



**Scientific  
Drilling**

## Survey Certification

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

<b>Operator</b>	KP Kauffman Co, Inc.
<b>Well Name &amp; No.</b>	David Howard B-1
<b>County &amp; State</b>	Weld County, CO
<b>SDI Job No.</b>	411113K79285
<b>Rig</b>	HALLIBURTON 1668
<b>Survey Date</b>	6-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 4884.52 feet is true and correct as determined from all available records.

Signature

2-Dec-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-1**

**OH**

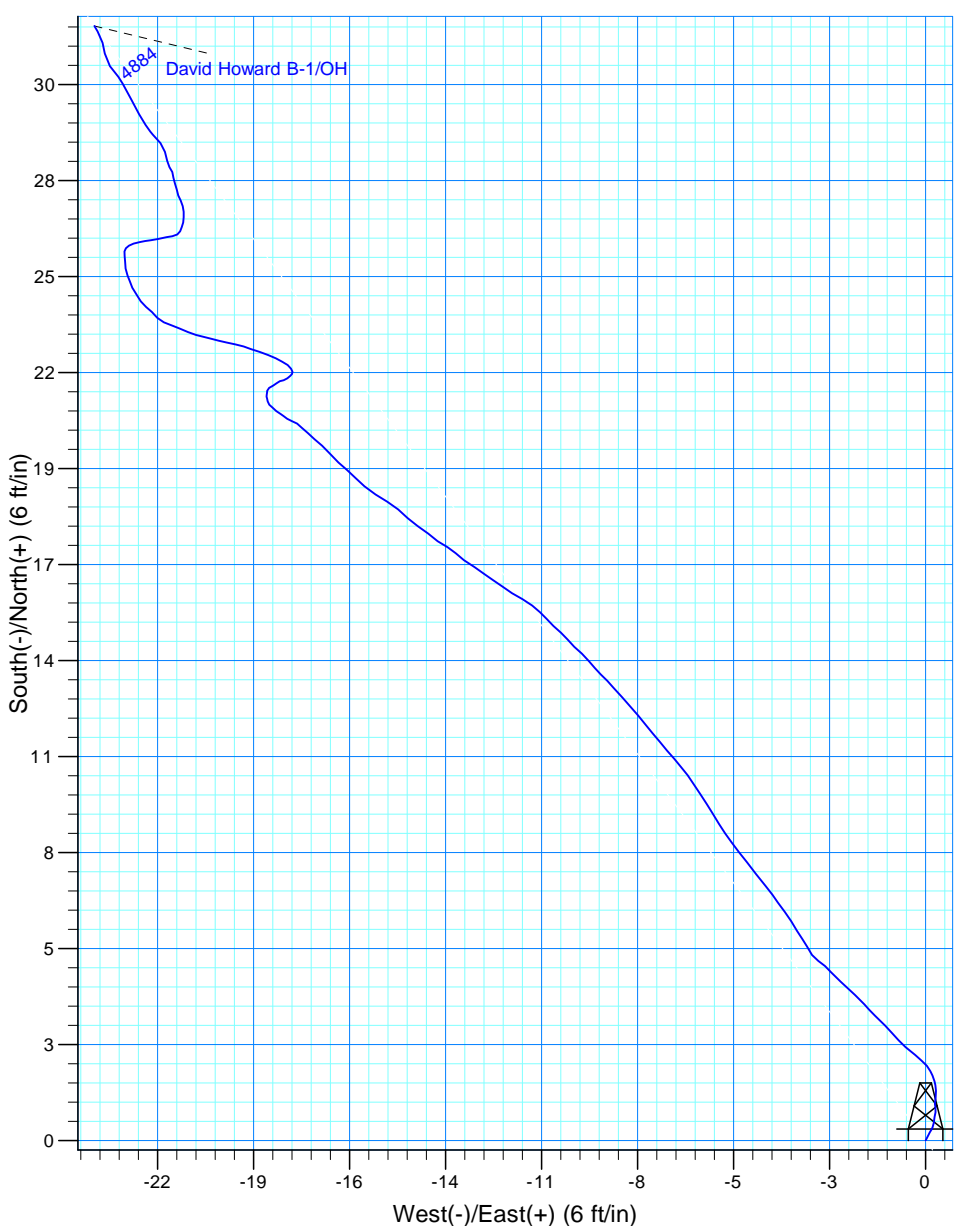
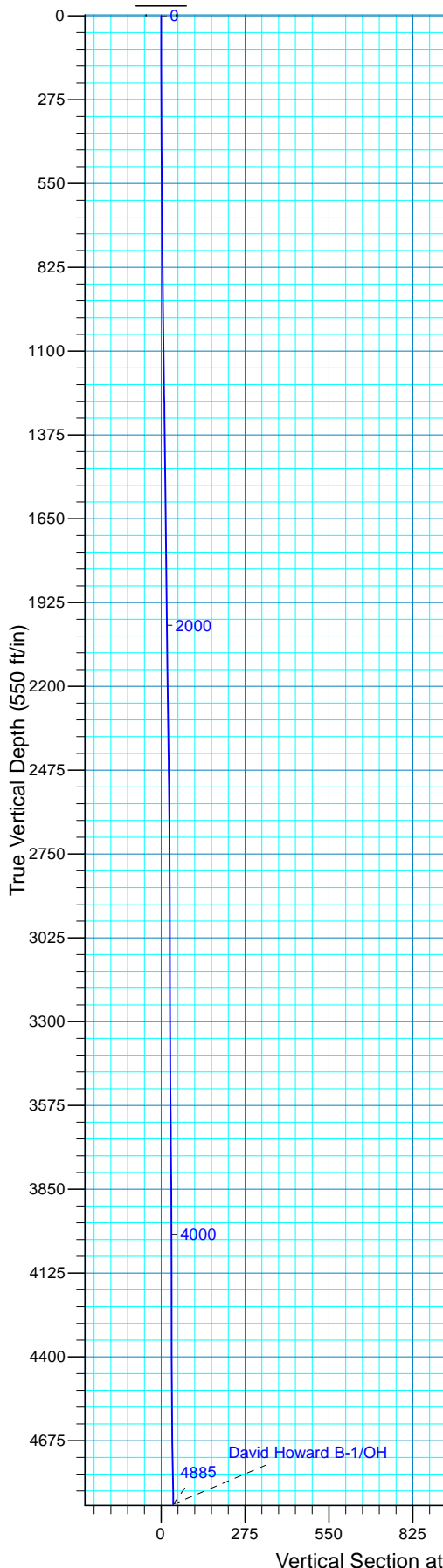
**Design: OH**

