



# **Piceance Energy, LLC**

**Mesa County, CO  
Gunderson  
Gunderson 29-14E**

**Slot B-8**

**Survey: Survey #1**

## **Standard Survey Report**

**04 May, 2015**

# **Archer**



Project: Mesa County, CO  
Site: Gunderson  
Well: Gunderson 29-14E  
Wellbore: Slot B-8  
Design: Design #1  
Latitude: 39.248803  
Longitude: -107.787903  
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 29-14E, 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 29-14E

+N-S	+E-W	Northing	Ground Level: Easting	Latitude	Longitude	Slot
0.00	0.00	1523668.986	2352153.747	39.248803	-107.787903	

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

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape
Gunderson 29-14E tgt	7756.00	-979.67	315.82	1522681.671	2352444.800	39.246113	-107.786788	Circle (Radius: 50.00)

### SECTION DETAILS

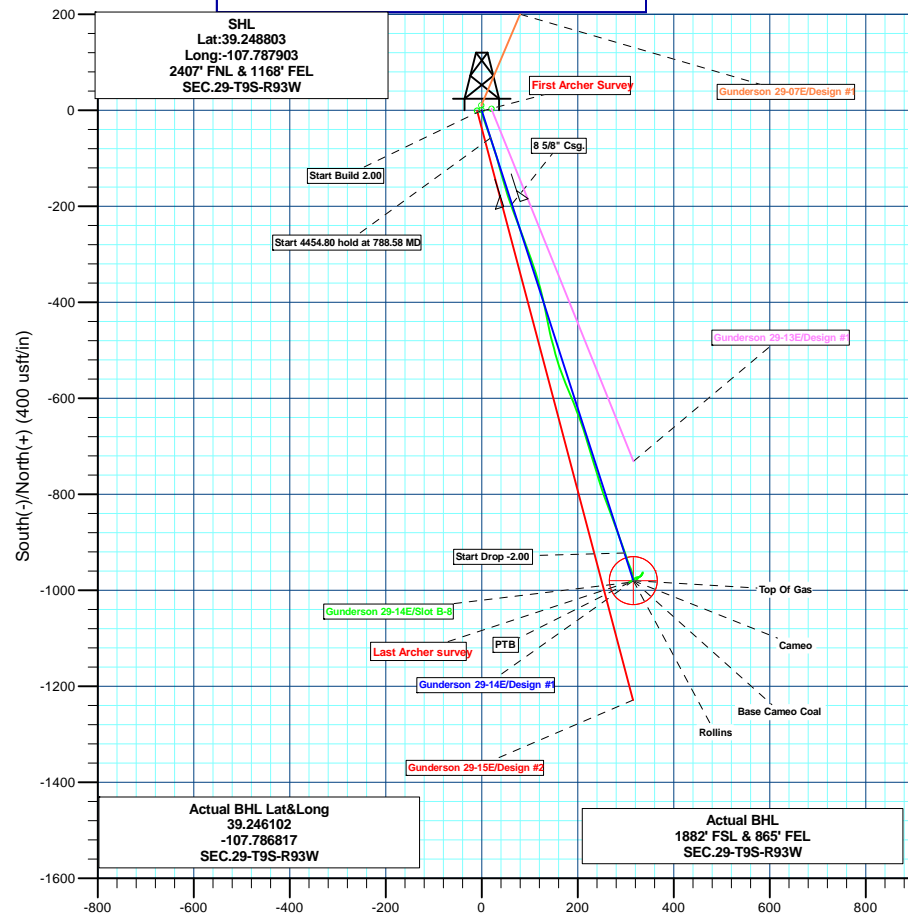
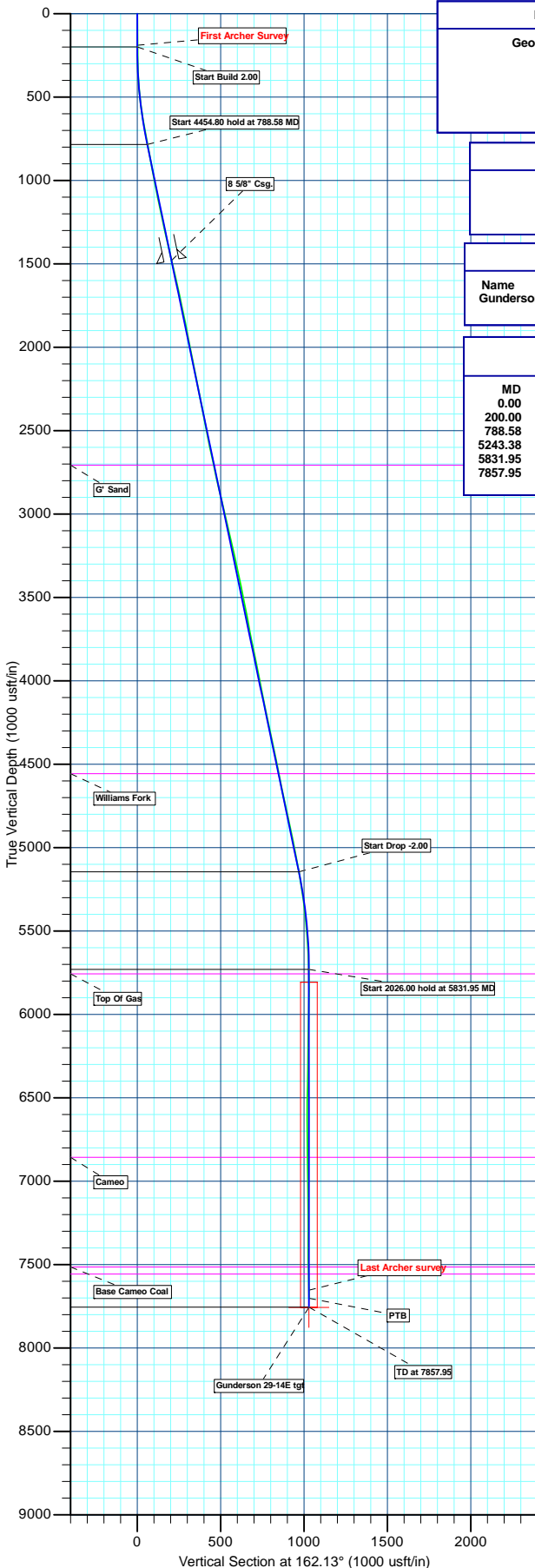
MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	Vsect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
788.58	11.77	162.13	784.44	-57.34	18.49	2.00	162.13	60.25	Start 4454.80 hold at 788.58 MD
5243.38	11.77	162.13	5145.56	-922.33	297.34	0.00	0.00	969.07	Start Drop -2.00
5831.95	0.00	0.00	5730.00	-979.67	315.82	2.00	180.00	1029.32	Start 2026.00 hold at 5831.95 MD
7857.95	0.00	0.00	7756.00	-979.67	315.82	0.00	0.00	1029.32	TD at 7857.95



