



Piceance Energy, LLC

**Mesa County, CO
Gunderson
Gunderson 29-13E**

Slot B-9

Survey: Survey #1

Standard Survey Report

21 April, 2015

Archer



Project: Mesa County, CO
Site: Gunderson
Well: Gunderson 29-13E
Wellbore: Slot B-9
Design: Design #1
Latitude: 39.248811
Longitude: -107.787831
Ground Level: 7531.00
Well @ 7553.00usft

Archer

PROJECT DETAILS: Mesa County, CO

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Central Zone
System Datum: Mean Sea Level

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Gunderson 29-13E, True North
Vertical (TVD) Reference: Well @ 7553.00usft
Section (VS) Reference: Slot - (0.00N, 0.00E)
Measured Depth Reference: Well @ 7553.00usft
Calculation Method: Minimum Curvature

WELL DETAILS: Gunderson 29-13E

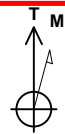
+N/-S	+E/-W	Northing	Ground Level: Easting	7531.00 Latitude	Longitude	Slot
0.00	0.00	1523671.505	2352174.270	39.248811	-107.787831	

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Gunderson 29-13E tgt	7765.00	-733.95	295.64	1522930.341	2352451.330	39.246796	-107.786787	Circle (Radius: 50.00)

