



# **Piceance Energy, LLC**

**Mesa County, CO  
Gunderson  
Gunderson 29-08E**

**Slot A-9**

**Survey: Survey #1**

## **Standard Survey Report**

**25 April, 2015**

# **Archer**



Project: Mesa County, CO  
 Site: Gunderson  
 Well: Gunderson 29-08E  
 Wellbore: Slot A-9  
 Design: Design #1  
 Latitude: 39.248839  
 Longitude: -107.787836  
 Ground Level: 7531.00  
 Well @ 7553.00usft



**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 29-08E, 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 29-08E**

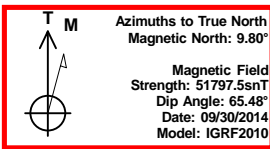
+N-S	+E-W	Northing	Ground Level:	7531.00	Latitude	Slot
0.00	0.00	1523681.658	Easting	2352172.952	39.248839	-107.787836

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

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape
Gunderson 29-08E tgt	7805.00	499.74	298.54	1524173.721	2352483.980	39.250211	-107.786782	Circle (Radius: 50.00)

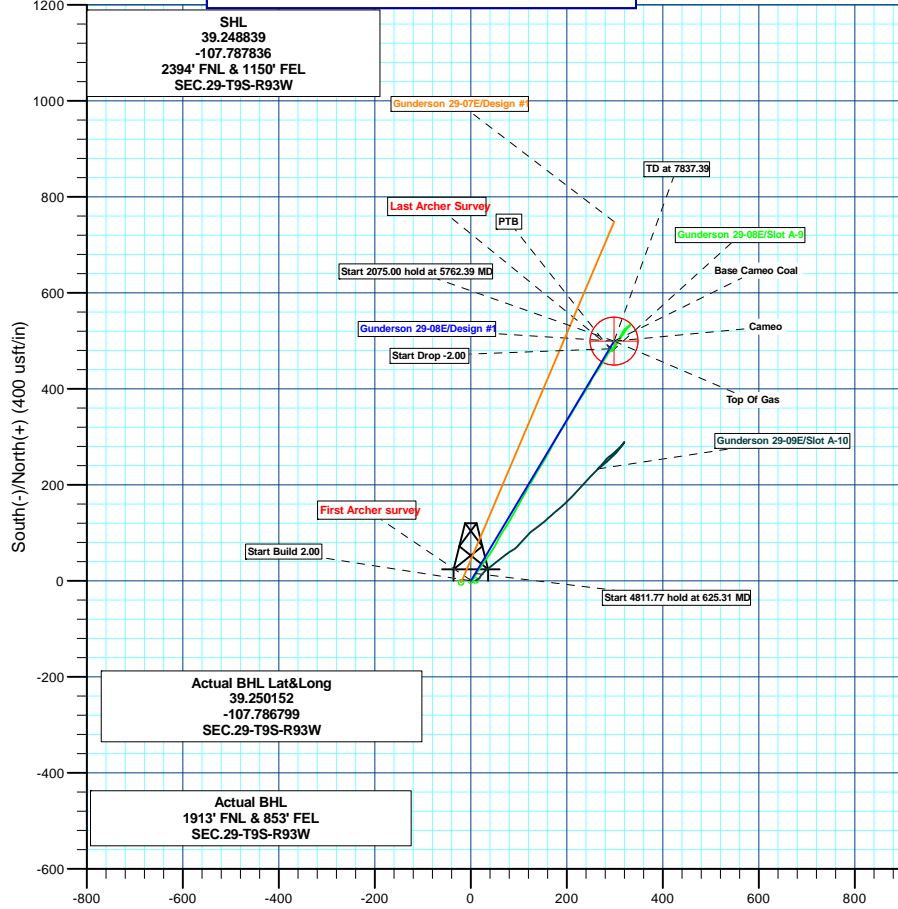
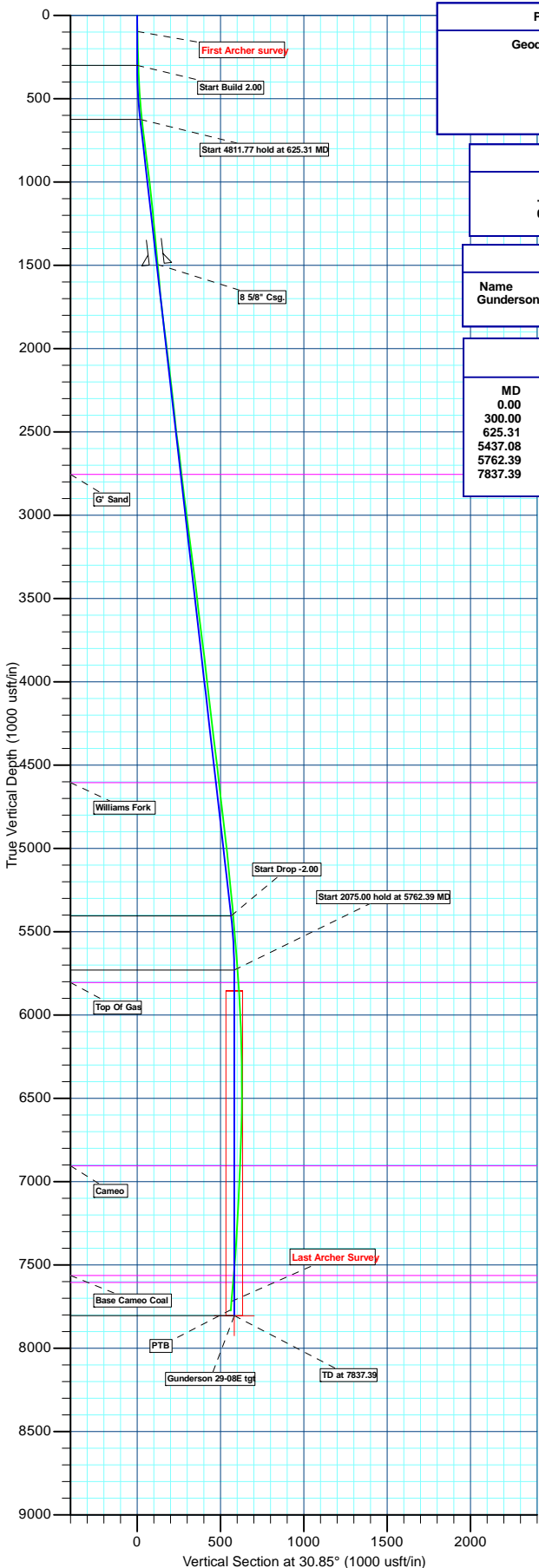
**SECTION DETAILS**

MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	V Sect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
625.31	6.51	30.85	624.61	15.84	9.46	2.00	30.85	18.45	Start 4811.77 hold at 625.31 MD
5437.08	6.51	30.85	5405.39	483.90	289.08	0.00	0.00	563.67	Start Drop -2.00
5762.39	0.00	0.00	5730.00	499.74	298.54	2.00	180.00	582.12	Start 2075.00 hold at 5762.39 MD
7837.39	0.00	0.00	7805.00	499.74	298.54	0.00	0.00	582.12	TD at 7837.39



**FORMATION TOP DETAILS**

TVDPATH	MDPATH	FORMATION
2755.00	2769.51	G' Sand
4605.00	4631.50	Williams Fork
5805.00	5837.39	Top Of Gas
6905.00	6937.39	Cameo
7563.00	7595.39	Base Cameo Coal
7605.00	7637.39	Rollins





<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Gunderson 29-08E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7558.00usft
<b>Site:</b>	Gunderson	<b>MD Reference:</b>	Well @ 7558.00usft
<b>Well:</b>	Gunderson 29-08E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot A-9	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot A-9	<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		

<b>Site</b>	Gunderson				
<b>Site Position:</b>		<b>Northing:</b>	1,523,671.416 usft	<b>Latitude:</b>	39° 14' 55.692 N
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,352,063.747 usft	<b>Longitude:</b>	107° 47' 17.595 W
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16"	<b>Grid Convergence:</b>	-1.44 °

<b>Well</b>	Gunderson 29-08E					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	1,523,681.658 usft	<b>Latitude:</b>	39° 14' 55.820 N
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	2,352,172.952 usft	<b>Longitude:</b>	107° 47' 16.210 W
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	7,531.00 usft

<b>Wellbore</b>	Slot A-9				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	09/30/14	9.80	65.48	51,798

<b>Design</b>	Slot A-9				
<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	33.00	

<b>Survey Program</b>	<b>Date</b>	04/25/15			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
107.00	7,816.00	Survey #1 (Slot A-9)	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>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>First Archer survey</b>										
107.00	1.45	46.63	106.99	0.93	0.98	1.32	1.36	1.36	0.00	
199.00	1.76	43.81	198.95	2.75	2.81	3.83	0.35	0.34	-3.07	
292.00	2.02	34.06	291.90	5.14	4.72	6.88	0.44	0.28	-10.48	
384.00	2.15	42.14	383.84	7.76	6.78	10.20	0.35	0.14	8.78	
476.00	3.38	29.31	475.73	11.40	9.27	14.61	1.49	1.34	-13.95	
568.00	5.76	33.18	567.43	17.63	13.12	21.94	2.61	2.59	4.21	
660.00	6.68	33.71	658.89	25.95	18.62	31.90	1.00	1.00	0.58	
753.00	6.72	34.94	751.26	34.91	24.74	42.75	0.16	0.04	1.32	
845.00	6.99	35.90	842.60	43.86	31.10	53.72	0.32	0.29	1.04	
937.00	7.47	35.11	933.87	53.28	37.82	65.29	0.53	0.52	-0.86	
1,029.00	6.20	30.72	1,025.21	62.45	43.80	76.23	1.49	-1.38	-4.77	