## **Standard Survey Report**

**02 December, 2013**



Project: Weld County, CO  
Site: David Howard  
Well: David Howard B-1  
Wellbore: OH  
Design: OH



WELL DETAILS: David Howard B-1

Ground Level:	5019.00		
Northing	Easting	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-1, True North  
Vertical (TVD) Reference: GL 5019' @ 5019.00ft (Halliburton 1668)  
Section (VS) Reference: Slot - (0.00N, 0.00E)  
Measured Depth Reference: GL 5019' @ 5019.00ft (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-1/OH)

Created By: Steven Gottschalk 18:02, December 02 2013

# Scientific Drilling International

## Survey Report

<b>Company:</b>	KP Kauffman Co, Inc.	<b>Local Co-ordinate Reference:</b>	Well David Howard B-1
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Site:</b>	David Howard	<b>MD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Well:</b>	David Howard B-1	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Casper District

<b>Project</b>	Weld County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	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-1, 690' FSL, 602' FEL, SEC 28 T1N R67W					
Well Position	+N/-S	0.00 ft	Northing:	1,249,478.33 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:	5,019.00 ft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2013	11/6/2013	8.61	66.63	52,587

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	323.30	

<b>Survey Program</b>	<b>Date</b>	12/2/2013			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
101.64	4,884.52	Survey #1 Surface Gyros (OH)	SDI Standard Keeper 103	SDI Standard Wireline Keeper ver 1.0.3	

