



Laramie Energy, LLC

Mesa County, CO

Nichols 24-06A

Nichols 0994-24-03E

A-6

Design: A-6

QES Survey Report

01 January, 2018





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Nichols 0994-24-03E
Project:	Mesa County, CO	TVD Reference:	well @ 7161.0usft (H&P #290)
Site:	Nichols 24-06A	MD Reference:	well @ 7161.0usft (H&P #290)
Well:	Nichols 0994-24-03E	North Reference:	True
Wellbore:	A-6	Survey Calculation Method:	Minimum Curvature
Design:	A-6	Database:	EDM 5000.1 Single User Db

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	Nichols 24-06A				
Site Position:		Northing:	1,529,702.08 usft	Latitude:	39.264528
From:	Lat/Long	Easting:	2,340,203.74 usft	Longitude:	-107.830633
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.47 °

Well	Nichols 0994-24-03E					
Well Position	+N/-S	0.0 usft	Northing:	1,529,743.10 usft	Latitude:	39.264642
	+E/-W	0.0 usft	Easting:	2,340,222.92 usft	Longitude:	-107.830569
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,137.0 usft

Wellbore	A-6				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/24/2017	9.54	65.42	51,358.17254887

Design	A-6				
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	45.88	

Survey Program	Date	1/1/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
201.0	7,778.0	QES MWD Surveys (A-6)	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
First MWD Survey @ 201.0' MD / 201.0' TVD									
201.0	2.20	76.20	201.0	0.9	3.7	3.3	1.09	1.09	0.00
292.0	2.70	89.40	291.9	1.4	7.6	6.4	0.83	0.55	14.51
383.0	2.40	57.20	382.8	2.4	11.3	9.8	1.59	-0.33	-35.38
473.0	4.20	60.80	472.6	5.0	15.8	14.8	2.01	2.00	4.00
564.0	5.90	47.30	563.3	9.8	22.1	22.7	2.27	1.87	-14.84
654.0	7.10	43.70	652.7	17.0	29.4	32.9	1.41	1.33	-4.00
744.0	9.60	40.60	741.7	26.7	38.1	46.0	2.82	2.78	-3.44
836.0	10.30	42.30	832.4	38.6	48.6	61.8	0.83	0.76	1.85
927.0	12.30	42.50	921.6	51.8	60.7	79.6	2.20	2.20	0.22



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Wellbore:	A-6	Survey Calculation Method:	Minimum Curvature
Design:	A-6	Database:	EDM 5000.1 Single User Db