SECTION DETAILS

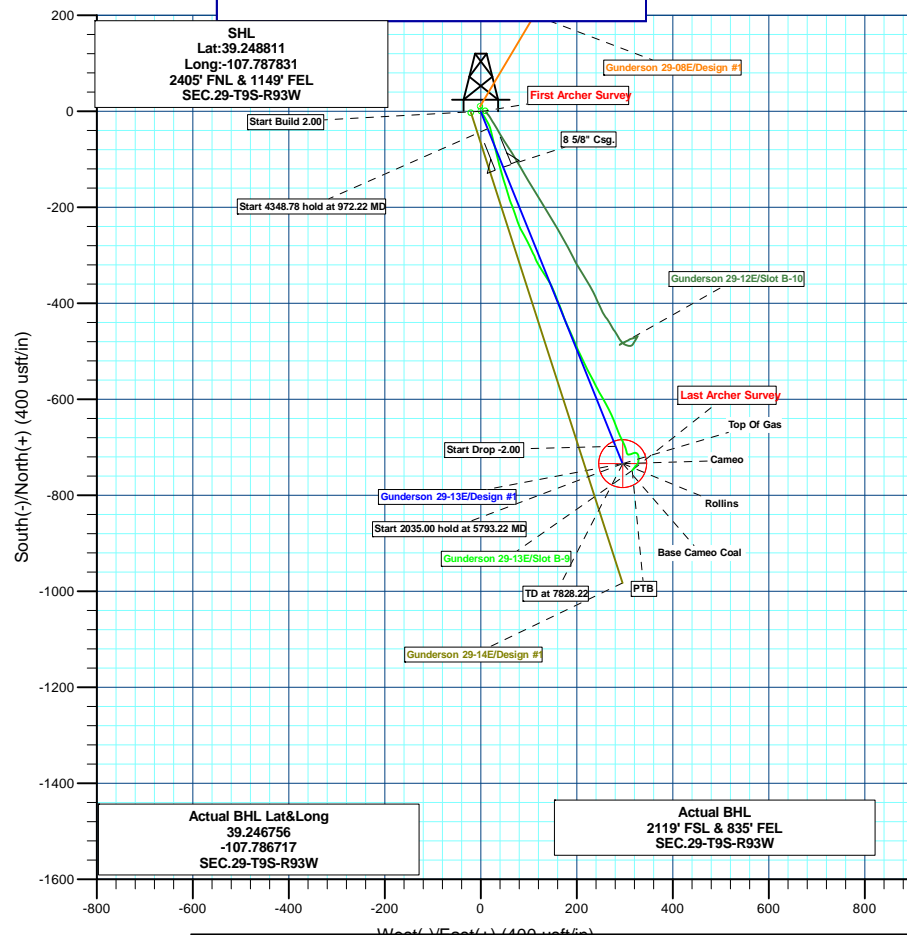
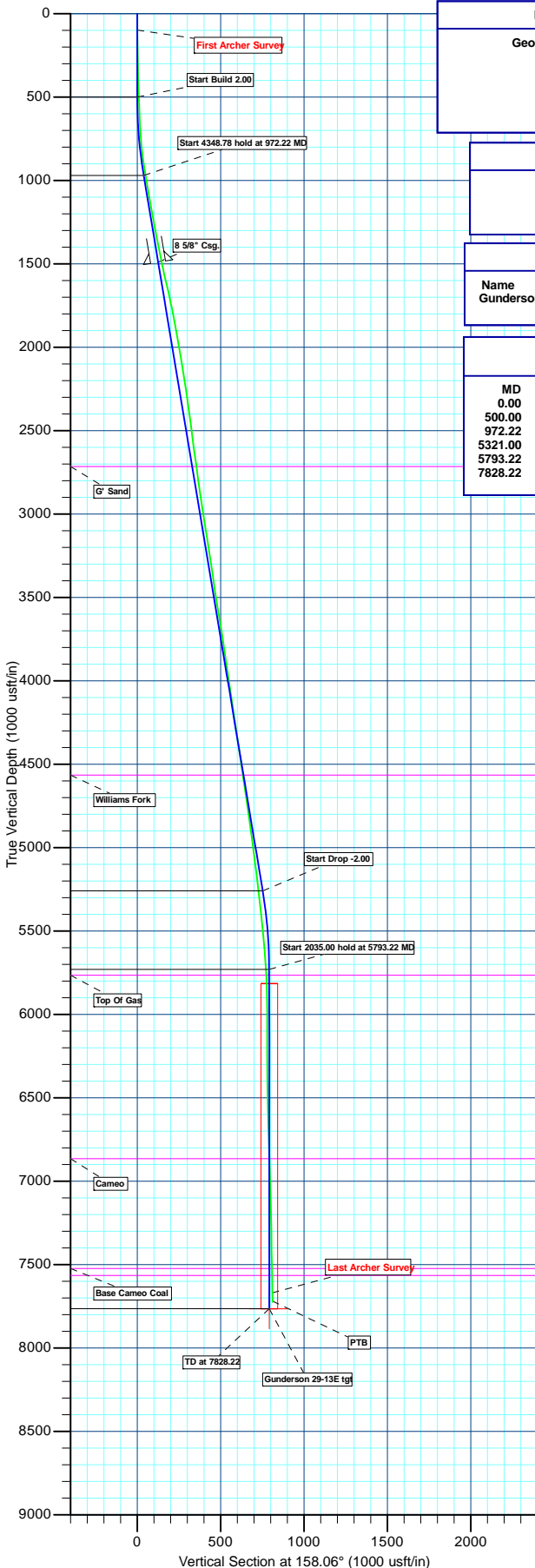
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
972.22	9.44	158.06	970.08	-36.02	14.51	2.00	158.06	38.83	Start 4348.78 hold at 972.22 MD
5321.00	9.44	158.06	5259.92	-697.93	281.13	0.00	0.00	752.42	Start Drop -2.00
5793.22	0.00	0.00	5730.00	-733.95	295.64	2.00	180.00	791.26	Start 2035.00 hold at 5793.22 MD
7828.22	0.00	0.00	7765.00	-733.95	295.64	0.00	0.00	791.26	TD at 7828.22



Azimuths to True North
Magnetic North: 9.73°
Magnetic Field
Strength: 51742.8snT
Dip Angle: 65.47°
Date: 04/16/2015
Model: IGRF2010

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2715.00	2741.11	G' Sand
4565.00	4616.53	Williams Fork
5765.00	5828.22	Top Of Gas
6865.00	6928.22	Cameo
7523.00	7586.22	Base Cameo Coal
7565.00	7628.22	Rollins



