



Piceance Energy, LLC

**Mesa County, CO
Gunderson
Gunderson 29-09E**

Slot A-10

Survey: Survey #1

Standard Survey Report

13 April, 2015

Archer



Project: Mesa County, CO
Site: Gunderson
Well: Gunderson 29-09E
Wellbore: Slot A-10
Design: Design #1
Latitude: 39.248842
Longitude: -107.787800
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 29-09E, 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 29-09E

+N/-S	+E/-W	Northing	Ground Level: Easting	7531.00 Latitude	Longitude	Slot
0.00	0.00	1523682.412	2352183.201	39.248842	-107.787800	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Gunderson 29-09E tgt	7800.00	249.96	288.05	1523925.041	2352477.450	39.249528	-107.786783	Circle (Radius: 50.00)

SECTION DETAILS

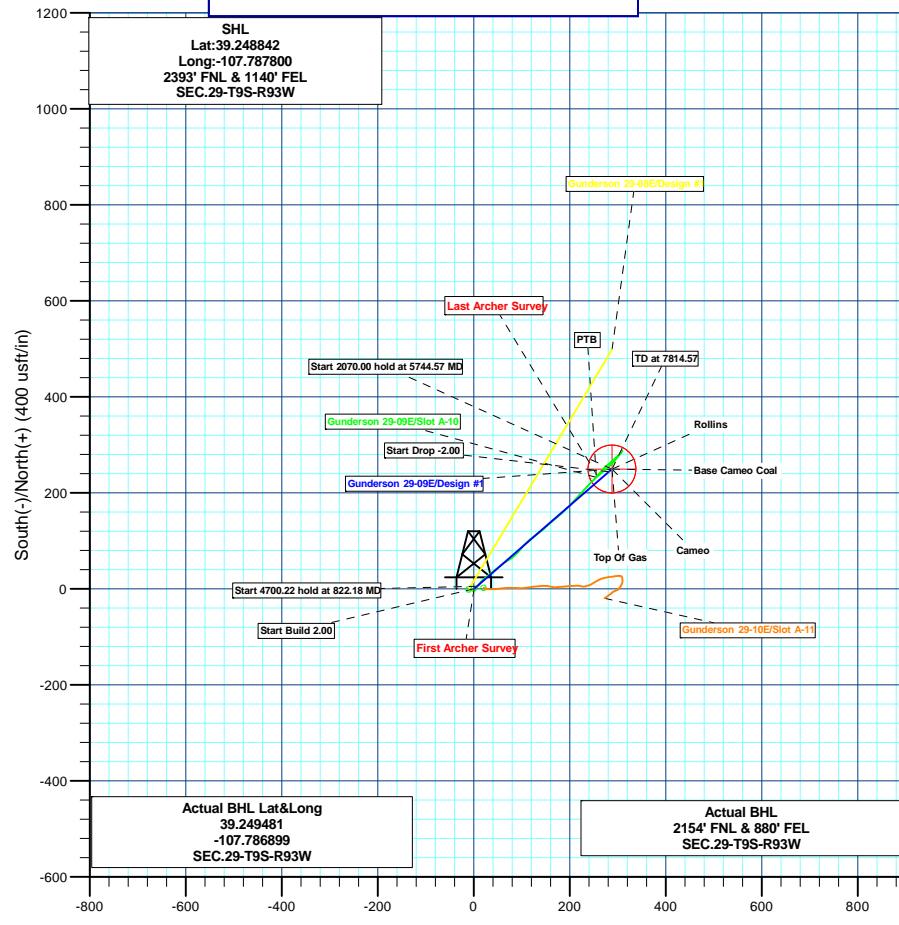
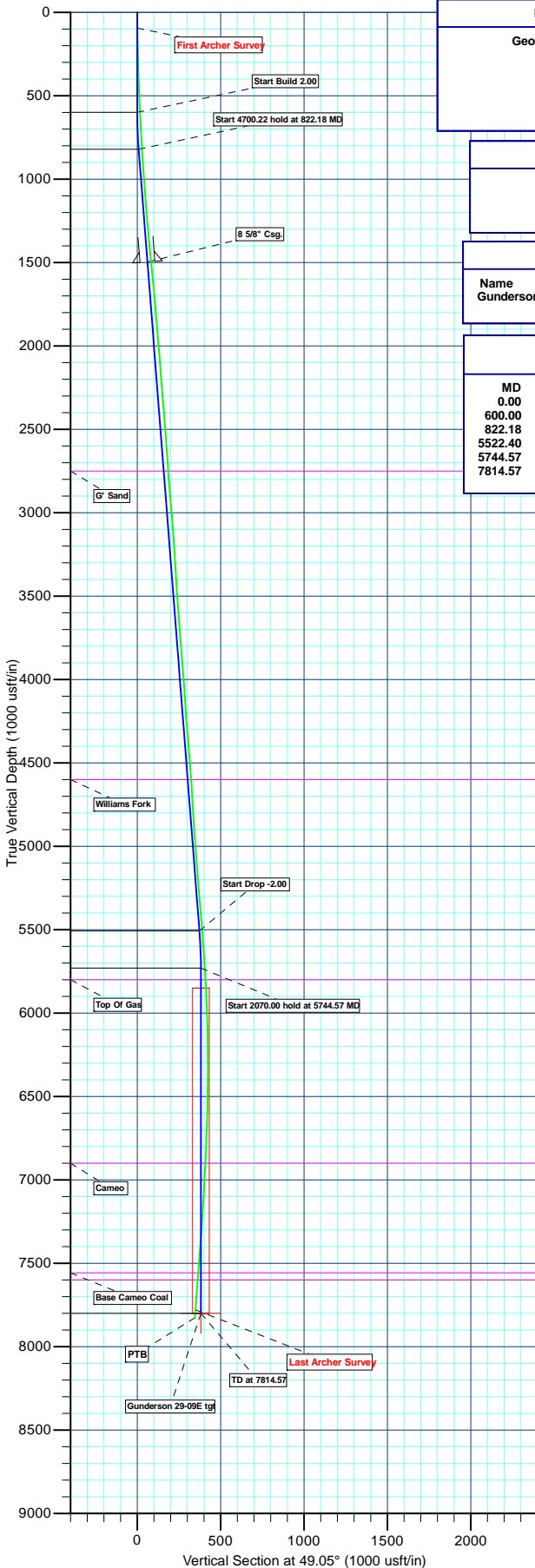
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
822.18	4.44	49.05	821.96	5.64	6.50	2.00	49.05	8.61	Start 4700.22 hold at 822.18 MD
5522.40	4.44	49.05	5508.04	244.32	281.54	0.00	0.00	372.77	Start Drop -2.00
5744.57	0.00	0.00	5730.00	249.96	288.05	2.00	180.00	381.38	Start 2070.00 hold at 5744.57 MD
7814.57	0.00	0.00	7800.00	249.96	288.05	0.00	0.00	381.38	TD at 7814.57