<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Gunderson 29-08E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7558.00usft
<b>Site:</b>	Gunderson	<b>MD Reference:</b>	Well @ 7558.00usft
<b>Well:</b>	Gunderson 29-08E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot A-9	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot A-9	<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)	
1,124.00	6.68	33.09	1,119.61	71.49	49.44	86.88	0.58	0.51	2.49	
1,219.00	5.36	24.13	1,214.09	80.17	54.27	96.79	1.70	-1.39	-9.43	
1,314.00	5.27	27.20	1,308.68	88.10	58.08	105.51	0.31	-0.09	3.23	
1,408.00	5.01	31.42	1,402.30	95.44	62.19	113.91	0.49	-0.28	4.49	
1,499.00	5.58	32.12	1,492.91	102.58	66.61	122.31	0.63	0.63	0.77	
1,599.00	5.32	31.33	1,592.46	110.65	71.61	131.80	0.27	-0.26	-0.79	
1,694.00	4.57	30.10	1,687.11	117.69	75.80	139.99	0.80	-0.79	-1.29	
1,789.00	7.47	33.00	1,781.57	126.15	81.06	149.94	3.07	3.05	3.05	
1,884.00	7.16	30.45	1,875.80	136.43	87.42	162.03	0.47	-0.33	-2.68	
1,979.00	7.34	29.75	1,970.04	146.80	93.44	174.01	0.21	0.19	-0.74	
2,074.00	6.94	26.76	2,064.30	157.19	99.03	185.77	0.57	-0.42	-3.15	
2,168.00	6.50	28.26	2,157.66	166.95	104.11	196.72	0.50	-0.47	1.60	
2,263.00	6.64	28.96	2,252.03	176.49	109.31	207.56	0.17	0.15	0.74	
2,358.00	6.15	30.01	2,346.44	185.71	114.52	218.12	0.53	-0.52	1.11	
2,453.00	5.49	28.87	2,440.95	194.09	119.26	227.73	0.71	-0.69	-1.20	
2,548.00	8.00	29.40	2,535.29	203.83	124.70	238.86	2.64	2.64	0.56	
2,643.00	7.51	29.14	2,629.42	215.01	130.97	251.65	0.52	-0.52	-0.27	
2,738.00	6.64	33.09	2,723.70	225.04	136.99	263.34	1.05	-0.92	4.16	
2,833.00	6.37	30.01	2,818.08	234.20	142.62	274.10	0.46	-0.28	-3.24	
2,928.00	5.89	34.15	2,912.54	242.80	147.99	284.23	0.69	-0.51	4.36	
3,023.00	7.82	29.75	3,006.86	252.45	153.94	295.56	2.10	2.03	-4.63	
3,117.00	8.08	27.99	3,099.95	263.83	160.21	308.53	0.38	0.28	-1.87	
3,212.00	7.42	27.64	3,194.09	275.16	166.19	321.28	0.70	-0.69	-0.37	
3,307.00	7.12	28.26	3,288.32	285.78	171.82	333.26	0.33	-0.32	0.65	
3,402.00	6.90	28.61	3,382.61	295.98	177.34	344.82	0.24	-0.23	0.37	
3,497.00	6.68	32.30	3,476.95	305.66	183.03	356.03	0.51	-0.23	3.88	
3,591.00	6.15	30.45	3,570.36	314.62	188.50	366.53	0.61	-0.56	-1.97	
3,685.00	7.69	33.00	3,663.67	324.24	194.48	377.85	1.67	1.64	2.71	
3,780.00	7.21	31.42	3,757.87	334.65	201.05	390.16	0.55	-0.51	-1.66	
3,875.00	7.12	31.73	3,852.13	344.75	207.25	402.01	0.10	-0.09	0.33	
3,970.00	6.68	31.42	3,946.44	354.47	213.23	413.42	0.46	-0.46	-0.33	
4,065.00	6.42	27.29	4,040.82	363.91	218.55	424.23	0.57	-0.27	-4.35	
4,160.00	5.63	32.12	4,135.29	372.57	223.46	434.17	0.99	-0.83	5.08	
4,255.00	7.34	33.71	4,229.68	381.57	229.31	444.90	1.81	1.80	1.67	
4,350.00	7.34	32.65	4,323.90	391.73	235.95	457.04	0.14	0.00	-1.12	
4,445.00	6.72	31.07	4,418.19	401.60	242.09	468.66	0.68	-0.65	-1.66	
4,540.00	6.81	29.22	4,512.53	411.27	247.71	479.84	0.25	0.09	-1.95	
4,635.00	5.76	24.04	4,606.96	420.54	252.40	490.16	1.26	-1.11	-5.45	
4,730.00	7.03	38.10	4,701.37	429.47	257.93	500.67	2.11	1.34	14.80	
4,825.00	7.03	32.92	4,795.66	438.93	264.68	512.27	0.67	0.00	-5.45	
4,920.00	6.94	32.04	4,889.95	448.67	270.88	523.82	0.15	-0.09	-0.93	
5,015.00	5.71	31.42	4,984.37	457.57	276.39	534.28	1.30	-1.29	-0.65	
5,110.00	5.23	27.73	5,078.94	465.44	280.87	543.32	0.63	-0.51	-3.88	
5,205.00	6.20	35.90	5,173.47	473.43	285.89	552.76	1.33	1.02	8.60	
5,299.00	5.89	38.98	5,266.94	481.29	291.90	562.62	0.48	-0.33	3.28	
5,395.00	5.32	43.29	5,362.48	488.36	298.05	571.90	0.74	-0.59	4.49	
5,490.00	4.57	38.01	5,457.13	494.54	303.40	580.00	0.92	-0.79	-5.56	
5,585.00	4.92	37.22	5,551.81	500.77	308.20	587.84	0.37	0.37	-0.83	
5,680.00	4.44	33.44	5,646.49	507.08	312.69	595.58	0.60	-0.51	-3.98	
5,774.00	4.26	30.72	5,740.22	513.12	316.48	602.70	0.29	-0.19	-2.89	
5,869.00	3.74	35.99	5,834.99	518.66	320.10	609.32	0.67	-0.55	5.55	
5,964.00	3.42	35.55	5,929.80	523.47	323.57	615.25	0.34	-0.34	-0.46	
6,059.00	2.46	49.70	6,024.68	527.10	326.77	620.03	1.26	-1.01	14.89	
6,154.00	1.93	44.08	6,119.61	529.56	329.44	623.55	0.60	-0.56	-5.92	



