0.64	-53.27

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Site:	David Howard	MD Reference:	GL 5021' @ 5021.00ft (Halliburton 1668)
Well:	David Howard B-5	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)
324.99	0.37	189.68	324.99	-1.55	-0.14	-0.60	0.39	-0.39	5.90
349.35	0.33	183.92	349.34	-1.69	-0.16	-0.66	0.22	-0.16	-23.65
373.91	0.28	215.69	373.90	-1.81	-0.20	-0.68	0.71	-0.20	129.36
399.18	0.32	224.77	399.17	-1.91	-0.28	-0.65	0.25	0.16	35.93
424.85	0.37	219.55	424.84	-2.03	-0.39	-0.61	0.23	0.19	-20.34
449.07	0.37	247.07	449.06	-2.12	-0.51	-0.55	0.73	0.00	113.63
474.25	0.36	253.13	474.24	-2.17	-0.66	-0.44	0.16	-0.04	24.07
499.66	0.47	263.77	499.65	-2.21	-0.84	-0.30	0.53	0.43	41.87
524.55	0.43	246.69	524.54	-2.26	-1.03	-0.16	0.56	-0.16	-68.62
548.94	0.41	259.53	548.93	-2.31	-1.20	-0.03	0.39	-0.08	52.64
574.86	0.41	258.34	574.85	-2.34	-1.38	0.11	0.03	0.00	-4.59
599.26	0.43	257.79	599.25	-2.38	-1.55	0.25	0.08	0.08	-2.25
623.92	0.44	274.36	623.91	-2.39	-1.74	0.41	0.51	0.04	67.19
649.44	0.43	265.83	649.43	-2.39	-1.93	0.58	0.26	-0.04	-33.42
674.41	0.48	262.04	674.40	-2.41	-2.13	0.74	0.23	0.20	-15.18
699.83	0.47	259.16	699.82	-2.45	-2.34	0.91	0.10	-0.04	-11.33
724.54	0.44	263.96	724.53	-2.48	-2.53	1.06	0.20	-0.12	19.43
748.93	0.44	269.78	748.91	-2.49	-2.72	1.22	0.18	0.00	23.86
774.20	0.52	263.06	774.18	-2.50	-2.93	1.40	0.39	0.32	-26.59
799.92	0.58	264.03	799.90	-2.53	-3.17	1.61	0.24	0.23	3.77
824.57	0.50	271.01	824.55	-2.54	-3.41	1.81	0.42	-0.32	28.32
849.17	0.45	268.48	849.15	-2.54	-3.61	1.99	0.22	-0.20	-10.28
873.75	0.53	261.24	873.73	-2.56	-3.82	2.16	0.41	0.33	-29.45
899.05	0.52	237.84	899.03	-2.64	-4.03	2.31	0.84	-0.04	-92.49
924.16	0.52	264.80	924.14	-2.71	-4.24	2.46	0.97	0.00	107.37
949.75	0.46	255.91	949.73	-2.75	-4.46	2.64	0.38	-0.23	-34.74
974.95	0.47	271.50	974.93	-2.77	-4.66	2.80	0.50	0.04	61.87
999.50	0.48	275.08	999.48	-2.76	-4.86	2.99	0.13	0.04	14.58
1,024.62	0.52	274.56	1,024.59	-2.74	-5.08	3.19	0.16	0.16	-2.07
1,050.00	0.54	267.98	1,049.97	-2.73	-5.31	3.40	0.25	0.08	-25.93
1,074.83	0.56	265.42	1,074.80	-2.75	-5.55	3.60	0.13	0.08	-10.31
1,099.58	0.55	265.85	1,099.55	-2.76	-5.79	3.80	0.04	-0.04	1.74
1,124.11	0.52	263.47	1,124.08	-2.79	-6.02	3.99	0.15	-0.12	-9.70
1,149.48	0.51	262.62	1,149.45	-2.81	-6.24	4.18	0.05	-0.04	-3.35
1,174.39	0.47	268.66	1,174.36	-2.83	-6.46	4.36	0.26	-0.16	24.25
1,199.80	0.48	276.07	1,199.77	-2.82	-6.67	4.55	0.24	0.04	29.16
1,224.12	0.55	273.27	1,224.09	-2.80	-6.88	4.75	0.31	0.29	-11.51
1,249.17	0.47	273.19	1,249.13	-2.79	-7.11	4.95	0.32	-0.32	-0.32
1,273.97	0.43	271.44	1,273.93	-2.78	-7.30	5.13	0.17	-0.16	-7.06
1,299.10	0.45	276.48	1,299.06	-2.77	-7.49	5.30	0.17	0.08	20.06
1,324.77	0.48	287.68	1,324.73	-2.73	-7.70	5.50	0.37	0.12	43.63
1,349.51	0.42	282.68	1,349.47	-2.67	-7.88	5.69	0.29	-0.24	-20.21
1,374.00	0.42	289.05	1,373.96	-2.63	-8.06	5.87	0.19	0.00	26.01