Azimuths to True North  
Magnetic North: 9.80°  
Magnetic Field  
Strength: 51796.9snT  
Dip Angle: 65.48°  
Date: 10/02/2014  
Model: IGRF2010

### FORMATION TOP DETAILS

TVDPPath	MDPath	Formation
2706.00	2751.41	G' Sand
4556.00	4641.16	Williams Fork
5756.00	5857.95	Top Of Gas
6856.00	6957.95	Cameo
7514.00	7615.95	Base Cameo Coal
7556.00	7657.95	Rollins



Plan: Design #1 (Gunderson 29-14E/Slot B-8)

Created By: Ricky Osburn Date: 15:10, August 03 2015



<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Gunderson 29-14E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7558.0usft
<b>Site:</b>	Gunderson	<b>MD Reference:</b>	Well @ 7558.0usft
<b>Well:</b>	Gunderson 29-14E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-8	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-8	<b>Database:</b>	EDMDBBW

<b>Project</b>	Mesa 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 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 29-14E				
Well Position	+N/-S	0.0 usft	Northing:	1,523,668.99 usft	Latitude:	39° 14' 55.690 N
	+E/-W	0.0 usft	Easting:	2,352,153.75 usft	Longitude:	107° 47' 16.450 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	7,531.0 usft

<b>Wellbore</b>	Slot B-8				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	10/02/14	9.80	65.48	51,797

Design	Slot B-8				
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	162.82

<b>Survey Program</b>	<b>Date</b>	05/04/15			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
200.0	7,815.0	Survey #1 (Slot B-8)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>First Archer Survey</b>										
200.0	0.75	179.60	200.0	-1.3	0.0	1.3	0.37	0.37	0.00	
293.0	0.79	181.63	293.0	-2.6	0.0	2.4	0.05	0.04	2.18	
385.0	3.43	168.27	384.9	-5.9	0.5	5.8	2.90	2.87	-14.52	
477.0	5.63	160.01	476.6	-12.8	2.6	13.0	2.49	2.39	-8.98	
570.0	7.43	162.38	569.0	-22.8	6.0	23.6	1.96	1.94	2.55	
662.0	10.15	160.62	659.9	-36.2	10.5	37.7	2.97	2.96	-1.91	
754.0	10.72	160.71	750.4	-51.9	16.0	54.3	0.62	0.62	0.10	
846.0	10.99	161.06	840.8	-68.3	21.7	71.6	0.30	0.29	0.38	
938.0	10.94	162.11	931.1	-84.9	27.2	89.1	0.22	-0.05	1.14	
1,030.0	10.63	163.26	1,021.5	-101.3	32.4	106.3	0.41	-0.34	1.25	
1,125.0	10.94	165.10	1,114.8	-118.4	37.2	124.1	0.49	0.33	1.94	



