



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance 28-05W

Slot B-1

Plan: Design #1

Standard Planning Report

29 April, 2015

Archer



Project: Mesa County, CO
Site: Piceance 28-05
Well: Piceance 28-05W
Wellbore: Slot B-1
Design: Design #1
Latitude: 39° 15' 4.220 N
Longitude: 107° 46' 46.810 W
Ground Level: 7556.00
Well @ 7578.00usft

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 Piceance 28-05W, True North
Vertical (TVD) Reference: Well @ 7578.00usft
Section (VS) Reference: Slot - (0.00N, 0.00E)
Measured Depth Reference: Well @ 7578.00usft
Calculation Method: Minimum Curvature

WELL DETAILS: Piceance 28-05W

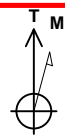
+N/-S	+E/-W	North	Ground Level:	Latitude	Longitude	Slot
0.00	0.00	1524473.093	7556.00 Easting 2354506.275	39° 15' 4.220 N	107° 46' 46.810 W	

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

Name	TVD	+N/-S	+E/-W	North	Easting	Latitude	Longitude	Shape
Piceance Federal 28-05W tgt	7866.00	397.62	-295.76	1524878.007	2354220.581	39° 15' 8.150 N	107° 46' 50.570 W	Circle (Radius: 50.00)

SECTION DETAILS

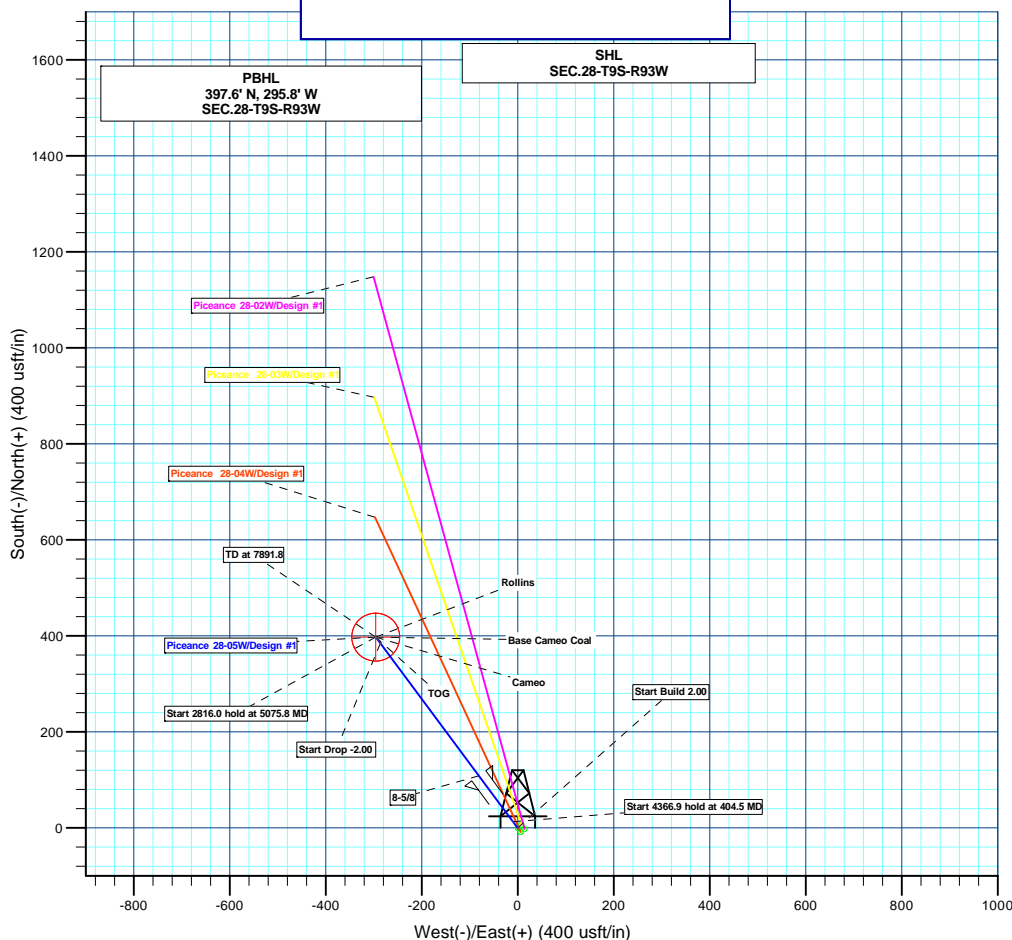
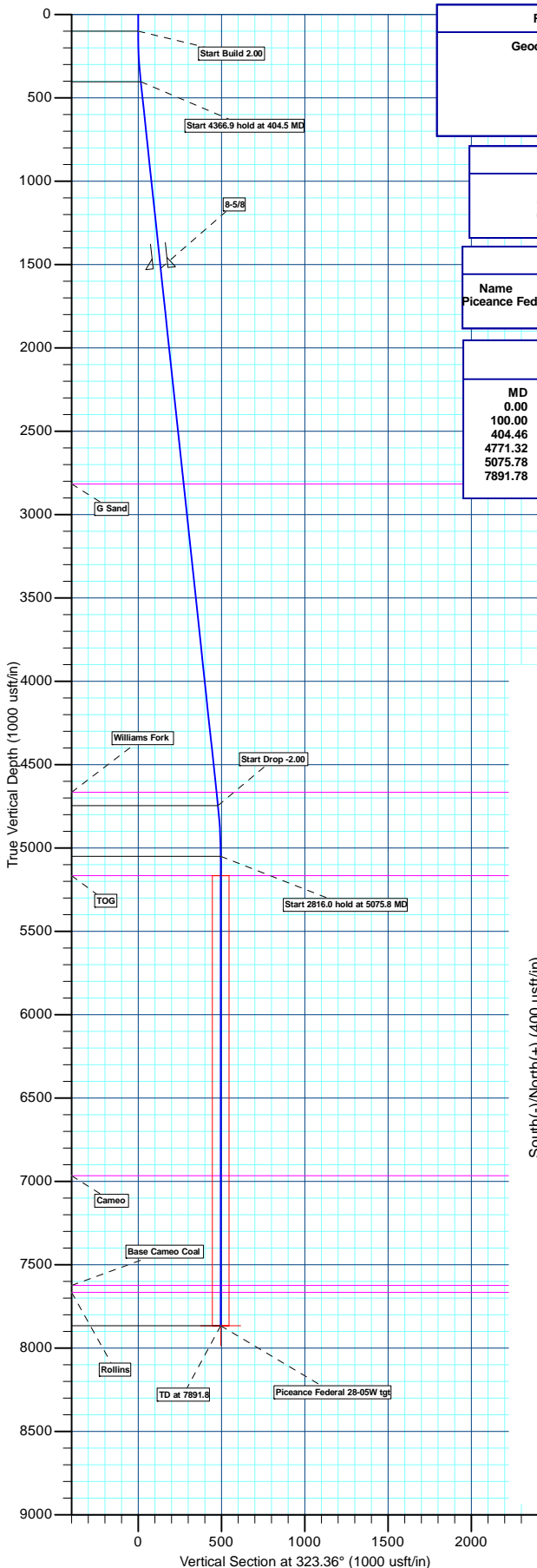
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
404.46	6.09	323.36	403.89	12.97	-9.65	2.00	323.36	16.16	Start 4366.9 hold at 404.5 MD
4771.32	6.09	323.36	4746.11	384.65	-286.12	0.00	0.00	479.39	Start Drop -2.00
5075.78	0.00	0.00	5050.00	397.61	-295.76	2.00	180.00	495.55	Start 2816.0 hold at 5075.8 MD
7891.78	0.00	0.00	7866.00	397.61	-295.76	0.00	0.00	495.55	TD at 7891.8



Azimuths to True North
Magnetic North: 9.72°
Magnetic Field
Strength: 51741.9snT
Dip Angle: 65.47°
Date: 04/27/2015
Model: IGRF2010