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Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well David Howard B-5
Project:	Weld County, CO	TVD Reference:	GL 5021' @ 5021.00ft (Halliburton 1668)
Site:	David Howard	MD Reference:	GL 5021' @ 5021.00ft (Halliburton 1668)
Well:	David Howard B-5	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)
1,399.28	0.46	297.91	1,399.24	-2.55	-8.23	6.06	0.31	0.16	35.05
1,424.05	0.48	306.27	1,424.01	-2.44	-8.41	6.26	0.29	0.08	33.75
1,449.79	0.46	302.79	1,449.75	-2.32	-8.58	6.47	0.14	-0.08	-13.52
1,473.74	0.51	294.44	1,473.70	-2.22	-8.76	6.67	0.36	0.21	-34.86
1,499.06	0.46	291.39	1,499.02	-2.14	-8.95	6.89	0.22	-0.20	-12.05
1,524.93	0.48	296.66	1,524.89	-2.05	-9.15	7.10	0.18	0.08	20.37
1,549.16	0.43	289.13	1,549.12	-1.98	-9.32	7.29	0.32	-0.21	-31.08
1,574.47	0.44	292.54	1,574.42	-1.91	-9.50	7.48	0.11	0.04	13.47
1,598.36	0.45	300.54	1,598.31	-1.83	-9.67	7.67	0.26	0.04	33.49
1,624.05	0.43	303.31	1,624.00	-1.72	-9.84	7.86	0.11	-0.08	10.78
1,649.82	0.51	301.09	1,649.77	-1.61	-10.02	8.07	0.32	0.31	-8.61
1,674.11	0.51	303.89	1,674.06	-1.49	-10.20	8.29	0.10	0.00	11.53
1,698.97	0.52	299.79	1,698.92	-1.38	-10.39	8.51	0.15	0.04	-16.49
1,723.86	0.50	295.39	1,723.81	-1.27	-10.58	8.73	0.18	-0.08	-17.68
1,749.14	0.52	308.51	1,749.09	-1.16	-10.77	8.96	0.47	0.08	51.90
1,773.99	0.49	296.70	1,773.94	-1.04	-10.96	9.17	0.44	-0.12	-47.53
1,799.85	0.49	307.29	1,799.80	-0.92	-11.14	9.39	0.35	0.00	40.95
1,824.64	0.60	308.08	1,824.59	-0.78	-11.33	9.63	0.44	0.44	3.19
1,849.11	0.61	307.87	1,849.05	-0.62	-11.53	9.88	0.04	0.04	-0.86
1,874.33	0.43	301.66	1,874.27	-0.49	-11.72	10.11	0.75	-0.71	-24.62
1,899.06	0.54	301.57	1,899.00	-0.38	-11.90	10.32	0.44	0.44	-0.36
1,924.78	0.54	298.15	1,924.72	-0.25	-12.11	10.56	0.13	0.00	-13.30
1,949.31	0.61	315.85	1,949.25	-0.11	-12.30	10.80	0.77	0.29	72.16
1,974.71	0.51	305.47	1,974.65	0.06	-12.49	11.04	0.56	-0.39	-40.87
1,999.38	0.60	310.06	1,999.32	0.20	-12.68	11.27	0.41	0.36	18.61
2,024.74	0.65	310.92	2,024.68	0.38	-12.89	11.54	0.20	0.20	3.39
2,049.50	0.56	304.61	2,049.43	0.54	-13.09	11.80	0.45	-0.36	-25.48
2,073.69	0.54	307.42	2,073.62	0.68	-13.28	12.03	0.14	-0.08	11.62
2,098.75	0.51	311.10	2,098.68	0.82	-13.46	12.26	0.18	-0.12	14.68
2,124.22	0.64	312.98	2,124.15	1.00	-13.65	12.50	0.52	0.51	7.38
2,149.50	0.61	312.68	2,149.43	1.18	-13.85	12.77	0.12	-0.12	-1.19
2,174.77	0.59	318.96	2,174.70	1.37	-14.03	13.02	0.27	-0.08	24.85
2,199.98	0.56	318.86	2,199.91	1.56	-14.20	13.26	0.12	-0.12	-0.40
2,224.18	0.61	315.02	2,224.11	1.74	-14.37	13.49	0.26	0.21	-15.87
2,249.96	0.56	315.68	2,249.88	1.93	-14.55	13.75	0.20	-0.19	2.56
2,273.98	0.62	322.05	2,273.90	2.12	-14.72	13.98	0.37	0.25	26.52
2,299.29	0.70	320.82	2,299.21	2.35	-14.90	14.24	0.32	0.32	-4.86
2,324.09	0.65	317.03	2,324.01	2.57	-15.09	14.52	0.27	-0.20	-15.28
2,348.96	0.67	319.04	2,348.88	2.78	-15.28	14.79	0.12	0.08	8.08
2,374.83	0.67	319.53	2,374.75	3.01	-15.48	15.07	0.02	0.00	1.89
2,399.27	0.69	320.13	2,399.18	3.23	-15.66	15.34	0.09	0.08	2.45
2,424.11	0.70	321.61	2,424.02	3.46	-15.86	15.62	0.08	0.04	5.96
2,449.70	0.75	334.49	2,449.61	3.74	-16.02	15.89	0.66	0.20	50.33

