



Laramie Energy, LLC

**Mesa County, CO
Gunderson 29-09 Pad
Piceance Federal 29-19E**

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

06 May, 2017





Survey Report - Geographic



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Piceance Federal 29-19E
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 29-19E	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 29-19E					
Well Position	+N/-S	0.0 usft	Northing:	1,523,539.27 usft	Latitude:	39.248439
	+E/-W	0.0 usft	Easting:	2,352,040.32 usft	Longitude:	-107.788292
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	5/2/2017	9.59	65.42	51,423

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	180.50	

Survey Program	Date	5/6/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
112.0	8,081.0	MWD (Wellbore #1)	MWD default	MWD - Standard	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	1,523,539.27	2,352,040.32	39.248439	-107.788292
112.0	0.50	73.90	112.0	0.1	0.5	1,523,539.39	2,352,040.79	39.248439	-107.788290
First MWD Survey @ 112' MD / TVD									
204.0	0.70	68.50	204.0	0.5	1.4	1,523,539.69	2,352,041.71	39.248440	-107.788287
296.0	0.80	74.20	296.0	0.8	2.5	1,523,540.04	2,352,042.86	39.248441	-107.788283
388.0	1.10	158.30	388.0	0.2	3.5	1,523,539.37	2,352,043.78	39.248439	-107.788280
479.0	4.00	184.80	478.9	-3.8	3.5	1,523,535.40	2,352,043.74	39.248429	-107.788280
570.0	7.60	187.50	569.4	-12.9	2.5	1,523,526.29	2,352,042.46	39.248403	-107.788283
661.0	10.90	185.20	659.2	-27.5	0.9	1,523,511.80	2,352,040.53	39.248364	-107.788289
753.0	13.80	179.70	749.1	-47.1	0.2	1,523,492.18	2,352,039.30	39.248310	-107.788291
845.0	14.80	180.30	838.2	-69.8	0.2	1,523,469.47	2,352,038.73	39.248247	-107.788291
939.0	16.00	177.30	928.8	-94.8	0.7	1,523,444.51	2,352,038.65	39.248179	-107.788289



