



Laramie Energy, LLC

**Mesa County, CO
Gunderson 29-09 Pad
Piceance Federal 29-22E**

Wellbore #1

Design: Wellbore #1

Standard Survey Report

20 April, 2017





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 29-22E
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 29-22E	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 29-22E					
Well Position	+N/-S	0.0 usft	Northing:	1,523,529.12 usft	Latitude:	39.248411
	+E/-W	0.0 usft	Easting:	2,352,041.63 usft	Longitude:	-107.788286
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	4/16/2017	9.59	65.42	51,428

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	208.12	

Survey Program	Date	4/20/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
110.0	8,410.0	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
110.0	2.00	226.60	110.0	-1.3	-1.4	1.8	1.82	1.82	0.00
First MWD Survey @ 110.0' MD / TVD									
202.0	4.70	222.80	201.8	-5.2	-5.1	7.0	2.94	2.93	-4.13
294.0	7.80	213.40	293.3	-13.2	-11.1	16.9	3.54	3.37	-10.22
386.0	10.20	209.30	384.1	-25.5	-18.5	31.2	2.70	2.61	-4.46
477.0	13.10	209.20	473.2	-41.5	-27.5	49.6	3.19	3.19	-0.11
568.0	15.30	209.50	561.4	-61.0	-38.5	71.9	2.42	2.42	0.33
659.0	18.00	208.40	648.6	-83.8	-51.1	98.0	2.99	2.97	-1.21
751.0	20.50	207.90	735.5	-110.5	-65.4	128.3	2.72	2.72	-0.54
842.0	20.90	207.80	820.6	-139.0	-80.4	160.5	0.44	0.44	-0.11