<b>Survey</b>									
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101.64	0.20	27.09	101.64	0.16	0.08	0.08	0.20	0.20	0.00
<b>First SDI Gyro Survey</b>									
124.39	0.24	29.24	124.39	0.23	0.12	0.12	0.18	0.18	9.45
149.79	0.20	30.41	149.79	0.32	0.17	0.15	0.16	-0.16	4.61
173.84	0.17	15.33	173.84	0.39	0.20	0.19	0.24	-0.12	-62.70
199.35	0.17	25.80	199.35	0.46	0.23	0.23	0.12	0.00	41.04
223.98	0.21	355.73	223.98	0.54	0.24	0.29	0.43	0.16	-122.09
249.05	0.37	14.07	249.05	0.66	0.26	0.38	0.73	0.64	73.16
273.98	0.30	9.51	273.98	0.81	0.29	0.47	0.30	-0.28	-18.29
298.96	0.29	348.13	298.96	0.93	0.28	0.58	0.44	-0.04	-85.59

# Scientific Drilling International

## Survey Report

<b>Company:</b>	KP Kauffman Co, Inc.	<b>Local Co-ordinate Reference:</b>	Well David Howard B-1
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Site:</b>	David Howard	<b>MD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Well:</b>	David Howard B-1	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)
323.52	0.30	358.75	323.52	1.06	0.27	0.69	0.23	0.04	43.24
349.28	0.44	12.36	349.28	1.22	0.29	0.81	0.64	0.54	52.83
374.57	0.38	350.90	374.57	1.40	0.30	0.94	0.65	-0.24	-84.86
399.59	0.37	359.93	399.59	1.56	0.28	1.08	0.24	-0.04	36.09
424.52	0.37	338.29	424.52	1.72	0.25	1.22	0.56	0.00	-86.80
449.33	0.30	336.77	449.33	1.85	0.20	1.36	0.28	-0.28	-6.13
474.30	0.37	335.15	474.29	1.98	0.14	1.51	0.28	0.28	-6.49
499.08	0.49	319.65	499.07	2.14	0.04	1.69	0.67	0.48	-62.55
523.51	0.53	311.77	523.50	2.29	-0.11	1.91	0.33	0.16	-32.26
549.46	0.54	309.95	549.45	2.45	-0.30	2.14	0.08	0.04	-7.01
574.25	0.48	309.91	574.24	2.59	-0.47	2.36	0.24	-0.24	-0.16
599.11	0.49	311.51	599.10	2.73	-0.63	2.56	0.07	0.04	6.44
624.68	0.52	317.70	624.67	2.89	-0.79	2.79	0.24	0.12	24.21
649.39	0.48	317.77	649.38	3.05	-0.93	3.00	0.16	-0.16	0.28
674.13	0.60	315.52	674.12	3.22	-1.09	3.23	0.49	0.49	-9.09
698.49	0.55	317.66	698.48	3.39	-1.26	3.47	0.22	-0.21	8.78
724.36	0.60	311.37	724.34	3.58	-1.45	3.73	0.31	0.19	-24.31
749.06	0.57	318.76	749.04	3.75	-1.62	3.98	0.33	-0.12	29.92
773.77	0.59	316.83	773.75	3.94	-1.79	4.23	0.11	0.08	-7.81
799.63	0.62	315.12	799.61	4.13	-1.98	4.50	0.14	0.12	-6.61
824.32	0.58	310.47	824.30	4.31	-2.17	4.75	0.26	-0.16	-18.83
849.08	0.60	314.82	849.06	4.48	-2.36	5.00	0.20	0.08	17.57
874.91	0.52	311.34	874.89	4.66	-2.54	5.25	0.34	-0.31	-13.47
899.55	0.58	318.22	899.53	4.82	-2.71	5.49	0.36	0.24	27.92
924.17	0.57	313.91	924.14	5.00	-2.88	5.73	0.18	-0.04	-17.51
949.97	0.52	300.06	949.94	5.15	-3.07	5.96	0.54	-0.19	-53.68
974.23	0.66	324.33	974.20	5.32	-3.25	6.21	1.17	0.58	100.04
998.83	0.59	334.50	998.80	5.55	-3.39	6.47	0.53	-0.28	41.34
1,024.62	0.58	323.27	1,024.59	5.77	-3.52	6.73	0.45	-0.04	-43.54
1,049.50	0.76	328.36	1,049.47	6.01	-3.68	7.02	0.76	0.72	20.46
1,073.99	0.73	329.20	1,073.96	6.28	-3.85	7.34	0.13	-0.12	3.43
1,099.51	0.73	321.67	1,099.47	6.55	-4.03	7.66	0.38	0.00	-29.51
1,124.65	0.75	324.71	1,124.61	6.81	-4.23	7.99	0.18	0.08	12.09
1,149.79	0.51	326.09	1,149.75	7.04	-4.39	8.26	0.96	-0.95	5.49
1,173.91	1.01	320.58	1,173.87	7.29	-4.58	8.58	2.09	2.07	-22.84
1,199.14	1.02	321.22	1,199.09	7.64	-4.86	9.03	0.06	0.04	2.54
1,224.42	0.88	323.94	1,224.37	7.97	-5.12	9.45	0.58	-0.55	10.76
1,249.61	0.81	320.98	1,249.56	8.27	-5.34	9.82	0.33	-0.28	-11.75
1,274.77	0.76	324.37	1,274.71	8.54	-5.55	10.17	0.27	-0.20	13.47
1,299.69	0.72	323.53	1,299.63	8.80	-5.74	10.49	0.17	-0.16	-3.37
1,324.87	0.76	331.54	1,324.81	9.07	-5.92	10.81	0.44	0.16	31.81
1,349.99	0.75	326.01	1,349.93	9.36	-6.09	11.14	0.29	-0.04	-22.01
1,374.90	0.77	329.77	1,374.84	9.64	-6.26	11.47	0.22	0.08	15.09

