



Piceance Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton 30-09E

Slot B-8

Plan: Design #2

Standard Planning Report

09 July, 2015



Project: Mesa County, CO
Site: Bruton 30-10 Pad
Well: Bruton 30-09E
Wellbore: Slot B-8
Design: Design #2
Latitude: 39° 14' 53.390 N
Longitude: 107° 48' 32.152 W
Ground Level: 7643.00
Well @ 7665.00usft

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 Bruton 30-09E, True North
Vertical (TVD) Reference: Well @ 7665.00usft
Section (VS) Reference: Slot - (0.00N, 0.00E)
Measured Depth Reference: Well @ 7665.00usft
Calculation Method: Minimum Curvature

WELL DETAILS: Bruton 30-09E

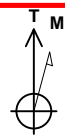
+N/-S	+E/-W	Northing	Ground Level: Easting	Latitude	Longitude	Slot
0.00	0.00	1523587.053	2346194.726	39° 14' 53.390 N	107° 48' 32.152 W	

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Bruton 30-09E tgt	7800.00	440.08	997.58	1524001.643	2347203.169	39° 14' 57.740 N	107° 48' 19.470 W	Circle (Radius: 50.00)

SECTION DETAILS

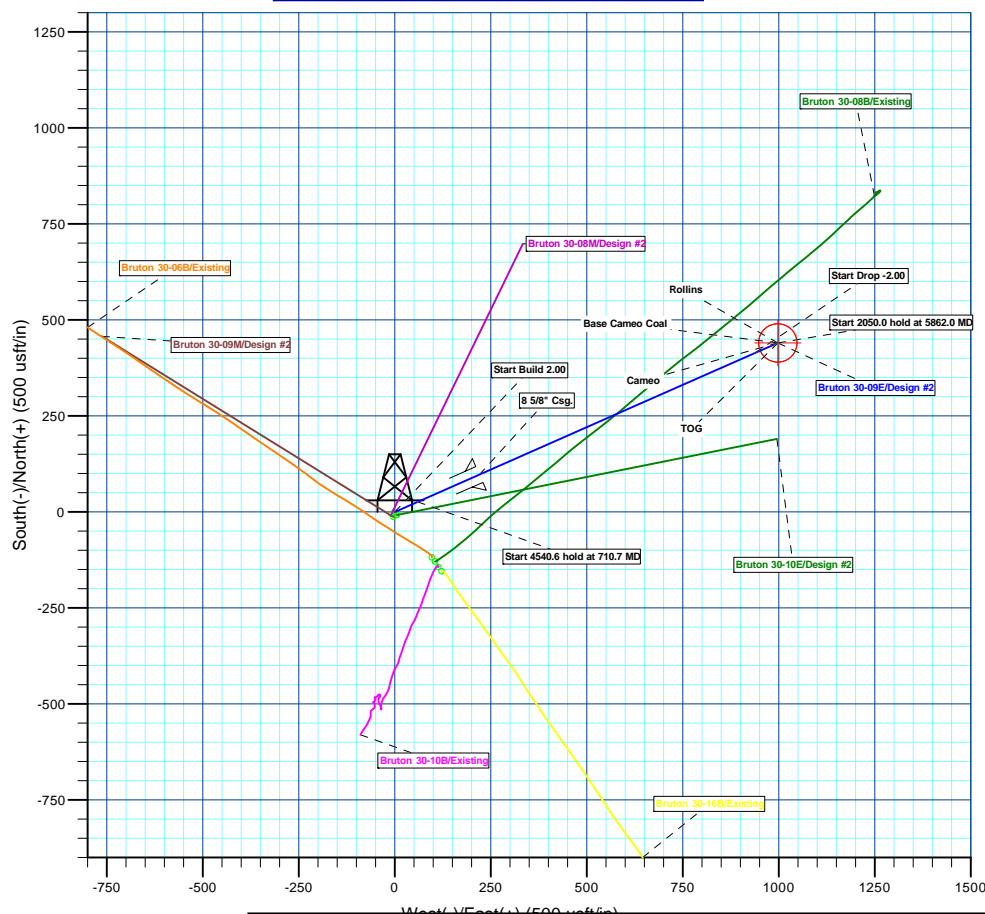
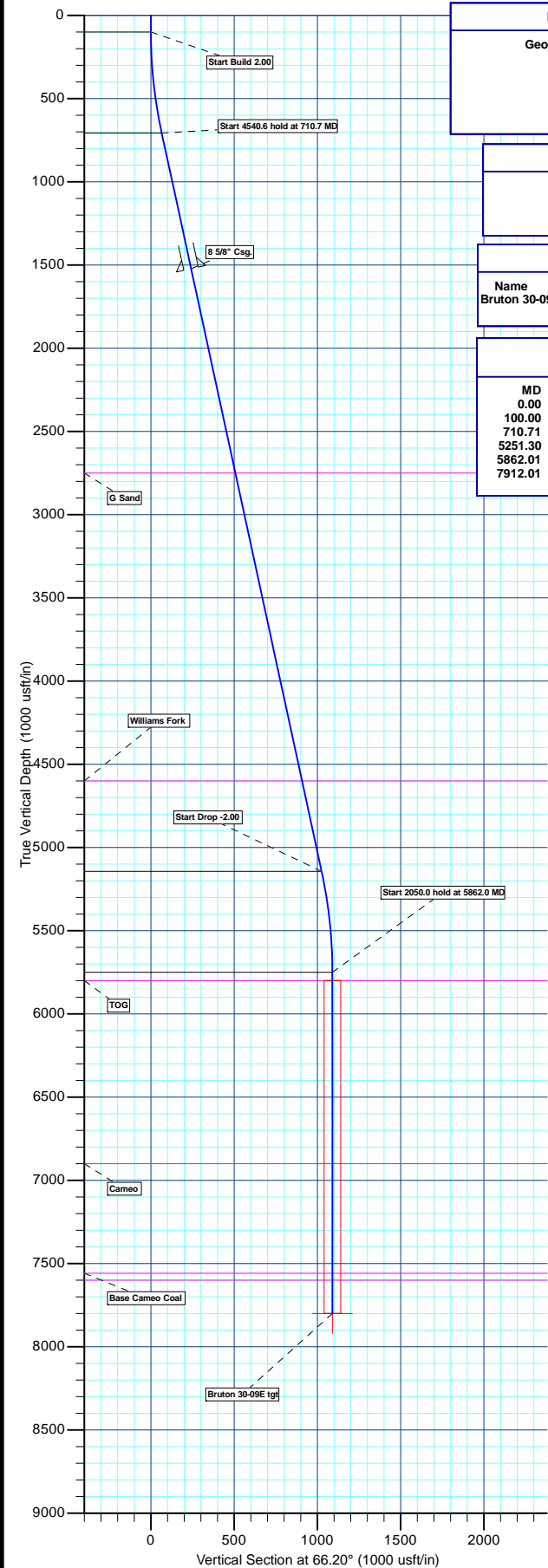
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
710.71	12.21	66.20	706.10	26.17	59.33	2.00	66.20	64.85	Start 4540.6 hold at 710.7 MD
5251.30	12.21	66.20	5143.90	413.91	938.25	0.00	0.00	1025.49	Start Drop -2.00
5862.01	0.00	0.00	5750.00	440.08	997.58	2.00	180.00	1090.34	Start 2050.0 hold at 5862.0 MD
7912.01	0.00	0.00	7800.00	440.08	997.58	0.00	0.00	1090.34	TD at 7912.0



Azimuths to True North
Magnetic North: 9.72°
Magnetic Field
Strength: 51724.0snT
Dip Angle: 65.46°
Date: 06/09/2015
Model: IGRF2010

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2750.00	2801.95	G Sand
4600.00	4694.80	Williams Fork
5800.00	5912.01	TOG
6900.00	7012.01	Cameo
7558.00	7670.01	Base Cameo Coal
7600.00	7712.01	Rollins



Plan: Design #2 (Bruton 30-09E/Slot B-8)

Created By: Ricky Osburn Date: 14:04, July 09 2015



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Planning Report

Database:	EDMDBBW	Local Co-ordinate Reference:	Well Bruton 30-09E
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7665.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7665.00usft
Site:	Bruton 30-10 Pad	North Reference:	True
Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-8		
Design:	Design #2		

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	Bruton 30-10 Pad				
Site Position:		Northing:	1,523,574.982 usft	Latitude:	39° 14' 53.270 N
From:	Lat/Long	Easting:	2,346,190.611 usft	Longitude:	107° 48' 32.200 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.46 °

Well	Bruton 30-09E					
Well Position	+N/-S	12.17 usft	Northing:	1,523,587.053 usft	Latitude:	39° 14' 53.390 N
	+E/-W	3.81 usft	Easting:	2,346,194.726 usft	Longitude:	107° 48' 32.152 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,643.00 usft

Wellbore	Slot B-8				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2015/06/09	9.72	65.46	51,724

Design	Design #2			
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	66.20

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	
710.71	12.21	66.20	706.10	26.17	59.33	2.00	2.00	0.00	66.20	
5,251.30	12.21	66.20	5,143.90	413.91	938.25	0.00	0.00	0.00	0.00	
5,862.01	0.00	0.00	5,750.00	440.08	997.58	2.00	-2.00	0.00	180.00	
7,912.01	0.00	0.00	7,800.00	440.08	997.58	0.00	0.00	0.00	0.00	Bruton 30-09E tgt



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Planning Report

Database:	EDMDBBW	Local Co-ordinate Reference:	Well Bruton 30-09E
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7665.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7665.00usft
Site:	Bruton 30-10 Pad	North Reference:	True
Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-8		
Design:	Design #2		