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)
1,021.0	14.10	45.70	1,013.1	67.2	75.6	101.1	2.07	1.91	3.40
1,116.0	17.30	47.50	1,104.5	84.8	94.3	126.8	3.41	3.37	1.89
1,210.0	18.80	46.50	1,193.9	104.7	115.6	155.9	1.63	1.60	-1.06
1,305.0	21.90	45.30	1,283.0	127.7	139.3	188.9	3.29	3.26	-1.26
1,399.0	23.40	44.80	1,369.7	153.3	164.9	225.1	1.61	1.60	-0.53
1,494.0	23.80	44.40	1,456.8	180.3	191.6	263.1	0.45	0.42	-0.42
1,587.0	24.40	43.80	1,541.7	207.6	218.1	301.1	0.70	0.65	-0.65
1,682.0	24.00	43.60	1,628.3	235.8	245.0	340.0	0.43	-0.42	-0.21
1,776.0	23.30	42.50	1,714.4	263.3	270.7	377.6	0.88	-0.74	-1.17
1,871.0	22.40	41.70	1,802.0	290.7	295.4	414.5	1.00	-0.95	-0.84
1,965.0	23.20	48.90	1,888.6	316.2	321.3	450.8	3.09	0.85	7.66
2,060.0	22.70	48.00	1,976.1	340.8	349.0	487.8	0.64	-0.53	-0.95
2,154.0	21.60	47.30	2,063.2	364.7	375.2	523.2	1.20	-1.17	-0.74
2,249.0	23.40	49.10	2,150.9	388.9	402.4	559.6	2.03	1.89	1.89
2,343.0	22.10	48.30	2,237.6	412.9	429.7	595.9	1.42	-1.38	-0.85
2,438.0	23.80	49.60	2,325.1	437.2	457.6	632.9	1.87	1.79	1.37
2,532.0	22.70	49.60	2,411.5	461.2	485.9	669.9	1.17	-1.17	0.00
2,627.0	24.00	46.00	2,498.7	486.5	513.7	707.5	2.03	1.37	-3.79
2,722.0	23.00	46.20	2,585.8	512.8	541.0	745.4	1.06	-1.05	0.21
2,816.0	25.20	46.60	2,671.6	539.3	568.8	783.8	2.35	2.34	0.43
2,911.0	24.70	45.90	2,757.8	567.0	597.8	823.8	0.61	-0.53	-0.74
3,006.0	23.70	46.20	2,844.4	594.0	625.8	862.8	1.06	-1.05	0.32
3,100.0	22.70	45.80	2,930.8	619.7	652.4	899.8	1.08	-1.06	-0.43
3,195.0	21.90	45.40	3,018.7	644.9	678.2	935.8	0.86	-0.84	-0.42
3,290.0	24.10	45.60	3,106.1	671.0	704.7	973.0	2.32	2.32	0.21
3,384.0	23.00	45.30	3,192.3	697.3	731.4	1,010.5	1.18	-1.17	-0.32
3,479.0	22.30	45.30	3,280.0	723.0	757.4	1,047.1	0.74	-0.74	0.00
3,574.0	21.90	45.20	3,368.0	748.2	782.8	1,082.8	0.42	-0.42	-0.11
3,668.0	20.80	44.80	3,455.5	772.4	807.0	1,117.1	1.18	-1.17	-0.43
3,763.0	22.70	48.40	3,543.8	796.5	832.6	1,152.2	2.44	2.00	3.79
3,858.0	22.10	48.80	3,631.6	820.5	859.8	1,188.4	0.65	-0.63	0.42
3,952.0	22.10	44.60	3,718.7	844.7	885.5	1,223.7	1.68	0.00	-4.47
4,047.0	20.30	43.60	3,807.3	869.4	909.4	1,258.1	1.93	-1.89	-1.05
4,140.0	22.50	47.00	3,893.9	893.2	933.6	1,292.0	2.71	2.37	3.66
4,235.0	21.60	48.80	3,981.9	917.1	960.0	1,327.6	1.18	-0.95	1.89
4,330.0	23.60	43.20	4,069.6	942.5	986.2	1,364.1	3.09	2.11	-5.89
4,424.0	22.10	41.50	4,156.3	969.5	1,010.8	1,400.5	1.74	-1.60	-1.81
4,519.0	20.50	42.50	4,244.8	995.1	1,033.9	1,435.0	1.73	-1.68	1.05
4,614.0	18.90	42.10	4,334.2	1,018.8	1,055.4	1,466.9	1.69	-1.68	-0.42
4,708.0	18.40	44.50	4,423.3	1,040.7	1,076.0	1,496.9	0.97	-0.53	2.55
4,802.0	16.80	44.40	4,512.9	1,061.0	1,095.9	1,525.4	1.70	-1.70	-0.11
4,897.0	17.30	47.80	4,603.7	1,080.3	1,116.0	1,553.2	1.17	0.53	3.58
4,991.0	15.80	47.30	4,693.8	1,098.3	1,135.8	1,580.0	1.60	-1.60	-0.53