Azimuths to True North
Magnetic North: 9.73°
Magnetic Field
Strength: 51745.0snT
Dip Angle: 65.47°
Date: 04/08/2015
Model: IGRF2010

FORMATION TOP DETAILS

TVDPATH	MDPATH	Formation
2750.00	2756.04	G' Sand
4600.00	4611.61	Williams Fork
5800.00	5814.57	Top Of Gas
6900.00	6914.57	Cameo
7558.00	7572.57	Base Cameo Coal
7600.00	7614.57	Rollins



Plan: Design #1 (Gunderson 29-09E/Slot A-10)

Created By: Ricky Osburn Date: 14:04, August 03 2015



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Gunderson 29-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7558.00usft
Site:	Gunderson	MD Reference:	Well @ 7558.00usft
Well:	Gunderson 29-09E	North Reference:	True
Wellbore:	Slot A-10	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-10	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:	1,523,671.416 usft	Latitude:	39° 14' 55.692 N
From:	Lat/Long	Easting:	2,352,063.747 usft	Longitude:	107° 47' 17.595 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.44 °

Well		Gunderson 29-09E				
Well Position	+N/-S	0.00 usft	Northing:	1,523,682.412 usft	Latitude:	39° 14' 55.830 N
	+E/-W	0.00 usft	Easting:	2,352,183.201 usft	Longitude:	107° 47' 16.080 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	7,531.00 usft

Wellbore	Slot A-10				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/08	9.74	65.47	51,745

Design	Slot A-10			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	49.61

Survey Program	Date	2015/04/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
105.00	7,856.00	Survey #1 (Slot A-10)	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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
First Archer Survey										
105.00	1.05	72.47	104.99	0.29	0.92	0.89	1.00	1.00	0.00	
197.00	1.36	54.80	196.97	1.17	2.61	2.75	0.52	0.34	-19.21	
290.00	1.58	58.49	289.94	2.48	4.61	5.12	0.26	0.24	3.97	
382.00	1.67	60.34	381.91	3.81	6.85	7.69	0.11	0.10	2.01	
474.00	2.42	27.11	473.85	6.20	8.90	10.80	1.49	0.82	-36.12	
566.00	2.55	30.10	565.76	9.70	10.82	14.52	0.20	0.14	3.25	
659.00	3.25	41.70	658.64	13.46	13.61	19.08	0.98	0.75	12.47	
751.00	3.30	46.19	750.49	17.24	17.25	24.31	0.28	0.05	4.88	
843.00	3.60	46.54	842.33	21.06	21.26	29.84	0.33	0.33	0.38	
935.00	3.91	51.99	934.13	24.97	25.83	35.86	0.51	0.34	5.92	
1,027.00	4.13	52.95	1,025.90	28.90	30.94	42.30	0.25	0.24	1.04	