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	66.20	199.98	0.70	1.60	1.75	2.00	2.00	0.00
300.00	4.00	66.20	299.84	2.82	6.38	6.98	2.00	2.00	0.00
400.00	6.00	66.20	399.45	6.33	14.36	15.69	2.00	2.00	0.00
500.00	8.00	66.20	498.70	11.25	25.51	27.88	2.00	2.00	0.00
600.00	10.00	66.20	597.47	17.57	39.82	43.52	2.00	2.00	0.00
700.00	12.00	66.20	695.62	25.27	57.28	62.60	2.00	2.00	0.00
Start 4540.6 hold at 710.7 MD									
710.71	12.21	66.20	706.10	26.17	59.33	64.85	2.00	2.00	0.00
800.00	12.21	66.20	793.36	33.80	76.62	83.74	0.00	0.00	0.00
900.00	12.21	66.20	891.10	42.34	95.97	104.90	0.00	0.00	0.00
1,000.00	12.21	66.20	988.84	50.88	115.33	126.05	0.00	0.00	0.00
1,100.00	12.21	66.20	1,086.57	59.42	134.69	147.21	0.00	0.00	0.00
1,200.00	12.21	66.20	1,184.31	67.96	154.04	168.37	0.00	0.00	0.00
1,300.00	12.21	66.20	1,282.05	76.50	173.40	189.52	0.00	0.00	0.00
1,400.00	12.21	66.20	1,379.78	85.03	192.76	210.68	0.00	0.00	0.00
1,500.00	12.21	66.20	1,477.52	93.57	212.11	231.84	0.00	0.00	0.00
8 5/8" Csg.									
1,545.51	12.21	66.20	1,522.00	97.46	220.92	241.47	0.00	0.00	0.00
1,600.00	12.21	66.20	1,575.25	102.11	231.47	252.99	0.00	0.00	0.00
1,700.00	12.21	66.20	1,672.99	110.65	250.83	274.15	0.00	0.00	0.00
1,800.00	12.21	66.20	1,770.73	119.19	270.18	295.31	0.00	0.00	0.00
1,900.00	12.21	66.20	1,868.46	127.73	289.54	316.46	0.00	0.00	0.00
2,000.00	12.21	66.20	1,966.20	136.27	308.90	337.62	0.00	0.00	0.00
2,100.00	12.21	66.20	2,063.94	144.81	328.26	358.78	0.00	0.00	0.00
2,200.00	12.21	66.20	2,161.67	153.35	347.61	379.93	0.00	0.00	0.00
2,300.00	12.21	66.20	2,259.41	161.89	366.97	401.09	0.00	0.00	0.00
2,400.00	12.21	66.20	2,357.15	170.43	386.33	422.25	0.00	0.00	0.00
2,500.00	12.21	66.20	2,454.88	178.97	405.68	443.40	0.00	0.00	0.00
2,600.00	12.21	66.20	2,552.62	187.51	425.04	464.56	0.00	0.00	0.00
2,700.00	12.21	66.20	2,650.35	196.05	444.40	485.72	0.00	0.00	0.00
2,800.00	12.21	66.20	2,748.09	204.58	463.75	506.87	0.00	0.00	0.00
G Sand									
2,801.95	12.21	66.20	2,750.00	204.75	464.13	507.29	0.00	0.00	0.00
2,900.00	12.21	66.20	2,845.83	213.12	483.11	528.03	0.00	0.00	0.00
3,000.00	12.21	66.20	2,943.56	221.66	502.47	549.19	0.00	0.00	0.00
3,100.00	12.21	66.20	3,041.30	230.20	521.82	570.35	0.00	0.00	0.00
3,200.00	12.21	66.20	3,139.04	238.74	541.18	591.50	0.00	0.00	0.00
3,300.00	12.21	66.20	3,236.77	247.28	560.54	612.66	0.00	0.00	0.00
3,400.00	12.21	66.20	3,334.51	255.82	579.89	633.82	0.00	0.00	0.00
3,500.00	12.21	66.20	3,432.24	264.36	599.25	654.97	0.00	0.00	0.00
3,600.00	12.21	66.20	3,529.98	272.90	618.61	676.13	0.00	0.00	0.00
3,700.00	12.21	66.20	3,627.72	281.44	637.97	697.29	0.00	0.00	0.00
3,800.00	12.21	66.20	3,725.45	289.98	657.32	718.44	0.00	0.00	0.00
3,900.00	12.21	66.20	3,823.19	298.52	676.68	739.60	0.00	0.00	0.00
4,000.00	12.21	66.20	3,920.93	307.06	696.04	760.76	0.00	0.00	0.00
4,100.00	12.21	66.20	4,018.66	315.60	715.39	781.91	0.00	0.00	0.00
4,200.00	12.21	66.20	4,116.40	324.13	734.75	803.07	0.00	0.00	0.00
4,300.00	12.21	66.20	4,214.14	332.67	754.11	824.23	0.00	0.00	0.00
4,400.00	12.21	66.20	4,311.87	341.21	773.46	845.38	0.00	0.00	0.00
4,500.00	12.21	66.20	4,409.61	349.75	792.82	866.54	0.00	0.00	0.00
4,600.00	12.21	66.20	4,507.34	358.29	812.18	887.70	0.00	0.00	0.00



Archer

Planning Report

Database:	EDMDBBW	Local Co-ordinate Reference:	Well Bruton 30-09E
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7665.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7665.00usft
Site:	Bruton 30-10 Pad	North Reference:	True
Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-8		
Design:	Design #2		

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)
Williams Fork									
4,694.80	12.21	66.20	4,600.00	366.39	830.53	907.75	0.00	0.00	0.00
4,700.00	12.21	66.20	4,605.08	366.83	831.53	908.85	0.00	0.00	0.00
4,800.00	12.21	66.20	4,702.82	375.37	850.89	930.01	0.00	0.00	0.00
4,900.00	12.21	66.20	4,800.55	383.91	870.25	951.17	0.00	0.00	0.00
5,000.00	12.21	66.20	4,898.29	392.45	889.60	972.32	0.00	0.00	0.00
5,100.00	12.21	66.20	4,996.03	400.99	908.96	993.48	0.00	0.00	0.00
5,200.00	12.21	66.20	5,093.76	409.53	928.32	1,014.64	0.00	0.00	0.00
Start Drop -2.00									
5,251.30	12.21	66.20	5,143.90	413.91	938.25	1,025.49	0.00	0.00	0.00
5,300.00	11.24	66.20	5,191.58	417.90	947.31	1,035.39	2.00	-2.00	0.00
5,400.00	9.24	66.20	5,289.99	425.08	963.57	1,053.17	2.00	-2.00	0.00
5,500.00	7.24	66.20	5,388.95	430.86	976.68	1,067.50	2.00	-2.00	0.00
5,600.00	5.24	66.20	5,488.35	435.25	986.63	1,078.37	2.00	-2.00	0.00
5,700.00	3.24	66.20	5,588.07	438.23	993.39	1,085.76	2.00	-2.00	0.00
5,800.00	1.24	66.20	5,687.99	439.81	996.97	1,089.67	2.00	-2.00	0.00
Start 2050.0 hold at 5862.0 MD									
5,862.01	0.00	0.00	5,750.00	440.08	997.58	1,090.34	2.00	-2.00	0.00
5,900.00	0.00	0.00	5,787.99	440.08	997.58	1,090.34	0.00	0.00	0.00
TOG									
5,912.01	0.00	0.00	5,800.00	440.08	997.58	1,090.34	0.00	0.00	0.00
6,000.00	0.00	0.00	5,887.99	440.08	997.58	1,090.34	0.00	0.00	0.00
6,100.00	0.00	0.00	5,987.99	440.08	997.58	1,090.34	0.00	0.00	0.00
6,200.00	0.00	0.00	6,087.99	440.08	997.58	1,090.34	0.00	0.00	0.00
6,300.00	0.00	0.00	6,187.99	440.08	997.58	1,090.34	0.00	0.00	0.00
6,400.00	0.00	0.00	6,287.99	440.08	997.58	1,090.34	0.00	0.00	0.00
6,500.00	0.00	0.00	6,387.99	440.08	997.58	1,090.34	0.00	0.00	0.00
6,600.00	0.00	0.00	6,487.99	440.08	997.58	1,090.34	0.00	0.00	0.00
6,700.00	0.00	0.00	6,587.99	440.08	997.58	1,090.34	0.00	0.00	0.00
6,800.00	0.00	0.00	6,687.99	440.08	997.58	1,090.34	0.00	0.00	0.00
6,900.00	0.00	0.00	6,787.99	440.08	997.58	1,090.34	0.00	0.00	0.00
7,000.00	0.00	0.00	6,887.99	440.08	997.58	1,090.34	0.00	0.00	0.00
Cameo									
7,012.01	0.00	0.00	6,900.00	440.08	997.58	1,090.34	0.00	0.00	0.00
7,100.00	0.00	0.00	6,987.99	440.08	997.58	1,090.34	0.00	0.00	0.00
7,200.00	0.00	0.00	7,087.99	440.08	997.58	1,090.34	0.00	0.00	0.00
7,300.00	0.00	0.00	7,187.99	440.08	997.58	1,090.34	0.00	0.00	0.00
7,400.00	0.00	0.00	7,287.99	440.08	997.58	1,090.34	0.00	0.00	0.00
7,500.00	0.00	0.00	7,387.99	440.08	997.58	1,090.34	0.00	0.00	0.00
7,600.00	0.00	0.00	7,487.99	440.08	997.58	1,090.34	0.00	0.00	0.00
Base Cameo Coal									
7,670.01	0.00	0.00	7,558.00	440.08	997.58	1,090.34	0.00	0.00	0.00
7,700.00	0.00	0.00	7,587.99	440.08	997.58	1,090.34	0.00	0.00	0.00
Rollins									
7,712.01	0.00	0.00	7,600.00	440.08	997.58	1,090.34	0.00	0.00	0.00
7,800.00	0.00	0.00	7,687.99	440.08	997.58	1,090.34	0.00	0.00	0.00
7,900.00	0.00	0.00	7,787.99	440.08	997.58	1,090.34	0.00	0.00	0.00
TD at 7912.0									
7,912.01	0.00	0.00	7,800.00	440.08	997.58	1,090.34	0.00	0.00	0.00



Archer

Planning Report

Database:	EDMDBBW	Local Co-ordinate Reference:	Well Bruton 30-09E
Company:	Piceance Energy, LLC	TVD Reference:	Well @ 7665.00usft
Project:	Mesa County, CO	MD Reference:	Well @ 7665.00usft
Site:	Bruton 30-10 Pad	North Reference:	True
Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Slot B-8		
Design:	Design #2		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
Bruton 30-09E tgt	0.00	0.00	7,800.00	440.08	997.58	1,524,001.643	2,347,203.169	39° 14' 57.740 N	107° 48' 19.470 W
- plan hits target center									
- Circle (radius 50.00)									

Casing Points				
Measured Depth	Vertical Depth	Name	Casing Diameter	Hole Diameter
(usft)	(usft)		(")	(")
1,545.51	1,522.00	8 5/8" Csg.	8-5/8	12-1/4

Formations					
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction
(usft)	(usft)			(°)	(°)
2,801.95	2,750.00	G Sand		0.00	
4,694.80	4,600.00	Williams Fork		0.00	
5,912.01	5,800.00	TOG		0.00	
7,012.01	6,900.00	Cameo		0.00	
7,670.01	7,558.00	Base Cameo Coal		0.00	
7,712.01	7,600.00	Rollins		0.00	

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	
100.00	100.00	0.00	0.00	Start Build 2.00
710.71	706.10	26.17	59.33	Start 4540.6 hold at 710.7 MD
5,251.30	5,143.90	413.91	938.25	Start Drop -2.00
5,862.01	5,750.00	440.08	997.58	Start 2050.0 hold at 5862.0 MD
7,912.01	7,800.00	440.08	997.58	TD at 7912.0