<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Gunderson 29-14E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7558.0usft
<b>Site:</b>	Gunderson	<b>MD Reference:</b>	Well @ 7558.0usft
<b>Well:</b>	Gunderson 29-14E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-8	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-8	<b>Database:</b>	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)	
1,220.0	12.66	164.40	1,207.8	-137.1	42.3	143.5	1.82	1.81	-0.74	
1,315.0	13.05	163.87	1,300.4	-157.5	48.1	164.6	0.43	0.41	-0.56	
1,410.0	12.26	162.47	1,393.1	-177.4	54.1	185.5	0.89	-0.83	-1.47	
1,496.0	13.10	158.95	1,477.0	-195.2	60.4	204.3	1.33	0.98	-4.09	
1,600.0	12.74	160.71	1,578.3	-217.0	68.4	227.5	0.51	-0.35	1.69	
1,695.0	12.26	159.21	1,671.1	-236.3	75.4	248.1	0.61	-0.51	-1.58	
1,789.0	11.95	159.04	1,763.0	-254.7	82.4	267.7	0.33	-0.33	-0.18	
1,885.0	11.51	159.21	1,857.0	-273.0	89.4	287.2	0.46	-0.46	0.18	
1,979.0	11.07	160.44	1,949.2	-290.3	95.8	305.6	0.53	-0.47	1.31	
2,074.0	10.72	159.39	2,042.5	-307.1	101.9	323.5	0.42	-0.37	-1.11	
2,169.0	11.82	162.38	2,135.6	-324.7	108.0	342.1	1.31	1.16	3.15	
2,264.0	11.34	162.55	2,228.7	-342.8	113.7	361.1	0.51	-0.51	0.18	
2,359.0	10.68	162.83	2,322.0	-360.2	119.1	379.3	0.70	-0.69	0.29	
2,454.0	11.56	167.04	2,415.2	-377.9	123.9	397.6	1.26	0.93	4.43	
2,548.0	10.81	166.95	2,507.4	-395.6	128.0	415.8	0.80	-0.80	-0.10	
2,643.0	12.57	168.35	2,600.4	-414.4	132.1	434.9	1.88	1.85	1.47	
2,739.0	12.13	167.92	2,694.2	-434.5	136.3	455.4	0.47	-0.46	-0.45	
2,833.0	11.91	170.11	2,786.1	-453.7	140.0	474.8	0.54	-0.23	2.33	
2,928.0	13.40	164.40	2,878.8	-474.0	144.7	495.6	2.05	1.57	-6.01	
3,023.0	13.14	164.84	2,971.3	-495.0	150.4	517.4	0.29	-0.27	0.46	
3,118.0	12.92	165.10	3,063.8	-515.7	156.0	538.8	0.24	-0.23	0.27	
3,213.0	13.05	160.09	3,156.4	-536.1	162.4	560.1	1.19	0.14	-5.27	
3,308.0	12.61	159.04	3,249.0	-555.8	169.7	581.2	0.52	-0.46	-1.11	
3,403.0	12.08	157.81	3,341.8	-574.7	177.2	601.4	0.62	-0.56	-1.29	
3,497.0	11.82	157.81	3,433.8	-592.7	184.6	620.8	0.28	-0.28	0.00	
3,592.0	11.21	158.16	3,526.9	-610.3	191.7	639.7	0.65	-0.64	0.37	
3,687.0	11.07	160.01	3,620.1	-627.5	198.2	658.0	0.40	-0.15	1.95	
3,782.0	10.63	156.93	3,713.4	-644.1	204.8	675.8	0.77	-0.46	-3.24	
3,877.0	11.82	163.17	3,806.6	-661.5	211.0	694.3	1.79	1.25	6.57	
3,972.0	11.38	163.52	3,899.6	-679.8	216.5	713.4	0.47	-0.46	0.37	
4,067.0	11.12	161.94	3,992.8	-697.5	222.0	731.9	0.42	-0.27	-1.66	
4,162.0	10.77	163.26	4,086.1	-714.7	227.4	749.9	0.45	-0.37	1.39	
4,257.0	12.39	162.55	4,179.2	-732.9	233.0	769.0	1.71	1.71	-0.75	
4,352.0	12.13	163.87	4,272.0	-752.2	238.8	789.2	0.40	-0.27	1.39	
4,447.0	11.82	162.82	4,364.9	-771.1	244.5	808.9	0.40	-0.33	-1.11	
4,542.0	11.21	161.68	4,458.0	-789.2	250.3	827.9	0.69	-0.64	-1.20	
4,637.0	10.99	160.36	4,551.2	-806.4	256.2	846.1	0.35	-0.23	-1.39	
4,732.0	12.52	159.04	4,644.2	-824.6	262.9	865.5	1.64	1.61	-1.39	
4,827.0	12.39	159.39	4,737.0	-843.7	270.2	885.9	0.16	-0.14	0.37	
4,922.0	11.87	159.74	4,829.9	-862.5	277.2	905.8	0.55	-0.55	0.37	
5,017.0	11.51	160.88	4,922.9	-880.6	283.7	925.1	0.45	-0.38	1.20	
5,111.0	10.99	159.65	5,015.1	-897.8	289.8	943.4	0.61	-0.55	-1.31	
5,206.0	10.50	160.80	5,108.4	-914.5	295.8	961.1	0.56	-0.52	1.21	
5,301.0	10.24	160.71	5,201.9	-930.6	301.5	978.2	0.27	-0.27	-0.09	
5,396.0	8.17	159.83	5,295.7	-945.0	306.6	993.4	2.18	-2.18	-0.93	
5,491.0	6.37	158.34	5,389.9	-956.2	310.9	1,005.3	1.90	-1.89	-1.57	
5,586.0	4.92	168.09	5,484.4	-965.1	313.7	1,014.7	1.82	-1.53	10.26	
5,681.0	3.60	178.99	5,579.2	-972.0	314.5	1,021.6	1.62	-1.39	11.47	
5,776.0	2.24	166.25	5,674.0	-976.8	315.0	1,026.3	1.58	-1.43	-13.41	
5,871.0	1.98	114.74	5,769.0	-979.3	317.0	1,029.3	1.95	-0.27	-54.22	
5,966.0	2.20	67.02	5,863.9	-979.3	320.1	1,030.2	1.79	0.23	-50.23	
6,061.0	2.81	45.48	5,958.8	-976.9	323.5	1,028.9	1.17	0.64	-22.67	
6,156.0	2.55	43.99	6,053.7	-973.8	326.6	1,026.8	0.28	-0.27	-1.57	
6,250.0	2.29	48.65	6,147.7	-971.1	329.5	1,025.0	0.35	-0.28	4.96	