FORMATION TOP DETAILS

TVDPPath	MDPath	Formation
2816.00	2830.26	G Sand
4666.00	4690.76	Williams Fork
5166.00	5191.78	TOG
6966.00	6991.78	Cameo
7624.00	7649.78	Base Cameo Coal
7666.00	7691.78	Rollins



Plan: Design #1 (Piceance 28-05W/Slot B-1)

Created By: Ricky Osburn Date: 8:28, April 29 2015



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-05W
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-05W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-1		
Design:	Design #1		

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° 15' 3.280 N
From:	Lat/Long	Easting:	2,354,593.535 usft	Longitude:	107° 46' 45.670 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.44 °

Well	Piceance 28-05W					
Well Position	+N/-S	95.09 usft	Northing:	1,524,473.093 usft	Latitude:	39° 15' 4.220 N
	+E/-W	-89.67 usft	Easting:	2,354,506.275 usft	Longitude:	107° 46' 46.810 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,556.00 usft

Wellbore	Slot B-1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/04/27	9.73	65.47	51,742

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	323.36

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	
404.46	6.09	323.36	403.89	12.97	-9.65	2.00	2.00	0.00	323.36	
4,771.32	6.09	323.36	4,746.11	384.65	-286.12	0.00	0.00	0.00	0.00	
5,075.78	0.00	0.00	5,050.00	397.61	-295.76	2.00	-2.00	0.00	180.00	
7,891.78	0.00	0.00	7,866.00	397.61	-295.76	0.00	0.00	0.00	0.00	Piceance Federal 28-1



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-05W
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-05W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-1		
Design:	Design #1		

Planned 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
Start Build 2.00									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	2.00	323.36	199.98	1.40	-1.04	1.75	2.00	2.00	0.00
300.00	4.00	323.36	299.84	5.60	-4.17	6.98	2.00	2.00	0.00
Start 4366.9 hold at 404.5 MD									
404.46	6.09	323.36	403.89	12.97	-9.65	16.16	2.00	2.00	0.00
500.00	6.09	323.36	498.89	21.10	-15.70	26.30	0.00	0.00	0.00
600.00	6.09	323.36	598.32	29.61	-22.03	36.91	0.00	0.00	0.00
700.00	6.09	323.36	697.76	38.12	-28.36	47.51	0.00	0.00	0.00
800.00	6.09	323.36	797.20	46.63	-34.69	58.12	0.00	0.00	0.00
900.00	6.09	323.36	896.63	55.15	-41.02	68.73	0.00	0.00	0.00
1,000.00	6.09	323.36	996.07	63.66	-47.35	79.34	0.00	0.00	0.00
1,100.00	6.09	323.36	1,095.50	72.17	-53.68	89.94	0.00	0.00	0.00
1,200.00	6.09	323.36	1,194.94	80.68	-60.01	100.55	0.00	0.00	0.00
1,300.00	6.09	323.36	1,294.37	89.19	-66.34	111.16	0.00	0.00	0.00
1,400.00	6.09	323.36	1,393.81	97.70	-72.68	121.77	0.00	0.00	0.00
1,500.00	6.09	323.36	1,493.25	106.21	-79.01	132.38	0.00	0.00	0.00
8-5/8									
1,528.92	6.09	323.36	1,522.00	108.67	-80.84	135.44	0.00	0.00	0.00
1,600.00	6.09	323.36	1,592.68	114.72	-85.34	142.98	0.00	0.00	0.00
1,700.00	6.09	323.36	1,692.12	123.24	-91.67	153.59	0.00	0.00	0.00
1,800.00	6.09	323.36	1,791.55	131.75	-98.00	164.20	0.00	0.00	0.00
1,900.00	6.09	323.36	1,890.99	140.26	-104.33	174.81	0.00	0.00	0.00
2,000.00	6.09	323.36	1,990.42	148.77	-110.66	185.41	0.00	0.00	0.00
2,100.00	6.09	323.36	2,089.86	157.28	-116.99	196.02	0.00	0.00	0.00
2,200.00	6.09	323.36	2,189.30	165.79	-123.32	206.63	0.00	0.00	0.00
2,300.00	6.09	323.36	2,288.73	174.30	-129.66	217.24	0.00	0.00	0.00
2,400.00	6.09	323.36	2,388.17	182.82	-135.99	227.85	0.00	0.00	0.00
2,500.00	6.09	323.36	2,487.60	191.33	-142.32	238.45	0.00	0.00	0.00
2,600.00	6.09	323.36	2,587.04	199.84	-148.65	249.06	0.00	0.00	0.00
2,700.00	6.09	323.36	2,686.48	208.35	-154.98	259.67	0.00	0.00	0.00
2,800.00	6.09	323.36	2,785.91	216.86	-161.31	270.28	0.00	0.00	0.00
G Sand									
2,830.26	6.09	323.36	2,816.00	219.44	-163.23	273.49	0.00	0.00	0.00
2,900.00	6.09	323.36	2,885.35	225.37	-167.64	280.88	0.00	0.00	0.00
3,000.00	6.09	323.36	2,984.78	233.88	-173.97	291.49	0.00	0.00	0.00
3,100.00	6.09	323.36	3,084.22	242.39	-180.30	302.10	0.00	0.00	0.00
3,200.00	6.09	323.36	3,183.65	250.91	-186.63	312.71	0.00	0.00	0.00
3,300.00	6.09	323.36	3,283.09	259.42	-192.97	323.32	0.00	0.00	0.00
3,400.00	6.09	323.36	3,382.53	267.93	-199.30	333.92	0.00	0.00	0.00
3,500.00	6.09	323.36	3,481.96	276.44	-205.63	344.53	0.00	0.00	0.00
3,600.00	6.09	323.36	3,581.40	284.95	-211.96	355.14	0.00	0.00	0.00
3,700.00	6.09	323.36	3,680.83	293.46	-218.29	365.75	0.00	0.00	0.00
3,800.00	6.09	323.36	3,780.27	301.97	-224.62	376.35	0.00	0.00	0.00
3,900.00	6.09	323.36	3,879.70	310.48	-230.95	386.96	0.00	0.00	0.00
4,000.00	6.09	323.36	3,979.14	319.00	-237.28	397.57	0.00	0.00	0.00
4,100.00	6.09	323.36	4,078.58	327.51	-243.61	408.18	0.00	0.00	0.00
4,200.00	6.09	323.36	4,178.01	336.02	-249.95	418.79	0.00	0.00	0.00
4,300.00	6.09	323.36	4,277.45	344.53	-256.28	429.39	0.00	0.00	0.00
4,400.00	6.09	323.36	4,376.88	353.04	-262.61	440.00	0.00	0.00	0.00
4,500.00	6.09	323.36	4,476.32	361.55	-268.94	450.61	0.00	0.00	0.00
4,600.00	6.09	323.36	4,575.76	370.06	-275.27	461.22	0.00	0.00	0.00
Williams Fork									



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-05W
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-05W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-1		
Design:	Design #1		

