



**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.	Suckla-Brown Unit Nav No.7
County & State	Weld County, CO
SDI Job No.	410214K119727
Rig	KPK 2
Survey Date	27-Feb-2014

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 4844.92 feet is true and correct as determined from all available records.

Signature

17-Mar-2014

Date

Steven F. Gottschalk

Rockies Region Well Planner
Scientific Drilling - Rocky Mountain District

KP Kauffman Co, Inc.

Weld County, CO

Suckla-Brown

Suckla-Brown Unit Nav No.7

OH

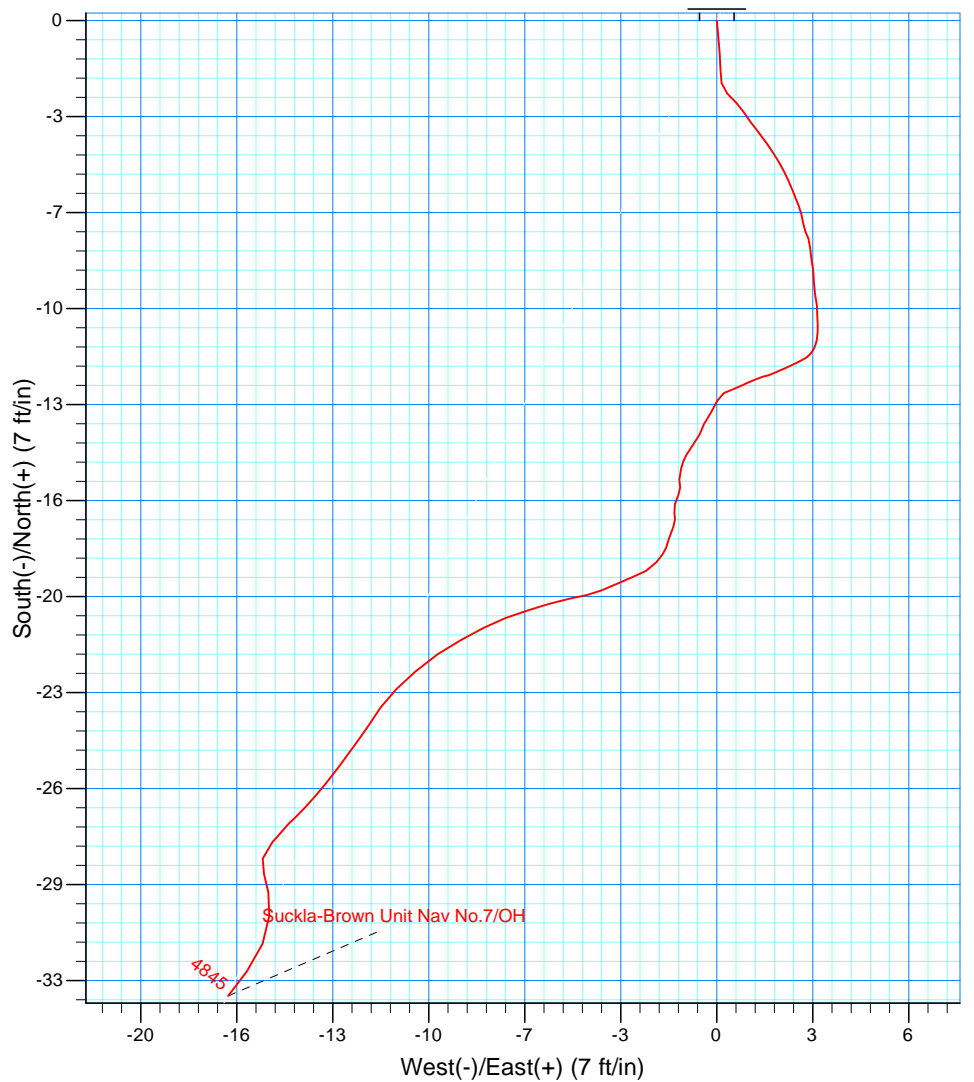
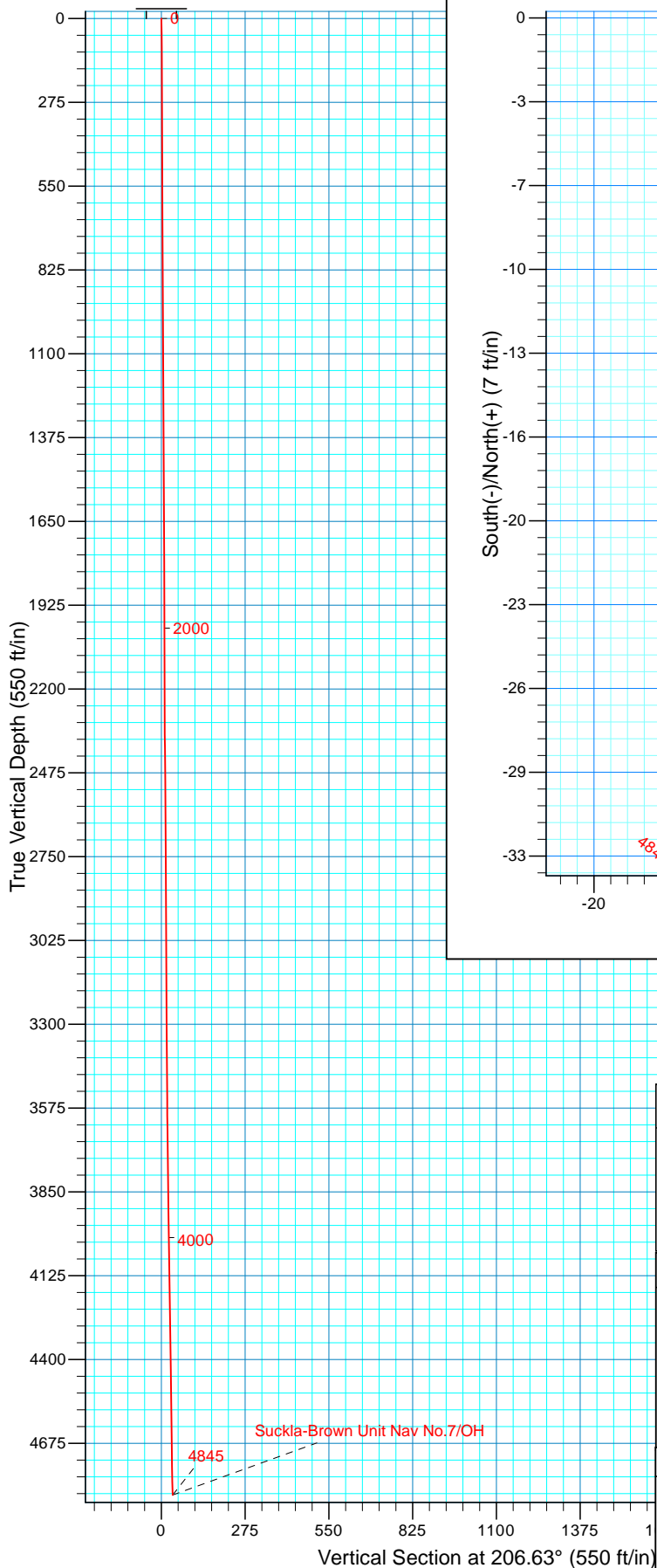
Survey: Survey #1 Surface Gyro

