



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance 28-10M

Slot B-10

Survey: Survey #1

Survey Report - Geographic

20 October, 2015



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance 28-10M
Wellbore: Slot B-10
Design: Design #2
Latitude: 39° 15' 3.220 N
Longitude: 107° 46' 45.770 W
Ground Level: 7556.0
Well @ 7578.0usft

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 Piceance 28-10M, True North
Vertical (TVD) Reference: Well @ 7578.0usft
Section (VS) Reference: Slot - (0.0N, 0.0E)
Measured Depth Reference: Well @ 7578.0usft
Calculation Method: Minimum Curvature

WELL DETAILS: Piceance 28-10M

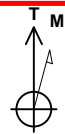
+N/-S	+E/-W	Northing	Ground Level:	7556.0	Latitude	Longitude	Slot
0.0	0.0	1524369.90	Easting	2354585.52	39° 15' 3.220 N	107° 46' 45.770 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Piceance Federal 28-10M tgt	7870.0	-769.9	1338.9	1523566.69	2355904.65	39° 14' 55.610 N	107° 46' 28.750 W	Circle (Radius: 50.0)

SECTION DETAILS

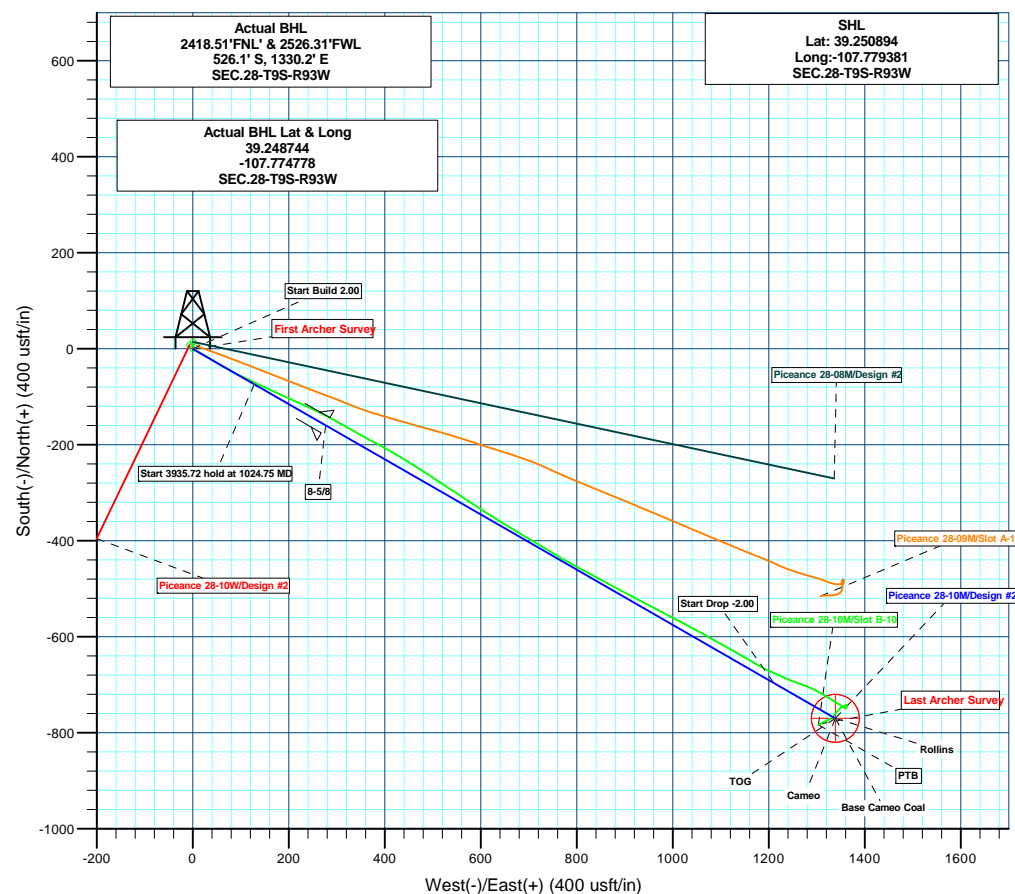
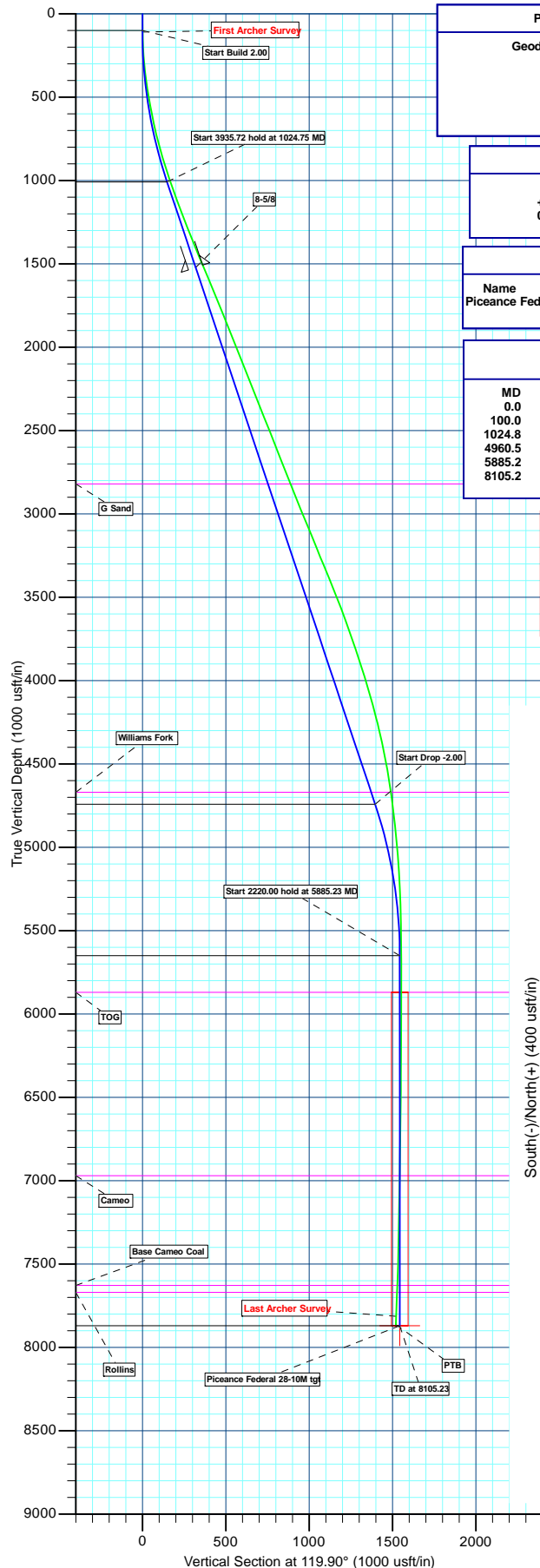
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
100.0	0.00	0.00	100.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