Piceance Energy, LLC

**Mesa County, CO
Bruton 30-10 Pad
Bruton 30-09E**

**Slot B-8
Design #2**

Anticollision Report

09 July, 2015



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference	Design #2		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.00 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	2015/07/09		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	7,911.69	Design #2 (Slot B-8)	MWD	MWD - Standard	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Bruton 30-10 Pad						
Bruton 30-06B - Existing - Existing	702.99	693.02	113.20	109.72	32.554	CC, ES
Bruton 30-06B - Existing - Existing	900.00	879.30	131.37	126.52	27.129	SF
Bruton 30-08B - Existing - Existing	2,186.67	2,169.75	79.84	65.32	5.499	CC, ES
Bruton 30-08B - Existing - Existing	2,200.00	2,182.90	79.86	65.34	5.497	SF
Bruton 30-08M - Slot A-8 - Design #2	100.00	100.00	9.91	9.73	56.518	CC, ES
Bruton 30-08M - Slot A-8 - Design #2	300.00	299.84	16.86	15.65	13.999	SF
Bruton 30-09M - Slot A-7 - Design #2	100.00	100.00	13.48	13.30	76.871	CC, ES
Bruton 30-09M - Slot A-7 - Design #2	400.00	399.45	26.14	24.44	15.348	SF
Bruton 30-10B - Existing - Existing	496.88	475.78	175.79	173.81	88.987	CC
Bruton 30-10B - Existing - Existing	500.00	478.77	175.79	173.80	88.263	ES
Bruton 30-10B - Existing - Existing	1,400.00	1,341.86	306.39	299.28	43.123	SF
Bruton 30-10E - Slot B-7 - Design #2	205.65	205.63	9.62	8.97	14.867	CC, ES
Bruton 30-10E - Slot B-7 - Design #2	7,900.00	7,890.48	249.95	199.35	4.939	SF
Bruton 30-16B - Existing - Existing	315.31	293.80	196.36	195.28	181.581	CC, ES
Bruton 30-16B - Existing - Existing	2,900.00	2,628.90	973.96	953.61	47.873	SF

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 98-MWD													Offset Well Error:	0.00 usft
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	
0.00	0.00	0.00	18.00	0.00	0.00	140.62	-118.15	96.99	153.92					
100.00	100.00	82.70	100.70	0.09	0.09	140.53	-117.85	97.06	152.68	152.50	0.18	843.838		
200.00	199.98	186.31	204.29	0.31	0.31	74.71	-116.09	96.72	150.69	150.06	0.63	240.179		
300.00	299.84	289.96	307.84	0.55	0.55	76.77	-112.55	94.21	145.22	144.11	1.10	131.767		
400.00	399.45	392.97	410.57	0.80	0.80	81.39	-107.85	88.36	136.51	134.92	1.60	85.387		
500.00	498.70	493.44	510.56	1.10	1.07	88.95	-102.54	80.08	126.76	124.63	2.13	59.507		
600.00	597.47	593.42	609.77	1.44	1.37	99.86	-95.62	69.81	117.74	114.99	2.74	42.922		
700.00	695.62	690.20	705.48	1.83	1.69	113.92	-87.50	58.03	113.20	109.74	3.45	32.766		
702.99	698.55	693.02	708.27	1.85	1.70	114.38	-87.26	57.65	113.20	109.72	3.48	32.554	CC, ES	
800.00	793.36	784.73	798.56	2.26	2.03	129.78	-79.29	43.75	117.88	113.69	4.19	28.137		
900.00	891.10	879.30	891.24	2.70	2.41	144.61	-69.78	27.51	131.37	126.52	4.84	27.129	SF	
1,000.00	988.84	971.90	981.64	3.15	2.82	156.74	-59.02	10.56	152.01	146.60	5.41	28.112		
1,100.00	1,086.57	1,062.09	1,069.11	3.60	3.25	166.40	-47.52	-8.12	179.26	173.32	5.94	30.189		

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



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Bruton 30-10 Pad - Bruton 30-06B - Existing - Existing													Offset Site Error: 0.00 usft
Survey Program: 98-MWD													Offset Well Error: 0.00 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	
1,200.00	1,184.31	1,152.17	1,155.91	4.05	3.73	174.13	-34.84	-28.61	211.51	205.04	6.47	32.676	
1,300.00	1,282.05	1,242.88	1,242.92	4.50	4.23	-179.70	-20.74	-50.02	246.78	239.76	7.03	35.127	
1,400.00	1,379.78	1,332.40	1,328.55	4.95	4.74	-174.87	-5.88	-71.48	284.10	276.51	7.59	37.407	
1,500.00	1,477.52	1,419.39	1,411.53	5.41	5.26	-171.12	8.86	-93.05	323.51	315.34	8.17	39.589	
1,600.00	1,575.25	1,505.09	1,493.13	5.86	5.76	-168.24	22.92	-115.11	364.87	356.12	8.75	41.696	
1,700.00	1,672.99	1,591.42	1,575.26	6.31	6.27	-165.98	36.35	-138.07	407.81	398.49	9.33	43.718	
1,800.00	1,770.73	1,686.62	1,665.87	6.77	6.81	-163.91	51.61	-163.00	450.79	440.86	9.93	45.387	
1,900.00	1,868.46	1,775.71	1,750.67	7.23	7.34	-162.25	66.50	-185.89	493.62	483.09	10.53	46.859	
2,000.00	1,966.20	1,867.43	1,837.80	7.68	7.91	-160.68	82.90	-209.37	536.59	525.43	11.17	48.044	
2,100.00	2,063.94	1,953.73	1,919.56	8.14	8.46	-159.30	99.38	-231.55	579.90	568.10	11.80	49.150	
2,200.00	2,161.67	2,039.85	2,000.98	8.59	9.03	-158.09	116.02	-254.11	623.93	611.49	12.44	50.161	
2,300.00	2,259.41	2,124.32	2,080.76	9.05	9.58	-157.06	132.17	-276.69	668.65	655.59	13.06	51.181	
2,400.00	2,357.15	2,212.53	2,164.08	9.51	10.12	-156.17	148.34	-300.71	713.98	700.30	13.69	52.163	
2,500.00	2,454.88	2,302.69	2,249.32	9.96	10.66	-155.39	164.75	-325.07	759.25	744.94	14.31	53.054	
2,600.00	2,552.62	2,394.84	2,336.48	10.42	11.21	-154.67	181.62	-349.78	804.42	789.48	14.94	53.832	
2,700.00	2,650.35	2,486.42	2,423.26	10.88	11.76	-154.05	198.22	-373.88	849.21	833.64	15.57	54.530	
2,800.00	2,748.09	2,576.07	2,508.26	11.33	12.30	-153.52	214.26	-397.43	894.01	877.81	16.20	55.181	
2,900.00	2,845.83	2,669.46	2,596.78	11.79	12.87	-152.99	231.43	-421.74	938.68	921.83	16.85	55.719	
3,000.00	2,943.56	2,760.80	2,683.69	12.25	13.42	-152.59	247.11	-445.07	982.86	965.38	17.48	56.225	



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design		Bruton 30-10 Pad - Bruton 30-08B - Existing - Existing											Offset Site Error:	0.00 usft
Survey Program:		128-MWD											Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance								Warning
Measured Depth 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		
0.00	0.00	0.00	18.00	0.00	0.00	140.74	-129.08	105.49	167.67					
100.00	100.00	82.11	100.11	0.09	0.09	140.76	-129.08	105.44	166.68	166.50	0.18	925.834		
200.00	199.98	181.70	199.70	0.31	0.25	75.16	-129.09	105.41	166.20	165.64	0.57	293.885		
300.00	299.84	281.39	299.39	0.55	0.46	76.80	-129.05	105.83	165.17	164.16	1.00	164.355		
400.00	399.45	380.55	398.54	0.80	0.67	79.36	-128.77	107.11	163.88	162.40	1.48	110.807		
500.00	498.70	481.70	499.59	1.10	0.90	82.19	-126.29	110.57	161.72	159.72	2.00	80.839		
600.00	597.47	580.30	597.84	1.44	1.14	84.75	-121.94	117.65	159.75	157.17	2.58	61.910		
700.00	695.62	681.92	698.69	1.83	1.42	87.38	-115.36	128.08	157.48	154.23	3.25	48.432		
800.00	793.36	784.32	799.75	2.26	1.76	89.44	-105.48	141.26	153.69	149.67	4.02	38.240		
900.00	891.10	886.24	899.62	2.70	2.14	90.16	-92.78	157.14	148.56	143.73	4.83	30.741		
1,000.00	988.84	985.43	996.23	3.15	2.53	89.85	-78.70	174.66	142.70	137.04	5.66	25.204		
1,100.00	1,086.57	1,087.81	1,095.84	3.60	2.95	89.31	-63.97	193.14	136.84	130.32	6.53	20.960		
1,200.00	1,184.31	1,189.13	1,193.95	4.05	3.42	88.07	-46.87	211.82	128.90	121.46	7.44	17.336		
1,300.00	1,282.05	1,289.24	1,290.64	4.50	3.91	86.31	-29.01	230.61	120.32	111.95	8.37	14.377		
1,400.00	1,379.78	1,388.22	1,385.96	4.95	4.42	83.73	-10.86	250.14	111.93	102.61	9.32	12.010		
1,500.00	1,477.52	1,485.98	1,480.05	5.41	4.91	80.59	6.35	270.33	104.89	94.65	10.25	10.235		
1,600.00	1,575.25	1,585.67	1,576.04	5.86	5.40	77.02	23.12	291.37	99.14	87.99	11.15	8.893		
1,700.00	1,672.99	1,685.22	1,672.05	6.31	5.87	73.37	39.58	311.92	93.73	81.72	12.00	7.809		
1,800.00	1,770.73	1,784.49	1,767.71	6.77	6.37	69.15	55.92	332.81	89.07	76.24	12.83	6.941		
1,900.00	1,868.46	1,884.78	1,863.88	7.23	6.93	63.23	73.95	354.80	84.69	71.11	13.58	6.236		
2,000.00	1,966.20	1,983.62	1,958.15	7.68	7.50	55.61	93.03	377.55	81.53	67.41	14.12	5.774		
2,100.00	2,063.94	2,083.12	2,053.00	8.14	8.05	47.47	112.16	400.72	80.23	65.81	14.41	5.566		
2,186.67	2,148.64	2,169.75	2,135.83	8.53	8.52	40.70	128.45	420.17	79.84	65.32	14.52	5.499 CC, ES		
2,200.00	2,161.67	2,182.90	2,148.42	8.59	8.59	39.68	130.92	423.11	79.86	65.34	14.53	5.497 SF		
2,300.00	2,259.41	2,281.89	2,242.89	9.05	9.14	31.71	149.90	445.75	81.39	66.91	14.48	5.622		
2,400.00	2,357.15	2,381.36	2,337.97	9.51	9.70	24.40	168.59	468.24	84.15	69.76	14.39	5.848		
2,500.00	2,454.88	2,480.41	2,432.53	9.96	10.25	17.87	186.98	491.28	88.83	74.50	14.34	6.197		
2,600.00	2,552.62	2,580.08	2,527.90	10.42	10.81	12.50	204.62	514.21	94.10	79.69	14.41	6.530		
2,700.00	2,650.35	2,678.85	2,622.29	10.88	11.37	7.77	222.23	537.37	100.58	86.00	14.58	6.897		
2,800.00	2,748.09	2,778.31	2,717.08	11.33	11.95	3.01	241.20	560.77	108.23	93.41	14.82	7.303		
2,900.00	2,845.83	2,877.57	2,811.81	11.79	12.51	-1.02	259.82	583.83	116.11	100.93	15.18	7.648		
3,000.00	2,943.56	2,977.20	2,906.73	12.25	13.08	-4.99	279.54	606.84	124.90	109.27	15.63	7.990		
3,100.00	3,041.30	3,076.98	3,002.00	12.71	13.65	-8.17	298.42	629.65	133.51	117.33	16.18	8.252		
3,200.00	3,139.04	3,177.95	3,098.53	13.16	14.20	-11.15	317.65	652.18	142.08	125.29	16.79	8.460		
3,300.00	3,236.77	3,277.36	3,193.84	13.62	14.75	-13.74	336.01	673.66	150.05	132.58	17.46	8.593		
3,400.00	3,334.51	3,375.73	3,288.00	14.08	15.30	-16.03	354.47	695.34	158.82	140.64	18.17	8.739		
3,500.00	3,432.24	3,476.04	3,383.95	14.54	15.87	-18.02	373.22	717.77	168.02	149.10	18.92	8.882		
3,600.00	3,529.98	3,576.52	3,480.25	14.99	16.41	-19.55	390.97	740.29	176.69	157.04	19.65	8.992		
3,700.00	3,627.72	3,675.30	3,574.95	15.45	16.95	-20.90	408.33	762.40	185.39	165.00	20.39	9.092		
3,800.00	3,725.45	3,773.00	3,668.34	15.91	17.51	-22.01	425.89	785.12	195.10	173.97	21.13	9.232		
3,900.00	3,823.19	3,873.90	3,764.79	16.36	18.08	-23.17	444.32	808.32	204.93	183.03	21.91	9.355		
4,000.00	3,920.93	3,970.80	3,857.38	16.82	18.63	-24.23	462.28	830.54	215.00	192.32	22.67	9.483		
4,100.00	4,018.66	4,072.16	3,954.26	17.28	19.21	-25.27	481.08	853.64	225.04	201.57	23.47	9.589		
4,200.00	4,116.40	4,169.41	4,047.11	17.74	19.76	-26.14	499.25	876.14	235.49	211.25	24.24	9.714		
4,300.00	4,214.14	4,271.31	4,144.50	18.19	20.33	-27.03	518.23	899.38	245.73	220.68	25.05	9.811		
4,400.00	4,311.87	4,370.65	4,239.64	18.65	20.88	-27.93	536.54	921.30	255.40	229.54	25.85	9.878		
4,500.00	4,409.61	4,468.04	4,332.69	19.11	21.43	-28.76	555.16	943.20	265.94	239.28	26.66	9.975		
4,600.00	4,507.34	4,568.76	4,429.03	19.57	21.99	-29.70	574.65	965.19	276.32	248.81	27.52	10.042		
4,700.00	4,605.08	4,669.99	4,525.86	20.03	22.55	-30.44	593.70	987.72	286.60	258.26	28.34	10.112		
4,800.00	4,702.82	4,769.81	4,621.67	20.48	23.10	-31.15	611.63	1,009.22	295.76	266.60	29.16	10.141		
4,900.00	4,800.55	4,866.26	4,713.93	20.94	23.64	-31.81	629.99	1,030.53	306.18	276.20	29.98	10.213		
5,000.00	4,898.29	4,969.41	4,812.56	21.40	24.22	-32.29	648.93	1,054.03	316.49	285.70	30.78	10.281		

