



Laramie Energy, LLC

**Mesa County, CO
Gunderson 29-09 Pad
Piceance Federal 29-20E**

Wellbore #1

Design: Wellbore #1

Standard Survey Report

01 May, 2017





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 29-20E
Project:	Mesa County, CO	TVD Reference:	well @ 7561.0usft (H&P #522)
Site:	Gunderson 29-09 Pad	MD Reference:	well @ 7561.0usft (H&P #522)
Well:	Piceance Federal 29-20E	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Project	Mesa County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		Gunderson 29-09 Pad						
Site Position:		Northing:	1,523,671.42	usft	Latitude:	39.248803		
From:	Lat/Long	Easting:	2,352,063.75	usft	Longitude:	-107.788221		
Position Uncertainty:	0.0	usft	Slot Radius:	13-3/16	"	Grid Convergence:	-1.44	°

Well	Piceance Federal 29-20E					
Well Position	+N/-S	0.0 usft	Northing:	1,523,527.35 usft	Latitude:	39.248406
	+E/-W	0.0 usft	Easting:	2,352,031.36 usft	Longitude:	-107.788322
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,531.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	4/26/2017	9.59	65.42	51,425

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	180.46	

Survey Program	Date	5/1/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
112.0	8,132.0	MWD Surveys (Wellbore #1)	MWD default	MWD - Standard	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
112.0	0.50	265.00	112.0	0.0	-0.5	0.0	0.45	0.45	0.00	
First MWD Survey @ 112.0' / TVD										
204.0	0.70	283.50	204.0	0.1	-1.4	0.0	0.30	0.22	20.11	
296.0	0.60	276.30	296.0	0.2	-2.5	-0.2	0.14	-0.11	-7.83	
388.0	2.30	202.20	388.0	-1.4	-3.6	1.4	2.40	1.85	-80.54	
479.0	4.90	180.50	478.8	-7.0	-4.4	7.0	3.18	2.86	-23.85	
570.0	7.70	175.50	569.2	-17.0	-3.9	17.0	3.13	3.08	-5.49	
661.0	10.60	176.90	659.1	-31.4	-3.0	31.4	3.20	3.19	1.54	
753.0	14.20	177.50	748.9	-51.1	-2.0	51.1	3.92	3.91	0.65	
844.0	17.10	178.90	836.5	-75.7	-1.3	75.7	3.21	3.19	1.54	



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Design:	Wellbore #1	Database:	EDM5002