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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)
934.0	23.70	208.00	905.7	-169.8	-96.7	195.4	3.04	3.04	0.22
1,028.0	26.80	208.30	990.7	-205.2	-115.7	235.5	3.30	3.30	0.32
1,122.0	29.40	207.60	1,073.6	-244.3	-136.4	279.7	2.79	2.77	-0.74
1,217.0	31.80	208.50	1,155.4	-287.0	-159.1	328.1	2.57	2.53	0.95
1,311.0	32.30	208.80	1,235.1	-330.7	-183.1	378.0	0.56	0.53	0.32
1,405.0	33.10	208.40	1,314.2	-375.3	-207.4	428.8	0.88	0.85	-0.43
1,499.0	34.90	209.10	1,392.1	-421.4	-232.7	481.3	1.96	1.91	0.74
1,620.0	34.90	207.90	1,491.3	-482.2	-265.7	550.5	0.57	0.00	-0.99
1,715.0	34.20	207.40	1,569.6	-530.0	-290.7	604.4	0.79	-0.74	-0.53
1,809.0	33.50	206.90	1,647.6	-576.5	-314.6	656.8	0.80	-0.74	-0.53
1,903.0	34.40	208.30	1,725.6	-623.1	-338.9	709.2	1.27	0.96	1.49
1,998.0	33.90	207.90	1,804.2	-670.1	-364.0	762.6	0.58	-0.53	-0.42
2,092.0	33.50	207.30	1,882.4	-716.3	-388.2	814.7	0.55	-0.43	-0.64
2,186.0	33.00	206.60	1,961.1	-762.3	-411.6	866.3	0.67	-0.53	-0.74
2,280.0	33.40	208.90	2,039.7	-807.8	-435.5	917.7	1.41	0.43	2.45
2,375.0	34.50	209.10	2,118.5	-854.2	-461.2	970.8	1.16	1.16	0.21
2,469.0	33.20	208.60	2,196.6	-900.1	-486.5	1,023.1	1.41	-1.38	-0.53
2,563.0	32.00	208.30	2,275.8	-944.6	-510.6	1,073.8	1.29	-1.28	-0.32
2,658.0	33.00	208.40	2,355.9	-989.5	-534.9	1,124.8	1.05	1.05	0.11
2,752.0	34.00	208.80	2,434.3	-1,035.1	-559.7	1,176.7	1.09	1.06	0.43
2,846.0	32.40	208.50	2,512.9	-1,080.2	-584.4	1,228.2	1.71	-1.70	-0.32
2,940.0	33.80	209.80	2,591.7	-1,125.0	-609.4	1,279.5	1.67	1.49	1.38
3,034.0	32.50	209.20	2,670.4	-1,169.8	-634.7	1,330.9	1.43	-1.38	-0.64
3,128.0	34.70	208.80	2,748.7	-1,215.3	-659.9	1,382.9	2.35	2.34	-0.43
3,223.0	33.90	208.20	2,827.1	-1,262.3	-685.5	1,436.4	0.91	-0.84	-0.63
3,317.0	33.10	208.10	2,905.5	-1,308.1	-710.0	1,488.3	0.85	-0.85	-0.11
3,411.0	34.50	208.90	2,983.6	-1,354.0	-734.9	1,540.6	1.56	1.49	0.85
3,506.0	33.60	208.40	3,062.4	-1,400.7	-760.4	1,593.8	0.99	-0.95	-0.53
3,600.0	35.10	208.40	3,140.0	-1,447.3	-785.6	1,646.8	1.60	1.60	0.00
3,694.0	34.20	207.70	3,217.3	-1,494.5	-810.8	1,700.2	1.05	-0.96	-0.74
3,788.0	33.60	207.10	3,295.3	-1,541.1	-834.9	1,752.7	0.73	-0.64	-0.64
3,882.0	34.50	207.20	3,373.2	-1,587.9	-858.9	1,805.3	0.96	0.96	0.11
3,976.0	33.70	207.00	3,451.0	-1,634.8	-882.9	1,858.0	0.86	-0.85	-0.21
4,071.0	34.70	208.20	3,529.6	-1,682.1	-907.7	1,911.4	1.27	1.05	1.26
4,165.0	33.60	207.50	3,607.4	-1,728.8	-932.3	1,964.1	1.24	-1.17	-0.74
4,259.0	34.50	208.10	3,685.3	-1,775.3	-956.9	2,016.8	1.02	0.96	0.64
4,353.0	33.90	207.70	3,763.0	-1,822.0	-981.6	2,069.6	0.68	-0.64	-0.43
4,448.0	33.10	207.30	3,842.2	-1,868.5	-1,005.8	2,122.0	0.87	-0.84	-0.42
4,542.0	33.90	207.50	3,920.6	-1,914.6	-1,029.7	2,173.9	0.86	0.85	0.21
4,636.0	32.60	206.40	3,999.2	-1,960.5	-1,053.1	2,225.4	1.52	-1.38	-1.17
4,731.0	31.40	205.50	4,079.8	-2,005.8	-1,075.1	2,275.7	1.36	-1.26	-0.95
4,825.0	30.00	205.50	4,160.6	-2,049.1	-1,095.8	2,323.7	1.49	-1.49	0.00
4,919.0	29.90	208.00	4,242.1	-2,091.0	-1,116.9	2,370.6	1.33	-0.11	2.66