<b>Company:</b>	Piceance Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Gunderson 29-08E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7558.00usft
<b>Site:</b>	Gunderson	<b>MD Reference:</b>	Well @ 7558.00usft
<b>Well:</b>	Gunderson 29-08E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Slot A-9	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Slot A-9	<b>Database:</b>	EDMDBBW

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)
6,248.00	1.05	42.41	6,213.57	531.34	331.12	625.96	0.94	-0.94	-1.78
6,343.00	0.62	35.55	6,308.56	532.40	332.01	627.33	0.46	-0.45	-7.22
6,438.00	0.22	341.15	6,403.56	532.99	332.25	627.96	0.55	-0.42	-57.26
6,533.00	0.31	299.22	6,498.56	533.29	331.96	628.05	0.22	0.09	-44.14
6,628.00	1.32	233.12	6,593.55	532.76	330.86	627.01	1.29	1.06	-69.58
6,723.00	1.49	230.58	6,688.52	531.32	329.03	624.80	0.19	0.18	-2.67
6,817.00	1.89	223.46	6,782.48	529.41	327.02	622.11	0.48	0.43	-7.57
6,912.00	2.37	239.11	6,877.42	527.27	324.26	618.81	0.79	0.51	16.47
7,007.00	2.99	226.36	6,972.31	524.55	320.78	614.63	0.90	0.65	-13.42
7,102.00	2.24	200.61	7,067.22	521.10	318.33	610.41	1.45	-0.79	-27.11
7,197.00	3.30	215.73	7,162.10	517.14	316.08	605.87	1.35	1.12	15.92
7,292.00	3.12	209.31	7,256.96	512.67	313.22	600.55	0.42	-0.19	-6.76
7,386.00	2.94	199.91	7,350.82	508.17	311.15	595.65	0.56	-0.19	-10.00
7,481.00	4.57	205.27	7,445.62	502.46	308.70	589.53	1.75	1.72	5.64
7,576.00	4.79	212.56	7,540.30	495.69	304.95	581.81	0.67	0.23	7.67
7,671.00	5.23	214.50	7,634.94	488.78	300.37	573.52	0.50	0.46	2.04
<b>Last Archer Survey</b>									
7,766.00	4.83	210.89	7,729.57	481.78	295.86	565.19	0.54	-0.42	-3.80
<b>PTB - Gunderson 29-08E tgt</b>									
7,816.00	4.83	210.89	7,779.40	478.17	293.70	560.99	0.00	0.00	0.00

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
107.00	106.99	0.93	0.98	First Archer survey
7,766.00	7,729.57	481.78	295.86	Last Archer Survey
7,816.00	7,779.40	478.17	293.70	PTB

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