Planned 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)
4,690.76	6.09	323.36	4,666.00	377.79	-281.02	470.84	0.00	0.00	0.00
4,700.00	6.09	323.36	4,675.19	378.57	-281.60	471.82	0.00	0.00	0.00
Start Drop -2.00									
4,771.32	6.09	323.36	4,746.11	384.65	-286.12	479.39	0.00	0.00	0.00
4,800.00	5.52	323.36	4,774.64	386.97	-287.85	482.29	2.00	-2.00	0.00
4,900.00	3.52	323.36	4,874.33	393.29	-292.55	490.16	2.00	-2.00	0.00
5,000.00	1.52	323.36	4,974.22	396.81	-295.17	494.55	2.00	-2.00	0.00
Start 2816.0 hold at 5075.8 MD									
5,075.78	0.00	0.00	5,050.00	397.61	-295.76	495.55	2.00	-2.00	0.00
5,100.00	0.00	0.00	5,074.22	397.61	-295.76	495.55	0.00	0.00	0.00
TOG									
5,191.78	0.00	0.00	5,166.00	397.61	-295.76	495.55	0.00	0.00	0.00
5,200.00	0.00	0.00	5,174.22	397.61	-295.76	495.55	0.00	0.00	0.00
5,300.00	0.00	0.00	5,274.22	397.61	-295.76	495.55	0.00	0.00	0.00
5,400.00	0.00	0.00	5,374.22	397.61	-295.76	495.55	0.00	0.00	0.00
5,500.00	0.00	0.00	5,474.22	397.61	-295.76	495.55	0.00	0.00	0.00
5,600.00	0.00	0.00	5,574.22	397.61	-295.76	495.55	0.00	0.00	0.00
5,700.00	0.00	0.00	5,674.22	397.61	-295.76	495.55	0.00	0.00	0.00
5,800.00	0.00	0.00	5,774.22	397.61	-295.76	495.55	0.00	0.00	0.00
5,900.00	0.00	0.00	5,874.22	397.61	-295.76	495.55	0.00	0.00	0.00
6,000.00	0.00	0.00	5,974.22	397.61	-295.76	495.55	0.00	0.00	0.00
6,100.00	0.00	0.00	6,074.22	397.61	-295.76	495.55	0.00	0.00	0.00
6,200.00	0.00	0.00	6,174.22	397.61	-295.76	495.55	0.00	0.00	0.00
6,300.00	0.00	0.00	6,274.22	397.61	-295.76	495.55	0.00	0.00	0.00
6,400.00	0.00	0.00	6,374.22	397.61	-295.76	495.55	0.00	0.00	0.00
6,500.00	0.00	0.00	6,474.22	397.61	-295.76	495.55	0.00	0.00	0.00
6,600.00	0.00	0.00	6,574.22	397.61	-295.76	495.55	0.00	0.00	0.00
6,700.00	0.00	0.00	6,674.22	397.61	-295.76	495.55	0.00	0.00	0.00
6,800.00	0.00	0.00	6,774.22	397.61	-295.76	495.55	0.00	0.00	0.00
6,900.00	0.00	0.00	6,874.22	397.61	-295.76	495.55	0.00	0.00	0.00
Cameo									
6,991.78	0.00	0.00	6,966.00	397.61	-295.76	495.55	0.00	0.00	0.00
7,000.00	0.00	0.00	6,974.22	397.61	-295.76	495.55	0.00	0.00	0.00
7,100.00	0.00	0.00	7,074.22	397.61	-295.76	495.55	0.00	0.00	0.00
7,200.00	0.00	0.00	7,174.22	397.61	-295.76	495.55	0.00	0.00	0.00
7,300.00	0.00	0.00	7,274.22	397.61	-295.76	495.55	0.00	0.00	0.00
7,400.00	0.00	0.00	7,374.22	397.61	-295.76	495.55	0.00	0.00	0.00
7,500.00	0.00	0.00	7,474.22	397.61	-295.76	495.55	0.00	0.00	0.00
7,600.00	0.00	0.00	7,574.22	397.61	-295.76	495.55	0.00	0.00	0.00
Base Cameo Coal									
7,649.78	0.00	0.00	7,624.00	397.61	-295.76	495.55	0.00	0.00	0.00
Rollins									
7,691.78	0.00	0.00	7,666.00	397.61	-295.76	495.55	0.00	0.00	0.00
7,700.00	0.00	0.00	7,674.22	397.61	-295.76	495.55	0.00	0.00	0.00
7,800.00	0.00	0.00	7,774.22	397.61	-295.76	495.55	0.00	0.00	0.00
TD at 7891.8									
7,891.78	0.00	0.00	7,866.00	397.61	-295.76	495.55	0.00	0.00	0.00



Database:	EDMDBBW	Local Co-ordinate Reference:	Well Piceance 28-05W
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7578.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7578.00usft
Site:	Piceance 28-05	North Reference:	True
Well:	Piceance 28-05W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-1		
Design:	Design #1		

Design Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
Piceance Federal 28-05' - plan hits target center - Circle (radius 50.00)	0.00	0.00	7,866.00	397.62	-295.76	1,524,878.007	2,354,220.581	39° 15' 8.150 N	107° 46' 50.570 W

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,528.92	1,522.00	8-5/8	8-5/8	12-1/4

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,830.26	2,816.00	G Sand		0.00	
4,690.76	4,666.00	Williams Fork		0.00	
5,191.78	5,166.00	TOG		0.00	
6,991.78	6,966.00	Cameo		0.00	
7,649.78	7,624.00	Base Cameo Coal		0.00	
7,691.78	7,666.00	Rollins		0.00	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
100.00	100.00	0.00	0.00	Start Build 2.00	
404.46	403.89	12.97	-9.65	Start 4366.9 hold at 404.5 MD	
4,771.32	4,746.11	384.65	-286.12	Start Drop -2.00	
5,075.78	5,050.00	397.61	-295.76	Start 2816.0 hold at 5075.8 MD	
7,891.78	7,866.00	397.61	-295.76	TD at 7891.8	



Piceance Energy, LLC

Mesa County, CO

Piceance 28-05

Piceance Federal 28-05W

Slot B-1

Design #1

Anticollision Report

28 April, 2015

Archer



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-05W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-05W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-1	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference	Design #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	2015/04/28		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	7,891.8	Design #1 (Slot B-1)	MWD	MWD - Standard	

Summary						
Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance		Separation Factor	Warning
			Between Centres (usft)	Between Ellipses (usft)		
Piceance 28-05						
Piceance Federal 28-02W - Slot A-2 - Design #1	100.0	100.0	14.3	14.1	81.583	CC, ES
Piceance Federal 28-02W - Slot A-2 - Design #1	800.0	801.0	34.4	30.5	8.724	SF
Piceance federal 28-03W - Slot A-1 - Design #1	134.2	134.2	9.9	9.6	30.189	CC
Piceance federal 28-03W - Slot A-1 - Design #1	200.0	200.0	10.1	9.4	16.076	ES
Piceance federal 28-03W - Slot A-1 - Design #1	1,600.0	1,605.3	52.9	44.4	6.216	SF
Piceance Federal 28-04W - Slot B-2 - Design #1	581.4	582.7	10.2	7.5	3.834	CC
Piceance Federal 28-04W - Slot B-2 - Design #1	600.0	601.3	10.3	7.5	3.681	ES
Piceance Federal 28-04W - Slot B-2 - Design #1	700.0	701.1	12.3	8.8	3.559	SF