# Scientific Drilling International

## Survey Report

<b>Company:</b>	KP Kauffman Co, Inc.	<b>Local Co-ordinate Reference:</b>	Well David Howard B-1
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Site:</b>	David Howard	<b>MD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Well:</b>	David Howard B-1	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)
1,399.09	0.78	324.10	1,399.02	9.91	-6.44	11.80	0.32	0.04	-23.44
1,424.73	0.76	328.44	1,424.66	10.20	-6.63	12.14	0.24	-0.08	16.93
1,449.78	0.73	322.16	1,449.71	10.46	-6.82	12.46	0.35	-0.12	-25.07
1,474.53	0.67	319.98	1,474.46	10.70	-7.01	12.77	0.27	-0.24	-8.81
1,499.56	0.70	321.29	1,499.49	10.93	-7.20	13.06	0.14	0.12	5.23
1,524.64	0.74	318.18	1,524.56	11.17	-7.40	13.38	0.22	0.16	-12.40
1,549.67	0.76	320.91	1,549.59	11.42	-7.61	13.71	0.16	0.08	10.91
1,574.56	0.70	319.77	1,574.48	11.66	-7.82	14.02	0.25	-0.24	-4.58
1,599.69	0.65	320.94	1,599.61	11.89	-8.00	14.32	0.21	-0.20	4.66
1,624.69	0.70	319.61	1,624.61	12.12	-8.19	14.61	0.21	0.20	-5.32
1,649.15	0.64	320.67	1,649.06	12.34	-8.38	14.90	0.25	-0.25	4.33
1,674.57	0.66	318.97	1,674.48	12.56	-8.56	15.19	0.11	0.08	-6.69
1,699.51	0.65	314.78	1,699.42	12.77	-8.76	15.47	0.20	-0.04	-16.80
1,724.44	0.59	322.47	1,724.35	12.97	-8.94	15.74	0.41	-0.24	30.85
1,749.24	0.65	314.27	1,749.15	13.17	-9.11	16.00	0.43	0.24	-33.06
1,774.29	0.55	315.30	1,774.20	13.35	-9.30	16.26	0.40	-0.40	4.11
1,799.18	0.60	317.82	1,799.09	13.53	-9.47	16.51	0.23	0.20	10.12
1,824.01	0.64	319.73	1,823.91	13.74	-9.65	16.78	0.18	0.16	7.69
1,849.10	0.68	314.15	1,849.00	13.95	-9.85	17.07	0.30	0.16	-22.24
1,873.97	0.68	311.40	1,873.87	14.15	-10.06	17.36	0.13	0.00	-11.06
1,899.79	0.59	321.45	1,899.69	14.35	-10.26	17.64	0.55	-0.35	38.92
1,924.40	0.67	311.66	1,924.30	14.55	-10.45	17.91	0.54	0.33	-39.78
1,949.14	0.65	313.36	1,949.04	14.74	-10.66	18.19	0.11	-0.08	6.87
1,974.93	0.63	318.99	1,974.82	14.95	-10.86	18.47	0.26	-0.08	21.83
1,998.69	0.66	311.22	1,998.58	15.14	-11.04	18.74	0.39	0.13	-32.70
2,024.09	0.68	309.70	2,023.98	15.33	-11.27	19.03	0.11	0.08	-5.98
2,049.50	0.84	296.96	2,049.39	15.51	-11.55	19.34	0.91	0.63	-50.14
2,073.91	0.76	304.72	2,073.80	15.68	-11.85	19.65	0.55	-0.33	31.79
2,099.27	0.72	304.60	2,099.15	15.87	-12.11	19.96	0.16	-0.16	-0.47
2,124.75	0.78	303.25	2,124.63	16.05	-12.39	20.28	0.25	0.24	-5.30
2,148.95	0.72	307.34	2,148.83	16.24	-12.65	20.58	0.33	-0.25	16.90
2,174.51	0.77	302.79	2,174.39	16.43	-12.92	20.89	0.30	0.20	-17.80
2,199.89	0.85	305.07	2,199.77	16.63	-13.22	21.23	0.34	0.32	8.98
2,224.18	0.62	315.54	2,224.05	16.83	-13.46	21.53	1.09	-0.95	43.10
2,249.45	0.69	298.72	2,249.32	17.00	-13.69	21.81	0.81	0.28	-66.56
2,274.73	0.82	303.39	2,274.60	17.17	-13.97	22.12	0.57	0.51	18.47
2,298.86	0.84	312.48	2,298.73	17.38	-14.25	22.45	0.55	0.08	37.67
2,324.20	0.84	298.93	2,324.06	17.60	-14.55	22.80	0.78	0.00	-53.47
2,349.49	0.86	318.20	2,349.35	17.83	-14.84	23.16	1.13	0.08	76.20
2,374.00	0.89	308.74	2,373.86	18.09	-15.11	23.53	0.60	0.12	-38.60
2,399.23	0.85	299.41	2,399.09	18.30	-15.42	23.89	0.58	-0.16	-36.98
2,424.63	0.93	304.23	2,424.48	18.51	-15.76	24.26	0.43	0.31	18.98
2,449.89	0.85	309.03	2,449.74	18.74	-16.07	24.63	0.43	-0.32	19.00

