



Piceance Energy, LLC

Mesa County, CO

N Vega 28-11

Piceance 28-12M

Wellbore #1

Survey: Survey #1

Standard Survey Report

15 March, 2015

Archer



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-12M
Project:	Mesa County, CO	TVD Reference:	WELL @ 7602.00usft (Original Well Elev)
Site:	N Vega 28-11	MD Reference:	WELL @ 7602.00usft (Original Well Elev)
Well:	Piceance 28-12M	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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		N Vega 28-11			
Site Position:		Northing:	1,523,092.764 usft	Latitude:	39° 14' 50.676 N
From:	Lat/Long	Easting:	2,354,890.736 usft	Longitude:	107° 46' 41.484 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.44 °

Well	Piceance 28-12M					
Well Position	+N/-S	0.00 usft	Northing:	1,523,217.422 usft	Latitude:	39° 14' 51.917 N
	+E/-W	0.00 usft	Easting:	2,354,926.320 usft	Longitude:	107° 46' 41.072 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	7,580.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/05/14	9.79	65.48	51,788

Design	Wellbore #1			
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	96.03

Survey Program	Date	03/15/15			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
110.00	8,040.00	Survey #1 (Wellbore #1)	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										
110.00	1.32	88.27	109.99	0.04	1.27	1.26	1.20	1.20	0.00	
201.00	1.32	97.06	200.97	-0.06	3.35	3.34	0.22	0.00	9.66	
293.00	1.41	85.28	292.94	-0.10	5.53	5.51	0.32	0.10	-12.80	
386.00	2.77	108.48	385.88	-0.71	8.81	8.83	1.69	1.46	24.95	
478.00	5.05	104.79	477.66	-2.45	14.83	15.01	2.49	2.48	-4.01	
570.00	6.68	103.38	569.17	-4.72	23.95	24.32	1.78	1.77	-1.53	
662.00	8.96	100.40	660.31	-7.26	36.21	36.77	2.52	2.48	-3.24	
755.00	10.81	100.48	751.93	-10.15	51.91	52.68	1.99	1.99	0.09	
847.00	11.65	100.31	842.16	-13.38	69.53	70.55	0.91	0.91	-0.18	
942.00	13.14	95.21	934.95	-16.08	89.72	90.91	1.94	1.57	-5.37	
1,037.00	13.75	94.33	1,027.35	-17.91	111.73	113.00	0.68	0.64	-0.93	



