



# **Laramie Energy, LLC**

**Mesa County, CO**

**Nichols 24-07 Pad**

**Nichols Federal 0994-24-17E**

**Wellbore #1**

**Design: Wellbore #1**

## **Survey Report - Geographic**

**19 April, 2018**





## Survey Report - Geographic



<b>Company:</b>	Laramie Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Nichols Federal 0994-24-17E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	well @ 7236.0usft (H&P #290)
<b>Site:</b>	Nichols 24-07 Pad	<b>MD Reference:</b>	well @ 7236.0usft (H&P #290)
<b>Well:</b>	Nichols Federal 0994-24-17E	<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		

<b>Site</b>	Nichols 24-07 Pad				
<b>Site Position:</b>		<b>Northing:</b>	1,529,213.07 usft	<b>Latitude:</b>	39.263181
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,340,128.94 usft	<b>Longitude:</b>	-107.830853
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-1.47 °

<b>Well</b>	Nichols Federal 0994-24-17E				
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	1,529,243.36 usft	<b>Latitude:</b> 39.263264
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	2,340,132.77 usft	<b>Longitude:</b> -107.830842
<b>Position Uncertainty</b>	0.0 usft		<b>Wellhead Elevation:</b>	0.0 usft	<b>Ground Level:</b> 7,212.0 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	3/28/2018	9.44	65.40	51,309.90000000

<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	140.38	

<b>Survey Program</b>	<b>Date</b>	4/19/2018			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
323.0	7,898.0	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	1,529,243.36	2,340,132.77	39.263264	-107.830842
323.0	2.30	116.20	322.9	-2.9	5.8	1,529,240.35	2,340,138.52	39.263256	-107.830822
<b>First MWD Survey @ 323.0' MD / 322.9' TVD</b>									
473.0	3.60	116.60	472.7	-6.3	12.7	1,529,236.73	2,340,145.34	39.263247	-107.830797
563.0	5.40	130.90	562.4	-10.3	18.5	1,529,232.55	2,340,150.96	39.263236	-107.830777
658.0	7.40	139.20	656.8	-17.9	25.8	1,529,224.80	2,340,158.14	39.263215	-107.830751
752.0	9.10	139.90	749.9	-28.2	34.6	1,529,214.31	2,340,166.62	39.263187	-107.830720
847.0	11.20	137.40	843.4	-40.7	45.7	1,529,201.49	2,340,177.38	39.263152	-107.830681
942.0	14.10	137.70	936.1	-56.1	59.7	1,529,185.79	2,340,191.02	39.263110	-107.830631
1,036.0	16.00	139.30	1,026.8	-74.4	75.9	1,529,167.09	2,340,206.70	39.263060	-107.830574
1,131.0	17.20	144.60	1,117.9	-95.7	92.5	1,529,145.29	2,340,222.82	39.263001	-107.830515
1,225.0	19.40	147.00	1,207.1	-120.2	109.1	1,529,120.45	2,340,238.74	39.262934	-107.830457