Plan: Design #1 (Gunderson 29-13E/Slot B-9)

Created By: Ricky Osburn Date: 15:00, August 03 2015



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Gunderson 29-13E
Project:	Mesa County, CO	TVD Reference:	WELL @ 7558.0usft
Site:	Gunderson	MD Reference:	WELL @ 7558.0usft
Well:	Gunderson 29-13E	North Reference:	True
Wellbore:	Slot B-9	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-9	Database:	EDMDBBW

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

Site		Gunderson			
Site Position:		Northing:	1,523,671.42 usft	Latitude:	39° 14' 55.692 N
From:	Lat/Long	Easting:	2,352,063.75 usft	Longitude:	107° 47' 17.595 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.44 °

Well	Gunderson 29-13E					
Well Position	+N/-S	0.0 usft	Northing:	1,523,671.50 usft	Latitude:	39° 14' 55.720 N
	+E/-W	0.0 usft	Easting:	2,352,174.27 usft	Longitude:	107° 47' 16.190 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	7,531.0 usft

Wellbore	Slot B-9				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/16	9.73	65.47	51,743

Design	Slot B-9			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	159.61

Survey Program	Date	2015/04/21		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
109.0	7,790.0	Survey #1 (Slot B-9)	MWD	MWD - Standard

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
First Archer Survey										
109.0	0.62	150.34	109.0	-0.5	0.3	0.6	0.57	0.57	0.00	
200.0	0.83	154.20	200.0	-1.5	0.8	1.7	0.24	0.23	4.24	
293.0	1.19	150.95	293.0	-3.0	1.6	3.3	0.39	0.39	-3.49	
385.0	1.41	148.40	385.0	-4.8	2.6	5.4	0.25	0.24	-2.77	
477.0	1.93	144.10	476.9	-7.0	4.1	8.0	0.58	0.57	-4.67	
569.0	2.15	139.97	568.9	-9.6	6.2	11.1	0.29	0.24	-4.49	
662.0	3.03	152.09	661.8	-13.1	8.4	15.2	1.11	0.95	13.03	
754.0	4.57	147.70	753.6	-18.3	11.5	21.2	1.70	1.67	-4.77	
846.0	7.08	152.09	845.1	-26.4	16.1	30.4	2.77	2.73	4.77	
938.0	9.32	162.64	936.1	-38.6	21.0	43.5	2.92	2.43	11.47	
1,030.0	9.71	168.97	1,026.9	-53.3	24.7	58.6	1.21	0.42	6.88	



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Gunderson 29-13E
Project:	Mesa County, CO	TVD Reference:	WELL @ 7558.0usft
Site:	Gunderson	MD Reference:	WELL @ 7558.0usft
Well:	Gunderson 29-13E	North Reference:	True
Wellbore:	Slot B-9	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-9	Database:	EDMDBBW