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



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Bruton 30-10 Pad - Bruton 30-08B - Existing - Existing													Offset Site Error:	0.00 usft
Survey Program: 128-MWD													Offset Well Error:	0.00 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		
5,100.00	4,996.03	5,072.60	4,911.74	21.86	24.77	-32.87	666.97	1,076.09	325.24	293.63	31.61	10.289		
5,200.00	5,093.76	5,169.32	5,004.79	22.31	25.28	-33.48	684.03	1,096.23	333.86	301.42	32.44	10.293		
5,300.00	5,191.58	5,269.10	5,100.52	22.74	25.82	-34.05	702.22	1,117.70	343.74	310.52	33.22	10.347		
5,400.00	5,289.99	5,363.94	5,191.58	23.06	26.34	-34.51	719.90	1,137.42	356.13	322.28	33.85	10.521		
5,500.00	5,388.95	5,465.92	5,289.27	23.33	26.89	-34.75	739.91	1,158.80	372.31	337.93	34.38	10.829		
5,600.00	5,488.35	5,577.01	5,396.45	23.56	27.46	-34.79	759.88	1,180.08	388.91	354.09	34.82	11.169		
5,700.00	5,588.07	5,685.22	5,501.65	23.74	27.95	-34.61	777.02	1,198.74	405.48	370.37	35.11	11.547		
5,800.00	5,687.99	5,801.26	5,615.37	23.88	28.42	-34.18	792.02	1,216.22	421.19	385.91	35.28	11.939		
5,900.00	5,787.99	5,909.25	5,721.75	23.99	28.80	32.57	804.28	1,230.19	437.19	401.80	35.39	12.354		
6,000.00	5,887.99	6,029.56	5,840.97	24.10	29.16	33.08	815.18	1,241.89	450.11	414.48	35.63	12.634		
6,100.00	5,987.99	6,146.50	5,957.47	24.22	29.42	33.38	822.09	1,249.29	458.49	422.59	35.90	12.771		
6,200.00	6,087.99	6,263.06	6,073.89	24.33	29.61	33.43	826.55	1,252.67	463.28	427.05	36.23	12.787		
6,300.00	6,187.99	6,371.50	6,182.30	24.45	29.73	33.30	828.91	1,252.98	465.24	428.65	36.58	12.717		
6,400.00	6,287.99	6,470.31	6,281.09	24.57	29.84	33.13	830.58	1,252.41	466.34	429.40	36.93	12.626		
6,500.00	6,387.99	6,566.36	6,377.12	24.69	29.95	33.08	832.63	1,253.25	468.59	431.33	37.25	12.579		
6,600.00	6,487.99	6,671.37	6,482.10	24.82	30.08	33.27	833.20	1,255.48	470.20	432.68	37.52	12.532		
6,700.00	6,587.99	6,773.73	6,584.44	24.94	30.20	33.41	833.46	1,257.10	471.29	433.49	37.80	12.468		
6,800.00	6,687.99	6,870.69	6,681.40	25.07	30.31	33.50	833.66	1,258.06	472.01	433.92	38.09	12.392		
6,900.00	6,787.99	6,967.58	6,778.27	25.19	30.43	33.60	834.86	1,259.87	474.07	435.69	38.38	12.353		
7,000.00	6,887.99	7,068.83	6,879.50	25.32	30.56	33.66	836.11	1,261.31	475.88	437.19	38.69	12.300		
7,100.00	6,987.99	7,171.41	6,982.05	25.45	30.68	33.77	836.99	1,263.02	477.52	438.54	38.99	12.248		
7,200.00	7,087.99	7,276.81	7,087.45	25.58	30.80	33.87	837.16	1,264.10	478.22	438.93	39.30	12.170		
7,300.00	7,187.99	7,381.37	7,192.01	25.72	30.91	33.96	836.40	1,264.50	477.83	438.23	39.60	12.065		
7,400.00	7,287.99	7,487.23	7,297.86	25.85	31.00	34.02	834.87	1,264.05	476.40	436.48	39.92	11.934		
7,500.00	7,387.99	7,593.29	7,403.87	25.98	31.06	34.00	832.56	1,262.27	473.65	433.40	40.25	11.767		
7,600.00	7,487.99	7,696.03	7,506.55	26.12	31.12	33.90	829.88	1,259.50	469.99	429.39	40.60	11.577		
7,700.00	7,587.99	7,797.49	7,607.91	26.26	31.16	33.73	827.16	1,256.00	465.84	424.88	40.96	11.374		
7,800.00	7,687.99	7,897.14	7,707.45	26.40	31.20	33.50	824.65	1,252.09	461.57	420.24	41.33	11.169		
7,892.24	7,780.23	7,970.00	7,780.23	26.52	31.23	33.30	822.99	1,249.09	458.12	416.48	41.64	11.002		
7,900.00	7,787.99	7,970.00	7,780.23	26.54	31.23	33.30	822.99	1,249.09	458.18	416.53	41.65	11.000		
7,912.01	7,800.00	7,970.00	7,780.23	26.54	31.23	33.30	822.99	1,249.09	458.55	416.88	41.66	11.006		