Standard Survey Report

17 March, 2014



Project: Weld County, CO
Site: Suckla-Brown
Well: Suckla-Brown Unit Nav No.7
Wellbore: OH
Design: OH



WELL DETAILS: Suckla-Brown Unit Nav No.7

Northing	Easting	Ground Level: 5058.00 Latitude	Longitude
1265290.55	3172421.48	40° 3' 35.885 N	104° 53' 2.400 W

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Suckla-Brown Unit Nav No.7, True North
Vertical (TVD) Reference: GL 5058' @ 5058.00ft (Ground Level)
Section (VS) Reference: Slot - (0.00N, 0.00E)
Measured Depth Reference: GL 5058' @ 5058.00ft (Ground Level)
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 (Suckla-Brown Unit Nav No.7/OH)

Created By: Steve Gottschalk

17:08, March 17 2014

Scientific Drilling International

Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well Suckla-Brown Unit Nav No.7
Project:	Weld County, CO	TVD Reference:	GL 5058' @ 5058.00ft (Ground Level)
Site:	Suckla-Brown	MD Reference:	GL 5058' @ 5058.00ft (Ground Level)
Well:	Suckla-Brown Unit Nav No.7	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		Suckla-Brown			
Site Position:		Northing:	1,265,290.56 usft	Latitude:	40° 3' 35.885 N
From:	Lat/Long	Easting:	3,172,421.48 usft	Longitude:	104° 53' 2.400 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.40 °