# Scientific Drilling International

## Survey Report

<b>Company:</b>	KP Kauffman Co, Inc.	<b>Local Co-ordinate Reference:</b>	Well David Howard B-1
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Site:</b>	David Howard	<b>MD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Well:</b>	David Howard B-1	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)	
2,473.99	0.79	317.05	2,473.84	18.98	-16.32	24.97	0.54	-0.25	33.28	
2,498.88	0.78	309.90	2,498.73	19.21	-16.57	25.31	0.40	-0.04	-28.73	
2,524.03	0.72	312.51	2,523.87	19.43	-16.82	25.63	0.27	-0.24	10.38	
2,549.42	0.83	319.07	2,549.26	19.67	-17.06	25.97	0.56	0.43	25.84	
2,574.65	0.66	309.92	2,574.49	19.91	-17.29	26.29	0.82	-0.67	-36.27	
2,599.89	0.62	312.20	2,599.73	20.09	-17.50	26.57	0.19	-0.16	9.03	
2,623.52	0.65	311.81	2,623.36	20.27	-17.70	26.82	0.13	0.13	-1.65	
2,648.69	0.41	312.03	2,648.52	20.42	-17.87	27.05	0.95	-0.95	0.87	
2,673.98	0.38	308.46	2,673.81	20.53	-18.00	27.22	0.15	-0.12	-14.12	
2,699.18	0.33	283.49	2,699.01	20.60	-18.14	27.36	0.64	-0.20	-99.09	
2,724.31	0.43	304.54	2,724.14	20.67	-18.29	27.50	0.68	0.40	83.76	
2,749.50	0.20	309.19	2,749.33	20.75	-18.40	27.64	0.92	-0.91	18.46	
2,774.65	0.24	300.31	2,774.48	20.81	-18.48	27.73	0.21	0.16	-35.31	
2,799.67	0.43	309.80	2,799.50	20.90	-18.59	27.87	0.79	0.76	37.93	
2,824.60	0.32	312.72	2,824.43	21.00	-18.72	28.03	0.45	-0.44	11.71	
2,848.92	0.21	319.48	2,848.75	21.08	-18.80	28.14	0.47	-0.45	27.80	
2,874.60	0.27	343.83	2,874.43	21.18	-18.84	28.24	0.46	0.23	94.82	
2,899.46	0.13	348.41	2,899.29	21.26	-18.87	28.32	0.57	-0.56	18.42	
2,924.94	0.08	351.11	2,924.77	21.31	-18.87	28.36	0.20	-0.20	10.60	
2,949.75	0.17	10.04	2,949.58	21.36	-18.87	28.40	0.39	0.36	76.30	
2,974.50	0.11	356.27	2,974.33	21.42	-18.87	28.45	0.28	-0.24	-55.64	
2,999.22	0.16	13.49	2,999.05	21.48	-18.86	28.49	0.26	0.20	69.66	
3,023.94	0.32	45.60	3,023.77	21.56	-18.80	28.52	0.82	0.65	129.89	
3,049.72	0.31	72.68	3,049.55	21.63	-18.68	28.51	0.57	-0.04	105.04	
3,074.43	0.27	37.63	3,074.26	21.70	-18.58	28.50	0.72	-0.16	-141.85	
3,099.12	0.26	78.10	3,098.95	21.75	-18.49	28.49	0.74	-0.04	163.91	
3,124.97	0.23	71.23	3,124.80	21.78	-18.39	28.45	0.16	-0.12	-26.58	
3,149.55	0.33	56.67	3,149.38	21.84	-18.28	28.43	0.50	0.41	-59.24	
3,174.63	0.17	37.18	3,174.46	21.91	-18.20	28.44	0.71	-0.64	-77.71	
3,199.24	0.17	43.98	3,199.07	21.96	-18.15	28.46	0.08	0.00	27.63	
3,224.99	0.16	347.38	3,224.82	22.02	-18.13	28.49	0.61	-0.04	-219.81	
3,249.61	0.30	327.35	3,249.44	22.11	-18.18	28.59	0.65	0.57	-81.36	
3,274.92	0.35	306.89	3,274.75	22.21	-18.27	28.73	0.50	0.20	-80.84	
3,299.78	0.52	298.41	3,299.61	22.31	-18.43	28.91	0.73	0.68	-34.11	
3,323.95	0.43	295.77	3,323.78	22.40	-18.61	29.09	0.38	-0.37	-10.92	
3,349.64	0.62	291.48	3,349.47	22.50	-18.83	29.29	0.75	0.74	-16.70	
3,374.05	0.63	289.88	3,373.87	22.59	-19.08	29.51	0.08	0.04	-6.55	
3,399.81	0.56	286.93	3,399.63	22.68	-19.33	29.73	0.30	-0.27	-11.45	
3,423.96	0.44	291.74	3,423.78	22.74	-19.53	29.91	0.53	-0.50	19.92	
3,449.85	0.68	280.02	3,449.67	22.81	-19.77	30.10	1.02	0.93	-45.27	
3,474.85	0.50	285.79	3,474.67	22.86	-20.02	30.30	0.76	-0.72	23.08	
3,499.35	0.57	279.69	3,499.17	22.91	-20.25	30.47	0.37	0.29	-24.90	
3,524.23	0.52	290.48	3,524.05	22.97	-20.47	30.66	0.46	-0.20	43.37	
3,549.78	0.51	276.44	3,549.60	23.03	-20.70	30.83	0.49	-0.04	-54.95	