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Bruton 30-10 Pad - Bruton 30-08M - Slot A-8 - Design #2													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
0.00	0.00	0.00	0.00	0.00	0.00	-120.97	-5.10	-8.50	9.91					
100.00	100.00	100.00	100.00	0.09	0.09	-120.97	-5.10	-8.50	9.91	9.73	0.18	56.518 CC, ES		
200.00	199.98	199.98	199.98	0.31	0.31	173.90	-5.10	-8.50	11.64	10.96	0.68	17.078		
300.00	299.84	299.84	299.84	0.55	0.54	175.78	-5.10	-8.50	16.86	15.65	1.20	13.999 SF		
400.00	399.45	400.12	400.10	0.80	0.76	179.75	-3.53	-7.73	24.20	22.48	1.72	14.070		
500.00	498.70	500.45	500.28	1.10	1.00	-174.17	1.20	-5.43	32.57	30.33	2.23	14.594		
600.00	597.47	600.73	600.18	1.44	1.24	-167.73	9.08	-1.60	42.36	39.61	2.75	15.378		
700.00	695.62	700.89	699.58	1.83	1.51	-161.63	20.08	3.76	53.92	50.61	3.31	16.286		
800.00	793.36	800.42	797.96	2.26	1.82	-156.15	33.69	10.38	66.40	62.55	3.85	17.249		
900.00	891.10	899.48	895.80	2.70	2.14	-152.19	47.59	17.14	79.15	74.70	4.45	17.802		
1,000.00	988.84	998.54	993.65	3.15	2.47	-149.33	61.49	23.90	92.16	87.08	5.08	18.134		
1,100.00	1,086.57	1,097.60	1,091.49	3.60	2.81	-147.18	75.39	30.67	105.35	99.61	5.74	18.339		
1,200.00	1,184.31	1,196.66	1,189.34	4.05	3.16	-145.51	89.28	37.43	118.65	112.23	6.42	18.469		
1,300.00	1,282.05	1,295.72	1,287.19	4.50	3.50	-144.18	103.18	44.19	132.03	124.92	7.12	18.554		
1,400.00	1,379.78	1,394.78	1,385.03	4.95	3.85	-143.10	117.08	50.96	145.47	137.65	7.82	18.610		
1,500.00	1,477.52	1,493.84	1,482.88	5.41	4.20	-142.20	130.98	57.72	158.95	150.43	8.52	18.648		
1,600.00	1,575.25	1,592.89	1,580.72	5.86	4.55	-141.44	144.88	64.48	172.46	163.23	9.24	18.674		
1,700.00	1,672.99	1,691.95	1,678.57	6.31	4.91	-140.79	158.78	71.25	186.00	176.05	9.95	18.693		
1,800.00	1,770.73	1,791.01	1,776.41	6.77	5.26	-140.22	172.67	78.01	199.56	188.89	10.67	18.705		
1,900.00	1,868.46	1,890.07	1,874.26	7.23	5.61	-139.73	186.57	84.77	213.14	201.75	11.39	18.714		
2,000.00	1,966.20	1,989.13	1,972.10	7.68	5.97	-139.30	200.47	91.53	226.72	214.61	12.11	18.720		
2,100.00	2,063.94	2,088.19	2,069.95	8.14	6.32	-138.92	214.37	98.30	240.32	227.49	12.84	18.724		
2,200.00	2,161.67	2,187.25	2,167.80	8.59	6.68	-138.58	228.27	105.06	253.93	240.37	13.56	18.727		
2,300.00	2,259.41	2,286.31	2,265.64	9.05	7.03	-138.27	242.17	111.82	267.55	253.26	14.29	18.728		
2,400.00	2,357.15	2,385.37	2,363.49	9.51	7.39	-137.99	256.06	118.59	281.17	266.16	15.01	18.729		
2,500.00	2,454.88	2,484.42	2,461.33	9.96	7.74	-137.74	269.96	125.35	294.80	279.06	15.74	18.729		
2,600.00	2,552.62	2,583.48	2,559.18	10.42	8.10	-137.51	283.86	132.11	308.44	291.97	16.47	18.729		
2,700.00	2,650.35	2,682.54	2,657.02	10.88	8.46	-137.30	297.76	138.87	322.08	304.88	17.20	18.728		
2,800.00	2,748.09	2,781.60	2,754.87	11.33	8.81	-137.11	311.66	145.64	335.72	317.79	17.93	18.727		
2,900.00	2,845.83	2,880.66	2,852.71	11.79	9.17	-136.93	325.56	152.40	349.37	330.71	18.66	18.726		
3,000.00	2,943.56	2,979.72	2,950.56	12.25	9.53	-136.77	339.45	159.16	363.02	343.63	19.39	18.725		
3,100.00	3,041.30	3,078.78	3,048.41	12.71	9.88	-136.61	353.35	165.93	376.67	356.55	20.12	18.724		
3,200.00	3,139.04	3,177.84	3,146.25	13.16	10.24	-136.47	367.25	172.69	390.32	369.48	20.85	18.723		
3,300.00	3,236.77	3,276.89	3,244.10	13.62	10.60	-136.34	381.15	179.45	403.98	382.40	21.58	18.721		
3,400.00	3,334.51	3,375.95	3,341.94	14.08	10.95	-136.21	395.05	186.21	417.64	395.33	22.31	18.720		
3,500.00	3,432.24	3,475.01	3,439.79	14.54	11.31	-136.10	408.95	192.98	431.30	408.26	23.04	18.719		
3,600.00	3,529.98	3,574.07	3,537.63	14.99	11.67	-135.99	422.84	199.74	444.96	421.19	23.77	18.718		
3,700.00	3,627.72	3,673.13	3,635.48	15.45	12.03	-135.89	436.74	206.50	458.63	434.12	24.50	18.716		
3,800.00	3,725.45	3,772.19	3,733.32	15.91	12.38	-135.79	450.64	213.27	472.29	447.06	25.24	18.715		
3,900.00	3,823.19	3,871.25	3,831.17	16.36	12.74	-135.70	464.54	220.03	485.96	459.99	25.97	18.714		
4,000.00	3,920.93	3,970.31	3,929.02	16.82	13.10	-135.61	478.44	226.79	499.63	472.93	26.70	18.712		
4,100.00	4,018.66	4,069.37	4,026.86	17.28	13.45	-135.53	492.34	233.56	513.30	485.86	27.43	18.711		
4,200.00	4,116.40	4,168.42	4,124.71	17.74	13.81	-135.46	506.23	240.32	526.97	498.80	28.16	18.710		
4,300.00	4,214.14	4,267.48	4,222.55	18.19	14.17	-135.38	520.13	247.08	540.64	511.74	28.90	18.709		
4,400.00	4,311.87	4,366.54	4,320.40	18.65	14.53	-135.31	534.03	253.84	554.31	524.68	29.63	18.708		
4,500.00	4,409.61	4,465.60	4,418.24	19.11	14.88	-135.25	547.93	260.61	567.98	537.62	30.36	18.707		
4,600.00	4,507.34	4,564.66	4,516.09	19.57	15.24	-135.18	561.83	267.37	581.65	550.56	31.10	18.705		
4,700.00	4,605.08	4,663.72	4,613.94	20.03	15.60	-135.12	575.73	274.13	595.33	563.50	31.83	18.704		
4,800.00	4,702.82	4,762.78	4,711.78	20.48	15.96	-135.07	589.62	280.90	609.00	576.44	32.56	18.703		
4,900.00	4,800.55	4,861.84	4,809.63	20.94	16.32	-135.01	603.52	287.66	622.67	589.38	33.29	18.702		
5,000.00	4,898.29	4,960.90	4,907.47	21.40	16.67	-134.96	617.42	294.42	636.35	602.32	34.03	18.701		
5,100.00	4,996.03	5,059.95	5,005.32	21.86	17.03	-134.91	631.32	301.18	650.02	615.27	34.76	18.700		

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



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Bruton 30-10 Pad - Bruton 30-08M - Slot A-8 - Design #2													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
5,200.00	5,093.76	5,159.01	5,103.16	22.31	17.39	-134.86	645.22	307.95	663.70	628.21	35.49	18.700		
5,300.00	5,191.58	5,258.11	5,201.04	22.74	17.75	-134.88	659.12	314.71	677.09	640.87	36.22	18.693		
5,400.00	5,289.99	5,356.48	5,298.27	23.06	18.08	-134.83	672.60	321.27	688.39	651.51	36.88	18.666		
5,500.00	5,388.95	5,454.05	5,395.09	23.33	18.34	-134.78	683.42	326.54	697.50	660.08	37.42	18.640		
5,600.00	5,488.35	5,551.85	5,492.49	23.56	18.55	-134.78	691.29	330.36	704.45	666.60	37.86	18.609		
5,700.00	5,588.07	5,649.78	5,590.26	23.74	18.73	-134.83	696.16	332.74	709.22	671.02	38.20	18.565		
5,800.00	5,687.99	5,747.77	5,688.23	23.88	18.87	-134.92	698.03	333.65	711.81	673.35	38.46	18.508		
5,900.00	5,787.99	5,847.53	5,787.99	23.99	19.01	-68.77	698.05	333.66	712.28	673.59	38.70	18.407		
6,000.00	5,887.99	5,947.53	5,887.99	24.10	19.15	-68.77	698.05	333.66	712.28	673.31	38.97	18.277		
6,100.00	5,987.99	6,047.53	5,987.99	24.22	19.30	-68.77	698.05	333.66	712.28	673.03	39.25	18.146		
6,200.00	6,087.99	6,147.53	6,087.99	24.33	19.44	-68.77	698.05	333.66	712.28	672.75	39.53	18.017		
6,300.00	6,187.99	6,247.53	6,187.99	24.45	19.59	-68.77	698.05	333.66	712.28	672.46	39.82	17.887		
6,400.00	6,287.99	6,347.53	6,287.99	24.57	19.74	-68.77	698.05	333.66	712.28	672.17	40.11	17.758		
6,500.00	6,387.99	6,447.53	6,387.99	24.69	19.89	-68.77	698.05	333.66	712.28	671.88	40.40	17.630		
6,600.00	6,487.99	6,547.53	6,487.99	24.82	20.05	-68.77	698.05	333.66	712.28	671.59	40.70	17.502		
6,700.00	6,587.99	6,647.53	6,587.99	24.94	20.20	-68.77	698.05	333.66	712.28	671.29	40.99	17.375		
6,800.00	6,687.99	6,747.53	6,687.99	25.07	20.36	-68.77	698.05	333.66	712.28	670.99	41.29	17.249		
6,900.00	6,787.99	6,847.53	6,787.99	25.19	20.51	-68.77	698.05	333.66	712.28	670.68	41.60	17.123		
7,000.00	6,887.99	6,947.53	6,887.99	25.32	20.67	-68.77	698.05	333.66	712.28	670.38	41.90	16.999		
7,100.00	6,987.99	7,047.53	6,987.99	25.45	20.83	-68.77	698.05	333.66	712.28	670.07	42.21	16.875		
7,200.00	7,087.99	7,147.53	7,087.99	25.58	20.99	-68.77	698.05	333.66	712.28	669.76	42.52	16.751		
7,300.00	7,187.99	7,247.53	7,187.99	25.72	21.15	-68.77	698.05	333.66	712.28	669.45	42.83	16.629		
7,400.00	7,287.99	7,347.53	7,287.99	25.85	21.32	-68.77	698.05	333.66	712.28	669.13	43.15	16.507		
7,500.00	7,387.99	7,447.53	7,387.99	25.98	21.48	-68.77	698.05	333.66	712.28	668.81	43.47	16.386		
7,600.00	7,487.99	7,547.53	7,487.99	26.12	21.65	-68.77	698.05	333.66	712.28	668.49	43.79	16.267		
7,700.00	7,587.99	7,647.53	7,587.99	26.26	21.81	-68.77	698.05	333.66	712.28	668.17	44.11	16.148		
7,800.00	7,687.99	7,747.53	7,687.99	26.40	21.98	-68.77	698.05	333.66	712.28	667.85	44.43	16.030		
7,865.88	7,753.87	7,813.41	7,753.87	26.49	22.09	-68.77	698.05	333.66	712.28	667.63	44.65	15.953		
7,900.00	7,787.99	7,845.22	7,785.68	26.54	22.14	-68.77	698.05	333.66	712.29	667.53	44.76	15.914		
7,912.01	7,800.00	7,845.22	7,785.68	26.54	22.14	-68.77	698.05	333.66	712.43	667.66	44.77	15.914		