Offset Design		Piceance 28-05 - Piceance Federal 28-02W - Slot A-2 - Design #1											Offset Site Error:	0.0 usf
Survey Program:		0-MWD											Offset Well Error:	0.0 usf
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	98.13	-2.0	14.2	14.3					
100.0	100.0	100.0	100.0	0.1	0.1	98.13	-2.0	14.2	14.3	14.1	0.18	81.583	CC, ES	
200.0	200.0	200.0	200.0	0.3	0.3	139.32	-2.0	14.2	15.6	14.9	0.66	23.637		
300.0	299.8	300.2	300.2	0.6	0.5	144.99	-0.3	13.7	18.8	17.7	1.16	16.181		
400.0	399.5	400.5	400.4	0.8	0.8	146.54	4.7	12.3	23.1	21.4	1.67	13.780		
500.0	498.9	501.0	500.4	1.1	1.0	143.77	13.2	10.0	26.9	24.8	2.13	12.634		
600.0	598.3	601.3	600.0	1.4	1.3	135.74	25.0	6.8	29.2	26.5	2.64	11.041		
700.0	697.8	701.4	698.9	1.7	1.6	122.85	40.2	2.6	31.1	27.8	3.25	9.554		
800.0	797.2	801.0	796.6	2.0	2.0	106.18	58.6	-2.4	34.4	30.5	3.94	8.724	SF	
900.0	896.6	900.0	893.1	2.3	2.4	88.84	80.1	-8.3	41.3	36.7	4.63	8.908		
1,000.0	996.1	997.5	987.3	2.6	2.9	74.26	104.4	-14.9	52.8	47.5	5.24	10.068		
1,100.0	1,095.5	1,094.2	1,079.7	2.8	3.4	63.33	131.5	-22.4	68.9	63.1	5.78	11.918		
1,200.0	1,194.9	1,189.4	1,169.8	3.1	4.0	55.49	161.1	-30.5	89.3	83.0	6.30	14.188		
1,300.0	1,294.4	1,283.0	1,257.4	3.4	4.6	49.83	193.1	-39.2	113.6	106.8	6.80	16.696		
1,400.0	1,393.8	1,379.1	1,346.7	3.7	5.3	45.78	227.3	-48.6	140.0	132.7	7.32	19.117		
1,500.0	1,493.2	1,475.2	1,436.0	4.0	5.9	43.02	261.5	-57.9	166.8	159.0	7.85	21.248		
1,600.0	1,592.7	1,571.2	1,525.3	4.3	6.6	41.03	295.7	-67.3	193.9	185.5	8.39	23.112		
1,700.0	1,692.1	1,667.3	1,614.6	4.6	7.3	39.52	329.9	-76.6	221.2	212.3	8.94	24.749		
1,800.0	1,791.6	1,763.4	1,703.9	4.9	8.0	38.34	364.0	-86.0	248.6	239.1	9.49	26.191		
1,900.0	1,891.0	1,859.4	1,793.2	5.2	8.7	37.40	398.2	-95.3	276.0	266.0	10.05	27.470		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-05W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-05W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-1	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-02W - Slot A-2 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
2,000.0	1,990.4	1,955.5	1,882.5	5.5	9.4	36.63	432.4	-104.7	303.6	292.9	10.61	28.609		
2,100.0	2,089.9	2,051.6	1,971.7	5.8	10.1	35.98	466.6	-114.0	331.1	319.9	11.18	29.630		
2,200.0	2,189.3	2,147.6	2,061.0	6.1	10.8	35.44	500.8	-123.4	358.7	347.0	11.74	30.550		
2,300.0	2,288.7	2,243.7	2,150.3	6.4	11.4	34.97	535.0	-132.7	386.3	374.0	12.31	31.381		
2,400.0	2,388.2	2,339.8	2,239.6	6.7	12.1	34.56	569.2	-142.1	414.0	401.1	12.88	32.137		
2,500.0	2,487.6	2,435.8	2,328.9	7.0	12.8	34.21	603.3	-151.4	441.6	428.2	13.45	32.826		
2,600.0	2,587.0	2,531.9	2,418.2	7.3	13.5	33.90	637.5	-160.8	469.3	455.3	14.03	33.457		
2,700.0	2,686.5	2,628.0	2,507.5	7.6	14.2	33.62	671.7	-170.1	497.0	482.4	14.60	34.037		
2,800.0	2,785.9	2,724.0	2,596.8	7.9	14.9	33.37	705.9	-179.5	524.7	509.5	15.18	34.572		
2,900.0	2,885.3	2,820.1	2,686.1	8.2	15.6	33.15	740.1	-188.8	552.4	536.6	15.75	35.066		
3,000.0	2,984.8	2,916.2	2,775.3	8.5	16.3	32.95	774.3	-198.2	580.1	563.7	16.33	35.524		
3,100.0	3,084.2	3,012.2	2,864.6	8.8	17.0	32.76	808.5	-207.5	607.8	590.9	16.91	35.950		
3,200.0	3,183.7	3,108.3	2,953.9	9.1	17.7	32.59	842.7	-216.9	635.5	618.0	17.48	36.348		
3,300.0	3,283.1	3,204.4	3,043.2	9.4	18.4	32.44	876.8	-226.2	663.2	645.2	18.06	36.719		
3,400.0	3,382.5	3,300.4	3,132.5	9.7	19.1	32.30	911.0	-235.6	690.9	672.3	18.64	37.066		
3,500.0	3,482.0	3,396.5	3,221.8	10.0	19.8	32.17	945.2	-244.9	718.7	699.5	19.22	37.392		
3,600.0	3,581.4	3,517.7	3,335.0	10.3	20.6	32.04	986.8	-256.3	745.2	725.3	19.85	37.542		
3,700.0	3,680.8	3,649.3	3,459.9	10.5	21.2	32.00	1,026.8	-267.2	767.5	747.0	20.47	37.499		
3,800.0	3,780.3	3,783.3	3,588.9	10.8	21.8	32.05	1,061.8	-276.8	785.3	764.2	21.08	37.254		
3,900.0	3,879.7	3,919.4	3,721.5	11.1	22.3	32.18	1,091.4	-284.9	798.6	776.9	21.68	36.832		
4,000.0	3,979.1	4,056.7	3,856.6	11.4	22.8	32.40	1,115.0	-291.4	807.2	784.9	22.27	36.248		