1024.8	18.50	119.90	1008.8	-73.8	128.3	2.00	119.90	148.0	Start 3935.72 hold at 1024.75 MD
4960.5	18.50	119.90	4741.2	-696.1	1210.6	0.00	0.00	1396.5	Start Drop -2.00
5885.2	0.00	0.00	5650.0	-769.9	1338.9	2.00	180.00	1544.4	Start 2220.00 hold at 5885.23 MD
8105.2	0.00	0.00	7870.0	-769.9	1338.9	0.00	0.00	1544.4	TD at 8105.23



Azimuths to True North
Magnetic North: 9.72°
Magnetic Field
Strength: 51741.8snT
Dip Angle: 65.47°
Date: 2015/04/27
Model: IGRF2010

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2820.0	2934.6	G Sand
4670.0	4885.4	Williams Fork
5870.0	6105.2	TOG
6970.0	7205.2	Cameo
7628.0	7863.2	Base Cameo Coal
7670.0	7905.2	Rollins



Plan: Design #2 (Piceance 28-10M/Slot B-10)

Created By: Ricky Osburn Date: 11:10, October 21 2015



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-10M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-10M	North Reference:	True
Wellbore:	Slot B-10	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-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	Piceance 28-05				
Site Position:		Northing:	1,524,375.785 usft	Latitude:	39.250911
From:	Lat/Long	Easting:	2,354,593.535 usft	Longitude:	-107.779353
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.44 °