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)
936.0	20.20	179.80	923.7	-105.1	-1.0	105.1	3.38	3.37	0.98
1,030.0	24.00	180.30	1,010.7	-140.4	-1.0	140.4	4.05	4.04	0.53
1,124.0	25.40	180.00	1,096.1	-179.7	-1.1	179.7	1.50	1.49	-0.32
1,218.0	25.70	179.90	1,180.9	-220.3	-1.1	220.3	0.32	0.32	-0.11
1,312.0	25.50	180.50	1,265.7	-260.9	-1.2	260.9	0.35	-0.21	0.64
1,407.0	24.40	181.80	1,351.9	-300.9	-2.0	300.9	1.29	-1.16	1.37
1,501.0	24.40	180.40	1,437.5	-339.8	-2.8	339.8	0.62	0.00	-1.49
1,597.0	25.80	181.40	1,524.4	-380.5	-3.4	380.5	1.52	1.46	1.04
1,692.0	25.40	181.10	1,610.1	-421.5	-4.3	421.5	0.44	-0.42	-0.32
1,786.0	24.50	181.40	1,695.3	-461.2	-5.2	461.2	0.97	-0.96	0.32
1,880.0	25.30	180.30	1,780.6	-500.7	-5.8	500.8	0.98	0.85	-1.17
1,974.0	24.40	180.30	1,865.9	-540.2	-6.0	540.3	0.96	-0.96	0.00
2,068.0	25.30	179.30	1,951.1	-579.7	-5.8	579.8	1.06	0.96	-1.06
2,162.0	24.90	179.00	2,036.3	-619.6	-5.2	619.6	0.45	-0.43	-0.32
2,257.0	24.60	178.30	2,122.5	-659.4	-4.3	659.4	0.44	-0.32	-0.74
2,351.0	24.00	178.10	2,208.2	-698.0	-3.1	698.0	0.64	-0.64	-0.21
2,445.0	24.30	181.20	2,294.0	-736.5	-2.8	736.5	1.39	0.32	3.30
2,539.0	24.70	181.10	2,379.5	-775.4	-3.6	775.4	0.43	0.43	-0.11
2,634.0	25.10	180.80	2,465.7	-815.4	-4.3	815.4	0.44	0.42	-0.32
2,728.0	24.00	181.30	2,551.2	-854.5	-5.0	854.5	1.19	-1.17	0.53
2,822.0	24.50	181.20	2,636.9	-893.1	-5.8	893.1	0.53	0.53	-0.11
2,916.0	25.50	180.60	2,722.1	-932.8	-6.5	932.8	1.10	1.06	-0.64
3,011.0	25.00	180.30	2,808.0	-973.3	-6.8	973.3	0.54	-0.53	-0.32
3,105.0	24.90	179.60	2,893.2	-1,013.0	-6.8	1,013.0	0.33	-0.11	-0.74
3,199.0	24.60	179.20	2,978.6	-1,052.3	-6.3	1,052.3	0.37	-0.32	-0.43
3,294.0	24.10	179.70	3,065.2	-1,091.5	-6.0	1,091.5	0.57	-0.53	0.53
3,388.0	24.70	179.60	3,150.8	-1,130.3	-5.7	1,130.3	0.64	0.64	-0.11
3,482.0	25.80	179.60	3,235.8	-1,170.4	-5.4	1,170.4	1.17	1.17	0.00
3,577.0	25.60	179.00	3,321.4	-1,211.6	-4.9	1,211.6	0.35	-0.21	-0.63
3,671.0	25.10	179.00	3,406.3	-1,251.9	-4.2	1,251.8	0.53	-0.53	0.00
3,765.0	26.10	179.80	3,491.1	-1,292.5	-3.8	1,292.5	1.13	1.06	0.85
3,859.0	25.60	179.10	3,575.7	-1,333.4	-3.4	1,333.4	0.62	-0.53	-0.74
3,953.0	25.30	178.30	3,660.6	-1,373.8	-2.5	1,373.8	0.49	-0.32	-0.85
4,047.0	24.60	178.10	3,745.8	-1,413.5	-1.3	1,413.4	0.75	-0.74	-0.21
4,142.0	25.20	179.40	3,832.0	-1,453.4	-0.4	1,453.4	0.85	0.63	1.37
4,236.0	24.50	178.80	3,917.3	-1,492.9	0.2	1,492.9	0.79	-0.74	-0.64
4,330.0	25.00	180.70	4,002.6	-1,532.3	0.4	1,532.2	1.00	0.53	2.02
4,424.0	24.30	181.10	4,088.1	-1,571.5	-0.2	1,571.4	0.77	-0.74	0.43
4,519.0	25.00	180.40	4,174.4	-1,611.1	-0.7	1,611.1	0.80	0.74	-0.74
4,613.0	26.70	180.20	4,259.0	-1,652.1	-1.0	1,652.0	1.81	1.81	-0.21
4,707.0	26.00	179.40	4,343.2	-1,693.8	-0.8	1,693.8	0.83	-0.74	-0.85
4,801.0	25.00	179.30	4,428.1	-1,734.3	-0.4	1,734.2	1.06	-1.06	-0.11
4,895.0	23.80	180.00	4,513.7	-1,773.1	-0.1	1,773.1	1.31	-1.28	0.74