4,100.0	4,078.6	4,194.9	3,993.6	11.7	23.1	32.71	1,132.5	-296.1	811.1	788.3	22.84	35.511		
4,200.0	4,178.0	4,333.1	4,131.3	12.0	23.4	33.11	1,143.5	-299.2	810.3	786.9	23.39	34.640		
4,300.0	4,277.4	4,470.8	4,268.9	12.3	23.6	33.61	1,148.1	-300.4	804.9	780.9	23.93	33.637		
4,400.0	4,376.9	4,578.8	4,376.9	12.6	23.7	34.07	1,148.3	-300.5	796.2	771.8	24.41	32.621		
4,500.0	4,476.3	4,678.2	4,476.3	12.9	23.8	34.50	1,148.3	-300.5	787.4	762.5	24.88	31.645		
4,600.0	4,575.8	4,777.7	4,575.8	13.2	23.8	34.94	1,148.3	-300.5	778.7	753.3	25.36	30.699		
4,700.0	4,675.2	4,877.1	4,675.2	13.5	23.9	35.39	1,148.3	-300.5	770.0	744.1	25.85	29.785		
4,800.0	4,774.6	4,976.5	4,774.6	13.8	24.0	35.82	1,148.3	-300.5	761.4	735.1	26.30	28.948		
4,900.0	4,874.3	5,076.2	4,874.3	14.0	24.1	36.09	1,148.3	-300.5	755.1	728.5	26.60	28.384		
5,000.0	4,974.2	5,176.1	4,974.2	14.2	24.2	36.25	1,148.3	-300.5	751.5	724.7	26.85	27.986		
5,100.0	5,074.2	5,276.1	5,074.2	14.3	24.3	-0.36	1,148.3	-300.5	750.7	723.6	27.09	27.708		
5,200.0	5,174.2	5,376.1	5,174.2	14.5	24.4	-0.36	1,148.3	-300.5	750.7	723.3	27.45	27.350		
5,300.0	5,274.2	5,476.1	5,274.2	14.7	24.5	-0.36	1,148.3	-300.5	750.7	722.9	27.81	26.998		
5,400.0	5,374.2	5,576.1	5,374.2	14.8	24.6	-0.36	1,148.3	-300.5	750.7	722.5	28.17	26.652		
5,500.0	5,474.2	5,676.1	5,474.2	15.0	24.7	-0.36	1,148.3	-300.5	750.7	722.2	28.53	26.313		
5,600.0	5,574.2	5,776.1	5,574.2	15.2	24.8	-0.36	1,148.3	-300.5	750.7	721.8	28.89	25.981		
5,700.0	5,674.2	5,876.1	5,674.2	15.4	24.9	-0.36	1,148.3	-300.5	750.7	721.4	29.26	25.654		
5,800.0	5,774.2	5,976.1	5,774.2	15.6	25.0	-0.36	1,148.3	-300.5	750.7	721.1	29.63	25.334		
5,900.0	5,874.2	6,076.1	5,874.2	15.7	25.1	-0.36	1,148.3	-300.5	750.7	720.7	30.00	25.020		
6,000.0	5,974.2	6,176.1	5,974.2	15.9	25.2	-0.36	1,148.3	-300.5	750.7	720.3	30.38	24.713		
6,100.0	6,074.2	6,276.1	6,074.2	16.1	25.3	-0.36	1,148.3	-300.5	750.7	720.0	30.75	24.410		
6,200.0	6,174.2	6,376.1	6,174.2	16.3	25.4	-0.36	1,148.3	-300.5	750.7	719.6	31.13	24.114		
6,300.0	6,274.2	6,476.1	6,274.2	16.5	25.5	-0.36	1,148.3	-300.5	750.7	719.2	31.51	23.824		
6,400.0	6,374.2	6,576.1	6,374.2	16.6	25.7	-0.36	1,148.3	-300.5	750.7	718.8	31.89	23.539		
6,500.0	6,474.2	6,676.1	6,474.2	16.8	25.8	-0.36	1,148.3	-300.5	750.7	718.4	32.28	23.259		
6,600.0	6,574.2	6,776.1	6,574.2	17.0	25.9	-0.36	1,148.3	-300.5	750.7	718.0	32.66	22.985		
6,700.0	6,674.2	6,876.1	6,674.2	17.2	26.0	-0.36	1,148.3	-300.5	750.7	717.7	33.05	22.717		
6,800.0	6,774.2	6,976.1	6,774.2	17.4	26.1	-0.36	1,148.3	-300.5	750.7	717.3	33.43	22.453		
6,900.0	6,874.2	7,076.1	6,874.2	17.6	26.2	-0.36	1,148.3	-300.5	750.7	716.9	33.82	22.195		
7,000.0	6,974.2	7,176.1	6,974.2	17.8	26.4	-0.36	1,148.3	-300.5	750.7	716.5	34.21	21.941		
7,100.0	7,074.2	7,276.1	7,074.2	18.0	26.5	-0.36	1,148.3	-300.5	750.7	716.1	34.61	21.692		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-05W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-05W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-1	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design												Offset Site Error:	0.0 usft
Survey Program: 0-MWD												Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
7,200.0	7,174.2	7,376.1	7,174.2	18.2	26.6	-0.36	1,148.3	-300.5	750.7	715.7	35.00	21.449	
7,300.0	7,274.2	7,476.1	7,274.2	18.4	26.7	-0.36	1,148.3	-300.5	750.7	715.3	35.40	21.209	
7,400.0	7,374.2	7,576.1	7,374.2	18.5	26.9	-0.36	1,148.3	-300.5	750.7	714.9	35.79	20.974	
7,500.0	7,474.2	7,676.1	7,474.2	18.7	27.0	-0.36	1,148.3	-300.5	750.7	714.5	36.19	20.744	
7,600.0	7,574.2	7,776.1	7,574.2	18.9	27.1	-0.36	1,148.3	-300.5	750.7	714.1	36.59	20.518	
7,700.0	7,674.2	7,876.1	7,674.2	19.1	27.3	-0.36	1,148.3	-300.5	750.7	713.7	36.99	20.296	
7,800.0	7,774.2	7,976.1	7,774.2	19.3	27.4	-0.36	1,148.3	-300.5	750.7	713.3	37.39	20.079	
7,891.8	7,866.0	8,067.9	7,866.0	19.5	27.5	-0.36	1,148.3	-300.5	750.7	712.9	37.76	19.883	