<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Gunderson 29-14E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7558.0usft
<b>Site:</b>	Gunderson	<b>MD Reference:</b>	Well @ 7558.0usft
<b>Well:</b>	Gunderson 29-14E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot B-8	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot B-8	<b>Database:</b>	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)	
6,345.0	1.85	51.99	6,242.6	-968.9	332.1	1,023.7	0.48	-0.46	3.52	
6,440.0	1.14	50.84	6,337.6	-967.3	334.0	1,022.8	0.75	-0.75	-1.21	
6,535.0	1.54	14.90	6,432.5	-965.5	335.1	1,021.4	0.96	0.42	-37.83	
6,629.0	0.97	7.78	6,526.5	-963.5	335.5	1,019.6	0.63	-0.61	-7.57	
6,724.0	0.18	353.28	6,621.5	-962.5	335.6	1,018.7	0.84	-0.83	-15.26	
6,819.0	0.48	205.97	6,716.5	-962.7	335.4	1,018.9	0.67	0.32	-155.06	
6,914.0	1.05	207.03	6,811.5	-963.9	334.9	1,019.8	0.60	0.60	1.12	
7,009.0	1.45	209.84	6,906.5	-965.7	333.9	1,021.2	0.43	0.42	2.96	
7,103.0	1.54	206.85	7,000.4	-967.8	332.7	1,022.9	0.13	0.10	-3.18	
7,198.0	1.45	213.88	7,095.4	-970.0	331.5	1,024.6	0.21	-0.09	7.40	
7,293.0	1.23	239.37	7,190.4	-971.5	329.9	1,025.6	0.66	-0.23	26.83	
7,388.0	1.89	267.93	7,285.4	-972.1	327.5	1,025.4	1.05	0.69	30.06	
7,483.0	2.55	255.01	7,380.3	-972.7	323.9	1,024.9	0.87	0.69	-13.60	
7,578.0	3.43	238.05	7,475.2	-974.7	319.4	1,025.6	1.30	0.93	-17.85	
7,673.0	3.73	234.36	7,570.0	-978.0	314.5	1,027.3	0.40	0.32	-3.88	
Last Archer survey										
7,767.0	3.60	231.20	7,663.8	-981.7	309.7	1,029.3	0.26	-0.14	-3.36	
PTB - Gunderson 29-14E tgt										
7,815.0	3.60	231.20	7,711.7	-983.6	307.4	1,030.5	0.00	0.00	0.00	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
200.0	200.0	-1.3	0.0	First Archer Survey	
7,767.0	7,663.8	-981.7	309.7	Last Archer survey	
7,815.0	7,711.7	-983.6	307.4	PTB	

Checked By: _____	Approved By: _____	Date: _____
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