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4,990.0	23.60	178.60	4,600.7	-1,811.3	0.3	1,811.2	0.63	-0.21	-1.47	
5,084.0	20.60	180.40	4,687.8	-1,846.6	0.7	1,846.6	3.27	-3.19	1.91	
5,178.0	19.70	180.80	4,776.0	-1,879.0	0.4	1,879.0	0.97	-0.96	0.43	
5,272.0	17.70	180.30	4,865.0	-1,909.2	0.1	1,909.1	2.13	-2.13	-0.53	
5,367.0	15.90	178.70	4,956.0	-1,936.6	0.3	1,936.5	1.96	-1.89	-1.68	
5,461.0	15.80	178.90	5,046.4	-1,962.3	0.8	1,962.2	0.12	-0.11	0.21	
5,555.0	15.80	181.90	5,136.9	-1,987.9	0.6	1,987.8	0.87	0.00	3.19	
5,650.0	15.80	181.80	5,228.3	-2,013.7	-0.2	2,013.7	0.03	0.00	-0.11	
5,744.0	13.90	183.50	5,319.1	-2,037.8	-1.3	2,037.7	2.07	-2.02	1.81	
5,838.0	13.30	184.10	5,410.5	-2,059.8	-2.7	2,059.8	0.66	-0.64	0.64	
5,933.0	11.20	182.60	5,503.3	-2,080.0	-3.9	2,079.9	2.24	-2.21	-1.58	
6,027.0	9.80	186.00	5,595.7	-2,097.0	-5.2	2,097.0	1.63	-1.49	3.62	
6,121.0	9.30	187.30	5,688.4	-2,112.5	-7.0	2,112.5	0.58	-0.53	1.38	
6,215.0	7.30	185.20	5,781.4	-2,126.0	-8.5	2,126.0	2.15	-2.13	-2.23	
6,310.0	5.40	182.70	5,875.9	-2,136.5	-9.3	2,136.5	2.02	-2.00	-2.63	
6,404.0	4.80	186.10	5,969.5	-2,144.8	-9.9	2,144.8	0.71	-0.64	3.62	
6,498.0	3.00	189.50	6,063.3	-2,151.1	-10.7	2,151.2	1.93	-1.91	3.62	
6,592.0	1.80	169.80	6,157.2	-2,155.0	-10.9	2,155.0	1.53	-1.28	-20.96	
6,683.0	1.80	163.00	6,248.1	-2,157.8	-10.2	2,157.8	0.23	0.00	-7.47	
6,781.0	1.50	97.40	6,346.1	-2,159.4	-8.5	2,159.4	1.84	-0.31	-66.94	
6,875.0	0.30	41.10	6,440.1	-2,159.4	-7.1	2,159.4	1.44	-1.28	-59.89	
6,969.0	0.80	345.60	6,534.1	-2,158.6	-7.1	2,158.6	0.72	0.53	-59.04	
7,063.0	1.00	344.10	6,628.1	-2,157.2	-7.5	2,157.2	0.21	0.21	-1.60	
7,158.0	2.40	356.40	6,723.0	-2,154.4	-7.8	2,154.4	1.51	1.47	12.95	
7,252.0	1.90	332.20	6,817.0	-2,151.0	-8.7	2,151.0	1.09	-0.53	-25.74	
7,346.0	1.90	316.10	6,910.9	-2,148.5	-10.5	2,148.6	0.57	0.00	-17.13	
7,441.0	1.80	290.90	7,005.9	-2,146.9	-13.0	2,146.9	0.86	-0.11	-26.53	
7,535.0	2.20	264.80	7,099.8	-2,146.5	-16.1	2,146.6	1.05	0.43	-27.77	
7,629.0	2.80	257.10	7,193.7	-2,147.2	-20.2	2,147.3	0.73	0.64	-8.19	
7,724.0	2.20	272.30	7,288.6	-2,147.6	-24.3	2,147.8	0.94	-0.63	16.00	
7,818.0	2.00	276.70	7,382.6	-2,147.4	-27.7	2,147.5	0.27	-0.21	4.68	
7,912.0	2.10	269.00	7,476.5	-2,147.2	-31.0	2,147.4	0.31	0.11	-8.19	
8,006.0	2.20	265.50	7,570.4	-2,147.4	-34.6	2,147.6	0.18	0.11	-3.72	
8,084.0	2.30	259.60	7,648.4	-2,147.8	-37.6	2,148.0	0.32	0.13	-7.56	
8,132.0	2.30	259.60	7,696.3	-2,148.1	-39.5	2,148.4	0.00	0.00	0.00	
TD @ 8132.0' MD / 7696.3' TVD										



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Design:	Wellbore #1	Database:	EDM5002

Design Annotations

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		+N/-S (usft)	+E/-W (usft)	
112.0	112.0	0.0	-0.5	First MWD Survey @ 112.0' / TVD
8,132.0	7,696.3	-2,148.1	-39.5	TD @ 8132.0' MD / 7696.3' TVD