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
1,125.0	9.84	167.92	1,120.5	-69.1	28.0	74.5	0.23	0.14	-1.11	
1,220.0	10.68	165.89	1,214.0	-85.6	31.8	91.3	0.96	0.88	-2.14	
1,315.0	11.03	165.54	1,307.3	-102.9	36.2	109.1	0.37	0.37	-0.37	
1,410.0	10.99	163.61	1,400.5	-120.4	41.0	127.2	0.39	-0.04	-2.03	
1,518.0	11.87	162.47	1,506.4	-140.9	47.3	148.5	0.84	0.81	-1.06	
1,598.0	13.05	164.22	1,584.5	-157.4	52.2	165.7	1.55	1.47	2.19	
1,693.0	13.36	162.11	1,677.0	-178.2	58.5	187.4	0.60	0.33	-2.22	
1,788.0	11.29	158.69	1,769.8	-197.3	65.3	207.7	2.31	-2.18	-3.60	
1,883.0	10.50	160.97	1,863.1	-214.1	71.5	225.6	0.95	-0.83	2.40	
1,978.0	10.02	161.41	1,956.6	-230.1	76.9	242.5	0.51	-0.51	0.46	
2,072.0	9.71	153.33	2,049.2	-245.0	83.1	258.6	1.51	-0.33	-8.60	
2,167.0	9.23	150.69	2,142.9	-258.8	90.4	274.1	0.68	-0.51	-2.78	
2,262.0	8.70	152.80	2,236.7	-271.8	97.4	288.7	0.66	-0.56	2.22	
2,357.0	7.91	155.00	2,330.7	-284.1	103.5	302.4	0.90	-0.83	2.32	
2,452.0	7.78	153.94	2,424.8	-295.8	109.1	315.3	0.20	-0.14	-1.12	
2,547.0	6.86	159.04	2,519.1	-306.9	113.9	327.4	1.18	-0.97	5.37	
2,642.0	8.31	150.07	2,613.2	-318.2	119.4	339.8	1.97	1.53	-9.44	
2,737.0	8.13	147.61	2,707.2	-329.8	126.4	353.2	0.42	-0.19	-2.59	
2,832.0	7.82	147.26	2,801.3	-340.9	133.5	366.0	0.33	-0.33	-0.37	
2,926.0	7.78	147.09	2,894.5	-351.6	140.4	378.5	0.05	-0.04	-0.18	
3,021.0	9.40	154.29	2,988.4	-364.0	147.3	392.5	2.04	1.71	7.58	
3,116.0	8.96	158.77	3,082.2	-377.9	153.3	407.6	0.88	-0.46	4.72	
3,211.0	9.14	156.14	3,176.0	-391.7	159.0	422.5	0.47	0.19	-2.77	
3,306.0	8.66	160.36	3,269.9	-405.3	164.5	437.2	0.85	-0.51	4.44	
3,401.0	8.39	160.27	3,363.8	-418.6	169.2	451.3	0.28	-0.28	-0.09	
3,496.0	7.69	159.48	3,457.9	-431.0	173.8	464.6	0.75	-0.74	-0.83	
3,591.0	9.89	155.35	3,551.7	-444.4	179.4	479.1	2.41	2.32	-4.35	
3,685.0	9.49	155.43	3,644.4	-458.8	186.0	494.9	0.43	-0.43	0.09	
3,780.0	8.92	155.17	3,738.2	-472.6	192.4	510.0	0.60	-0.60	-0.27	
3,875.0	8.31	158.46	3,832.1	-485.7	198.0	524.2	0.83	-0.64	3.46	
3,970.0	8.31	156.84	3,926.1	-498.4	203.2	538.0	0.25	0.00	-1.71	
4,065.0	7.56	155.96	4,020.2	-510.4	208.5	551.0	0.80	-0.79	-0.93	
4,160.0	9.58	151.92	4,114.1	-523.1	214.7	565.1	2.22	2.13	-4.25	
4,255.0	8.79	153.24	4,207.9	-536.5	221.7	580.2	0.86	-0.83	1.39	
4,350.0	8.53	152.45	4,301.8	-549.3	228.2	594.4	0.30	-0.27	-0.83	
4,445.0	8.04	152.53	4,395.8	-561.4	234.6	608.0	0.52	-0.52	0.08	
4,540.0	7.73	154.73	4,489.9	-573.1	240.4	620.9	0.46	-0.33	2.32	
4,635.0	8.61	150.33	4,584.0	-585.0	246.6	634.3	1.14	0.93	-4.63	
4,730.0	8.61	149.90	4,677.9	-597.4	253.7	648.3	0.07	0.00	-0.45	
4,825.0	8.35	150.50	4,771.9	-609.5	260.7	662.1	0.29	-0.27	0.63	
4,920.0	7.91	154.47	4,865.9	-621.4	266.9	675.5	0.75	-0.46	4.18	
5,015.0	7.69	154.00	4,960.0	-633.0	272.5	688.3	0.24	-0.23	-0.49	
5,110.0	7.34	159.30	5,054.2	-644.4	277.4	700.7	0.82	-0.37	5.58	
5,205.0	7.21	157.98	5,148.5	-655.6	281.8	712.7	0.22	-0.14	-1.39	
5,299.0	6.68	159.48	5,241.8	-666.2	285.9	724.1	0.60	-0.56	1.60	
5,395.0	6.64	153.68	5,337.1	-676.4	290.3	735.2	0.70	-0.04	-6.04	
5,490.0	6.20	153.50	5,431.5	-685.9	295.1	745.8	0.46	-0.46	-0.19	
5,585.0	4.79	156.67	5,526.1	-694.2	298.9	754.8	1.52	-1.48	3.34	
5,680.0	4.39	164.22	5,620.8	-701.3	301.5	762.4	0.76	-0.42	7.95	
5,774.0	4.31	165.72	5,714.5	-708.2	303.3	769.5	0.15	-0.09	1.60	
5,869.0	2.20	152.09	5,809.4	-713.3	305.1	774.9	2.35	-2.22	-14.35	
5,964.0	1.31	118.34	5,904.3	-715.4	306.9	777.5	1.40	-0.94	-35.53	
6,059.0	1.36	67.10	5,999.3	-715.5	308.9	778.3	1.22	0.05	-53.94	
6,154.0	1.41	72.99	6,094.3	-714.7	311.0	778.3	0.16	0.05	6.20	



