



# **Laramie Energy, LLC**

**Mesa County, CO**

**Gunderson 0993 21-05 Pad**

**BCU 0993-21-09W**

**Wellbore #1**

**Design: Wellbore #1**

## **Survey Report - Geographic**

**01 September, 2018**





## Survey Report - Geographic



<b>Company:</b>	Laramie Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well BCU 0993-21-09W
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7287.0usft (H&P #522)
<b>Site:</b>	Gunderson 0993 21-05 Pad	<b>MD Reference:</b>	Well @ 7287.0usft (H&P #522)
<b>Well:</b>	BCU 0993-21-09W	<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>	Mesa 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		Gunderson 0993 21-05 Pad			
Site Position:		Northing:	1,529,627.90 usft	Latitude:	39.265321
From:	Lat/Long	Easting:	2,354,508.90 usft	Longitude:	-107.780117
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.44 °

Well	BCU 0993-21-09W					
Well Position	+N/-S	0.0 usft	Northing:	1,529,635.07 usft	Latitude:	39.265340
	+E/-W	0.0 usft	Easting:	2,354,498.60 usft	Longitude:	-107.780154
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	7,257.0 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	8/9/2018	9.48	65.43	51,394.30000000

<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	154.94	

<b>Survey Program</b>	<b>Date</b>	9/1/2018			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
208.0	7,722.0	QES MWD Survey (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	1,529,635.07	2,354,498.60	39.265340	-107.780154
208.0	1.50	269.40	208.0	0.0	-2.7	1,529,635.11	2,354,495.88	39.265340	-107.780164
<b>First MWD Survey @ 208.0' MD / 208.0' TVD</b>									
301.0	2.00	279.50	300.9	0.2	-5.5	1,529,635.43	2,354,493.07	39.265341	-107.780174
393.0	2.60	222.90	392.9	-1.0	-8.5	1,529,634.25	2,354,490.04	39.265337	-107.780184
486.0	4.70	188.30	485.7	-6.4	-10.5	1,529,628.98	2,354,487.92	39.265323	-107.780191
579.0	6.20	173.90	578.3	-15.1	-10.5	1,529,620.22	2,354,487.68	39.265299	-107.780192
671.0	8.30	153.30	669.5	-26.0	-7.0	1,529,609.26	2,354,490.92	39.265269	-107.780179
764.0	8.10	148.30	761.6	-37.6	-0.6	1,529,597.53	2,354,497.09	39.265237	-107.780156
856.0	8.30	147.10	852.7	-48.7	6.4	1,529,586.27	2,354,503.82	39.265206	-107.780132
949.0	8.20	145.90	944.7	-59.8	13.8	1,529,574.96	2,354,510.90	39.265176	-107.780106
1,043.0	8.30	144.70	1,037.7	-70.9	21.5	1,529,563.68	2,354,518.30	39.265145	-107.780078