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Gunderson 29-09E
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Site:	Gunderson	MD Reference:	Well @ 7558.00usft
Well:	Gunderson 29-09E	North Reference:	True
Wellbore:	Slot A-10	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-10	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)	
1,125.00	4.48	54.18	1,123.63	33.27	36.86	49.64	0.37	0.36	1.26	
1,220.00	4.48	49.26	1,218.34	37.86	42.68	57.04	0.40	0.00	-5.18	
1,315.00	5.01	50.84	1,313.01	42.90	48.71	64.90	0.57	0.56	1.66	
1,410.00	5.36	52.34	1,407.62	48.23	55.44	73.48	0.40	0.37	1.58	
1,504.00	5.76	52.95	1,501.18	53.76	62.68	82.57	0.43	0.43	0.65	
1,599.00	5.71	58.23	1,595.71	59.12	70.50	92.01	0.56	-0.05	5.56	
1,693.00	5.54	58.23	1,689.25	63.97	78.34	101.12	0.18	-0.18	0.00	
1,788.00	4.92	43.73	1,783.86	69.33	85.05	109.70	1.53	-0.65	-15.26	
1,883.00	4.83	43.29	1,878.52	75.18	90.61	117.73	0.10	-0.09	-0.46	
1,978.00	4.70	43.02	1,973.19	80.94	96.01	125.57	0.14	-0.14	-0.28	
2,073.00	4.61	41.53	2,067.88	86.64	101.19	133.22	0.16	-0.09	-1.57	
2,168.00	4.39	43.11	2,162.58	92.15	106.21	140.61	0.27	-0.23	1.66	
2,263.00	4.17	40.91	2,257.32	97.42	110.96	147.64	0.29	-0.23	-2.32	
2,358.00	4.97	53.04	2,352.02	102.50	116.51	155.16	1.32	0.84	12.77	
2,453.00	4.83	54.10	2,446.67	107.32	123.04	163.25	0.18	-0.15	1.12	
2,547.00	4.35	53.13	2,540.37	111.78	129.09	170.76	0.52	-0.51	-1.03	
2,642.00	3.96	51.20	2,635.12	116.00	134.53	177.63	0.44	-0.41	-2.03	
2,737.00	3.60	54.54	2,729.91	119.79	139.52	183.88	0.44	-0.38	3.52	
2,831.00	4.79	47.86	2,823.66	124.13	144.83	190.75	1.37	1.27	-7.11	
2,926.00	4.75	47.59	2,918.33	129.45	150.68	198.64	0.05	-0.04	-0.28	
3,021.00	4.39	47.94	3,013.03	134.53	156.28	206.21	0.38	-0.38	0.37	
3,116.00	4.22	49.10	3,107.76	139.26	161.62	213.34	0.20	-0.18	1.22	
3,211.00	3.91	49.61	3,202.52	143.65	166.73	220.07	0.33	-0.33	0.54	
3,306.00	3.74	50.84	3,297.31	147.70	171.60	226.41	0.20	-0.18	1.29	
3,401.00	3.69	50.49	3,392.11	151.60	176.36	232.56	0.06	-0.05	-0.37	
3,496.00	3.56	48.21	3,486.92	155.51	180.92	238.57	0.20	-0.14	-2.40	
3,590.00	3.30	50.14	3,580.75	159.19	185.17	244.19	0.30	-0.28	2.05	
3,685.00	5.05	43.40	3,675.50	163.98	190.14	251.08	1.91	1.84	-7.09	
3,780.00	4.79	44.08	3,770.15	169.87	195.78	259.19	0.28	-0.27	0.72	
3,875.00	4.44	44.78	3,864.84	175.33	201.13	266.80	0.37	-0.37	0.74	
3,970.00	4.31	43.02	3,959.56	180.55	206.15	274.01	0.20	-0.14	-1.85	
4,065.00	4.22	42.93	4,054.30	185.72	210.97	281.03	0.09	-0.09	-0.09	
4,160.00	3.87	41.79	4,149.06	190.67	215.48	287.68	0.38	-0.37	-1.20	
4,255.00	3.65	42.93	4,243.86	195.27	219.68	293.85	0.24	-0.23	1.20	
4,350.00	5.58	44.60	4,338.54	200.78	224.98	301.46	2.04	2.03	1.76	
4,445.00	4.92	41.88	4,433.14	207.10	230.95	310.10	0.74	-0.69	-2.86	
4,540.00	4.35	41.97	4,527.83	212.81	236.08	317.71	0.60	-0.60	0.09	
4,635.00	3.89	43.02	4,622.59	217.84	240.68	324.48	0.49	-0.48	1.11	
4,730.00	3.38	45.04	4,717.40	222.18	244.86	330.47	0.55	-0.54	2.13	
4,825.00	3.12	45.31	4,812.24	225.98	248.68	335.84	0.27	-0.27	0.28	
4,920.00	4.22	43.46	4,907.05	230.33	252.93	341.89	1.16	1.16	-1.95	
5,015.00	3.82	38.98	5,001.81	235.33	257.32	348.48	0.54	-0.42	-4.72	
5,110.00	4.83	43.20	5,096.54	240.70	262.05	355.56	1.11	1.06	4.44	
5,204.00	4.57	40.03	5,190.23	246.46	267.17	363.19	0.39	-0.28	-3.37	
5,299.00	4.17	38.80	5,284.95	252.05	271.77	370.31	0.43	-0.42	-1.29	
5,394.00	5.27	52.34	5,379.63	257.40	277.38	378.07	1.64	1.16	14.25	
5,490.00	4.66	50.76	5,475.27	262.56	283.89	386.37	0.65	-0.64	-1.65	
5,584.00	4.17	49.44	5,568.99	267.20	289.45	393.60	0.53	-0.52	-1.40	
5,679.00	3.78	46.10	5,663.76	271.62	294.33	400.18	0.48	-0.41	-3.52	
5,774.00	3.47	48.47	5,758.57	275.70	298.74	406.18	0.36	-0.33	2.49	
5,869.00	3.08	44.25	5,853.42	279.43	302.67	411.60	0.48	-0.41	-4.44	
5,964.00	2.42	41.26	5,948.31	282.77	305.77	416.12	0.71	-0.69	-3.15	
6,059.00	1.67	38.54	6,043.24	285.36	307.96	419.47	0.80	-0.79	-2.86	
6,154.00	1.10	32.74	6,138.22	287.21	309.32	421.70	0.62	-0.60	-6.11	