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Survey										
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5,086.0	15.80	46.20	4,785.2	1,116.0	1,154.6	1,605.8	0.32	0.00	-1.16	
5,181.0	14.80	45.60	4,876.8	1,133.5	1,172.6	1,630.9	1.07	-1.05	-0.63	
5,275.0	13.70	44.50	4,967.9	1,149.8	1,189.0	1,654.0	1.21	-1.17	-1.17	
5,370.0	12.90	44.00	5,060.4	1,165.5	1,204.2	1,675.9	0.85	-0.84	-0.53	
5,464.0	11.40	42.20	5,152.3	1,179.9	1,217.8	1,695.6	1.65	-1.60	-1.91	
5,559.0	11.10	43.80	5,245.5	1,193.5	1,230.4	1,714.1	0.46	-0.32	1.68	
5,653.0	9.90	42.80	5,337.9	1,205.9	1,242.2	1,731.2	1.29	-1.28	-1.06	
5,748.0	9.00	41.20	5,431.6	1,217.5	1,252.6	1,746.8	0.99	-0.95	-1.68	
5,842.0	7.80	39.90	5,524.6	1,227.9	1,261.5	1,760.5	1.29	-1.28	-1.38	
5,937.0	7.30	49.80	5,618.8	1,236.8	1,270.3	1,772.9	1.46	-0.53	10.42	
6,031.0	6.40	47.60	5,712.1	1,244.2	1,278.7	1,784.1	1.00	-0.96	-2.34	
6,125.0	5.40	48.70	5,805.6	1,250.6	1,285.9	1,793.8	1.07	-1.06	1.17	
6,220.0	6.10	51.60	5,900.1	1,256.7	1,293.2	1,803.3	0.80	0.74	3.05	
6,315.0	5.20	51.70	5,994.7	1,262.5	1,300.6	1,812.6	0.95	-0.95	0.11	
6,409.0	4.50	50.40	6,088.3	1,267.5	1,306.7	1,820.5	0.75	-0.74	-1.38	
6,504.0	4.30	50.20	6,183.0	1,272.2	1,312.3	1,827.7	0.21	-0.21	-0.21	
6,599.0	0.80	44.40	6,277.9	1,274.9	1,315.5	1,832.0	3.69	-3.68	-6.11	
6,693.0	0.18	49.72	6,371.9	1,275.5	1,316.1	1,832.8	0.66	-0.66	5.66	
6,787.0	0.57	135.06	6,465.9	1,275.2	1,316.6	1,832.9	0.62	0.41	90.79	
6,882.0	0.66	135.41	6,560.9	1,274.5	1,317.3	1,832.9	0.09	0.09	0.37	
6,977.0	0.18	149.21	6,655.9	1,274.0	1,317.7	1,832.9	0.51	-0.51	14.53	
7,071.0	0.26	208.80	6,749.9	1,273.7	1,317.7	1,832.7	0.24	0.09	63.39	
7,166.0	0.66	201.59	6,844.9	1,273.0	1,317.4	1,831.9	0.42	0.42	-7.59	
7,261.0	1.01	195.79	6,939.9	1,271.7	1,317.0	1,830.7	0.38	0.37	-6.11	
7,355.0	1.01	201.50	7,033.9	1,270.1	1,316.4	1,829.3	0.11	0.00	6.07	
7,450.0	0.88	219.61	7,128.9	1,268.8	1,315.7	1,827.8	0.34	-0.14	19.06	
7,545.0	1.05	228.13	7,223.9	1,267.6	1,314.6	1,826.2	0.23	0.18	8.97	
7,639.0	1.23	223.56	7,317.8	1,266.3	1,313.2	1,824.3	0.21	0.19	-4.86	
7,724.0	1.58	231.47	7,402.8	1,264.9	1,311.7	1,822.2	0.47	0.41	9.31	
Projection to TD @ 7778.0' MD / 7456.8' TVD										
7,778.0	1.58	231.47	7,456.8	1,264.0	1,310.5	1,820.7	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
201.0	201.0	0.9	3.7	First MWD Survey @ 201.0' MD / 201.0' TVD	
7,778.0	7,456.8	1,264.0	1,310.5	Projection to TD @ 7778.0' MD / 7456.8' TVD	