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Site:	Gunderson 29-09 Pad	MD Reference:	well @ 7561.0usft (H&P #522)
Well:	Piceance Federal 29-19E	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,033.0	16.60	177.40	1,019.1	-121.1	1.9	1,523,418.14	2,352,039.20	39.248106	-107.788285
1,127.0	19.10	180.00	1,108.5	-149.9	2.5	1,523,389.33	2,352,039.08	39.248027	-107.788283
1,221.0	21.70	182.40	1,196.6	-182.7	1.8	1,523,356.61	2,352,037.53	39.247937	-107.788286
1,315.0	22.50	183.30	1,283.7	-218.0	0.1	1,523,321.35	2,352,034.88	39.247840	-107.788292
1,409.0	23.20	182.40	1,370.3	-254.4	-1.8	1,523,284.95	2,352,032.15	39.247740	-107.788298
1,498.0	24.00	180.70	1,451.9	-290.1	-2.7	1,523,249.37	2,352,030.30	39.247643	-107.788302
1,596.0	24.70	180.40	1,541.2	-330.5	-3.1	1,523,208.99	2,352,028.90	39.247532	-107.788303
1,690.0	24.20	179.00	1,626.8	-369.4	-2.9	1,523,170.09	2,352,028.12	39.247425	-107.788302
1,784.0	23.90	181.60	1,712.6	-407.7	-3.1	1,523,131.81	2,352,026.96	39.247320	-107.788303
1,879.0	23.20	180.80	1,799.7	-445.6	-3.9	1,523,093.90	2,352,025.20	39.247215	-107.788306
1,973.0	22.50	180.00	1,886.3	-482.1	-4.2	1,523,057.41	2,352,024.02	39.247115	-107.788307
2,067.0	23.80	182.20	1,972.7	-519.1	-4.9	1,523,020.50	2,352,022.37	39.247014	-107.788309
2,161.0	22.80	182.00	2,059.1	-556.2	-6.2	1,522,983.39	2,352,020.07	39.246912	-107.788314
2,256.0	24.30	181.70	2,146.2	-594.1	-7.5	1,522,945.50	2,352,017.89	39.246808	-107.788318
2,350.0	23.20	181.60	2,232.2	-632.0	-8.6	1,522,907.70	2,352,015.85	39.246704	-107.788322
2,444.0	21.90	180.60	2,319.0	-668.0	-9.3	1,522,871.69	2,352,014.24	39.246605	-107.788325
2,538.0	23.70	181.30	2,405.7	-704.4	-9.9	1,522,835.30	2,352,012.71	39.246505	-107.788327
2,632.0	22.50	180.80	2,492.1	-741.3	-10.5	1,522,798.45	2,352,011.10	39.246404	-107.788329
2,727.0	21.00	181.20	2,580.4	-776.5	-11.2	1,522,763.28	2,352,009.60	39.246307	-107.788331
2,821.0	22.60	180.90	2,667.6	-811.4	-11.8	1,522,728.41	2,352,008.09	39.246211	-107.788334
2,915.0	21.60	180.30	2,754.7	-846.8	-12.2	1,522,693.07	2,352,006.82	39.246114	-107.788335
3,009.0	24.20	180.30	2,841.3	-883.4	-12.4	1,522,656.51	2,352,005.71	39.246014	-107.788336
3,104.0	23.60	179.20	2,928.2	-921.8	-12.2	1,522,618.03	2,352,004.90	39.245908	-107.788335
3,198.0	23.20	178.30	3,014.4	-959.2	-11.4	1,522,580.70	2,352,004.78	39.245805	-107.788332
3,292.0	22.40	178.10	3,101.1	-995.6	-10.2	1,522,544.27	2,352,005.00	39.245705	-107.788328
3,387.0	24.00	179.60	3,188.4	-1,033.0	-9.5	1,522,506.85	2,352,004.79	39.245603	-107.788326
3,481.0	23.00	179.70	3,274.6	-1,070.5	-9.3	1,522,469.38	2,352,004.08	39.245500	-107.788325
3,575.0	22.50	179.00	3,361.3	-1,106.8	-8.9	1,522,433.03	2,352,003.57	39.245400	-107.788323
3,669.0	22.00	178.10	3,448.3	-1,142.4	-8.0	1,522,397.44	2,352,003.58	39.245302	-107.788320
3,763.0	22.70	180.40	3,535.2	-1,178.1	-7.5	1,522,361.71	2,352,003.13	39.245204	-107.788318
3,858.0	22.20	179.70	3,623.0	-1,214.4	-7.5	1,522,325.44	2,352,002.19	39.245105	-107.788319
3,952.0	21.80	178.70	3,710.2	-1,249.6	-7.1	1,522,290.23	2,352,001.79	39.245008	-107.788317
4,046.0	22.90	182.00	3,797.1	-1,285.3	-7.3	1,522,254.52	2,352,000.65	39.244910	-107.788318
4,140.0	22.20	180.40	3,883.9	-1,321.4	-8.1	1,522,218.51	2,351,998.98	39.244811	-107.788320
4,235.0	23.20	183.20	3,971.6	-1,358.0	-9.2	1,522,181.92	2,351,996.88	39.244710	-107.788325
4,329.0	22.10	182.10	4,058.3	-1,394.2	-10.9	1,522,145.82	2,351,994.29	39.244611	-107.788330
4,423.0	23.00	183.10	4,145.1	-1,430.2	-12.6	1,522,109.86	2,351,991.74	39.244512	-107.788336
4,517.0	22.80	182.20	4,231.7	-1,466.7	-14.2	1,522,073.38	2,351,989.13	39.244412	-107.788342
4,612.0	22.30	181.60	4,319.5	-1,503.1	-15.5	1,522,037.01	2,351,987.01	39.244312	-107.788347
4,706.0	21.50	181.10	4,406.7	-1,538.2	-16.3	1,522,001.99	2,351,985.29	39.244216	-107.788349
4,800.0	21.80	182.70	4,494.1	-1,572.8	-17.4	1,521,967.37	2,351,983.27	39.244121	-107.788354
4,894.0	23.20	183.00	4,580.9	-1,608.8	-19.2	1,521,931.50	2,351,980.57	39.244022	-107.788360
4,988.0	24.00	181.40	4,667.0	-1,646.4	-20.7	1,521,893.95	2,351,978.19	39.243919	-107.788365
5,083.0	24.60	179.80	4,753.6	-1,685.5	-21.1	1,521,854.88	2,351,976.80	39.243811	-107.788366
5,177.0	22.00	179.00	4,839.9	-1,722.6	-20.7	1,521,817.71	2,351,976.24	39.243709	-107.788365
5,271.0	19.70	179.40	4,927.8	-1,756.1	-20.2	1,521,784.26	2,351,975.87	39.243617	-107.788363
5,366.0	18.90	179.60	5,017.4	-1,787.5	-19.9	1,521,752.86	2,351,975.36	39.243531	-107.788362
5,460.0	16.70	179.00	5,106.9	-1,816.2	-19.6	1,521,724.13	2,351,974.98	39.243452	-107.788361
5,554.0	16.00	178.10	5,197.1	-1,842.7	-18.9	1,521,697.67	2,351,974.97	39.243380	-107.788359
5,649.0	14.40	179.20	5,288.8	-1,867.6	-18.3	1,521,672.77	2,351,974.95	39.243311	-107.788357
5,743.0	12.40	178.90	5,380.3	-1,889.3	-18.0	1,521,650.98	2,351,974.75	39.243252	-107.788355
5,837.0	10.00	181.90	5,472.5	-1,907.6	-18.1	1,521,632.74	2,351,974.22	39.243201	-107.788356
5,931.0	7.70	176.10	5,565.3	-1,922.0	-17.9	1,521,618.30	2,351,974.01	39.243162	-107.788355
6,026.0	5.50	170.10	5,659.7	-1,932.9	-16.7	1,521,607.44	2,351,974.95	39.243132	-107.788351
6,120.0	3.40	172.10	5,753.4	-1,940.1	-15.5	1,521,600.21	2,351,975.93	39.243112	-107.788347