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Well:	Piceance 28-12M	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
1,132.00	14.59	93.72	1,119.46	-19.54	134.93	136.24	0.90	0.88	-0.64
1,227.00	13.49	92.66	1,211.62	-20.83	157.94	159.25	1.19	-1.16	-1.12
1,322.00	14.19	92.05	1,303.86	-21.76	180.65	181.93	0.75	0.74	-0.64
1,417.00	14.32	92.13	1,395.93	-22.62	204.02	205.27	0.14	0.14	0.08
1,520.00	14.19	95.12	1,495.76	-24.22	229.33	230.60	0.73	-0.13	2.90
1,606.00	14.24	93.54	1,579.13	-25.81	250.38	251.71	0.45	0.06	-1.84
1,701.00	14.06	93.19	1,671.25	-27.17	273.57	274.91	0.21	-0.19	-0.37
1,796.00	13.14	97.41	1,763.58	-29.21	295.80	297.23	1.42	-0.97	4.44
1,891.00	13.10	95.56	1,856.11	-31.64	317.22	318.79	0.44	-0.04	-1.95
1,986.00	12.52	100.31	1,948.74	-34.53	338.07	339.82	1.27	-0.61	5.00
2,081.00	12.57	98.46	2,041.48	-37.89	358.42	360.42	0.43	0.05	-1.95
2,176.00	12.35	100.04	2,134.24	-41.19	378.65	380.88	0.43	-0.23	1.66
2,270.00	12.00	99.78	2,226.12	-44.60	398.18	400.66	0.38	-0.37	-0.28
2,365.00	11.29	97.67	2,319.17	-47.52	417.13	419.81	0.87	-0.75	-2.22
2,460.00	11.91	100.75	2,412.23	-50.59	435.98	438.88	0.92	0.65	3.24
2,555.00	11.91	99.16	2,505.18	-53.98	455.29	458.44	0.35	0.00	-1.67
2,650.00	11.47	100.57	2,598.21	-57.27	474.25	477.64	0.55	-0.46	1.48
2,745.00	10.99	99.60	2,691.39	-60.51	492.46	496.09	0.54	-0.51	-1.02
2,840.00	9.93	96.44	2,784.81	-62.94	509.53	513.32	1.27	-1.12	-3.33
2,935.00	10.55	100.31	2,878.30	-65.42	526.23	530.19	0.97	0.65	4.07
3,030.00	10.11	99.78	2,971.76	-68.39	543.00	547.18	0.47	-0.46	-0.56
3,125.00	11.03	100.92	3,065.15	-71.53	560.14	564.56	0.99	0.97	1.20
3,220.00	10.77	98.02	3,158.44	-74.49	577.85	582.48	0.64	-0.27	-3.05
3,315.00	11.91	99.52	3,251.58	-77.35	596.31	601.14	1.24	1.20	1.58
3,410.00	11.82	100.83	3,344.55	-80.80	615.54	620.62	0.30	-0.09	1.38
3,505.00	11.38	99.25	3,437.61	-84.13	634.34	639.67	0.57	-0.46	-1.66
3,600.00	12.79	99.96	3,530.50	-87.46	653.95	659.52	1.49	1.48	0.75
3,694.00	12.57	99.60	3,622.21	-90.96	674.29	680.11	0.25	-0.23	-0.38
3,789.00	12.04	100.83	3,715.03	-94.55	694.21	700.30	0.62	-0.56	1.29
3,884.00	13.75	99.52	3,807.63	-98.28	715.08	721.44	1.83	1.80	-1.38
3,979.00	13.80	98.02	3,899.90	-101.73	737.43	744.04	0.38	0.05	-1.58
4,074.00	12.92	98.37	3,992.32	-104.85	759.16	765.97	0.93	-0.93	0.37
4,169.00	13.13	92.75	4,084.88	-106.92	780.45	787.36	1.35	0.22	-5.92
4,264.00	12.30	93.89	4,177.55	-108.12	801.32	808.24	0.91	-0.87	1.20
4,359.00	12.13	93.45	4,270.40	-109.41	821.38	828.33	0.20	-0.18	-0.46
4,454.00	11.87	91.17	4,363.33	-110.21	841.11	848.03	0.57	-0.27	-2.40
4,549.00	11.34	92.05	4,456.38	-110.74	860.21	867.09	0.59	-0.56	0.93
4,644.00	11.12	88.18	4,549.57	-110.78	878.70	885.48	0.83	-0.23	-4.07
4,739.00	10.24	87.56	4,642.92	-110.13	896.30	902.91	0.93	-0.93	-0.65
4,834.00	9.62	87.56	4,736.50	-109.44	912.66	919.11	0.65	-0.65	0.00
4,929.00	8.88	89.94	4,830.26	-109.09	927.93	934.25	0.88	-0.78	2.51
5,024.00	8.57	90.11	4,924.16	-109.10	942.34	948.58	0.33	-0.33	0.18
5,119.00	8.31	88.44	5,018.13	-108.92	956.28	962.43	0.38	-0.27	-1.76
5,214.00	7.45	84.22	5,112.24	-108.12	969.27	975.26	1.09	-0.91	-4.44
5,309.00	5.71	84.75	5,206.61	-107.06	980.10	985.93	1.83	-1.83	0.56
5,404.00	4.04	79.04	5,301.26	-105.99	988.10	993.76	1.83	-1.76	-6.01
5,499.00	3.21	83.26	5,396.07	-105.05	994.02	999.56	0.92	-0.87	4.44
5,594.00	3.03	85.81	5,490.93	-104.55	999.17	1,004.62	0.24	-0.19	2.68
5,688.00	2.24	65.50	5,584.83	-103.61	1,003.32	1,008.65	1.29	-0.84	-21.61
5,783.00	0.62	99.78	5,679.80	-102.92	1,005.51	1,010.76	1.86	-1.71	36.08
5,878.00	0.79	86.16	5,774.79	-102.97	1,006.67	1,011.92	0.25	0.18	-14.34
5,973.00	0.48	87.83	5,869.79	-102.91	1,007.73	1,012.96	0.33	-0.33	1.76
6,068.00	0.04	99.78	5,964.78	-102.90	1,008.16	1,013.39	0.46	-0.46	12.58
6,164.00	0.22	191.36	6,060.78	-103.09	1,008.15	1,013.40	0.23	0.19	95.40



