



# **Laramie Energy, LLC**

**Garfield County, CO**

**CC 0697-03-07 Pad**

**CC Federal 0697-03-08E**

**Wellbore #1**

**Design: Wellbore #1**

## **Survey Report - Geographic**

**06 July, 2018**





## Survey Report - Geographic



<b>Company:</b>	Laramie Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well CC Federal 0697-03-08E
<b>Project:</b>	Garfield County, CO	<b>TVD Reference:</b>	WELL @ 8458.0usft (30' RKB)
<b>Site:</b>	CC 0697-03-07 Pad	<b>MD Reference:</b>	WELL @ 8458.0usft (30' RKB)
<b>Well:</b>	CC Federal 0697-03-08E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db

<b>Project</b>	Garfield County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Central Zone		

Site		CC 0697-03-07 Pad						
Site Position:		Northing:	1,638,132.66	usft	Latitude:	39.554247		
From:	Lat/Long	Easting:	2,236,874.96	usft	Longitude:	-108.206835		
Position Uncertainty:	0.0	usft	Slot Radius:	13-3/16	"	Grid Convergence:	-1.71	°

Well	CC Federal 0697-03-08E					
Well Position	+N/-S	0.0 usft	Northing:	1,639,643.60 usft	Latitude:	39.558437
	+E/-W	0.0 usft	Easting:	2,237,404.35 usft	Longitude:	-108.205118
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	8,428.0 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	User Defined	6/15/2018	9.62	65.59	51,401.60000000

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	69.70	

<b>Survey Program</b>	<b>Date</b>	7/6/2018			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
230.0	9,807.0	QES MWD Surveys (Wellbore #1)	MWD default	MWD - Standard	

<b>Survey</b>									
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Map Northing (usft)</b>	<b>Map Easting (usft)</b>	<b>Latitude</b>	<b>Longitude</b>
0.0	0.00	0.00	0.0	0.0	0.0	1,639,643.60	2,237,404.35	39.558437	-108.205118
230.0	0.50	27.40	230.0	0.9	0.5	1,639,644.48	2,237,404.84	39.558439	-108.205117
<b>First MWD Survey @ 230.0' MD / 230.0' TVD</b>									
322.0	0.50	6.10	322.0	1.6	0.7	1,639,645.22	2,237,405.09	39.558441	-108.205116
415.0	0.70	23.90	415.0	2.6	1.0	1,639,646.14	2,237,405.39	39.558444	-108.205115
506.0	1.10	48.90	506.0	3.7	1.8	1,639,647.19	2,237,406.30	39.558447	-108.205112
597.0	2.30	63.90	596.9	5.0	4.1	1,639,648.50	2,237,408.64	39.558450	-108.205103
687.0	4.70	75.90	686.8	6.7	9.3	1,639,650.04	2,237,413.89	39.558455	-108.205085
778.0	7.50	79.80	777.2	8.7	18.8	1,639,651.72	2,237,423.40	39.558460	-108.205051
869.0	10.10	76.70	867.2	11.6	32.4	1,639,654.20	2,237,437.10	39.558468	-108.205003
960.0	13.60	71.10	956.2	16.9	50.3	1,639,658.97	2,237,455.14	39.558483	-108.204940
1,051.0	15.20	63.60	1,044.4	25.6	71.1	1,639,667.11	2,237,476.20	39.558507	-108.204866