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Bruton 30-10 Pad - Bruton 30-09M - Slot A-7 - Design #2												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 usft
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
0.00	0.00	0.00	0.00	0.00	0.00	-166.64	-13.11	-3.12	13.48				
100.00	100.00	100.00	100.00	0.09	0.09	-166.64	-13.11	-3.12	13.48	13.30	0.18	76.871	CC, ES
200.00	199.98	199.98	199.98	0.31	0.31	132.62	-13.11	-3.12	14.60	13.95	0.65	22.449	
300.00	299.84	299.84	299.84	0.55	0.54	144.55	-13.11	-3.12	18.55	17.38	1.17	15.912	
400.00	399.45	399.45	399.45	0.80	0.76	155.63	-13.11	-3.12	26.14	24.44	1.70	15.348	SF
500.00	498.70	498.70	498.70	1.10	0.98	163.25	-13.11	-3.12	37.59	35.35	2.24	16.782	
600.00	597.47	597.47	597.47	1.44	1.21	168.08	-13.11	-3.12	52.77	50.00	2.77	19.047	
700.00	695.62	694.56	694.54	1.83	1.42	172.29	-12.29	-4.44	72.26	68.96	3.29	21.934	
800.00	793.36	790.22	790.08	2.26	1.63	176.58	-9.79	-8.48	95.67	91.94	3.72	25.694	
900.00	891.10	884.67	884.20	2.70	1.85	-179.55	-5.67	-15.13	121.23	117.07	4.16	29.167	
1,000.00	988.84	977.74	976.65	3.15	2.09	-176.07	-0.02	-24.26	149.08	144.47	4.61	32.340	
1,100.00	1,086.57	1,069.27	1,067.18	3.60	2.35	-172.95	7.07	-35.72	179.32	174.23	5.09	35.257	
1,200.00	1,184.31	1,159.25	1,155.71	4.05	2.64	-170.15	15.53	-49.38	212.01	206.42	5.59	37.947	
1,300.00	1,282.05	1,252.84	1,247.53	4.50	2.97	-167.75	25.04	-64.74	246.07	239.96	6.11	40.279	
1,400.00	1,379.78	1,346.43	1,339.36	4.95	3.32	-165.94	34.55	-80.10	280.42	273.78	6.64	42.236	
1,500.00	1,477.52	1,440.02	1,431.19	5.41	3.67	-164.52	44.06	-95.47	314.97	307.79	7.18	43.879	
1,600.00	1,575.25	1,533.60	1,523.02	5.86	4.04	-163.39	53.57	-110.83	349.65	341.92	7.73	45.232	
1,700.00	1,672.99	1,627.19	1,614.84	6.31	4.41	-162.45	63.08	-126.19	384.43	376.15	8.28	46.425	
1,800.00	1,770.73	1,720.78	1,706.67	6.77	4.79	-161.67	72.59	-141.55	419.29	410.45	8.84	47.441	
1,900.00	1,868.46	1,814.37	1,798.50	7.23	5.17	-161.01	82.10	-156.92	454.20	444.80	9.40	48.324	
2,000.00	1,966.20	1,907.96	1,890.33	7.68	5.55	-160.45	91.62	-172.28	489.16	479.20	9.96	49.098	
2,100.00	2,063.94	2,001.55	1,982.15	8.14	5.94	-159.96	101.13	-187.64	524.16	513.63	10.53	49.781	
2,200.00	2,161.67	2,095.13	2,073.98	8.59	6.32	-159.53	110.64	-203.00	559.19	548.09	11.10	50.387	
2,300.00	2,259.41	2,188.72	2,165.81	9.05	6.71	-159.15	120.15	-218.36	594.24	582.57	11.67	50.929	
2,400.00	2,357.15	2,282.31	2,257.64	9.51	7.10	-158.82	129.66	-233.73	629.31	617.07	12.24	51.417	
2,500.00	2,454.88	2,375.90	2,349.46	9.96	7.50	-158.51	139.17	-249.09	664.40	651.58	12.81	51.857	
2,600.00	2,552.62	2,469.49	2,441.29	10.42	7.89	-158.24	148.68	-264.45	699.50	686.11	13.39	52.257	
2,700.00	2,650.35	2,563.07	2,533.12	10.88	8.28	-158.00	158.19	-279.81	734.61	720.65	13.96	52.622	
2,800.00	2,748.09	2,656.66	2,624.95	11.33	8.68	-157.78	167.70	-295.17	769.74	755.20	14.54	52.955	
2,900.00	2,845.83	2,750.25	2,716.77	11.79	9.07	-157.57	177.21	-310.54	804.87	789.76	15.11	53.262	
3,000.00	2,943.56	2,843.84	2,808.60	12.25	9.47	-157.39	186.72	-325.90	840.02	824.33	15.69	53.544	
3,100.00	3,041.30	2,937.43	2,900.43	12.71	9.86	-157.22	196.23	-341.26	875.17	858.90	16.27	53.805	
3,200.00	3,139.04	3,031.01	2,992.26	13.16	10.26	-157.06	205.74	-356.62	910.32	893.48	16.84	54.047	
3,300.00	3,236.77	3,124.60	3,084.08	13.62	10.65	-156.91	215.25	-371.99	945.48	928.06	17.42	54.272	
3,400.00	3,334.51	3,218.19	3,175.91	14.08	11.05	-156.78	224.76	-387.35	980.65	962.65	18.00	54.481	



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Bruton 30-10 Pad - Bruton 30-10B - Existing - Existing													Offset Site Error:	0.00 usft
Survey Program: 130-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
0.00	0.00	0.00	18.00	0.00	0.00	141.57	-143.65	113.99	184.26					
100.00	100.00	83.28	101.28	0.09	0.10	141.47	-143.23	114.04	183.09	182.91	0.18	1,005.938		
200.00	199.98	184.37	202.36	0.31	0.26	75.54	-141.79	114.14	181.59	181.01	0.58	312.262		
300.00	299.84	284.00	301.98	0.55	0.47	77.25	-140.79	113.17	178.97	177.95	1.03	174.574		
400.00	399.45	381.22	399.17	0.80	0.68	80.60	-141.42	111.22	176.67	175.19	1.48	118.990		
496.88	495.61	475.78	493.67	1.09	0.89	85.41	-143.61	108.59	175.79	173.81	1.98	88.987 CC		
500.00	498.70	478.77	496.66	1.10	0.89	85.58	-143.70	108.49	175.79	173.80	1.99	88.263 ES		
600.00	597.47	574.15	591.91	1.44	1.11	91.81	-147.41	105.32	177.59	175.04	2.55	69.619		
700.00	695.62	668.88	686.47	1.83	1.33	98.67	-152.37	102.70	183.58	180.42	3.16	58.016		
800.00	793.36	763.66	781.03	2.26	1.55	105.75	-158.32	100.03	193.93	190.12	3.81	50.943		
900.00	891.10	857.74	874.78	2.70	1.79	112.31	-165.24	96.45	208.22	203.79	4.43	46.999		
1,000.00	988.84	952.90	969.57	3.15	2.03	118.02	-173.01	93.00	225.82	220.80	5.02	45.017		
1,100.00	1,086.57	1,051.13	1,067.44	3.60	2.25	122.84	-180.89	90.40	245.10	239.53	5.56	44.053		
1,200.00	1,184.31	1,150.29	1,166.35	4.05	2.47	126.93	-187.65	88.31	264.53	258.45	6.08	43.474		
1,300.00	1,282.05	1,246.13	1,261.96	4.50	2.70	130.37	-193.86	86.20	284.78	278.19	6.60	43.160		
1,400.00	1,379.78	1,341.86	1,357.44	4.95	2.93	133.43	-200.38	83.61	306.39	299.28	7.10	43.123 SF		
1,500.00	1,477.52	1,439.98	1,455.32	5.41	3.16	136.09	-206.91	81.38	328.44	320.84	7.60	43.212		
1,600.00	1,575.25	1,537.99	1,553.11	5.86	3.38	138.44	-212.93	79.15	350.63	342.55	8.08	43.371		
1,700.00	1,672.99	1,633.92	1,648.86	6.31	3.60	140.52	-218.48	76.87	373.05	364.49	8.56	43.558		
1,800.00	1,770.73	1,729.68	1,744.40	6.77	3.83	142.33	-224.52	74.47	396.40	387.36	9.05	43.824		
1,900.00	1,868.46	1,827.71	1,842.21	7.23	4.06	143.94	-230.59	72.45	419.77	410.25	9.53	44.064		
2,000.00	1,966.20	1,925.75	1,940.05	7.68	4.29	145.36	-236.56	70.67	443.22	433.21	10.01	44.297		
2,100.00	2,063.94	2,023.55	2,037.69	8.14	4.51	146.70	-241.91	68.68	466.50	456.02	10.48	44.507		
2,200.00	2,161.67	2,119.19	2,133.17	8.59	4.74	147.91	-247.05	66.56	490.02	479.06	10.95	44.731		
2,300.00	2,259.41	2,215.46	2,229.26	9.05	4.96	149.02	-252.38	64.23	513.98	502.55	11.43	44.973		
2,400.00	2,357.15	2,312.14	2,325.77	9.51	5.19	150.03	-257.69	61.96	538.03	526.13	11.90	45.210		
2,500.00	2,454.88	2,409.49	2,422.95	9.96	5.41	150.96	-263.13	59.76	562.26	549.88	12.37	45.437		
2,600.00	2,552.62	2,507.03	2,520.32	10.42	5.64	151.81	-268.35	57.61	586.39	573.54	12.85	45.643		
2,700.00	2,650.35	2,604.02	2,617.15	10.88	5.86	152.59	-273.55	55.58	610.57	597.25	13.32	45.835		
2,800.00	2,748.09	2,699.20	2,712.17	11.33	6.09	153.30	-278.65	53.54	634.89	621.10	13.79	46.033		
2,900.00	2,845.83	2,790.50	2,803.30	11.79	6.30	153.98	-283.52	50.83	659.79	645.54	14.25	46.286		
3,000.00	2,943.56	2,882.37	2,894.95	12.25	6.52	154.63	-288.96	47.48	685.65	670.93	14.72	46.583		
3,100.00	3,041.30	2,975.07	2,987.38	12.71	6.75	155.19	-295.20	44.31	712.02	696.83	15.19	46.873		
3,200.00	3,139.04	3,071.84	3,083.83	13.16	7.00	155.67	-302.52	41.28	738.87	723.19	15.67	47.139		
3,300.00	3,236.77	3,172.17	3,183.85	13.62	7.24	156.10	-309.93	38.73	765.23	749.06	16.16	47.343		
3,400.00	3,334.51	3,274.14	3,285.56	14.08	7.49	156.55	-316.80	36.18	791.15	774.50	16.65	47.514		
3,500.00	3,432.24	3,371.86	3,383.06	14.54	7.72	156.97	-322.75	33.94	816.51	799.38	17.13	47.665		
3,600.00	3,529.98	3,466.70	3,477.71	14.99	7.94	157.38	-328.35	31.38	842.06	824.46	17.60	47.835		
3,700.00	3,627.72	3,557.75	3,568.55	15.45	8.16	157.73	-334.07	28.84	867.98	849.90	18.07	48.023		
3,800.00	3,725.45	3,648.49	3,659.00	15.91	8.39	158.02	-340.76	26.36	894.63	876.08	18.55	48.224		
3,900.00	3,823.19	3,741.70	3,751.88	16.36	8.63	158.29	-348.13	23.68	921.76	902.73	19.04	48.420		
4,000.00	3,920.93	3,845.79	3,855.60	16.82	8.89	158.54	-356.61	21.06	948.85	929.30	19.54	48.551		
4,100.00	4,018.66	3,945.23	3,954.76	17.28	9.14	158.80	-363.62	18.83	975.00	954.97	20.03	48.667		