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<b>Site:</b>	Nichols 24-07 Pad	<b>MD Reference:</b>	well @ 7236.0usft (H&P #290)
<b>Well:</b>	Nichols Federal 0994-24-17E	<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
1,320.0	22.70	147.80	1,295.8	-148.9	127.5	1,529,091.23	2,340,256.36	39.262855	-107.830392
1,414.0	25.20	148.70	1,381.7	-181.4	147.5	1,529,058.28	2,340,275.59	39.262766	-107.830321
1,506.0	27.60	148.40	1,464.1	-216.2	168.9	1,529,022.85	2,340,296.03	39.262670	-107.830246
1,622.0	26.50	148.40	1,567.4	-261.2	196.5	1,528,977.22	2,340,322.51	39.262547	-107.830148
1,717.0	26.30	140.80	1,652.5	-295.6	220.9	1,528,942.24	2,340,346.04	39.262453	-107.830062
1,811.0	26.90	139.90	1,736.5	-328.0	247.8	1,528,909.15	2,340,372.06	39.262364	-107.829967
1,906.0	26.80	139.10	1,821.3	-360.6	275.6	1,528,875.82	2,340,399.08	39.262274	-107.829869
2,000.0	28.10	134.20	1,904.7	-392.0	305.4	1,528,843.61	2,340,428.01	39.262188	-107.829764
2,095.0	28.20	135.30	1,988.5	-423.6	337.2	1,528,811.26	2,340,459.02	39.262101	-107.829651
2,189.0	28.50	137.10	2,071.2	-455.8	368.1	1,528,778.26	2,340,489.07	39.262013	-107.829542
2,284.0	30.30	135.90	2,154.0	-489.6	400.2	1,528,743.63	2,340,520.30	39.261920	-107.829429
2,378.0	30.30	138.20	2,235.1	-524.3	432.5	1,528,708.10	2,340,551.71	39.261824	-107.829315
2,473.0	28.00	134.60	2,318.1	-557.9	464.4	1,528,673.77	2,340,582.70	39.261732	-107.829202
2,567.0	25.90	137.80	2,401.9	-588.6	493.9	1,528,642.31	2,340,611.40	39.261648	-107.829098
2,662.0	26.50	136.50	2,487.1	-619.3	522.4	1,528,610.85	2,340,639.13	39.261564	-107.828997
2,756.0	26.40	142.10	2,571.3	-651.0	549.7	1,528,578.45	2,340,665.59	39.261477	-107.828901
2,851.0	28.80	143.00	2,655.5	-686.0	576.4	1,528,542.83	2,340,691.43	39.261381	-107.828806
2,946.0	27.50	140.20	2,739.3	-721.1	604.3	1,528,507.00	2,340,718.34	39.261284	-107.828708
3,041.0	28.00	143.20	2,823.3	-755.8	631.7	1,528,471.60	2,340,744.83	39.261189	-107.828611
3,135.0	29.20	141.70	2,905.9	-791.5	659.1	1,528,435.24	2,340,771.34	39.261091	-107.828515
3,230.0	27.30	137.40	2,989.6	-825.7	688.2	1,528,400.28	2,340,799.57	39.260997	-107.828412
3,324.0	28.60	142.80	3,072.6	-859.5	716.4	1,528,365.77	2,340,826.89	39.260904	-107.828312
3,419.0	29.80	139.30	3,155.5	-895.5	745.5	1,528,329.02	2,340,855.10	39.260805	-107.828209
3,514.0	29.30	143.30	3,238.2	-932.0	774.8	1,528,291.74	2,340,883.44	39.260705	-107.828106
3,608.0	30.70	142.40	3,319.6	-969.5	803.2	1,528,253.57	2,340,910.86	39.260602	-107.828005
3,703.0	29.50	141.40	3,401.8	-1,007.0	832.6	1,528,215.34	2,340,939.28	39.260499	-107.827902
3,797.0	30.40	141.30	3,483.2	-1,043.6	861.9	1,528,177.95	2,340,967.64	39.260399	-107.827798
3,892.0	28.90	138.70	3,565.8	-1,079.7	892.1	1,528,141.18	2,340,996.89	39.260300	-107.827692
3,986.0	28.90	143.40	3,648.1	-1,115.0	920.6	1,528,105.15	2,341,024.51	39.260203	-107.827591
4,081.0	27.60	142.30	3,731.8	-1,150.8	947.8	1,528,068.62	2,341,050.73	39.260104	-107.827495
4,175.0	27.50	141.60	3,815.1	-1,185.0	974.6	1,528,033.71	2,341,076.64	39.260010	-107.827400
4,270.0	29.70	141.90	3,898.5	-1,220.7	1,002.7	1,527,997.29	2,341,103.86	39.259912	-107.827301
4,364.0	28.30	141.20	3,980.7	-1,256.4	1,031.1	1,527,960.88	2,341,131.27	39.259814	-107.827201
4,459.0	28.50	139.10	4,064.3	-1,291.1	1,060.0	1,527,925.47	2,341,159.32	39.259719	-107.827099
4,554.0	26.90	141.10	4,148.4	-1,325.0	1,088.4	1,527,890.89	2,341,186.78	39.259626	-107.826999
4,648.0	26.20	143.50	4,232.5	-1,358.2	1,114.1	1,527,857.01	2,341,211.62	39.259535	-107.826908
4,743.0	27.20	142.20	4,317.4	-1,392.2	1,139.8	1,527,822.35	2,341,236.52	39.259441	-107.826817
4,838.0	28.80	139.80	4,401.3	-1,426.9	1,167.9	1,527,787.00	2,341,263.70	39.259346	-107.826718
4,932.0	26.50	135.70	4,484.5	-1,459.2	1,197.2	1,527,753.95	2,341,292.13	39.259258	-107.826614
5,027.0	23.60	138.90	4,570.6	-1,488.7	1,224.5	1,527,723.75	2,341,318.68	39.259177	-107.826518
5,121.0	19.50	141.70	4,658.0	-1,515.2	1,246.6	1,527,696.69	2,341,340.09	39.259104	-107.826440
5,216.0	19.30	136.20	4,747.6	-1,539.0	1,267.3	1,527,672.39	2,341,360.17	39.259039	-107.826367
5,311.0	15.80	138.70	4,838.2	-1,560.0	1,286.7	1,527,650.84	2,341,379.03	39.258981	-107.826298
5,405.0	16.40	131.10	4,928.5	-1,578.4	1,305.1	1,527,632.04	2,341,397.00	39.258930	-107.826233
5,500.0	17.10	132.80	5,019.5	-1,596.7	1,325.5	1,527,613.21	2,341,416.88	39.258880	-107.826161
5,595.0	14.60	131.80	5,110.8	-1,614.1	1,344.7	1,527,595.26	2,341,435.60	39.258832	-107.826093
5,689.0	12.60	128.70	5,202.2	-1,628.4	1,361.5	1,527,580.52	2,341,452.07	39.258793	-107.826034
5,784.0	9.30	138.20	5,295.5	-1,640.7	1,374.7	1,527,567.98	2,341,464.96	39.258759	-107.825987
5,879.0	8.30	130.80	5,389.4	-1,650.9	1,385.0	1,527,557.51	2,341,475.00	39.258731	-107.825951
5,974.0	5.70	132.70	5,483.6	-1,658.5	1,393.7	1,527,549.61	2,341,483.46	39.258710	-107.825920
6,068.0	2.90	144.90	5,577.4	-1,663.6	1,398.5	1,527,544.38	2,341,488.13	39.258696	-107.825903
6,163.0	2.90	137.30	5,672.2	-1,667.4	1,401.5	1,527,540.57	2,341,491.04	39.258686	-107.825893
6,258.0	0.80	167.30	5,767.2	-1,669.8	1,403.3	1,527,538.11	2,341,492.75	39.258679	-107.825886
6,352.0	1.50	143.40	5,861.2	-1,671.4	1,404.2	1,527,536.46	2,341,493.59	39.258675	-107.825883
6,447.0	0.90	108.50	5,956.2	-1,672.7	1,405.6	1,527,535.19	2,341,495.01	39.258671	-107.825878