Well	Piceance 28-10M					
Well Position	+N/-S	0.00 usft	Northing:	1,524,369.901 usft	Latitude:	39.250894
	+E/-W	0.00 usft	Easting:	2,354,585.519 usft	Longitude:	-107.779381
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,556.00 usft	

Wellbore	Slot B-10				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/27	9.73	65.47	51,742

Design	Slot B-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	117.03

Survey Program	Date	2015/07/18			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
110.00	8,127.00	Survey #1 (Slot B-10)	MWD	MWD - Standard	



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Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-10M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-10M	North Reference:	True
Wellbore:	Slot B-10	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-10	Database:	EDMDBBW

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	1,524,369.901	2,354,585.519	39.250894	-107.779381
First Archer Survey									
110.00	1.19	122.06	109.99	-0.61	0.97	1,524,369.270	2,354,586.471	39.250893	-107.779377
202.00	2.79	112.71	201.93	-1.98	3.84	1,524,367.827	2,354,589.311	39.250889	-107.779367
294.00	5.01	117.58	293.72	-4.70	9.47	1,524,364.962	2,354,594.868	39.250881	-107.779347
386.00	7.48	121.28	385.16	-9.67	18.15	1,524,359.776	2,354,603.420	39.250868	-107.779316
478.00	9.92	120.74	476.10	-16.83	30.08	1,524,352.318	2,354,615.168	39.250848	-107.779274
571.00	10.31	123.14	567.65	-25.48	43.93	1,524,343.328	2,354,628.800	39.250824	-107.779225
663.00	12.30	119.90	657.86	-34.86	59.33	1,524,333.559	2,354,643.950	39.250799	-107.779171
755.00	14.25	118.06	747.40	-45.08	77.81	1,524,322.886	2,354,662.177	39.250771	-107.779106
847.00	16.53	115.78	836.10	-56.10	99.59	1,524,311.323	2,354,683.674	39.250740	-107.779029
939.00	16.90	116.62	924.21	-67.78	123.33	1,524,299.047	2,354,707.114	39.250708	-107.778945
1,031.00	19.51	114.22	1,011.60	-80.08	149.30	1,524,286.103	2,354,732.767	39.250675	-107.778853
1,126.00	20.19	114.13	1,100.95	-93.29	178.73	1,524,272.159	2,354,761.856	39.250638	-107.778749
1,221.00	21.00	113.80	1,189.88	-106.86	209.27	1,524,257.825	2,354,792.042	39.250601	-107.778642
1,316.00	21.48	115.38	1,278.43	-121.18	240.56	1,524,242.720	2,354,822.963	39.250562	-107.778531
1,411.00	22.18	116.84	1,366.62	-136.74	272.28	1,524,226.378	2,354,854.278	39.250519	-107.778419
1,506.00	22.03	119.39	1,454.64	-153.58	303.80	1,524,208.752	2,354,885.371	39.250473	-107.778308
1,573.00	23.08	120.38	1,516.51	-166.38	326.08	1,524,195.388	2,354,907.321	39.250438	-107.778229
1,696.00	22.98	118.36	1,629.71	-189.98	368.01	1,524,170.746	2,354,948.644	39.250373	-107.778081
1,791.00	21.68	117.77	1,717.58	-206.97	399.85	1,524,152.967	2,354,980.054	39.250326	-107.777969
1,886.00	21.58	120.42	1,805.90	-223.99	430.45	1,524,135.182	2,355,010.210	39.250279	-107.777861
1,980.00	22.51	123.24	1,893.02	-242.61	460.40	1,524,115.820	2,355,039.692	39.250228	-107.777755
2,075.00	21.91	123.07	1,980.98	-262.25	490.47	1,524,095.432	2,355,069.253	39.250174	-107.777649
2,170.00	21.12	122.28	2,069.36	-281.06	519.79	1,524,075.889	2,355,098.095	39.250123	-107.777545
2,265.00	22.02	124.24	2,157.70	-300.22	548.99	1,524,056.001	2,355,126.799	39.250070	-107.777442