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Gunderson 29-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7558.00usft
Site:	Gunderson	MD Reference:	Well @ 7558.00usft
Well:	Gunderson 29-09E	North Reference:	True
Wellbore:	Slot A-10	Survey Calculation Method:	Minimum Curvature
Design:	Slot A-10	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)
6,248.00	0.53	12.44	6,232.21	288.39	309.90	422.91	0.67	-0.61	-21.60
6,343.00	0.22	251.32	6,327.21	288.76	309.82	423.09	0.71	-0.33	-127.49
6,438.00	0.66	211.16	6,422.20	288.24	309.36	422.40	0.54	0.46	-42.27
6,533.00	0.83	209.31	6,517.19	287.17	308.74	421.24	0.18	0.18	-1.95
6,628.00	1.27	220.21	6,612.18	285.76	307.73	419.55	0.51	0.46	11.47
6,722.00	1.93	214.94	6,706.14	283.67	306.15	416.99	0.72	0.70	-5.61
6,817.00	2.42	212.83	6,801.07	280.67	304.14	413.53	0.52	0.52	-2.22
6,912.00	2.99	215.64	6,895.97	276.97	301.61	409.20	0.62	0.60	2.96
7,007.00	3.52	218.89	6,990.81	272.69	298.34	403.93	0.59	0.56	3.42
7,102.00	3.87	220.12	7,085.62	267.97	294.44	397.90	0.38	0.37	1.29
7,197.00	3.03	219.86	7,180.44	263.59	290.77	392.27	0.88	-0.88	-0.27
7,291.00	3.77	226.53	7,274.28	259.56	286.93	386.73	0.89	0.79	7.10
7,386.00	4.22	230.49	7,369.05	255.18	281.97	380.12	0.56	0.47	4.17
7,481.00	4.35	228.47	7,463.78	250.57	276.57	373.02	0.21	0.14	-2.13
7,576.00	4.32	230.00	7,558.51	245.88	271.14	365.84	0.13	-0.03	1.61
7,671.00	4.26	230.41	7,653.24	241.34	265.68	358.74	0.07	-0.06	0.43
7,766.00	4.26	231.37	7,747.98	236.88	260.20	351.68	0.08	0.00	1.01
Last Archer Survey - Gunderson 29-09E tgt									
7,808.00	4.17	230.76	7,789.87	234.94	257.80	348.59	0.24	-0.21	-1.45
PTB									
7,856.00	4.17	230.76	7,837.74	232.74	255.10	345.10	0.00	0.00	0.00

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
105.00	104.99	0.29	0.92	First Archer Survey
7,808.00	7,789.87	234.94	257.80	Last Archer Survey
7,856.00	7,837.74	232.74	255.10	PTB

Checked By: _____	Approved By: _____	Date: _____
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