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-05W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-05W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-1	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	52.34	6.1	7.9	9.9					
100.0	100.0	100.0	100.0	0.1	0.1	52.34	6.1	7.9	9.9	9.8	0.18	56.674		
134.2	134.2	134.2	134.2	0.2	0.2	90.16	6.1	7.9	9.9	9.6	0.33	30.189 CC		
200.0	200.0	200.0	200.0	0.3	0.3	98.97	6.1	7.9	10.1	9.4	0.63	16.076 ES		
300.0	299.8	299.8	299.8	0.6	0.5	124.34	6.1	7.9	12.0	10.9	1.12	10.717		
400.0	399.5	399.5	399.5	0.8	0.8	147.23	6.1	7.9	18.4	16.7	1.68	10.956		
500.0	498.9	498.9	498.9	1.1	1.0	159.07	6.1	7.9	27.9	25.8	2.13	13.106		
600.0	598.3	598.3	598.3	1.4	1.2	164.78	6.1	7.9	38.0	35.5	2.57	14.814		
700.0	697.8	697.8	697.8	1.7	1.4	168.08	6.1	7.9	48.4	45.4	3.01	16.083		
800.0	797.2	799.0	798.9	2.0	1.7	169.46	7.7	7.3	57.3	53.9	3.45	16.610		
900.0	896.6	900.7	900.5	2.3	1.9	168.97	12.7	5.6	63.1	59.2	3.90	16.198		
1,000.0	996.1	1,002.6	1,002.1	2.6	2.1	167.04	21.2	2.7	65.9	61.5	4.36	15.115		
1,100.0	1,095.5	1,104.5	1,103.2	2.8	2.4	163.58	33.0	-1.4	65.7	60.9	4.84	13.579		
1,200.0	1,194.9	1,206.1	1,203.5	3.1	2.7	158.14	48.2	-6.6	63.0	57.7	5.36	11.756		
1,300.0	1,294.4	1,307.2	1,302.7	3.4	3.0	149.81	66.7	-13.0	58.5	52.5	5.96	9.812		
1,400.0	1,393.8	1,407.5	1,400.3	3.7	3.4	137.23	88.3	-20.4	53.5	46.8	6.71	7.975		
1,500.0	1,493.2	1,506.5	1,496.2	4.0	3.8	120.87	111.5	-28.4	51.0	43.3	7.61	6.693		
1,507.5	1,500.7	1,513.8	1,503.4	4.1	3.8	119.60	113.2	-29.0	50.9	43.3	7.68	6.631		
1,600.0	1,592.7	1,605.3	1,591.9	4.3	4.2	104.30	134.7	-36.4	52.9	44.4	8.50	6.216 SF		
1,700.0	1,692.1	1,704.1	1,687.7	4.6	4.7	89.95	157.9	-44.4	58.8	49.5	9.24	6.359		
1,800.0	1,791.6	1,803.0	1,783.4	4.9	5.1	78.74	181.1	-52.4	67.7	57.9	9.84	6.878		
1,900.0	1,891.0	1,901.8	1,879.1	5.2	5.6	70.35	204.3	-60.4	78.6	68.2	10.36	7.584		
2,000.0	1,990.4	2,000.6	1,974.9	5.5	6.1	64.08	227.5	-68.3	90.7	79.9	10.85	8.363		
2,100.0	2,089.9	2,099.4	2,070.6	5.8	6.6	59.32	250.7	-76.3	103.7	92.4	11.33	9.153		
2,200.0	2,189.3	2,198.3	2,166.3	6.1	7.0	55.63	273.9	-84.3	117.2	105.4	11.81	9.923		
2,300.0	2,288.7	2,297.1	2,262.1	6.4	7.5	52.71	297.1	-92.3	131.1	118.8	12.30	10.658		
2,400.0	2,388.2	2,395.9	2,357.8	6.7	8.0	50.35	320.3	-100.3	145.3	132.5	12.80	11.353		
2,500.0	2,487.6	2,494.8	2,453.6	7.0	8.5	48.42	343.5	-108.3	159.6	146.3	13.30	12.005		
2,600.0	2,587.0	2,593.6	2,549.3	7.3	9.0	46.80	366.7	-116.3	174.1	160.3	13.80	12.615		
2,700.0	2,686.5	2,692.4	2,645.0	7.6	9.5	45.43	389.9	-124.2	188.8	174.5	14.32	13.186		
2,800.0	2,785.9	2,791.3	2,740.8	7.9	10.0	44.26	413.1	-132.2	203.5	188.7	14.83	13.719		
2,900.0	2,885.3	2,890.1	2,836.5	8.2	10.5	43.25	436.3	-140.2	218.3	202.9	15.35	14.219		
3,000.0	2,984.8	2,988.9	2,932.2	8.5	11.0	42.37	459.5	-148.2	233.1	217.3	15.87	14.686		
3,100.0	3,084.2	3,087.8	3,028.0	8.8	11.5	41.59	482.8	-156.2	248.0	231.6	16.40	15.124		
3,200.0	3,183.7	3,186.6	3,123.7	9.1	12.0	40.90	506.0	-164.2	263.0	246.0	16.93	15.535		
3,300.0	3,283.1	3,285.4	3,219.4	9.4	12.5	40.29	529.2	-172.2	277.9	260.5	17.46	15.922		
3,400.0	3,382.5	3,384.3	3,315.2	9.7	13.0	39.73	552.4	-180.2	292.9	274.9	17.99	16.286		
3,500.0	3,482.0	3,483.1	3,410.9	10.0	13.5	39.23	575.6	-188.1	308.0	289.4	18.52	16.629		
3,600.0	3,581.4	3,581.9	3,506.7	10.3	14.0	38.78	598.8	-196.1	323.0	303.9	19.05	16.952		
3,700.0	3,680.8	3,680.7	3,602.4	10.5	14.5	38.37	622.0	-204.1	338.1	318.5	19.59	17.258		
3,800.0	3,780.3	3,779.6	3,698.1	10.8	15.0	37.99	645.2	-212.1	353.1	333.0	20.12	17.548		
3,900.0	3,879.7	3,878.4	3,793.9	11.1	15.5	37.65	668.4	-220.1	368.2	347.6	20.66	17.822		
4,000.0	3,979.1	3,977.2	3,889.6	11.4	16.0	37.33	691.6	-228.1	383.3	362.1	21.20	18.082		
4,100.0	4,078.6	4,076.1	3,985.3	11.7	16.5	37.03	714.8	-236.1	398.4	376.7	21.74	18.329		
4,200.0	4,178.0	4,174.9	4,081.1	12.0	17.0	36.76	738.0	-244.0	413.6	391.3	22.28	18.565		
4,300.0	4,277.4	4,273.7	4,176.8	12.3	17.5	36.51	761.2	-252.0	428.7	405.9	22.82	18.789		
4,400.0	4,376.9	4,372.6	4,272.5	12.6	18.0	36.27	784.4	-260.0	443.8	420.5	23.36	19.002		
4,500.0	4,476.3	4,471.4	4,368.3	12.9	18.5	36.05	807.6	-268.0	459.0	435.1	23.90	19.206		
4,600.0	4,575.8	4,584.7	4,478.4	13.2	19.0	35.87	832.9	-276.7	472.9	448.5	24.43	19.362		
4,700.0	4,675.2	4,702.9	4,594.3	13.5	19.4	35.87	854.9	-284.3	483.1	458.2	24.96	19.357		
4,800.0	4,774.6	4,821.9	4,711.7	13.8	19.7	36.06	872.4	-290.3	489.5	464.0	25.47	19.216		
4,900.0	4,874.3	4,941.2	4,830.3	14.0	20.0	36.25	885.4	-294.8	494.1	468.2	25.86	19.105		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-05W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-05W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-1	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,000.0	4,974.2	5,060.7	4,949.5	14.2	20.2	36.33	893.7	-297.6	497.5	471.3	26.18	19.004		
5,100.0	5,074.2	5,180.4	5,069.1	14.3	20.4	-0.35	897.2	-298.8	499.7	473.2	26.46	18.887		
5,200.0	5,174.2	5,285.5	5,174.2	14.5	20.5	-0.36	897.4	-298.9	499.8	473.0	26.81	18.642		
5,300.0	5,274.2	5,385.5	5,274.2	14.7	20.6	-0.36	897.4	-298.9	499.8	472.6	27.18	18.389		
5,400.0	5,374.2	5,485.5	5,374.2	14.8	20.8	-0.36	897.4	-298.9	499.8	472.2	27.55	18.140		
5,500.0	5,474.2	5,585.5	5,474.2	15.0	20.9	-0.36	897.4	-298.9	499.8	471.9	27.93	17.896		
5,600.0	5,574.2	5,685.5	5,574.2	15.2	21.0	-0.36	897.4	-298.9	499.8	471.5	28.30	17.658		
5,700.0	5,674.2	5,785.5	5,674.2	15.4	21.1	-0.36	897.4	-298.9	499.8	471.1	28.68	17.424		
5,800.0	5,774.2	5,885.5	5,774.2	15.6	21.3	-0.36	897.4	-298.9	499.8	470.7	29.07	17.195		
5,900.0	5,874.2	5,985.5	5,874.2	15.7	21.4	-0.36	897.4	-298.9	499.8	470.3	29.45	16.971		
6,000.0	5,974.2	6,085.5	5,974.2	15.9	21.5	-0.36	897.4	-298.9	499.8	470.0	29.83	16.752		
6,100.0	6,074.2	6,185.5	6,074.2	16.1	21.6	-0.36	897.4	-298.9	499.8	469.6	30.22	16.538		
6,200.0	6,174.2	6,285.5	6,174.2	16.3	21.8	-0.36	897.4	-298.9	499.8	469.2	30.61	16.328		
6,300.0	6,274.2	6,385.5	6,274.2	16.5	21.9	-0.36	897.4	-298.9	499.8	468.8	31.00	16.122		
6,400.0	6,374.2	6,485.5	6,374.2	16.6	22.0	-0.36	897.4	-298.9	499.8	468.4	31.39	15.921		
6,500.0	6,474.2	6,585.5	6,474.2	16.8	22.2	-0.36	897.4	-298.9	499.8	468.0	31.79	15.724		
6,600.0	6,574.2	6,685.5	6,574.2	17.0	22.3	-0.36	897.4	-298.9	499.8	467.6	32.18	15.531		
6,700.0	6,674.2	6,785.5	6,674.2	17.2	22.5	-0.36	897.4	-298.9	499.8	467.2	32.58	15.342		
6,800.0	6,774.2	6,885.5	6,774.2	17.4	22.6	-0.36	897.4	-298.9	499.8	466.8	32.98	15.157		
6,900.0	6,874.2	6,985.5	6,874.2	17.6	22.7	-0.36	897.4	-298.9	499.8	466.4	33.37	14.975		
7,000.0	6,974.2	7,085.5	6,974.2	17.8	22.9	-0.36	897.4	-298.9	499.8	466.0	33.77	14.798		
7,100.0	7,074.2	7,185.5	7,074.2	18.0	23.0	-0.36	897.4	-298.9	499.8	465.6	34.18	14.624		
7,200.0	7,174.2	7,285.5	7,174.2	18.2	23.2	-0.36	897.4	-298.9	499.8	465.2	34.58	14.454		
7,300.0	7,274.2	7,385.5	7,274.2	18.4	23.3	-0.36	897.4	-298.9	499.8	464.8	34.98	14.287		
7,400.0	7,374.2	7,485.5	7,374.2	18.5	23.5	-0.36	897.4	-298.9	499.8	464.4	35.39	14.124		
7,500.0	7,474.2	7,585.5	7,474.2	18.7	23.6	-0.36	897.4	-298.9	499.8	464.0	35.79	13.963		
7,600.0	7,574.2	7,685.5	7,574.2	18.9	23.8	-0.36	897.4	-298.9	499.8	463.6	36.20	13.806		
7,700.0	7,674.2	7,785.5	7,674.2	19.1	23.9	-0.36	897.4	-298.9	499.8	463.2	36.61	13.653		
7,800.0	7,774.2	7,885.5	7,774.2	19.3	24.1	-0.36	897.4	-298.9	499.8	462.8	37.02	13.502		
7,891.8	7,866.0	7,977.3	7,866.0	19.5	24.2	-0.36	897.4	-298.9	499.8	462.4	37.39	13.366		