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



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Bruton 30-10 Pad - Bruton 30-10E - Slot B-7 - Design #2													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 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		
0.00	0.00	0.00	0.00	0.00	0.00	144.75	-8.01	5.66	9.81					
100.00	100.00	100.00	100.00	0.09	0.09	144.75	-8.01	5.66	9.81	9.64	0.18	55.969		
200.00	199.98	199.98	199.98	0.31	0.31	88.79	-8.01	5.66	9.62	9.00	0.62	15.491		
205.65	205.63	205.63	205.63	0.33	0.33	90.00	-8.01	5.66	9.62	8.97	0.65	14.867 CC, ES		
300.00	299.84	299.84	299.84	0.55	0.54	117.56	-8.01	5.66	10.85	9.74	1.11	9.789		
400.00	399.45	399.45	399.45	0.80	0.76	144.87	-8.01	5.66	16.78	15.10	1.68	9.994		
500.00	498.70	498.70	498.70	1.10	0.98	159.47	-8.01	5.66	27.66	25.42	2.23	12.379		
600.00	597.47	597.47	597.47	1.44	1.21	166.78	-8.01	5.66	42.67	39.90	2.77	15.406		
700.00	695.62	697.53	697.51	1.83	1.42	170.26	-7.69	7.29	59.90	56.62	3.28	18.241		
800.00	793.36	798.44	798.28	2.26	1.64	171.52	-6.66	12.40	76.06	72.36	3.70	20.557		
900.00	891.10	900.35	899.80	2.70	1.87	171.53	-4.92	21.09	88.98	84.84	4.14	21.517		
1,000.00	988.84	1,003.02	1,001.69	3.15	2.14	170.79	-2.45	33.41	98.59	93.99	4.60	21.423		
1,100.00	1,086.57	1,106.19	1,103.56	3.60	2.44	169.41	0.75	49.40	104.90	99.80	5.10	20.554		
1,200.00	1,184.31	1,209.60	1,205.01	4.05	2.80	167.39	4.68	69.02	107.99	102.34	5.65	19.116		
1,300.00	1,282.05	1,310.44	1,303.39	4.50	3.19	164.90	9.02	90.71	108.84	102.60	6.24	17.441		
1,400.00	1,379.78	1,410.32	1,400.81	4.95	3.60	162.44	13.35	112.33	109.77	102.90	6.87	15.979		
1,500.00	1,477.52	1,510.21	1,498.24	5.41	4.03	160.02	17.68	133.95	110.90	103.36	7.54	14.712		
1,600.00	1,575.25	1,610.09	1,595.66	5.86	4.47	157.66	22.01	155.56	112.23	103.98	8.25	13.610		
1,700.00	1,672.99	1,709.98	1,693.08	6.31	4.91	155.36	26.34	177.18	113.74	104.75	8.99	12.651		
1,800.00	1,770.73	1,809.86	1,790.50	6.77	5.36	153.12	30.67	198.79	115.43	105.66	9.77	11.815		
1,900.00	1,868.46	1,909.75	1,887.92	7.23	5.81	150.95	35.00	220.41	117.29	106.71	10.58	11.086		
2,000.00	1,966.20	2,009.64	1,985.35	7.68	6.27	148.85	39.33	242.03	119.31	107.89	11.42	10.448		
2,100.00	2,063.94	2,109.52	2,082.77	8.14	6.73	146.82	43.66	263.64	121.49	109.21	12.29	9.890		
2,200.00	2,161.67	2,209.41	2,180.19	8.59	7.19	144.87	47.99	285.26	123.82	110.65	13.17	9.399		
2,300.00	2,259.41	2,309.29	2,277.61	9.05	7.65	142.99	52.32	306.88	126.29	112.20	14.08	8.968		
2,400.00	2,357.15	2,409.18	2,375.03	9.51	8.12	141.18	56.65	328.49	128.88	113.87	15.01	8.588		
2,500.00	2,454.88	2,509.06	2,472.46	9.96	8.59	139.45	60.98	350.11	131.60	115.65	15.95	8.252		
2,600.00	2,552.62	2,608.95	2,569.88	10.42	9.05	137.79	65.31	371.73	134.44	117.54	16.90	7.955		
2,700.00	2,650.35	2,708.83	2,667.30	10.88	9.52	136.20	69.64	393.34	137.38	119.52	17.86	7.691		
2,800.00	2,748.09	2,808.72	2,764.72	11.33	9.99	134.67	73.97	414.96	140.42	121.59	18.83	7.456		
2,900.00	2,845.83	2,908.60	2,862.14	11.79	10.46	133.21	78.30	436.58	143.56	123.75	19.81	7.246		
3,000.00	2,943.56	3,008.49	2,959.57	12.25	10.93	131.82	82.63	458.19	146.79	126.00	20.80	7.058		
3,100.00	3,041.30	3,108.37	3,056.99	12.71	11.40	130.48	86.95	479.81	150.10	128.32	21.79	6.890		
3,200.00	3,139.04	3,208.26	3,154.41	13.16	11.87	129.21	91.28	501.43	153.49	130.72	22.78	6.739		
3,300.00	3,236.77	3,308.14	3,251.83	13.62	12.34	127.99	95.61	523.04	156.96	133.19	23.77	6.603		
3,400.00	3,334.51	3,408.03	3,349.25	14.08	12.82	126.82	99.94	544.66	160.49	135.72	24.77	6.480		
3,500.00	3,432.24	3,507.92	3,446.68	14.54	13.29	125.70	104.27	566.28	164.08	138.32	25.76	6.369		
3,600.00	3,529.98	3,607.80	3,544.10	14.99	13.76	124.63	108.60	587.89	167.74	140.98	26.76	6.269		
3,700.00	3,627.72	3,707.69	3,641.52	15.45	14.23	123.61	112.93	609.51	171.45	143.69	27.75	6.177		
3,800.00	3,725.45	3,807.57	3,738.94	15.91	14.71	122.63	117.26	631.13	175.21	146.46	28.75	6.094		
3,900.00	3,823.19	3,907.46	3,836.36	16.36	15.18	121.69	121.59	652.74	179.02	149.28	29.75	6.018		
4,000.00	3,920.93	4,007.34	3,933.79	16.82	15.65	120.80	125.92	674.36	182.88	152.14	30.74	5.949		
4,100.00	4,018.66	4,107.23	4,031.21	17.28	16.13	119.93	130.25	695.97	186.78	155.05	31.73	5.886		
4,200.00	4,116.40	4,207.11	4,128.63	17.74	16.60	119.11	134.58	717.59	190.72	158.00	32.72	5.828		
4,300.00	4,214.14	4,307.00	4,226.05	18.19	17.07	118.32	138.91	739.21	194.70	160.99	33.71	5.775		
4,400.00	4,311.87	4,406.88	4,323.47	18.65	17.55	117.56	143.24	760.82	198.72	164.01	34.70	5.726		
4,500.00	4,409.61	4,506.77	4,420.90	19.11	18.02	116.83	147.57	782.44	202.76	167.07	35.69	5.681		
4,600.00	4,507.34	4,606.65	4,518.32	19.57	18.50	116.12	151.90	804.06	206.84	170.17	36.68	5.640		
4,700.00	4,605.08	4,706.54	4,615.74	20.03	18.97	115.45	156.23	825.67	210.95	173.29	37.66	5.602		
4,800.00	4,702.82	4,806.42	4,713.16	20.48	19.44	114.80	160.56	847.29	215.09	176.45	38.64	5.567		
4,900.00	4,800.55	4,906.31	4,810.58	20.94	19.92	114.18	164.89	868.91	219.26	179.64	39.62	5.534		
5,000.00	4,898.29	5,006.19	4,908.01	21.40	20.39	113.58	169.22	890.52	223.44	182.85	40.60	5.504		

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



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Bruton 30-10 Pad - Bruton 30-10E - Slot B-7 - Design #2												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 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	
5,100.00	4,996.03	5,106.08	5,005.43	21.86	20.87	113.00	173.55	912.14	227.66	186.08	41.58	5.476	
5,200.00	5,093.76	5,205.45	5,102.40	22.31	21.32	112.50	177.81	933.43	231.93	189.42	42.51	5.455	
5,300.00	5,191.58	5,303.91	5,199.02	22.74	21.64	112.61	181.52	951.95	236.55	193.31	43.24	5.471	
5,400.00	5,289.99	5,402.33	5,296.21	23.06	21.93	112.89	184.57	967.19	240.61	196.82	43.79	5.495	
5,500.00	5,388.95	5,500.00	5,393.11	23.33	22.17	113.19	186.95	979.07	243.96	199.71	44.25	5.513	
5,600.00	5,488.35	5,599.09	5,491.80	23.56	22.38	113.51	188.70	987.80	246.58	201.95	44.63	5.525	
5,700.00	5,588.07	5,697.41	5,589.96	23.74	22.54	113.85	189.77	993.16	248.47	203.55	44.91	5.532	
5,800.00	5,687.99	5,795.68	5,688.20	23.88	22.66	114.20	190.18	995.21	249.63	204.52	45.11	5.534	
5,900.00	5,787.99	5,895.46	5,787.99	23.99	22.77	-179.46	190.19	995.23	249.90	204.60	45.30	5.516	
6,000.00	5,887.99	5,995.46	5,887.99	24.10	22.89	-179.46	190.19	995.23	249.90	204.36	45.54	5.487	
6,100.00	5,987.99	6,095.46	5,987.99	24.22	23.01	-179.46	190.19	995.23	249.90	204.12	45.79	5.458	
6,200.00	6,087.99	6,195.46	6,087.99	24.33	23.13	-179.46	190.19	995.23	249.90	203.87	46.04	5.428	
6,300.00	6,187.99	6,295.46	6,187.99	24.45	23.26	-179.46	190.19	995.23	249.90	203.62	46.29	5.399	
6,400.00	6,287.99	6,395.46	6,287.99	24.57	23.38	-179.46	190.19	995.23	249.90	203.36	46.54	5.369	
6,500.00	6,387.99	6,495.46	6,387.99	24.69	23.51	-179.46	190.19	995.23	249.90	203.11	46.80	5.340	
6,600.00	6,487.99	6,595.46	6,487.99	24.82	23.64	-179.46	190.19	995.23	249.90	202.85	47.06	5.311	
6,700.00	6,587.99	6,695.46	6,587.99	24.94	23.77	-179.46	190.19	995.23	249.90	202.58	47.32	5.281	
6,800.00	6,687.99	6,795.46	6,687.99	25.07	23.90	-179.46	190.19	995.23	249.90	202.32	47.59	5.252	
6,900.00	6,787.99	6,895.46	6,787.99	25.19	24.03	-179.46	190.19	995.23	249.90	202.05	47.85	5.222	
7,000.00	6,887.99	6,995.46	6,887.99	25.32	24.17	-179.46	190.19	995.23	249.90	201.78	48.13	5.193	
7,100.00	6,987.99	7,095.46	6,987.99	25.45	24.30	-179.46	190.19	995.23	249.90	201.51	48.40	5.163	
7,200.00	7,087.99	7,195.46	7,087.99	25.58	24.44	-179.46	190.19	995.23	249.90	201.23	48.68	5.134	
7,300.00	7,187.99	7,295.46	7,187.99	25.72	24.58	-179.46	190.19	995.23	249.90	200.95	48.95	5.105	
7,400.00	7,287.99	7,395.46	7,287.99	25.85	24.72	-179.46	190.19	995.23	249.90	200.67	49.24	5.076	
7,500.00	7,387.99	7,495.46	7,387.99	25.98	24.86	-179.46	190.19	995.23	249.90	200.39	49.52	5.047	
7,600.00	7,487.99	7,595.46	7,487.99	26.12	25.00	-179.46	190.19	995.23	249.90	200.10	49.81	5.018	
7,700.00	7,587.99	7,695.46	7,587.99	26.26	25.14	-179.46	190.19	995.23	249.90	199.81	50.09	4.989	
7,800.00	7,687.99	7,795.46	7,687.99	26.40	25.29	-179.46	190.19	995.23	249.90	199.52	50.38	4.960	
7,864.92	7,752.90	7,860.38	7,752.90	26.49	25.34	-179.46	190.19	995.23	249.90	199.37	50.53	4.946	
7,900.00	7,787.99	7,890.48	7,783.00	26.54	25.36	-179.46	190.19	995.23	249.95	199.35	50.60	4.939 SF	
7,912.01	7,800.00	7,890.48	7,783.00	26.54	25.36	-179.46	190.19	995.23	250.48	199.87	50.61	4.949	