2,360.00	21.40	123.66	2,245.96	-319.85	578.13	1,524,035.649	2,355,155.447	39.250016	-107.777339
2,455.00	22.09	122.18	2,334.20	-338.97	607.68	1,524,015.794	2,355,184.503	39.249964	-107.777235
2,550.00	21.35	121.97	2,422.46	-357.64	637.47	1,523,996.382	2,355,213.814	39.249912	-107.777130
2,645.00	22.18	121.41	2,510.69	-376.14	667.44	1,523,977.134	2,355,243.316	39.249862	-107.777024
2,739.00	21.07	120.33	2,598.07	-393.92	697.17	1,523,958.613	2,355,272.589	39.249813	-107.776919
2,834.00	22.11	120.59	2,686.40	-411.64	727.30	1,523,940.141	2,355,302.265	39.249764	-107.776812
2,929.00	20.64	120.41	2,774.87	-429.22	757.13	1,523,921.824	2,355,331.647	39.249716	-107.776707
3,024.00	21.78	119.91	2,863.43	-446.48	786.85	1,523,903.820	2,355,360.923	39.249668	-107.776602
3,119.00	23.65	118.54	2,951.06	-464.37	818.87	1,523,885.128	2,355,392.483	39.249619	-107.776489
3,213.00	22.70	117.92	3,037.47	-481.88	851.46	1,523,866.815	2,355,424.624	39.249571	-107.776374
3,309.00	21.93	117.93	3,126.28	-498.95	883.67	1,523,848.942	2,355,456.392	39.249524	-107.776260
3,403.00	21.16	117.69	3,213.71	-515.05	914.20	1,523,832.075	2,355,486.510	39.249480	-107.776152
3,499.00	22.68	117.63	3,302.77	-531.69	945.94	1,523,814.648	2,355,517.824	39.249435	-107.776040
3,593.00	22.30	117.80	3,389.62	-548.41	977.77	1,523,797.133	2,355,549.227	39.249389	-107.775928
3,688.00	21.97	117.47	3,477.62	-565.01	1,009.49	1,523,779.739	2,355,580.511	39.249343	-107.775816
3,783.00	21.11	118.43	3,565.98	-581.36	1,040.30	1,523,762.628	2,355,610.904	39.249298	-107.775707
3,878.00	19.71	119.10	3,655.02	-597.29	1,069.34	1,523,745.968	2,355,639.538	39.249254	-107.775604
3,973.00	18.86	119.08	3,744.69	-612.55	1,096.76	1,523,730.031	2,355,666.564	39.249213	-107.775508
4,068.00	18.21	119.95	3,834.76	-627.42	1,123.04	1,523,714.503	2,355,692.464	39.249172	-107.775415
4,163.00	17.79	120.24	3,925.11	-642.14	1,148.44	1,523,699.151	2,355,717.486	39.249131	-107.775325
4,257.00	17.29	120.03	4,014.74	-656.36	1,172.94	1,523,684.318	2,355,741.621	39.249092	-107.775239
4,352.00	15.74	115.10	4,105.82	-668.90	1,196.83	1,523,671.190	2,355,765.193	39.249058	-107.775154
4,447.00	14.98	114.63	4,197.43	-679.48	1,219.66	1,523,660.037	2,355,787.750	39.249029	-107.775074
4,542.00	12.98	111.59	4,289.61	-688.52	1,240.75	1,523,650.467	2,355,808.600	39.249004	-107.774999
4,637.00	11.90	112.29	4,382.38	-696.16	1,259.73	1,523,642.352	2,355,827.386	39.248983	-107.774932
4,732.00	11.88	107.89	4,475.34	-702.88	1,278.10	1,523,635.175	2,355,845.581	39.248964	-107.774867
4,826.00	9.40	118.87	4,567.73	-709.56	1,294.03	1,523,628.097	2,355,861.343	39.248946	-107.774811
4,921.00	7.96	118.94	4,661.64	-716.49	1,306.58	1,523,620.855	2,355,873.716	39.248927	-107.774767
5,016.00	7.17	121.32	4,755.81	-722.76	1,317.40	1,523,614.320	2,355,884.376	39.248910	-107.774729



Archer

Survey Report - Geographic

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance 28-10M
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	MD Reference:	Well @ 7578.00usft
Well:	Piceance 28-10M	North Reference:	True
Wellbore:	Slot B-10	Survey Calculation Method:	Minimum Curvature
Design:	Slot B-10	Database:	EDMDBBW