# Survey Report - Geographic



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<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7287.0usft (H&P #522)
<b>Site:</b>	Gunderson 0993 21-05 Pad	<b>MD Reference:</b>	Well @ 7287.0usft (H&P #522)
<b>Well:</b>	BCU 0993-21-09W	<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
1,138.0	8.30	143.90	1,131.7	-82.0	29.5	1,529,552.35	2,354,526.02	39.265115	-107.780050
1,232.0	8.00	143.60	1,224.8	-92.8	37.4	1,529,541.40	2,354,533.63	39.265085	-107.780022
1,327.0	8.00	147.70	1,318.8	-103.7	44.8	1,529,530.31	2,354,540.81	39.265055	-107.779996
1,421.0	7.60	156.00	1,412.0	-114.9	50.8	1,529,518.96	2,354,546.55	39.265025	-107.779975
1,487.0	7.70	157.70	1,477.4	-122.9	54.3	1,529,510.79	2,354,549.80	39.265002	-107.779963
1,605.0	8.20	155.60	1,594.3	-137.9	60.8	1,529,495.66	2,354,555.89	39.264961	-107.779940
1,699.0	8.00	154.40	1,687.3	-149.9	66.4	1,529,483.52	2,354,561.19	39.264928	-107.779920
1,794.0	7.60	152.40	1,781.4	-161.5	72.1	1,529,471.85	2,354,566.66	39.264897	-107.779899
1,888.0	7.80	154.10	1,874.6	-172.7	77.8	1,529,460.46	2,354,572.04	39.264866	-107.779879
1,983.0	9.10	160.30	1,968.6	-185.6	83.1	1,529,447.46	2,354,577.07	39.264831	-107.779861
2,077.0	8.70	159.20	2,061.4	-199.2	88.2	1,529,433.69	2,354,581.75	39.264793	-107.779843
2,171.0	8.20	156.40	2,154.4	-212.0	93.4	1,529,420.78	2,354,586.64	39.264758	-107.779824
2,266.0	7.50	156.10	2,248.5	-223.9	98.6	1,529,408.77	2,354,591.56	39.264725	-107.779806
2,360.0	8.90	152.90	2,341.6	-236.0	104.4	1,529,396.55	2,354,597.06	39.264692	-107.779786
2,454.0	8.00	151.50	2,434.5	-248.2	110.8	1,529,384.17	2,354,603.18	39.264659	-107.779763
2,549.0	9.40	155.00	2,528.4	-261.0	117.3	1,529,371.17	2,354,609.29	39.264623	-107.779740
2,643.0	8.90	156.40	2,621.2	-274.7	123.4	1,529,357.40	2,354,615.10	39.264586	-107.779718
2,738.0	8.70	154.60	2,715.1	-287.9	129.5	1,529,344.03	2,354,620.79	39.264550	-107.779697
2,832.0	8.60	154.00	2,808.1	-300.6	135.6	1,529,331.14	2,354,626.60	39.264515	-107.779675
2,927.0	8.30	153.50	2,902.0	-313.1	141.8	1,529,318.47	2,354,632.46	39.264480	-107.779654
3,021.0	8.20	152.30	2,995.1	-325.1	147.9	1,529,306.31	2,354,638.30	39.264447	-107.779632
3,115.0	7.80	149.70	3,088.1	-336.6	154.2	1,529,294.71	2,354,644.34	39.264416	-107.779610
3,209.0	8.90	155.60	3,181.1	-348.7	160.5	1,529,282.43	2,354,650.26	39.264383	-107.779588
3,304.0	8.70	152.10	3,275.0	-361.8	166.9	1,529,269.23	2,354,656.33	39.264347	-107.779565
3,399.0	8.70	151.90	3,368.9	-374.4	173.6	1,529,256.38	2,354,662.76	39.264312	-107.779541
3,493.0	8.50	151.00	3,461.9	-386.8	180.3	1,529,243.87	2,354,669.16	39.264278	-107.779517
3,588.0	8.40	149.60	3,555.8	-398.9	187.2	1,529,231.57	2,354,675.77	39.264245	-107.779493
3,682.0	8.00	147.90	3,648.9	-410.4	194.2	1,529,219.94	2,354,682.43	39.264213	-107.779468
3,777.0	8.70	154.20	3,742.9	-422.5	200.8	1,529,207.71	2,354,688.76	39.264180	-107.779445
3,871.0	8.50	153.70	3,835.8	-435.1	207.0	1,529,194.93	2,354,694.62	39.264145	-107.779423
3,966.0	8.20	151.30	3,929.8	-447.3	213.4	1,529,182.53	2,354,700.67	39.264112	-107.779401
4,060.0	7.80	149.40	4,022.9	-458.7	219.8	1,529,171.00	2,354,706.85	39.264081	-107.779378
4,155.0	7.40	150.00	4,117.1	-469.5	226.2	1,529,160.00	2,354,712.92	39.264051	-107.779355
4,249.0	7.40	150.60	4,210.3	-480.1	232.2	1,529,149.34	2,354,718.65	39.264022	-107.779334
4,344.0	6.70	148.50	4,304.6	-490.1	238.1	1,529,139.14	2,354,724.29	39.263994	-107.779313
4,439.0	5.90	143.50	4,399.0	-498.8	243.9	1,529,130.35	2,354,729.88	39.263971	-107.779293
4,533.0	4.70	159.20	4,492.6	-506.2	248.1	1,529,122.76	2,354,733.93	39.263950	-107.779278
4,628.0	3.30	165.50	4,587.4	-512.5	250.2	1,529,116.42	2,354,735.84	39.263933	-107.779271
4,722.0	1.00	156.60	4,681.3	-515.9	251.2	1,529,113.02	2,354,736.76	39.263924	-107.779267
4,817.0	0.50	128.70	4,776.3	-516.9	251.8	1,529,111.99	2,354,737.38	39.263921	-107.779265
4,911.0	0.20	209.50	4,870.3	-517.3	252.1	1,529,111.58	2,354,737.61	39.263920	-107.779264
5,006.0	0.30	327.80	4,965.3	-517.3	251.9	1,529,111.65	2,354,737.40	39.263920	-107.779265
5,100.0	0.50	314.80	5,059.3	-516.8	251.4	1,529,112.16	2,354,736.99	39.263921	-107.779266
5,194.0	0.70	301.60	5,153.3	-516.2	250.7	1,529,112.77	2,354,736.22	39.263923	-107.779269
5,289.0	0.90	298.10	5,248.3	-515.5	249.5	1,529,113.46	2,354,735.09	39.263925	-107.779273
5,383.0	0.70	300.40	5,342.2	-514.9	248.4	1,529,114.12	2,354,733.96	39.263926	-107.779277
5,477.0	0.20	328.90	5,436.2	-514.4	247.8	1,529,114.57	2,354,733.39	39.263928	-107.779279
5,572.0	0.10	279.50	5,531.2	-514.3	247.6	1,529,114.73	2,354,733.23	39.263928	-107.779280
5,666.0	0.30	214.40	5,625.2	-514.5	247.4	1,529,114.54	2,354,733.00	39.263927	-107.779281
5,760.0	0.20	242.40	5,719.2	-514.8	247.1	1,529,114.27	2,354,732.71	39.263927	-107.779282
5,855.0	0.30	249.10	5,814.2	-514.9	246.7	1,529,114.12	2,354,732.33	39.263926	-107.779283
5,949.0	0.50	258.60	5,908.2	-515.1	246.1	1,529,113.96	2,354,731.69	39.263926	-107.779285
6,043.0	0.80	255.20	6,002.2	-515.3	245.1	1,529,113.74	2,354,730.65	39.263925	-107.779289
6,138.0	1.00	157.00	6,097.2	-516.3	244.7	1,529,112.82	2,354,730.31	39.263923	-107.779290
6,232.0	1.00	146.50	6,191.2	-517.7	245.5	1,529,111.36	2,354,731.04	39.263919	-107.779287