# Survey Report - Geographic



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<b>Project:</b>	Garfield County, CO	<b>TVD Reference:</b>	WELL @ 8458.0usft (30' RKB)
<b>Site:</b>	CC 0697-03-07 Pad	<b>MD Reference:</b>	WELL @ 8458.0usft (30' RKB)
<b>Well:</b>	CC Federal 0697-03-08E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,146.0	16.00	61.70	1,135.9	37.4	93.8	1,639,678.18	2,237,499.23	39.558539	-108.204785
1,240.0	15.30	62.60	1,226.4	49.2	116.2	1,639,689.36	2,237,521.99	39.558572	-108.204706
1,335.0	13.60	66.70	1,318.4	59.4	137.6	1,639,698.90	2,237,543.67	39.558600	-108.204630
1,430.0	10.80	68.90	1,411.2	67.0	156.2	1,639,705.97	2,237,562.45	39.558621	-108.204564
1,524.0	10.20	70.40	1,503.6	73.0	172.2	1,639,711.45	2,237,578.68	39.558637	-108.204507
1,618.0	10.50	71.90	1,596.1	78.5	188.2	1,639,716.43	2,237,594.82	39.558652	-108.204451
1,713.0	9.10	68.80	1,689.7	83.9	203.5	1,639,721.38	2,237,610.21	39.558667	-108.204397
1,808.0	8.00	64.60	1,783.7	89.4	216.4	1,639,726.54	2,237,623.34	39.558682	-108.204351
1,903.0	8.40	76.20	1,877.7	93.9	229.1	1,639,730.65	2,237,636.18	39.558694	-108.204305
1,998.0	9.00	81.40	1,971.6	96.7	243.2	1,639,733.00	2,237,650.34	39.558702	-108.204256
2,091.0	9.50	73.80	2,063.4	99.9	257.8	1,639,735.79	2,237,665.00	39.558711	-108.204204
2,185.0	8.70	65.30	2,156.2	105.0	271.7	1,639,740.51	2,237,679.05	39.558725	-108.204155
2,279.0	8.60	63.80	2,249.2	111.1	284.5	1,639,746.20	2,237,691.99	39.558742	-108.204109
2,374.0	8.60	68.10	2,343.1	116.9	297.4	1,639,751.60	2,237,705.12	39.558758	-108.204063
2,468.0	8.90	69.10	2,436.0	122.1	310.7	1,639,756.41	2,237,718.58	39.558772	-108.204016
2,531.0	8.60	67.00	2,498.3	125.7	319.6	1,639,759.73	2,237,727.58	39.558782	-108.203985
2,667.0	8.80	68.50	2,632.7	133.5	338.7	1,639,766.94	2,237,746.84	39.558803	-108.203917
2,762.0	10.60	70.30	2,726.3	139.1	353.7	1,639,772.10	2,237,761.99	39.558818	-108.203864
2,856.0	10.10	70.20	2,818.8	144.8	369.5	1,639,777.33	2,237,778.05	39.558834	-108.203807
2,951.0	9.60	71.60	2,912.4	150.1	384.9	1,639,782.20	2,237,793.55	39.558849	-108.203753
3,046.0	10.10	69.40	3,006.0	155.6	400.2	1,639,787.17	2,237,809.02	39.558864	-108.203699
3,140.0	10.50	68.30	3,098.5	161.6	415.9	1,639,792.77	2,237,824.87	39.558880	-108.203643
3,235.0	11.40	68.20	3,191.8	168.3	432.7	1,639,798.95	2,237,841.82	39.558899	-108.203584
3,329.0	10.80	65.40	3,284.0	175.4	449.3	1,639,805.57	2,237,858.66	39.558918	-108.203525
3,424.0	12.40	68.00	3,377.1	183.0	466.8	1,639,812.57	2,237,876.42	39.558939	-108.203462
3,518.0	11.90	67.20	3,468.9	190.5	485.1	1,639,819.56	2,237,894.93	39.558960	-108.203398