Well	Suckla-Brown Unit Nav No.7, 660' FSL, 660' FWL, SEC10 T1N R67W					
Well Position	+N/-S	0.00 ft	Northing:	1,265,290.55 usft	Latitude:	40° 3' 35.885 N
	+E/-W	0.00 ft	Easting:	3,172,421.48 usft	Longitude:	104° 53' 2.400 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	5,058.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	2/27/2014	8.58	66.65	52,572

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	206.63	

Survey Program	Date	3/17/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
49.83	4,844.92	Survey #1 Surface Gyro (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
49.83	0.94	174.68	49.83	-0.41	0.04	0.35	1.89	1.89	0.00
First SDI Gyro Survey									
99.97	0.69	175.66	99.96	-1.12	0.10	0.95	0.50	-0.50	1.95
149.62	0.58	179.29	149.61	-1.67	0.12	1.43	0.24	-0.22	7.31
199.13	0.48	170.35	199.12	-2.12	0.16	1.82	0.26	-0.20	-18.06
249.00	0.51	133.47	248.99	-2.48	0.36	2.06	0.63	0.06	-73.95
299.95	0.45	137.00	299.93	-2.78	0.66	2.19	0.13	-0.12	6.93
348.98	0.45	146.81	348.96	-3.08	0.90	2.36	0.16	0.00	20.01
399.67	0.53	143.62	399.65	-3.44	1.14	2.56	0.17	0.16	-6.29
449.95	0.45	138.99	449.93	-3.78	1.41	2.74	0.18	-0.16	-9.21

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Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well Suckla-Brown Unit Nav No.7
Project:	Weld County, CO	TVD Reference:	GL 5058' @ 5058.00ft (Ground Level)
Site:	Suckla-Brown	MD Reference:	GL 5058' @ 5058.00ft (Ground Level)
Well:	Suckla-Brown Unit Nav No.7	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)
499.28	0.52	150.42	499.26	-4.12	1.65	2.94	0.24	0.14	23.17
549.60	0.41	137.81	549.58	-4.45	1.88	3.13	0.30	-0.22	-25.06
598.90	0.38	155.49	598.87	-4.73	2.07	3.30	0.25	-0.06	35.86
649.18	0.39	149.81	649.15	-5.03	2.22	3.50	0.08	0.02	-11.30
699.74	0.29	155.10	699.71	-5.29	2.36	3.67	0.21	-0.20	10.46
748.79	0.32	157.58	748.76	-5.53	2.47	3.84	0.07	0.06	5.06
799.32	0.28	154.05	799.29	-5.77	2.58	4.01	0.09	-0.08	-6.99
849.58	0.33	163.46	849.55	-6.02	2.67	4.19	0.14	0.10	18.72
899.72	0.30	151.06	899.69	-6.28	2.78	4.37	0.15	-0.06	-24.73
949.55	0.36	173.12	949.52	-6.55	2.86	4.57	0.28	0.12	44.27
999.01	0.40	163.80	998.98	-6.87	2.93	4.83	0.15	0.08	-18.84
1,048.79	0.29	165.22	1,048.76	-7.15	3.01	5.05	0.22	-0.22	2.85
1,099.95	0.29	147.93	1,099.92	-7.39	3.11	5.21	0.17	0.00	-33.80
1,149.79	0.45	183.61	1,149.75	-7.69	3.16	5.46	0.55	0.32	71.59
1,199.17	0.43	162.20	1,199.13	-8.06	3.21	5.77	0.33	-0.04	-43.36
1,248.90	0.46	179.85	1,248.86	-8.44	3.26	6.08	0.28	0.06	35.49
1,299.59	0.50	174.09	1,299.55	-8.86	3.29	6.45	0.12	0.08	-11.36
1,349.27	0.43	174.14	1,349.23	-9.26	3.33	6.79	0.14	-0.14	0.10
1,399.92	0.49	167.41	1,399.88	-9.66	3.40	7.12	0.16	0.12	-13.29
1,449.46	0.48	188.24	1,449.42	-10.08	3.41	7.48	0.35	-0.02	42.05
1,499.08	0.45	173.64	1,499.03	-10.48	3.40	7.84	0.25	-0.06	-29.42
1,549.86	0.29	194.80	1,549.81	-10.80	3.39	8.13	0.41	-0.32	41.67
1,598.73	0.31	196.57	1,598.68	-11.04	3.32	8.38	0.05	0.04	3.62
1,649.15	0.30	227.73	1,649.10	-11.26	3.19	8.64	0.33	-0.02	61.80
1,699.78	0.17	226.80	1,699.73	-11.40	3.03	8.83	0.26	-0.26	-1.84
1,748.65	0.23	247.15	1,748.60	-11.49	2.89	8.98	0.19	0.12	41.64
1,799.09	0.22	236.60	1,799.04	-11.58	2.72	9.14	0.08	-0.02	-20.92
1,849.68	0.24	251.91	1,849.63	-11.67	2.54	9.30	0.13	0.04	30.26
1,899.93	0.29	240.54	1,899.88	-11.77	2.32	9.48	0.14	0.10	-22.63
1,949.26	0.22	252.33	1,949.21	-11.86	2.13	9.65	0.18	-0.14	23.90
1,999.39	0.27	241.26	1,999.34	-11.94	1.93	9.81	0.14	0.10	-22.08
2,049.30	0.17	259.73	2,049.25	-12.01	1.75	9.95	0.24	-0.20	37.01
2,099.68	0.30	254.00	2,099.63	-12.06	1.55	10.09	0.26	0.26	-11.37
2,149.63	0.27	242.82	2,149.58	-12.15	1.32	10.27	0.13	-0.06	-22.38
2,198.90	0.38	251.14	2,198.85	-12.26	1.07	10.48	0.24	0.22	16.89
2,249.82	0.33	241.19	2,249.77	-12.38	0.78	10.72	0.16	-0.10	-19.54
2,298.97	0.30	251.34	2,298.91	-12.49	0.53	10.93	0.13	-0.06	20.65
2,349.77	0.40	245.17	2,349.71	-12.61	0.24	11.16	0.21	0.20	-12.15
2,398.83	0.48	199.38	2,398.77	-12.87	0.02	11.50	0.71	0.16	-93.33
2,449.56	0.55	216.47	2,449.50	-13.27	-0.19	11.95	0.33	0.14	33.69
2,499.99	0.53	203.76	2,499.93	-13.68	-0.43	12.42	0.24	-0.04	-25.20
2,548.94	0.35	204.34	2,548.88	-14.02	-0.58	12.80	0.37	-0.37	1.18
2,599.58	0.54	216.28	2,599.51	-14.36	-0.79	13.19	0.42	0.38	23.58