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Site:	David Howard	MD Reference:	GL 5021' @ 5021.00ft (Halliburton 1668)
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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)
2,474.48	0.74	331.67	2,474.39	4.02	-16.17	16.16	0.15	-0.04	-11.38
2,499.29	0.73	327.33	2,499.20	4.30	-16.33	16.43	0.23	-0.04	-17.49
2,524.47	0.72	329.64	2,524.37	4.57	-16.50	16.70	0.12	-0.04	9.17
2,549.10	0.69	332.08	2,549.00	4.83	-16.65	16.96	0.17	-0.12	9.91
2,574.79	0.60	340.56	2,574.69	5.10	-16.76	17.19	0.51	-0.35	33.01
2,599.56	0.60	341.44	2,599.46	5.34	-16.85	17.38	0.04	0.00	3.55
2,624.09	0.67	333.40	2,623.99	5.59	-16.95	17.59	0.46	0.29	-32.78
2,649.85	0.49	336.10	2,649.75	5.83	-17.06	17.80	0.71	-0.70	10.48
2,673.79	0.53	337.74	2,673.69	6.02	-17.15	17.96	0.18	0.17	6.85
2,699.75	0.55	336.72	2,699.64	6.25	-17.24	18.15	0.09	0.08	-3.93
2,724.11	0.53	335.11	2,724.00	6.46	-17.34	18.33	0.10	-0.08	-6.61
2,749.21	0.57	341.02	2,749.10	6.68	-17.43	18.52	0.28	0.16	23.55
2,773.91	0.56	334.56	2,773.80	6.91	-17.52	18.71	0.26	-0.04	-26.15
2,799.69	0.46	331.38	2,799.58	7.11	-17.62	18.89	0.40	-0.39	-12.34
2,824.62	0.50	331.14	2,824.51	7.30	-17.72	19.07	0.16	0.16	-0.96
2,849.61	0.40	339.19	2,849.50	7.47	-17.81	19.23	0.47	-0.40	32.21
2,874.24	0.37	339.99	2,874.13	7.63	-17.86	19.35	0.12	-0.12	3.25
2,899.24	0.42	343.27	2,899.13	7.79	-17.92	19.47	0.22	0.20	13.12
2,924.40	0.35	349.75	2,924.29	7.96	-17.96	19.59	0.33	-0.28	25.76
2,949.36	0.32	347.69	2,949.25	8.10	-17.99	19.68	0.13	-0.12	-8.25
2,974.61	0.34	2.76	2,974.50	8.24	-18.00	19.76	0.35	0.08	59.68
2,999.18	0.32	0.73	2,999.07	8.38	-17.99	19.82	0.09	-0.08	-8.26
3,023.83	0.36	355.95	3,023.71	8.53	-18.00	19.89	0.20	0.16	-19.39
3,049.45	0.24	353.15	3,049.33	8.66	-18.01	19.97	0.47	-0.47	-10.93
3,074.65	0.26	1.88	3,074.53	8.77	-18.01	20.02	0.17	0.08	34.64
3,098.82	0.27	352.31	3,098.70	8.88	-18.02	20.08	0.19	0.04	-39.59
3,124.28	0.22	354.26	3,124.16	8.99	-18.03	20.14	0.20	-0.20	7.66
3,148.88	0.21	343.96	3,148.76	9.08	-18.05	20.20	0.16	-0.04	-41.87
3,174.99	0.25	350.30	3,174.87	9.19	-18.07	20.27	0.18	0.15	24.28
3,199.10	0.23	346.94	3,198.98	9.28	-18.09	20.33	0.10	-0.08	-13.94
3,224.99	0.24	345.73	3,224.87	9.39	-18.12	20.40	0.04	0.04	-4.67
3,249.04	0.29	1.28	3,248.92	9.50	-18.13	20.46	0.36	0.21	64.66
3,273.88	0.17	354.23	3,273.76	9.60	-18.13	20.51	0.50	-0.48	-28.38
3,299.75	0.25	340.98	3,299.63	9.69	-18.15	20.58	0.36	0.31	-51.22
3,323.77	0.10	331.81	3,323.65	9.76	-18.18	20.63	0.63	-0.62	-38.18
3,348.84	0.07	256.47	3,348.72	9.77	-18.21	20.66	0.43	-0.12	-300.52
3,370.37	0.18	196.92	3,370.25	9.74	-18.23	20.67	0.73	0.51	-276.59
Last SDI Gyro Survey									

Scientific Drilling International
Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well David Howard B-5
Project:	Weld County, CO	TVD Reference:	GL 5021' @ 5021.00ft (Halliburton 1668)
Site:	David Howard	MD Reference:	GL 5021' @ 5021.00ft (Halliburton 1668)
Well:	David Howard B-5	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Casper District

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
99.73	99.73	-0.11	0.01	First SDI Gyro Survey
3,370.37	3,370.25	9.74	-18.23	Last SDI Gyro Survey

Checked By: _____	Approved By: _____	Date: _____
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