## Survey Report - Geographic



<b>Company:</b>	Laramie Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well BCU 0993-21-09W
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	Well @ 7287.0usft (H&P #522)
<b>Site:</b>	Gunderson 0993 21-05 Pad	<b>MD Reference:</b>	Well @ 7287.0usft (H&P #522)
<b>Well:</b>	BCU 0993-21-09W	<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
6,326.0	1.10	136.60	6,285.2	-519.1	246.6	1,529,109.99	2,354,732.08	39.263915	-107.779283
6,420.0	0.70	151.00	6,379.2	-520.2	247.5	1,529,108.81	2,354,732.95	39.263912	-107.779280
6,515.0	0.30	184.40	6,474.2	-521.0	247.7	1,529,108.05	2,354,733.20	39.263910	-107.779279
6,609.0	0.50	319.90	6,568.2	-520.9	247.5	1,529,108.13	2,354,732.91	39.263910	-107.779280
6,703.0	0.70	255.00	6,662.2	-520.7	246.6	1,529,108.31	2,354,732.10	39.263910	-107.779283
6,797.0	0.50	271.00	6,756.2	-520.9	245.7	1,529,108.19	2,354,731.13	39.263910	-107.779287
6,891.0	0.70	237.90	6,850.2	-521.2	244.8	1,529,107.92	2,354,730.23	39.263909	-107.779290
6,985.0	1.10	241.30	6,944.2	-521.9	243.5	1,529,107.21	2,354,728.93	39.263907	-107.779294
7,079.0	1.10	242.00	7,038.1	-522.8	241.9	1,529,106.40	2,354,727.32	39.263905	-107.779300
7,174.0	0.80	241.00	7,133.1	-523.5	240.5	1,529,105.68	2,354,725.92	39.263903	-107.779305
7,268.0	1.30	245.20	7,227.1	-524.3	239.0	1,529,104.96	2,354,724.36	39.263901	-107.779310
7,362.0	1.40	257.90	7,321.1	-525.0	236.9	1,529,104.32	2,354,722.25	39.263899	-107.779318
7,456.0	1.50	259.00	7,415.1	-525.4	234.6	1,529,103.90	2,354,719.91	39.263897	-107.779326
7,550.0	1.30	264.10	7,509.0	-525.8	232.3	1,529,103.62	2,354,717.63	39.263896	-107.779334
7,662.0	1.20	262.80	7,621.0	-526.1	229.9	1,529,103.40	2,354,715.20	39.263896	-107.779342
7,722.0	1.20	262.80	7,681.0	-526.2	228.6	1,529,103.27	2,354,713.95	39.263895	-107.779347

Projection to TD @ 7722.0' MD / 7681.0' TVD

## Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
208.0	208.0	0.0	-2.7	First MWD Survey @ 208.0' MD / 208.0' TVD
7,722.0	7,681.0	-526.2	228.6	Projection to TD @ 7722.0' MD / 7681.0' TVD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_