Scientific Drilling International

Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well Suckla-Brown Unit Nav No.7
Project:	Weld County, CO	TVD Reference:	GL 5058' @ 5058.00ft (Ground Level)
Site:	Suckla-Brown	MD Reference:	GL 5058' @ 5058.00ft (Ground Level)
Well:	Suckla-Brown Unit Nav No.7	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)
2,649.71	0.41	211.43	2,649.64	-14.70	-1.02	13.60	0.27	-0.26	-9.67
2,698.95	0.16	193.75	2,698.88	-14.92	-1.13	13.84	0.53	-0.51	-35.91
2,748.92	0.45	198.31	2,748.85	-15.17	-1.21	14.10	0.58	0.58	9.13
2,799.60	0.42	177.66	2,799.53	-15.54	-1.26	14.46	0.31	-0.06	-40.75
2,849.86	0.20	168.72	2,849.79	-15.82	-1.24	14.69	0.45	-0.44	-17.79
2,899.71	0.41	205.58	2,899.64	-16.06	-1.30	14.94	0.56	0.42	73.94
2,948.68	0.40	194.49	2,948.61	-16.38	-1.42	15.28	0.16	-0.02	-22.65
2,999.39	0.27	166.66	2,999.32	-16.67	-1.43	15.55	0.40	-0.26	-54.88
3,049.69	0.22	182.85	3,049.62	-16.88	-1.41	15.73	0.17	-0.10	32.19
3,099.15	0.37	199.50	3,099.08	-17.13	-1.47	15.97	0.35	0.30	33.66
3,149.58	0.27	201.44	3,149.50	-17.39	-1.57	16.25	0.20	-0.20	3.85
3,198.76	0.29	195.49	3,198.68	-17.62	-1.64	16.49	0.07	0.04	-12.10
3,249.24	0.27	198.88	3,249.16	-17.86	-1.72	16.73	0.05	-0.04	6.72
3,298.76	0.31	216.45	3,298.68	-18.08	-1.83	16.98	0.20	0.08	35.48
3,348.77	0.48	218.63	3,348.69	-18.35	-2.04	17.32	0.34	0.34	4.36
3,399.78	0.56	240.63	3,399.70	-18.64	-2.40	17.73	0.42	0.16	43.13
3,449.09	0.66	249.50	3,449.01	-18.85	-2.87	18.14	0.28	0.20	17.99
3,498.74	0.66	243.78	3,498.65	-19.08	-3.40	18.58	0.13	0.00	-11.52
3,549.20	0.57	249.81	3,549.11	-19.30	-3.89	18.99	0.22	-0.18	11.95
3,598.79	0.63	255.45	3,598.70	-19.45	-4.39	19.35	0.17	0.12	11.37
3,649.25	0.74	260.70	3,649.15	-19.57	-4.98	19.73	0.25	0.22	10.40
3,699.97	0.82	250.72	3,699.87	-19.74	-5.64	20.18	0.31	0.16	-19.68
3,749.09	0.95	254.92	3,748.98	-19.97	-6.37	20.70	0.30	0.26	8.55
3,799.81	0.92	247.50	3,799.70	-20.23	-7.15	21.29	0.25	-0.06	-14.63
3,848.80	0.96	243.90	3,848.68	-20.56	-7.88	21.91	0.15	0.08	-7.35
3,899.46	1.06	239.87	3,899.33	-20.99	-8.67	22.64	0.24	0.20	-7.95
3,948.27	1.06	238.29	3,948.13	-21.45	-9.44	23.41	0.06	0.00	-3.24
3,999.50	1.09	225.89	3,999.36	-22.04	-10.20	24.27	0.46	0.06	-24.20
4,049.28	0.94	228.37	4,049.13	-22.64	-10.84	25.10	0.31	-0.30	4.98
4,099.96	0.94	213.60	4,099.80	-23.26	-11.38	25.89	0.48	0.00	-29.14
4,149.73	0.98	213.57	4,149.56	-23.96	-11.84	26.72	0.08	0.08	-0.06
4,199.41	0.76	217.92	4,199.24	-24.57	-12.28	27.47	0.46	-0.44	8.76
4,249.87	0.74	215.77	4,249.69	-25.10	-12.68	28.12	0.07	-0.04	-4.26
4,299.57	0.65	218.86	4,299.39	-25.58	-13.04	28.71	0.20	-0.18	6.22
4,348.77	0.82	216.32	4,348.59	-26.08	-13.43	29.33	0.35	0.35	-5.16
4,399.56	0.90	228.27	4,399.37	-26.64	-13.94	30.06	0.39	0.16	23.53
4,448.96	0.94	221.28	4,448.76	-27.20	-14.50	30.81	0.24	0.08	-14.15
4,498.88	0.97	222.06	4,498.68	-27.82	-15.05	31.61	0.07	0.06	1.56
4,549.81	0.53	188.71	4,549.60	-28.37	-15.37	32.25	1.18	-0.86	-65.48
4,599.59	0.70	163.89	4,599.38	-28.89	-15.32	32.70	0.63	0.34	-49.86
4,648.82	0.78	170.05	4,648.61	-29.51	-15.18	33.19	0.23	0.16	12.51
4,699.92	1.02	183.31	4,699.70	-30.31	-15.15	33.88	0.62	0.47	25.95
4,749.42	1.28	201.68	4,749.19	-31.26	-15.38	34.84	0.90	0.53	37.11

Scientific Drilling International

Survey Report

Company:	KP Kauffman Co, Inc.	Local Co-ordinate Reference:	Well Suckla-Brown Unit Nav No.7
Project:	Weld County, CO	TVD Reference:	GL 5058' @ 5058.00ft (Ground Level)
Site:	Suckla-Brown	MD Reference:	GL 5058' @ 5058.00ft (Ground Level)
Well:	Suckla-Brown Unit Nav No.7	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)	
4,799.59	1.22	217.70	4,799.35	-32.21	-15.91	35.92	0.70	-0.12	31.93	
4,844.92	1.39	217.47	4,844.67	-33.02	-16.54	36.94	0.38	0.38	-0.51	
Last SDI Gyro Survey										

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
49.83	49.83	-0.41	0.04	First SDI Gyro Survey	
4,844.92	4,844.67	-33.02	-16.54	Last SDI Gyro Survey	

Checked By: _____ Approved By: _____ Date: _____