3,613.0	10.80	68.10	3,562.1	197.6	502.4	1,639,826.16	2,237,912.43	39.558979	-108.203336
3,707.0	13.30	69.50	3,654.0	204.7	520.7	1,639,832.68	2,237,930.93	39.558998	-108.203271
3,801.0	12.00	70.20	3,745.7	211.8	540.0	1,639,839.20	2,237,950.46	39.559018	-108.203203
3,896.0	10.50	68.70	3,838.9	218.3	557.4	1,639,845.17	2,237,968.00	39.559036	-108.203141
3,991.0	11.60	69.60	3,932.1	224.7	574.4	1,639,851.13	2,237,985.20	39.559054	-108.203081
4,085.0	10.30	68.50	4,024.4	231.1	591.1	1,639,857.01	2,238,002.06	39.559071	-108.203022
4,179.0	9.40	66.90	4,117.0	237.2	606.0	1,639,862.66	2,238,017.12	39.559088	-108.202969
4,273.0	10.50	68.90	4,209.6	243.3	621.0	1,639,868.30	2,238,032.34	39.559105	-108.202916
4,368.0	10.10	67.10	4,303.1	249.7	636.8	1,639,874.19	2,238,048.27	39.559122	-108.202860
4,462.0	9.10	67.30	4,395.8	255.7	651.2	1,639,879.83	2,238,062.90	39.559139	-108.202808
4,557.0	10.80	69.80	4,489.3	261.7	666.5	1,639,885.34	2,238,078.36	39.559155	-108.202754
4,651.0	10.30	68.50	4,581.8	267.8	682.6	1,639,890.98	2,238,094.62	39.559172	-108.202697
4,745.0	9.80	67.80	4,674.3	273.9	697.8	1,639,896.63	2,238,110.02	39.559189	-108.202643
4,840.0	9.80	70.70	4,767.9	279.7	712.9	1,639,901.90	2,238,125.30	39.559204	-108.202590
4,934.0	10.30	68.60	4,860.5	285.4	728.3	1,639,907.15	2,238,140.83	39.559220	-108.202535
5,028.0	9.50	68.50	4,953.1	291.3	743.4	1,639,912.61	2,238,156.05	39.559236	-108.202482
5,123.0	10.30	68.00	5,046.7	297.3	758.5	1,639,918.21	2,238,171.39	39.559253	-108.202428
5,217.0	7.80	80.50	5,139.5	301.5	772.6	1,639,921.99	2,238,185.59	39.559264	-108.202378
5,312.0	9.30	78.10	5,233.4	304.2	786.5	1,639,924.23	2,238,199.54	39.559272	-108.202329
5,406.0	7.90	75.50	5,326.4	307.4	800.2	1,639,927.00	2,238,213.31	39.559280	-108.202280
5,501.0	9.20	64.10	5,420.3	312.3	813.3	1,639,931.56	2,238,226.61	39.559294	-108.202234
5,596.0	12.10	63.40	5,513.7	320.1	829.1	1,639,938.87	2,238,242.57	39.559315	-108.202178
5,690.0	11.60	63.50	5,605.7	328.7	846.3	1,639,946.98	2,238,260.09	39.559339	-108.202116
5,784.0	10.90	63.00	5,697.9	337.0	862.7	1,639,954.74	2,238,276.70	39.559362	-108.202058
5,879.0	11.40	68.50	5,791.1	344.5	879.4	1,639,961.75	2,238,293.66	39.559382	-108.201999
5,973.0	10.70	70.50	5,883.3	350.8	896.3	1,639,967.57	2,238,310.71	39.559400	-108.201939
6,067.0	11.60	68.40	5,975.6	357.2	913.3	1,639,973.45	2,238,327.90	39.559417	-108.201879
6,161.0	11.60	67.00	6,067.6	364.4	930.8	1,639,980.10	2,238,345.60	39.559437	-108.201817
6,256.0	11.00	67.70	6,160.8	371.5	948.0	1,639,986.75	2,238,362.98	39.559457	-108.201756