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Well:	Piceance 28-12M	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)	
6,258.00	0.48	279.78	6,154.78	-103.20	1,007.73	1,012.99	0.56	0.28	94.06	
6,353.00	0.97	228.80	6,249.78	-103.66	1,006.73	1,012.05	0.81	0.52	-53.66	
6,448.00	1.63	201.73	6,344.75	-105.44	1,005.63	1,011.14	0.93	0.69	-28.49	
6,543.00	2.11	212.37	6,439.70	-108.18	1,004.19	1,010.00	0.62	0.51	11.20	
6,638.00	2.24	199.45	6,534.63	-111.40	1,002.63	1,008.79	0.53	0.14	-13.60	
6,733.00	2.37	217.29	6,629.56	-114.72	1,000.83	1,007.34	0.76	0.14	18.78	
6,828.00	2.68	217.11	6,724.47	-118.05	998.30	1,005.17	0.33	0.33	-0.19	
6,923.00	3.08	221.68	6,819.35	-121.73	995.26	1,002.54	0.49	0.42	4.81	
7,018.00	3.16	214.65	6,914.20	-125.79	992.07	999.80	0.41	0.08	-7.40	
7,112.00	3.16	217.38	7,008.06	-129.98	989.03	997.21	0.16	0.00	2.90	
7,207.00	3.08	228.63	7,102.92	-133.75	985.52	994.12	0.65	-0.08	11.84	
7,302.00	2.64	230.65	7,197.80	-136.82	981.92	990.85	0.48	-0.46	2.13	
7,396.00	3.08	228.10	7,291.69	-139.88	978.36	987.64	0.49	0.47	-2.71	
7,492.00	2.77	220.72	7,387.56	-143.36	974.93	984.59	0.51	-0.32	-7.69	
7,587.00	3.82	222.12	7,482.40	-147.45	971.31	981.42	1.11	1.11	1.47	
7,682.00	4.13	223.00	7,577.17	-152.30	966.85	977.50	0.33	0.33	0.93	
7,776.00	3.69	226.87	7,670.96	-156.84	962.34	973.49	0.55	-0.47	4.12	
7,871.00	3.78	226.43	7,765.75	-161.09	957.84	969.46	0.10	0.09	-0.46	
7,966.00	3.47	225.46	7,860.56	-165.26	953.52	965.60	0.33	-0.33	-1.02	
Last Archer Survey - Piceance 28-12M tgt										
7,990.00	3.60	230.47	7,884.52	-166.25	952.42	964.61	1.40	0.54	20.87	
PTB										
8,040.00	3.60	230.47	7,934.42	-168.25	950.00	962.41	0.00	0.00	0.00	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
110.00	109.99	0.04	1.27	First Archer Survey	
7,990.00	7,884.52	-166.25	952.42	Last Archer Survey	
8,040.00	7,934.42	-168.25	950.00	PTB	

Checked By: _____ Approved By: _____ Date: _____