# Scientific Drilling International

## Survey Report

<b>Company:</b>	KP Kauffman Co, Inc.	<b>Local Co-ordinate Reference:</b>	Well David Howard B-1
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Site:</b>	David Howard	<b>MD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Well:</b>	David Howard B-1	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)
3,573.91	0.49	291.31	3,573.72	23.08	-20.90	30.99	0.54	-0.08	61.62
3,599.50	0.60	288.78	3,599.31	23.16	-21.13	31.20	0.44	0.43	-9.89
3,624.31	0.59	295.86	3,624.12	23.26	-21.37	31.42	0.30	-0.04	28.54
3,649.41	0.50	288.97	3,649.22	23.35	-21.59	31.62	0.44	-0.36	-27.45
3,674.75	0.63	292.43	3,674.56	23.44	-21.82	31.83	0.53	0.51	13.65
3,698.95	0.48	322.07	3,698.76	23.57	-22.00	32.05	1.32	-0.62	122.48
3,724.56	0.52	310.48	3,724.37	23.73	-22.16	32.27	0.42	0.16	-45.26
3,749.45	0.53	311.02	3,749.26	23.88	-22.33	32.49	0.04	0.04	2.17
3,774.75	0.47	325.28	3,774.56	24.04	-22.48	32.71	0.54	-0.24	56.36
3,799.65	0.61	327.55	3,799.45	24.24	-22.61	32.94	0.57	0.56	9.12
3,824.51	0.44	333.13	3,824.31	24.43	-22.72	33.17	0.71	-0.68	22.45
3,849.27	0.44	342.49	3,849.07	24.61	-22.79	33.35	0.29	0.00	37.80
3,874.23	0.41	337.04	3,874.03	24.78	-22.86	33.53	0.20	-0.12	-21.83
3,899.83	0.51	349.31	3,899.63	24.98	-22.91	33.72	0.55	0.39	47.93
3,925.00	0.40	2.64	3,924.80	25.18	-22.93	33.89	0.60	-0.44	52.96
3,949.47	0.35	350.67	3,949.27	25.33	-22.94	34.02	0.38	-0.20	-48.92
3,973.94	0.28	4.34	3,973.74	25.47	-22.95	34.13	0.42	-0.29	55.86
3,999.78	0.22	47.83	3,999.58	25.56	-22.90	34.19	0.75	-0.23	168.30
4,024.57	0.29	51.71	4,024.37	25.64	-22.82	34.19	0.29	0.28	15.65
4,049.13	0.40	76.77	4,048.93	25.69	-22.69	34.16	0.75	0.45	102.04
4,074.65	0.40	77.58	4,074.45	25.73	-22.51	34.09	0.02	0.00	3.17
4,099.44	0.35	80.75	4,099.24	25.76	-22.36	34.02	0.22	-0.20	12.79
4,124.17	0.41	81.81	4,123.97	25.79	-22.19	33.94	0.24	0.24	4.29
4,148.94	0.59	78.21	4,148.74	25.83	-21.98	33.84	0.74	0.73	-14.53
4,174.75	0.47	78.80	4,174.55	25.88	-21.75	33.74	0.47	-0.46	2.29
4,199.04	0.35	81.94	4,198.83	25.90	-21.58	33.66	0.50	-0.49	12.93
4,224.63	0.33	58.97	4,224.42	25.95	-21.43	33.62	0.53	-0.08	-89.76
4,249.00	0.29	21.75	4,248.79	26.05	-21.35	33.64	0.83	-0.16	-152.73
4,274.37	0.30	20.03	4,274.16	26.17	-21.31	33.71	0.05	0.04	-6.78
4,299.02	0.33	14.22	4,298.81	26.30	-21.27	33.79	0.18	0.12	-23.57
4,324.50	0.35	358.45	4,324.29	26.45	-21.25	33.90	0.37	0.08	-61.89
4,349.96	0.37	359.34	4,349.75	26.61	-21.25	34.03	0.08	0.08	3.50
4,373.96	0.42	341.54	4,373.75	26.77	-21.28	34.18	0.55	0.21	-74.17
4,399.33	0.38	338.01	4,399.12	26.93	-21.34	34.35	0.19	-0.16	-13.91
4,424.88	0.33	332.18	4,424.67	27.08	-21.41	34.51	0.24	-0.20	-22.82
4,449.05	0.48	353.75	4,448.84	27.24	-21.45	34.66	0.87	0.62	89.24
4,474.39	0.38	331.38	4,474.18	27.42	-21.50	34.84	0.76	-0.39	-88.28
4,499.63	0.38	1.52	4,499.42	27.58	-21.54	34.98	0.78	0.00	119.41
4,524.98	0.40	334.77	4,524.77	27.74	-21.58	35.14	0.72	0.08	-105.52
4,549.85	0.36	326.59	4,549.64	27.88	-21.66	35.30	0.27	-0.16	-32.89
4,574.88	0.54	348.95	4,574.67	28.07	-21.72	35.49	0.99	0.72	89.33
4,599.50	0.66	344.56	4,599.29	28.32	-21.78	35.72	0.52	0.49	-17.83
4,624.36	0.70	319.63	4,624.14	28.57	-21.92	36.01	1.19	0.16	-100.28