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-05W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-05W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-1	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Piceance 28-05 - Piceance Federal 28-04W - Slot B-2 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	142.13	-8.1	6.3	10.3					
100.0	100.0	100.0	100.0	0.1	0.1	142.13	-8.1	6.3	10.3	10.1	0.18	58.478		
200.0	200.0	200.3	200.3	0.3	0.3	176.78	-6.5	5.6	10.3	9.6	0.68	15.140		
300.0	299.8	300.7	300.5	0.6	0.6	170.94	-1.7	3.3	10.5	9.3	1.20	8.786		
400.0	399.5	401.0	400.5	0.8	0.8	161.86	6.2	-0.3	11.1	9.4	1.71	6.475		
500.0	498.9	501.3	500.0	1.1	1.1	146.94	17.4	-5.5	10.9	8.7	2.17	5.023		
581.4	579.9	582.7	580.5	1.3	1.4	123.77	28.6	-10.7	10.2	7.5	2.66	3.834 CC		
600.0	598.3	601.3	598.8	1.4	1.4	117.78	31.2	-11.9	10.3	7.5	2.79	3.681 ES		
700.0	697.8	701.1	697.4	1.7	1.8	89.96	45.4	-18.5	12.3	8.8	3.45	3.559 SF		
800.0	797.2	800.9	796.0	2.0	2.1	72.77	59.6	-25.1	16.2	12.2	4.02	4.032		
900.0	896.6	900.8	894.6	2.3	2.5	62.83	73.8	-31.7	21.0	16.5	4.55	4.621		
1,000.0	996.1	1,000.6	993.2	2.6	2.9	56.69	88.1	-38.2	26.2	21.1	5.06	5.177		
1,100.0	1,095.5	1,100.4	1,091.8	2.8	3.2	52.62	102.3	-44.8	31.6	26.0	5.58	5.666		
1,200.0	1,194.9	1,200.3	1,190.4	3.1	3.6	49.74	116.5	-51.4	37.1	31.0	6.09	6.090		
1,300.0	1,294.4	1,300.1	1,288.9	3.4	3.9	47.61	130.7	-58.0	42.7	36.1	6.61	6.456		
1,400.0	1,393.8	1,399.9	1,387.5	3.7	4.3	45.97	144.9	-64.6	48.3	41.2	7.13	6.774		
1,500.0	1,493.2	1,499.8	1,486.1	4.0	4.7	44.68	159.1	-71.2	54.0	46.3	7.65	7.051		
1,600.0	1,592.7	1,599.6	1,584.7	4.3	5.0	43.63	173.3	-77.7	59.6	51.5	8.18	7.295		
1,700.0	1,692.1	1,699.4	1,683.3	4.6	5.4	42.76	187.6	-84.3	65.3	56.6	8.70	7.510		
1,800.0	1,791.6	1,799.3	1,781.9	4.9	5.8	42.03	201.8	-90.9	71.0	61.8	9.22	7.702		
1,900.0	1,891.0	1,899.1	1,880.5	5.2	6.1	41.42	216.0	-97.5	76.8	67.0	9.75	7.873		
2,000.0	1,990.4	1,998.9	1,979.1	5.5	6.5	40.88	230.2	-104.1	82.5	72.2	10.27	8.027		
2,100.0	2,089.9	2,098.8	2,077.7	5.8	6.8	40.42	244.4	-110.7	88.2	77.4	10.80	8.167		
2,200.0	2,189.3	2,198.6	2,176.3	6.1	7.2	40.01	258.6	-117.2	93.9	82.6	11.33	8.293		
2,300.0	2,288.7	2,298.4	2,274.9	6.4	7.6	39.65	272.8	-123.8	99.7	87.8	11.85	8.409		
2,400.0	2,388.2	2,398.3	2,373.5	6.7	7.9	39.33	287.1	-130.4	105.4	93.0	12.38	8.515		
2,500.0	2,487.6	2,498.1	2,472.1	7.0	8.3	39.04	301.3	-137.0	111.2	98.3	12.91	8.612		
2,600.0	2,587.0	2,597.9	2,570.7	7.3	8.7	38.78	315.5	-143.6	116.9	103.5	13.44	8.701		
2,700.0	2,686.5	2,697.8	2,669.3	7.6	9.0	38.54	329.7	-150.1	122.7	108.7	13.96	8.784		
2,800.0	2,785.9	2,797.6	2,767.9	7.9	9.4	38.33	343.9	-156.7	128.4	113.9	14.49	8.861		
2,900.0	2,885.3	2,897.4	2,866.5	8.2	9.8	38.13	358.1	-163.3	134.2	119.1	15.02	8.932		
3,000.0	2,984.8	2,997.3	2,965.1	8.5	10.1	37.95	372.3	-169.9	139.9	124.4	15.55	8.999		
3,100.0	3,084.2	3,097.1	3,063.7	8.8	10.5	37.79	386.6	-176.5	145.7	129.6	16.08	9.061		
3,200.0	3,183.7	3,196.9	3,162.3	9.1	10.8	37.64	400.8	-183.1	151.4	134.8	16.60	9.119		
3,300.0	3,283.1	3,296.8	3,260.9	9.4	11.2	37.49	415.0	-189.6	157.2	140.0	17.13	9.174		
3,400.0	3,382.5	3,396.6	3,359.5	9.7	11.6	37.36	429.2	-196.2	162.9	145.3	17.66	9.226		
3,500.0	3,482.0	3,496.4	3,458.1	10.0	11.9	37.24	443.4	-202.8	168.7	150.5	18.19	9.274		
3,600.0	3,581.4	3,596.3	3,556.7	10.3	12.3	37.12	457.6	-209.4	174.5	155.7	18.72	9.320		
3,700.0	3,680.8	3,696.1	3,655.3	10.5	12.7	37.02	471.8	-216.0	180.2	161.0	19.25	9.363		
3,800.0	3,780.3	3,795.9	3,753.9	10.8	13.0	36.92	486.0	-222.6	186.0	166.2	19.78	9.404		
3,900.0	3,879.7	3,895.8	3,852.5	11.1	13.4	36.82	500.3	-229.1	191.7	171.4	20.31	9.442		
4,000.0	3,979.1	3,995.6	3,951.1	11.4	13.8	36.73	514.5	-235.7	197.5	176.7	20.83	9.479		
4,100.0	4,078.6	4,095.4	4,049.7	11.7	14.1	36.65	528.7	-242.3	203.3	181.9	21.36	9.514		
4,200.0	4,178.0	4,195.3	4,148.3	12.0	14.5	36.57	542.9	-248.9	209.0	187.1	21.89	9.547		
4,300.0	4,277.4	4,295.1	4,246.9	12.3	14.9	36.49	557.1	-255.5	214.8	192.4	22.42	9.579		
4,400.0	4,376.9	4,394.9	4,345.5	12.6	15.2	36.42	571.3	-262.1	220.5	197.6	22.95	9.609		
4,500.0	4,476.3	4,494.8	4,444.0	12.9	15.6	36.36	585.5	-268.6	226.3	202.8	23.48	9.638		
4,600.0	4,575.8	4,594.6	4,542.6	13.2	16.0	36.29	599.8	-275.2	232.1	208.1	24.01	9.666		
4,700.0	4,675.2	4,694.4	4,641.2	13.5	16.3	36.23	614.0	-281.8	237.8	213.3	24.54	9.692		
4,800.0	4,774.6	4,801.8	4,747.5	13.8	16.7	36.32	627.8	-288.2	242.3	217.3	25.05	9.672		
4,900.0	4,874.3	4,910.1	4,855.3	14.0	16.9	36.44	638.0	-292.9	245.5	220.0	25.42	9.655		
5,000.0	4,974.2	5,018.6	4,963.5	14.2	17.1	36.43	644.6	-296.0	248.0	222.3	25.73	9.639		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer

Anticollision Report

Archer

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-05W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-05W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-1	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

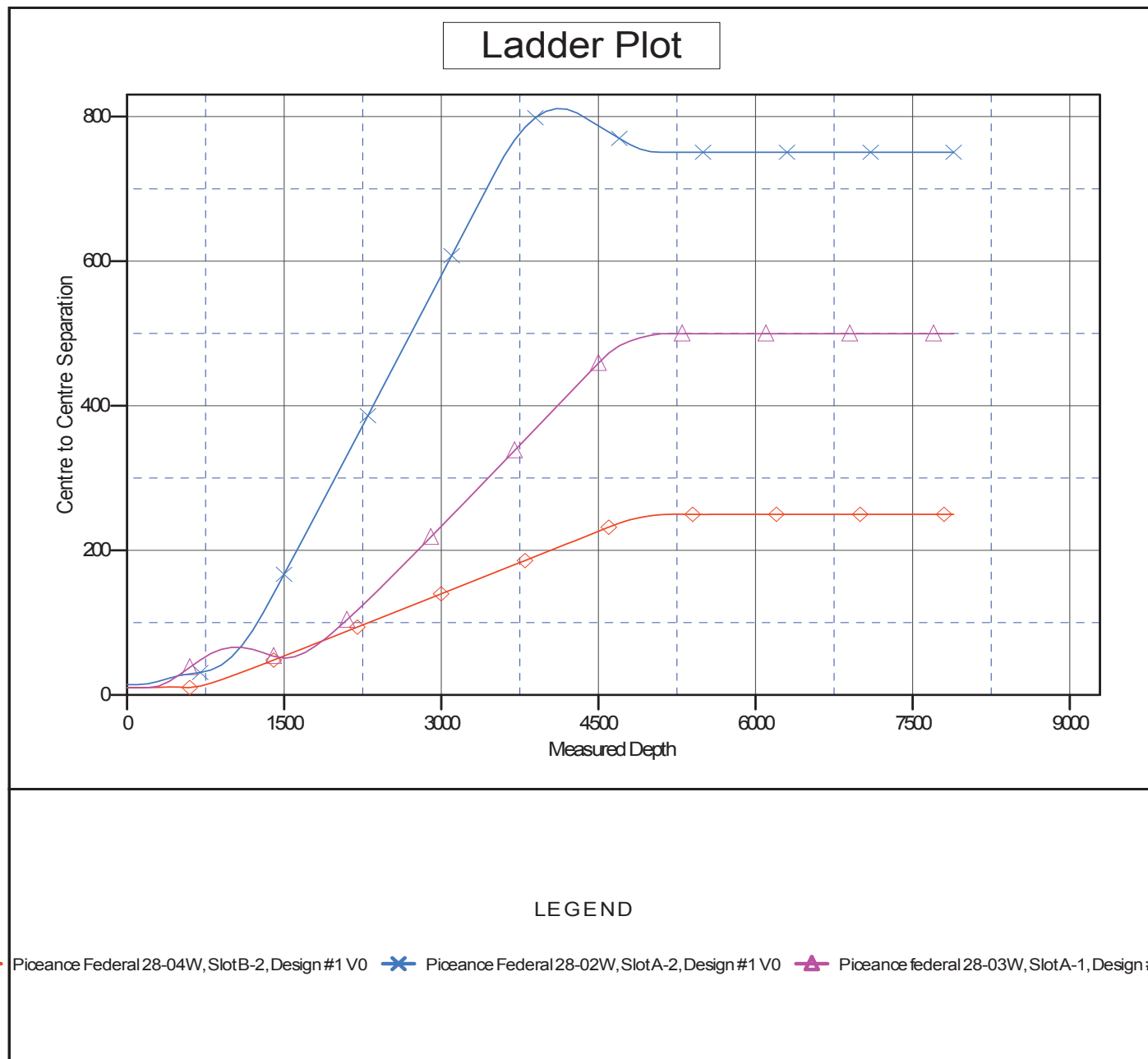
Offset Design Piceance 28-05 - Piceance Federal 28-04W - Slot B-2 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,100.0	5,074.2	5,127.2	5,072.0	14.3	17.3	-0.35	647.4	-297.3	249.8	223.8	25.99	9.609		
5,200.0	5,174.2	5,229.4	5,174.2	14.5	17.4	-0.36	647.5	-297.3	249.9	223.5	26.36	9.482		
5,300.0	5,274.2	5,329.4	5,274.2	14.7	17.5	-0.36	647.5	-297.3	249.9	223.2	26.74	9.346		
5,400.0	5,374.2	5,429.4	5,374.2	14.8	17.7	-0.36	647.5	-297.3	249.9	222.8	27.12	9.214		
5,500.0	5,474.2	5,529.4	5,474.2	15.0	17.8	-0.36	647.5	-297.3	249.9	222.4	27.51	9.085		
5,600.0	5,574.2	5,629.4	5,574.2	15.2	18.0	-0.36	647.5	-297.3	249.9	222.0	27.89	8.959		
5,700.0	5,674.2	5,729.4	5,674.2	15.4	18.1	-0.36	647.5	-297.3	249.9	221.6	28.28	8.836		
5,800.0	5,774.2	5,829.4	5,774.2	15.6	18.3	-0.36	647.5	-297.3	249.9	221.2	28.67	8.715		
5,900.0	5,874.2	5,929.4	5,874.2	15.7	18.4	-0.36	647.5	-297.3	249.9	220.8	29.07	8.598		
6,000.0	5,974.2	6,029.4	5,974.2	15.9	18.6	-0.36	647.5	-297.3	249.9	220.4	29.46	8.483		
6,100.0	6,074.2	6,129.4	6,074.2	16.1	18.7	-0.36	647.5	-297.3	249.9	220.0	29.86	8.370		
6,200.0	6,174.2	6,229.4	6,174.2	16.3	18.9	-0.36	647.5	-297.3	249.9	219.6	30.25	8.260		
6,300.0	6,274.2	6,329.4	6,274.2	16.5	19.0	-0.36	647.5	-297.3	249.9	219.2	30.65	8.153		
6,400.0	6,374.2	6,429.4	6,374.2	16.6	19.2	-0.36	647.5	-297.3	249.9	218.8	31.05	8.048		
6,500.0	6,474.2	6,529.4	6,474.2	16.8	19.4	-0.36	647.5	-297.3	249.9	218.4	31.45	7.945		
6,600.0	6,574.2	6,629.4	6,574.2	17.0	19.5	-0.36	647.5	-297.3	249.9	218.0	31.85	7.845		
6,700.0	6,674.2	6,729.4	6,674.2	17.2	19.7	-0.36	647.5	-297.3	249.9	217.6	32.26	7.747		
6,800.0	6,774.2	6,829.4	6,774.2	17.4	19.9	-0.36	647.5	-297.3	249.9	217.2	32.66	7.651		
6,900.0	6,874.2	6,929.4	6,874.2	17.6	20.0	-0.36	647.5	-297.3	249.9	216.8	33.07	7.557		
7,000.0	6,974.2	7,029.4	6,974.2	17.8	20.2	-0.36	647.5	-297.3	249.9	216.4	33.48	7.465		
7,100.0	7,074.2	7,129.4	7,074.2	18.0	20.4	-0.36	647.5	-297.3	249.9	216.0	33.89	7.375		
7,200.0	7,174.2	7,229.4	7,174.2	18.2	20.5	-0.36	647.5	-297.3	249.9	215.6	34.30	7.287		
7,300.0	7,274.2	7,329.4	7,274.2	18.4	20.7	-0.36	647.5	-297.3	249.9	215.2	34.71	7.201		
7,400.0	7,374.2	7,429.4	7,374.2	18.5	20.9	-0.36	647.5	-297.3	249.9	214.8	35.12	7.116		
7,500.0	7,474.2	7,529.4	7,474.2	18.7	21.0	-0.36	647.5	-297.3	249.9	214.4	35.53	7.034		
7,600.0	7,574.2	7,629.4	7,574.2	18.9	21.2	-0.36	647.5	-297.3	249.9	214.0	35.94	6.953		
7,700.0	7,674.2	7,729.4	7,674.2	19.1	21.4	-0.36	647.5	-297.3	249.9	213.5	36.36	6.874		
7,800.0	7,774.2	7,829.4	7,774.2	19.3	21.6	-0.36	647.5	-297.3	249.9	213.1	36.77	6.796		
7,891.8	7,866.0	7,921.2	7,866.0	19.5	21.7	-0.36	647.5	-297.3	249.9	212.7	37.15	6.726		



Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 28-05W
Project:	Mesa County, CO	TVD Reference:	Well @ 7578.0usft
Reference Site:	Piceance 28-05	MD Reference:	Well @ 7578.0usft
Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-05W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-1	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to Well @ 7578.0usft
Offset Depths are relative to Offset Datum
Central Meridian is 105° 30' 0.000 W

Coordinates are relative to: Piceance Federal 28-05W
Coordinate System is US State Plane 1983, Colorado Central Zone
Grid Convergence at Surface is: -1.44°





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Site Error:	0.0 usft	North Reference:	True
Reference Well:	Piceance Federal 28-05W	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-1	Database:	EDMDBBW
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to Well @ 7578.0usft

Offset Depths are relative to Offset Datum

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