Survey Report - Geographic



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Site:	Gunderson 29-09 Pad	MD Reference:	well @ 7561.0usft (H&P #522)
Well:	Piceance Federal 29-19E	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,214.0	0.50	190.00	5,847.3	-1,943.2	-15.2	1,521,597.04	2,351,976.16	39.243104	-107.788346
6,308.0	0.60	216.30	5,941.3	-1,944.0	-15.6	1,521,596.25	2,351,975.78	39.243101	-107.788347
6,404.0	1.10	192.30	6,037.3	-1,945.3	-16.1	1,521,594.95	2,351,975.25	39.243098	-107.788349
6,498.0	1.30	203.00	6,131.3	-1,947.2	-16.7	1,521,593.11	2,351,974.60	39.243093	-107.788351
6,592.0	2.50	229.20	6,225.3	-1,949.5	-18.7	1,521,590.84	2,351,972.57	39.243086	-107.788358
6,686.0	1.80	214.90	6,319.2	-1,952.1	-21.0	1,521,588.35	2,351,970.11	39.243079	-107.788366
6,781.0	1.30	194.60	6,414.2	-1,954.3	-22.2	1,521,586.11	2,351,968.93	39.243073	-107.788370
6,875.0	0.70	129.70	6,508.1	-1,955.7	-22.0	1,521,584.71	2,351,969.07	39.243069	-107.788370
6,969.0	0.90	57.00	6,602.1	-1,955.7	-20.9	1,521,584.72	2,351,970.13	39.243069	-107.788366
7,063.0	0.70	23.30	6,696.1	-1,954.8	-20.1	1,521,585.62	2,351,971.00	39.243072	-107.788363
7,157.0	0.70	338.20	6,790.1	-1,953.7	-20.1	1,521,586.68	2,351,971.04	39.243075	-107.788363
7,252.0	0.90	293.30	6,885.1	-1,952.9	-21.0	1,521,587.54	2,351,970.16	39.243077	-107.788366
7,346.0	1.50	276.00	6,979.1	-1,952.5	-22.9	1,521,588.01	2,351,968.27	39.243078	-107.788373
7,441.0	1.80	276.40	7,074.1	-1,952.2	-25.6	1,521,588.37	2,351,965.56	39.243079	-107.788382
7,535.0	2.10	256.80	7,168.0	-1,952.4	-28.7	1,521,588.22	2,351,962.41	39.243078	-107.788393
7,629.0	1.90	268.30	7,261.9	-1,952.8	-32.0	1,521,587.87	2,351,959.16	39.243077	-107.788405
7,723.0	1.90	264.30	7,355.9	-1,953.0	-35.1	1,521,587.74	2,351,956.05	39.243077	-107.788416
7,818.0	2.10	241.70	7,450.8	-1,954.0	-38.2	1,521,586.84	2,351,952.93	39.243074	-107.788427
7,912.0	2.20	231.70	7,544.8	-1,955.9	-41.1	1,521,584.98	2,351,949.95	39.243069	-107.788437
8,006.0	2.30	232.70	7,638.7	-1,958.2	-44.0	1,521,582.79	2,351,946.98	39.243062	-107.788447
8,033.0	2.60	231.90	7,665.7	-1,958.9	-44.9	1,521,582.11	2,351,946.05	39.243061	-107.788451
8,081.0	2.60	231.90	7,713.6	-1,960.3	-46.7	1,521,580.81	2,351,944.30	39.243057	-107.788457
Projection to TD @ 8081.0' MD / 7713.6' TVD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
112.0	112.0	0.1	0.5	First MWD Survey @ 112' MD / TVD
8,081.0	7,713.6	-1,960.3	-46.7	Projection to TD @ 8081.0' MD / 7713.6' TVD

Checked By: _____	Approved By: _____	Date: _____
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