# Scientific Drilling International

## Survey Report

<b>Company:</b>	KP Kauffman Co, Inc.	<b>Local Co-ordinate Reference:</b>	Well David Howard B-1
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Site:</b>	David Howard	<b>MD Reference:</b>	GL 5019' @ 5019.00ft (Halliburton 1668)
<b>Well:</b>	David Howard B-1	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)
4,649.50	0.79	317.69	4,649.28	28.82	-22.14	36.33	0.37	0.36	-7.72
4,674.50	0.86	327.65	4,674.28	29.10	-22.35	36.69	0.64	0.28	39.84
4,699.62	0.92	333.47	4,699.40	29.44	-22.54	37.08	0.43	0.24	23.17
4,724.56	0.93	329.58	4,724.33	29.79	-22.74	37.48	0.25	0.04	-15.60
4,749.70	0.90	332.77	4,749.47	30.15	-22.93	37.87	0.24	-0.12	12.69
4,773.83	0.89	324.60	4,773.60	30.47	-23.12	38.25	0.53	-0.04	-33.86
4,798.63	0.92	320.78	4,798.39	30.78	-23.36	38.64	0.27	0.12	-15.40
4,824.96	0.87	354.84	4,824.72	31.14	-23.51	39.02	2.00	-0.19	129.36
4,849.63	0.60	339.26	4,849.39	31.45	-23.58	39.30	1.35	-1.09	-63.15
4,874.85	1.00	334.83	4,874.61	31.77	-23.72	39.65	1.60	1.59	-17.57
4,884.52	1.15	323.04	4,884.27	31.93	-23.81	39.83	2.76	1.55	-121.92
Last SDI Gyro Survey									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
101.64	101.64	0.16	0.08	First SDI Gyro Survey
4,884.52	4,884.27	31.93	-23.81	Last SDI Gyro Survey

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_