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Site:	Gunderson	MD Reference:	WELL @ 7558.0usft
Well:	Gunderson 29-13E	North Reference:	True
Wellbore:	Slot B-9	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-9	Database:	EDMDBBW

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
6,248.0	2.46	70.27	6,188.2	-713.7	314.0	778.4	1.12	1.12	-2.89	
6,343.0	2.59	69.30	6,283.1	-712.2	318.0	778.4	0.14	0.14	-1.02	
6,438.0	1.75	91.36	6,378.1	-711.5	321.4	778.9	1.23	-0.88	23.22	
6,533.0	1.23	106.04	6,473.0	-711.8	323.8	780.0	0.67	-0.55	15.45	
6,628.0	1.58	135.66	6,568.0	-713.0	325.7	781.8	0.84	0.37	31.18	
6,723.0	1.85	150.34	6,662.9	-715.3	327.4	784.6	0.54	0.28	15.45	
6,817.0	2.07	160.36	6,756.9	-718.2	328.7	787.8	0.43	0.23	10.66	
6,912.0	2.11	184.53	6,851.8	-721.6	329.2	791.1	0.92	0.04	25.44	
7,007.0	1.75	187.87	6,946.8	-724.8	328.8	793.9	0.40	-0.38	3.52	
7,102.0	1.71	186.37	7,041.7	-727.6	328.5	796.5	0.06	-0.04	-1.58	
7,197.0	2.02	183.21	7,136.7	-730.7	328.2	799.3	0.34	0.33	-3.33	
7,292.0	2.20	210.81	7,231.6	-733.9	327.2	801.9	1.08	0.19	29.05	
7,386.0	1.84	225.84	7,325.6	-736.5	325.2	803.7	0.68	-0.38	15.99	
7,481.0	1.71	221.00	7,420.5	-738.7	323.2	805.0	0.21	-0.14	-5.09	
7,576.0	2.50	220.03	7,515.5	-741.3	320.9	806.7	0.83	0.83	-1.02	
7,671.0	2.15	213.79	7,610.4	-744.4	318.6	808.7	0.45	-0.37	-6.57	
Last Archer Survey										
7,740.0	2.55	220.30	7,679.3	-746.6	316.9	810.2	0.70	0.58	9.43	
PTB - Gunderson 29-13E tgt										
7,790.0	2.55	220.30	7,729.3	-748.3	315.4	811.3	0.00	0.00	0.00	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
109.0	109.0	-0.5	0.3	First Archer Survey	
7,740.0	7,679.3	-746.6	316.9	Last Archer Survey	
7,790.0	7,729.3	-748.3	315.4	PTB	

Checked By: _____	Approved By: _____	Date: _____
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