## Survey Report - Geographic



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<b>Site:</b>	Nichols 24-07 Pad	<b>MD Reference:</b>	well @ 7236.0usft (H&P #290)
<b>Well:</b>	Nichols Federal 0994-24-17E	<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	
6,541.0	0.40	232.80	6,050.1	-1,673.1	1,406.0	1,527,534.75	2,341,495.43	39.258670	-107.825877	
6,636.0	1.50	201.50	6,145.1	-1,674.4	1,405.3	1,527,533.41	2,341,494.68	39.258667	-107.825879	
6,730.0	1.70	196.30	6,239.1	-1,676.9	1,404.5	1,527,530.95	2,341,493.77	39.258660	-107.825882	
6,825.0	0.50	220.10	6,334.1	-1,678.6	1,403.8	1,527,529.30	2,341,493.07	39.258655	-107.825884	
6,920.0	1.20	189.40	6,429.1	-1,679.9	1,403.4	1,527,528.01	2,341,492.61	39.258652	-107.825886	
7,014.0	2.29	232.15	6,523.0	-1,682.0	1,401.7	1,527,525.93	2,341,490.91	39.258646	-107.825892	
7,109.0	1.85	222.93	6,618.0	-1,684.3	1,399.2	1,527,523.71	2,341,488.31	39.258639	-107.825901	
7,203.0	1.89	230.05	6,711.9	-1,686.4	1,397.0	1,527,521.66	2,341,486.03	39.258634	-107.825909	
7,298.0	0.66	163.69	6,806.9	-1,687.9	1,395.9	1,527,520.16	2,341,484.95	39.258629	-107.825912	
7,393.0	0.75	250.79	6,901.9	-1,688.7	1,395.5	1,527,519.44	2,341,484.49	39.258627	-107.825914	
7,487.0	0.48	256.50	6,995.9	-1,689.0	1,394.5	1,527,519.17	2,341,483.52	39.258627	-107.825917	
7,582.0	1.54	224.68	7,090.9	-1,690.0	1,393.3	1,527,518.20	2,341,482.21	39.258624	-107.825922	
7,677.0	1.89	232.15	7,185.8	-1,691.8	1,391.1	1,527,516.39	2,341,480.03	39.258619	-107.825929	
7,771.0	1.67	184.78	7,279.8	-1,694.2	1,389.8	1,527,514.11	2,341,478.63	39.258612	-107.825934	
7,843.0	1.71	235.58	7,351.8	-1,695.8	1,388.8	1,527,512.48	2,341,477.62	39.258608	-107.825937	
7,898.0	1.71	235.58	7,406.7	-1,696.7	1,387.5	1,527,511.59	2,341,476.24	39.258605	-107.825942	
Projection to TD @ 7898.0' MD / 7406.7' TVD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
323.0	322.9	-2.9	5.8	First MWD Survey @ 323.0' MD / 322.9' TVD	
7,898.0	7,406.7	-1,696.7	1,387.5	Projection to TD @ 7898.0' MD / 7406.7' TVD	

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