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design Bruton 30-10 Pad - Bruton 30-16B - Existing - Existing													Offset Site Error:	0.00 usft
Survey Program: 128-MWD													Offset Well Error:	0.00 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		
0.00	0.00	0.00	18.00	0.00	0.00	141.61	-154.57	122.48	198.04					
100.00	100.00	81.87	99.87	0.09	0.09	141.51	-154.40	122.75	197.25	197.06	0.18	1,089.171		
200.00	199.98	181.26	199.26	0.31	0.25	75.52	-153.90	123.64	196.97	196.41	0.57	348.073		
300.00	299.84	280.00	297.99	0.55	0.46	76.75	-153.93	124.72	196.41	195.40	1.01	194.516		
315.31	315.11	293.80	311.79	0.59	0.49	76.99	-154.00	124.94	196.36	195.28	1.08	181.581 CC, ES		
400.00	399.45	371.00	388.93	0.80	0.67	78.66	-155.64	127.32	197.76	196.28	1.47	134.130		
500.00	498.70	462.00	479.65	1.10	0.90	81.34	-160.74	132.16	203.27	201.28	1.99	102.287		
600.00	597.47	554.00	571.01	1.44	1.15	84.87	-169.59	138.32	213.15	210.59	2.55	83.424		
700.00	695.62	640.58	656.52	1.83	1.43	88.49	-180.84	145.70	227.66	224.48	3.17	71.710		
800.00	793.36	729.78	744.08	2.26	1.77	92.21	-194.87	155.42	246.83	242.98	3.85	64.042		
900.00	891.10	820.15	832.25	2.70	2.17	95.31	-211.11	166.80	269.66	265.11	4.55	59.228		
1,000.00	988.84	906.84	916.24	3.15	2.59	97.65	-228.60	179.15	295.72	290.46	5.26	56.220		
1,100.00	1,086.57	1,000.89	1,006.83	3.60	3.06	99.63	-249.20	193.85	324.20	318.21	5.99	54.103		
1,200.00	1,184.31	1,091.64	1,094.01	4.05	3.54	101.10	-269.37	208.93	353.49	346.76	6.73	52.552		
1,300.00	1,282.05	1,178.02	1,176.52	4.50	4.03	102.20	-289.93	224.10	384.67	377.21	7.47	51.505		
1,400.00	1,379.78	1,269.25	1,263.23	4.95	4.57	103.21	-313.30	240.18	417.74	409.50	8.24	50.718		
1,500.00	1,477.52	1,359.46	1,348.76	5.41	5.11	103.98	-336.60	256.86	451.25	442.25	9.01	50.110		
1,600.00	1,575.25	1,449.76	1,434.09	5.86	5.68	104.62	-360.85	273.79	485.85	476.06	9.79	49.631		
1,700.00	1,672.99	1,541.90	1,520.91	6.31	6.29	105.09	-385.81	291.89	520.85	510.26	10.59	49.176		
1,800.00	1,770.73	1,631.16	1,604.85	6.77	6.87	105.45	-410.28	309.85	556.27	544.88	11.39	48.857		
1,900.00	1,868.46	1,717.61	1,686.02	7.23	7.43	105.86	-435.01	326.36	592.72	580.56	12.17	48.713		
2,000.00	1,966.20	1,803.41	1,766.32	7.68	8.01	106.23	-460.47	342.66	630.23	617.27	12.95	48.649		
2,100.00	2,063.94	1,891.27	1,848.08	8.14	8.63	106.49	-487.38	360.27	668.79	655.03	13.76	48.610		
2,200.00	2,161.67	1,988.26	1,938.50	8.59	9.28	106.76	-516.65	379.61	706.91	692.33	14.59	48.464		
2,300.00	2,259.41	2,071.95	2,016.26	9.05	9.85	106.92	-542.34	396.87	745.62	730.25	15.37	48.514		
2,400.00	2,357.15	2,168.92	2,106.07	9.51	10.55	106.99	-572.19	417.98	784.55	768.32	16.23	48.354		
2,500.00	2,454.88	2,272.20	2,202.10	9.96	11.22	107.06	-602.85	440.44	822.40	805.32	17.08	48.141		
2,600.00	2,552.62	2,365.96	2,289.70	10.42	11.82	107.20	-630.19	459.71	859.62	841.72	17.90	48.028		
2,700.00	2,650.35	2,453.29	2,371.21	10.88	12.41	107.32	-655.90	477.61	897.13	878.42	18.71	47.961		
2,800.00	2,748.09	2,538.14	2,450.23	11.33	13.02	107.44	-681.49	494.97	935.32	915.80	19.51	47.933		
2,900.00	2,845.83	2,628.90	2,534.59	11.79	13.67	107.54	-709.26	513.66	973.96	953.61	20.34	47.873 SF		



Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference Depths are relative to Well @ 7665.00usft

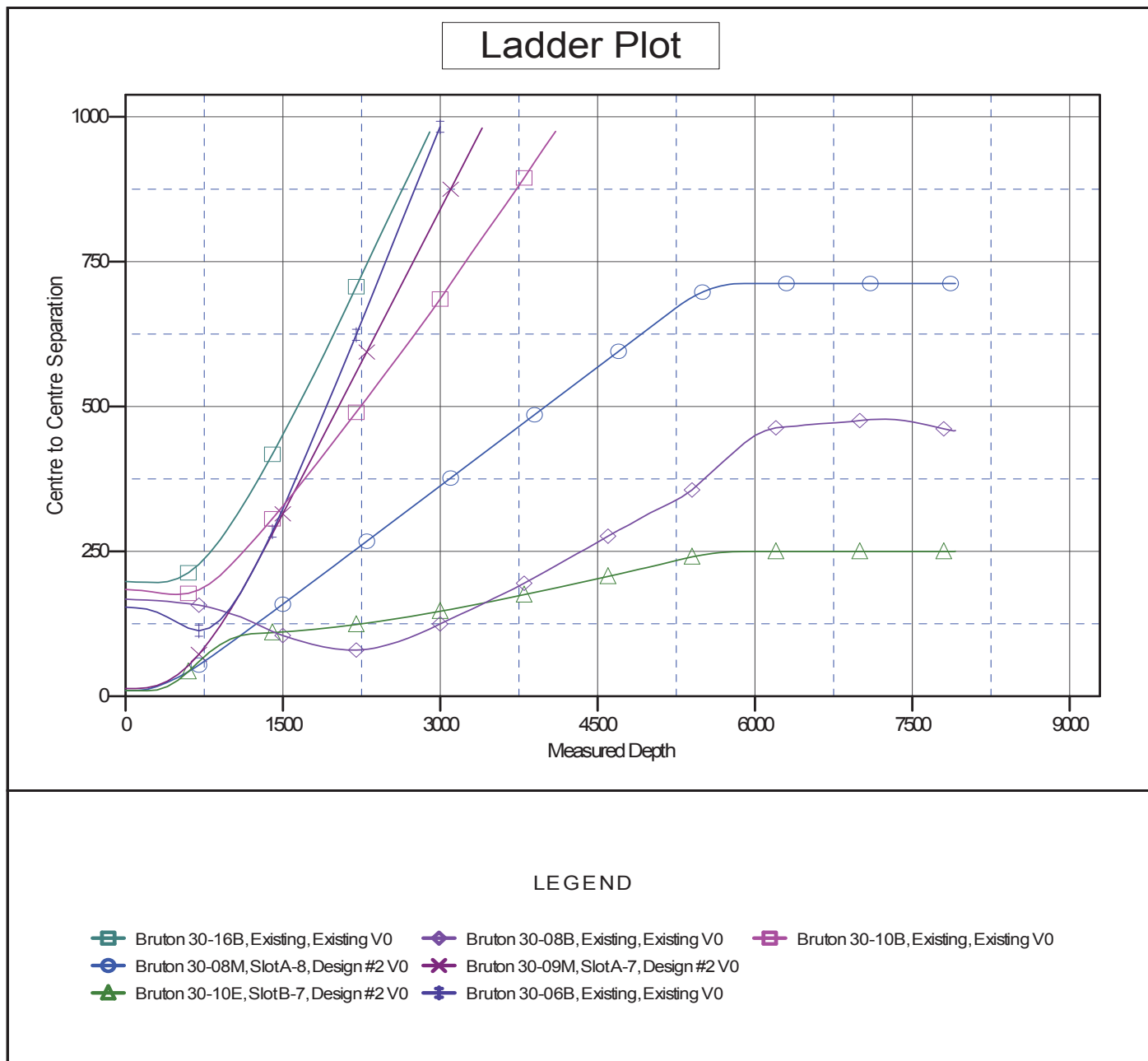
Offset Depths are relative to Offset Datum

Central Meridian is 105° 30' 0.000 W

Coordinates are relative to: Bruton 30-09E

Coordinate System is US State Plane 1983, Colorado Central Zone

Grid Convergence at Surface is: -1.46°





Archer

Anticollision Report

Company:	Piceance Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-09E
Project:	Mesa County, CO	TVD Reference:	Well @ 7665.00usft
Reference Site:	Bruton 30-10 Pad	MD Reference:	Well @ 7665.00usft
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Bruton 30-09E	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Slot B-8	Database:	EDMDBBW
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference Depths are relative to Well @ 7665.00usft

Offset Depths are relative to Offset Datum

Central Meridian is 105° 30' 0.000 W

Coordinates are relative to: Bruton 30-09E

Coordinate System is US State Plane 1983, Colorado Central Zone

Grid Convergence at Surface is: -1.46°