# Survey Report - Geographic



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<b>Site:</b>	CC 0697-03-07 Pad	<b>MD Reference:</b>	WELL @ 8458.0usft (30' RKB)
<b>Well:</b>	CC Federal 0697-03-08E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,351.0	10.10	67.20	6,254.2	378.2	964.1	1,639,992.94	2,238,379.24	39.559475	-108.201699
6,445.0	9.10	68.50	6,346.9	384.1	978.6	1,639,998.42	2,238,393.92	39.559491	-108.201647
6,540.0	9.90	69.90	6,440.6	389.7	993.2	1,640,003.55	2,238,408.74	39.559506	-108.201595
6,634.0	8.90	72.60	6,533.3	394.6	1,007.8	1,640,008.06	2,238,423.41	39.559520	-108.201544
6,729.0	8.50	66.70	6,627.2	399.6	1,021.2	1,640,012.63	2,238,437.01	39.559534	-108.201496
6,823.0	7.70	66.70	6,720.3	404.9	1,033.4	1,640,017.51	2,238,449.32	39.559548	-108.201453
6,918.0	6.70	70.80	6,814.5	409.2	1,044.5	1,640,021.52	2,238,460.53	39.559560	-108.201414
7,013.0	5.70	62.40	6,909.0	413.2	1,053.9	1,640,025.24	2,238,470.06	39.559571	-108.201380
7,107.0	4.40	63.30	7,002.6	417.0	1,061.2	1,640,028.81	2,238,477.53	39.559581	-108.201354
7,202.0	4.10	62.50	7,097.3	420.2	1,067.5	1,640,031.82	2,238,483.89	39.559590	-108.201332
7,296.0	4.60	77.90	7,191.1	422.5	1,074.2	1,640,033.97	2,238,490.62	39.559597	-108.201308
7,391.0	4.20	86.20	7,285.8	423.6	1,081.4	1,640,034.78	2,238,497.84	39.559599	-108.201283
7,485.0	4.20	73.00	7,379.6	424.8	1,088.1	1,640,035.81	2,238,504.60	39.559603	-108.201259
7,580.0	3.10	76.10	7,474.4	426.4	1,093.9	1,640,037.27	2,238,510.47	39.559607	-108.201238
7,675.0	3.60	78.60	7,569.2	427.6	1,099.3	1,640,038.32	2,238,515.92	39.559611	-108.201219
7,769.0	4.30	69.80	7,663.0	429.4	1,105.5	1,640,039.93	2,238,522.17	39.559616	-108.201197
7,863.0	4.60	73.80	7,756.7	431.7	1,112.5	1,640,041.99	2,238,529.16	39.559622	-108.201173
7,958.0	3.40	78.90	7,851.5	433.3	1,118.9	1,640,043.41	2,238,535.63	39.559626	-108.201150
8,053.0	2.90	65.60	7,946.3	434.8	1,123.8	1,640,044.79	2,238,540.63	39.559630	-108.201132
8,147.0	4.00	59.30	8,040.1	437.5	1,128.8	1,640,047.30	2,238,545.69	39.559638	-108.201115
8,242.0	3.50	60.20	8,134.9	440.6	1,134.2	1,640,050.27	2,238,551.15	39.559646	-108.201095
8,337.0	2.80	60.10	8,229.8	443.2	1,138.7	1,640,052.73	2,238,555.75	39.559653	-108.201079
8,431.0	2.00	67.90	8,323.7	445.0	1,142.2	1,640,054.39	2,238,559.31	39.559658	-108.201067
8,525.0	1.20	83.10	8,417.7	445.7	1,144.7	1,640,055.05	2,238,561.83	39.559660	-108.201058
8,619.0	1.00	112.50	8,511.7	445.5	1,146.5	1,640,054.80	2,238,563.56	39.559660	-108.201052
8,714.0	0.50	185.80	8,606.6	444.8	1,147.2	1,640,054.05	2,238,564.26	39.559658	-108.201049
8,808.0	0.70	231.70	8,700.6	444.0	1,146.7	1,640,053.31	2,238,563.74	39.559656	-108.201051
8,902.0	1.40	227.20	8,794.6	442.9	1,145.4	1,640,052.21	2,238,562.42	39.559652	-108.201056
8,996.0	2.00	229.20	8,888.6	441.1	1,143.3	1,640,050.42	2,238,560.28	39.559647	-108.201063
9,091.0	0.30	245.70	8,983.6	439.9	1,141.8	1,640,049.28	2,238,558.76	39.559644	-108.201068
9,186.0	0.40	42.60	9,078.6	440.0	1,141.8	1,640,049.42	2,238,558.77	39.559645	-108.201068
9,280.0	0.60	305.90	9,172.6	440.5	1,141.6	1,640,049.95	2,238,558.60	39.559646	-108.201069
9,375.0	1.70	254.80	9,267.5	440.5	1,139.9	1,640,049.93	2,238,556.84	39.559646	-108.201075
9,469.0	4.00	233.74	9,361.4	438.2	1,135.9	1,640,047.74	2,238,552.78	39.559639	-108.201089
9,563.0	6.10	231.81	9,455.1	433.1	1,129.3	1,640,042.91	2,238,546.07	39.559626	-108.201113
9,658.0	6.70	233.50	9,549.5	426.7	1,120.9	1,640,036.75	2,238,537.46	39.559608	-108.201143
9,749.0	6.60	234.00	9,639.8	420.5	1,112.4	1,640,030.78	2,238,528.78	39.559591	-108.201173
9,807.0	6.60	234.00	9,697.5	416.6	1,107.0	1,640,027.02	2,238,523.27	39.559580	-108.201192
Projection to TD @ 9807.0' MD / 9697.5' TVD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
230.0	230.0	0.9	0.5	First MWD Survey @ 230.0' MD / 230.0' TVD
9,807.0	9,697.5	416.6	1,107.0	Projection to TD @ 9807.0' MD / 9697.5' TVD