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5,014.0	28.90	207.90	4,324.8	-2,132.2	-1,138.7	2,417.2	1.05	-1.05	-0.11	
5,108.0	27.60	207.40	4,407.6	-2,171.6	-1,159.4	2,461.7	1.41	-1.38	-0.53	
5,202.0	25.90	207.00	4,491.6	-2,209.2	-1,178.7	2,504.0	1.82	-1.81	-0.43	
5,296.0	25.60	209.20	4,576.2	-2,245.3	-1,198.0	2,544.8	1.07	-0.32	2.34	
5,391.0	23.60	208.10	4,662.6	-2,279.9	-1,216.9	2,584.4	2.16	-2.11	-1.16	
5,485.0	22.20	208.10	4,749.2	-2,312.2	-1,234.2	2,621.0	1.49	-1.49	0.00	
5,579.0	20.50	207.00	4,836.8	-2,342.5	-1,250.0	2,655.2	1.86	-1.81	-1.17	
5,673.0	18.70	206.20	4,925.3	-2,370.7	-1,264.1	2,686.7	1.94	-1.91	-0.85	
5,767.0	16.90	210.50	5,014.8	-2,396.0	-1,277.7	2,715.4	2.37	-1.91	4.57	
5,861.0	15.50	209.20	5,105.1	-2,418.8	-1,290.8	2,741.6	1.54	-1.49	-1.38	
5,956.0	13.10	210.60	5,197.1	-2,439.1	-1,302.4	2,765.1	2.55	-2.53	1.47	
6,050.0	9.90	215.10	5,289.2	-2,454.9	-1,312.5	2,783.7	3.53	-3.40	4.79	
6,144.0	7.60	221.50	5,382.1	-2,466.2	-1,321.3	2,797.8	2.65	-2.45	6.81	
6,239.0	4.40	224.40	5,476.6	-2,473.5	-1,328.0	2,807.4	3.38	-3.37	3.05	
6,333.0	0.30	236.40	5,570.5	-2,476.2	-1,330.7	2,811.1	4.37	-4.36	12.77	
6,427.0	0.40	161.00	5,664.5	-2,476.6	-1,330.8	2,811.5	0.46	0.11	-80.21	
6,521.0	0.80	173.80	5,758.5	-2,477.6	-1,330.6	2,812.3	0.45	0.43	13.62	
6,616.0	0.80	189.40	5,853.5	-2,478.9	-1,330.7	2,813.5	0.23	0.00	16.42	
6,710.0	1.30	194.60	5,947.5	-2,480.6	-1,331.1	2,815.1	0.54	0.53	5.53	
6,804.0	1.80	194.60	6,041.4	-2,483.1	-1,331.7	2,817.6	0.53	0.53	0.00	
6,899.0	2.10	192.10	6,136.4	-2,486.2	-1,332.4	2,820.7	0.33	0.32	-2.63	
6,993.0	2.00	188.60	6,230.3	-2,489.5	-1,333.0	2,823.9	0.17	-0.11	-3.72	
7,087.0	1.90	198.40	6,324.3	-2,492.6	-1,333.8	2,827.0	0.37	-0.11	10.43	
7,181.0	2.00	192.60	6,418.2	-2,495.7	-1,334.6	2,830.1	0.24	0.11	-6.17	
7,275.0	2.20	193.30	6,512.1	-2,499.0	-1,335.4	2,833.5	0.21	0.21	0.74	
7,369.0	2.20	200.80	6,606.1	-2,502.5	-1,336.5	2,837.0	0.31	0.00	7.98	
7,464.0	3.20	194.60	6,701.0	-2,506.8	-1,337.8	2,841.4	1.10	1.05	-6.53	
7,558.0	2.10	238.00	6,794.9	-2,510.2	-1,339.9	2,845.4	2.35	-1.17	46.17	
7,652.0	0.90	183.30	6,888.8	-2,511.9	-1,341.4	2,847.6	1.85	-1.28	-58.19	
7,746.0	1.30	191.70	6,982.8	-2,513.6	-1,341.7	2,849.3	0.46	0.43	8.94	
7,841.0	1.90	192.90	7,077.8	-2,516.2	-1,342.2	2,851.8	0.63	0.63	1.26	
7,935.0	3.00	201.00	7,171.7	-2,520.0	-1,343.5	2,855.8	1.22	1.17	8.62	
8,029.0	3.10	191.10	7,265.6	-2,524.8	-1,344.8	2,860.7	0.57	0.11	-10.53	
8,123.0	2.20	183.30	7,359.5	-2,529.1	-1,345.4	2,864.7	1.03	-0.96	-8.30	
8,217.0	1.90	187.70	7,453.4	-2,532.5	-1,345.7	2,867.8	0.36	-0.32	4.68	
8,311.0	2.10	189.40	7,547.3	-2,535.7	-1,346.2	2,870.9	0.22	0.21	1.81	
8,355.0	2.10	198.80	7,591.3	-2,537.3	-1,346.6	2,872.5	0.78	0.00	21.36	
8,410.0	2.10	198.80	7,646.3	-2,539.2	-1,347.3	2,874.5	0.00	0.00	0.00	
TD @ 8410' MD / 7646' TVD										



Survey Report



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Design:	Wellbore #1	Database:	EDM5002

Design Annotations

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		+N/-S (usft)	+E/-W (usft)	
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8,410.0	7,646.3	-2,539.2	-1,347.3	TD @ 8410' MD / 7646' TVD