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,700.00	1.00	121.32	5,437.74	-748.07	1,359.01	1,523,587.968	2,355,925.333	39.248840	-107.774582
5,774.00	0.44	127.99	5,511.74	-748.58	1,359.79	1,523,587.439	2,355,926.096	39.248839	-107.774579
5,869.00	0.36	150.65	5,606.73	-749.07	1,360.22	1,523,586.943	2,355,926.517	39.248838	-107.774577
5,964.00	0.53	195.04	5,701.73	-749.75	1,360.25	1,523,586.258	2,355,926.532	39.248836	-107.774577
6,059.00	0.65	25.47	5,796.73	-749.69	1,360.37	1,523,586.317	2,355,926.652	39.248836	-107.774577
6,154.00	1.74	35.41	5,891.71	-748.03	1,361.44	1,523,587.952	2,355,927.760	39.248840	-107.774573
6,249.00	1.17	27.92	5,986.68	-746.00	1,362.73	1,523,589.952	2,355,929.101	39.248846	-107.774569
6,343.00	0.91	348.55	6,080.66	-744.42	1,363.03	1,523,591.523	2,355,929.442	39.248850	-107.774567
6,438.00	0.41	330.44	6,175.66	-743.38	1,362.71	1,523,592.566	2,355,929.150	39.248853	-107.774569
6,533.00	0.67	12.73	6,270.65	-742.54	1,362.67	1,523,593.404	2,355,929.126	39.248856	-107.774569
6,628.00	0.45	336.82	6,365.65	-741.66	1,362.64	1,523,594.289	2,355,929.124	39.248858	-107.774569
6,723.00	0.70	254.15	6,460.64	-741.47	1,361.94	1,523,594.491	2,355,928.424	39.248858	-107.774571
6,816.00	0.78	237.25	6,553.64	-741.97	1,360.86	1,523,594.021	2,355,927.332	39.248857	-107.774575
6,818.00	0.78	237.25	6,555.64	-741.99	1,360.83	1,523,594.007	2,355,927.309	39.248857	-107.774575
6,914.00	0.72	247.35	6,651.63	-742.57	1,359.73	1,523,593.449	2,355,926.189	39.248855	-107.774579
7,008.00	2.37	244.74	6,745.59	-743.63	1,357.42	1,523,592.450	2,355,923.860	39.248853	-107.774587
7,103.00	2.50	243.68	6,840.50	-745.39	1,353.79	1,523,590.785	2,355,920.183	39.248848	-107.774600
7,198.00	3.03	230.68	6,935.39	-747.90	1,349.99	1,523,588.371	2,355,916.322	39.248841	-107.774613
7,293.00	3.47	223.47	7,030.24	-751.57	1,346.07	1,523,584.793	2,355,912.311	39.248831	-107.774627
7,388.00	3.47	222.42	7,125.07	-755.78	1,342.15	1,523,580.684	2,355,908.289	39.248819	-107.774641
7,482.00	3.43	216.26	7,218.90	-760.15	1,338.57	1,523,576.408	2,355,904.599	39.248807	-107.774654
7,577.00	3.16	220.04	7,313.74	-764.45	1,335.21	1,523,572.198	2,355,901.127	39.248795	-107.774666
7,672.00	3.82	223.21	7,408.56	-768.76	1,331.36	1,523,567.984	2,355,897.168	39.248784	-107.774679
7,767.00	4.44	246.23	7,503.32	-772.55	1,325.82	1,523,564.335	2,355,891.543	39.248773	-107.774699
7,862.00	3.65	248.08	7,598.09	-775.16	1,319.65	1,523,561.880	2,355,885.308	39.248766	-107.774721
7,957.00	4.04	244.30	7,692.87	-777.74	1,313.83	1,523,559.447	2,355,879.425	39.248759	-107.774741
Last Archer Survey									
8,078.00	3.91	240.61	7,813.58	-781.61	1,306.40	1,523,555.761	2,355,871.895	39.248748	-107.774767
PTB - Piceance Federal 28-10M tgt									
8,127.00	3.91	240.61	7,862.47	-783.25	1,303.48	1,523,554.195	2,355,868.943	39.248744	-107.774778

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
110.00	109.99	-0.61	0.97	First Archer Survey
8,078.00	7,813.58	-781.61	1,306.40	Last Archer Survey
8,127.00	7,862.47	-783.25	1,303.48	PTB

Checked By: _____ Approved By: _____ Date: _____