



Laramie Energy, LLC

Mesa County, CO

Nichols 24-06A

Nichols 0994-13-18E

A-1

Design: A-1

QES Survey Report

12 February, 2018





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Nichols 0994-13-18E
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 0994-13-18E	North Reference:	True
Wellbore:	A-1	Survey Calculation Method:	Minimum Curvature
Design:	A-1	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 0994-13-18E					
Well Position	+N/-S	0.0 usft	Northing:	1,529,776.96 usft	Latitude:	39.264736
	+E/-W	0.0 usft	Easting:	2,340,237.95 usft	Longitude:	-107.830519
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,137.0 usft

Wellbore	A-1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/24/2018	9.53	65.42	51,348.79743597

Design	A-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	26.20	

Survey Program	Date	2/12/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
203.0	8,338.0	QES MWD Surveys (A-1)	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 @ 203.0' MD / 202.9' TVD									
203.0	3.20	29.50	202.9	4.9	2.8	5.7	1.58	1.58	0.00
294.0	5.60	17.60	293.6	11.4	5.4	12.6	2.81	2.64	-13.08
384.0	8.20	20.40	383.0	21.6	9.0	23.3	2.91	2.89	3.11
475.0	10.80	22.60	472.7	35.5	14.5	38.3	2.88	2.86	2.42
566.0	13.40	24.90	561.7	53.0	22.2	57.3	2.91	2.86	2.53
656.0	15.90	26.20	648.7	73.5	32.0	80.1	2.80	2.78	1.44
746.0	18.70	23.80	734.7	97.8	43.3	106.8	3.21	3.11	-2.67
837.0	21.60	21.50	820.1	126.7	55.3	138.1	3.30	3.19	-2.53
929.0	24.10	24.20	904.9	159.6	69.2	173.8	2.95	2.72	2.93



Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Nichols 0994-13-18E
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 0994-13-18E	North Reference:	True
Wellbore:	A-1	Survey Calculation Method:	Minimum Curvature
Design:	A-1	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)
1,023.0	27.20	24.40	989.6	196.7	86.0	214.4	3.30	3.30	0.21
1,117.0	30.70	26.20	1,071.8	237.8	105.5	259.9	3.84	3.72	1.91
1,212.0	32.70	26.80	1,152.7	282.5	127.7	309.8	2.13	2.11	0.63
1,306.0	34.70	26.90	1,230.9	329.0	151.3	362.0	2.13	2.13	0.11
1,401.0	34.30	27.00	1,309.1	376.9	175.7	415.8	0.43	-0.42	0.11
1,495.0	35.20	25.90	1,386.4	424.9	199.5	469.4	1.17	0.96	-1.17
1,514.0	35.00	26.20	1,401.9	434.7	204.3	480.3	1.39	-1.05	1.58
1,621.0	34.30	26.10	1,490.0	489.3	231.2	541.1	0.66	-0.65	-0.09
1,716.0	35.20	27.80	1,568.0	537.6	255.7	595.3	1.39	0.95	1.79
1,811.0	34.70	28.00	1,645.9	585.7	281.2	649.7	0.54	-0.53	0.21
1,905.0	33.40	27.70	1,723.8	632.2	305.8	702.3	1.39	-1.38	-0.32
2,000.0	33.80	29.50	1,802.9	678.4	330.9	754.8	1.13	0.42	1.89
2,094.0	34.80	29.70	1,880.5	724.4	357.1	807.7	1.07	1.06	0.21
2,189.0	35.70	29.20	1,958.1	772.2	384.0	862.4	0.99	0.95	-0.53
2,284.0	34.90	28.90	2,035.7	820.2	410.7	917.2	0.86	-0.84	-0.32
2,378.0	36.10	27.30	2,112.2	868.3	436.4	971.8	1.61	1.28	-1.70
2,473.0	35.60	27.00	2,189.2	917.8	461.8	1,027.4	0.56	-0.53	-0.32
2,568.0	33.70	26.30	2,267.3	966.1	486.0	1,081.4	2.04	-2.00	-0.74
2,663.0	34.30	29.10	2,346.1	1,013.1	510.7	1,134.5	1.76	0.63	2.95
2,757.0	35.50	28.70	2,423.2	1,060.2	536.7	1,188.2	1.30	1.28	-0.43
2,852.0	34.10	28.30	2,501.2	1,107.9	562.6	1,242.4	1.49	-1.47	-0.42
2,946.0	36.00	29.20	2,578.1	1,155.2	588.6	1,296.3	2.09	2.02	0.96
3,041.0	35.00	29.70	2,655.5	1,203.2	615.7	1,351.4	1.10	-1.05	0.53
3,129.0	35.60	27.60	2,727.3	1,247.8	640.0	1,402.2	1.54	0.68	-2.39
3,230.0	36.10	24.60	2,809.2	1,300.9	666.1	1,461.4	1.81	0.50	-2.97
3,325.0	34.60	24.10	2,886.7	1,351.0	688.7	1,516.3	1.61	-1.58	-0.53
3,419.0	36.00	25.90	2,963.4	1,400.2	711.7	1,570.6	1.86	1.49	1.91
3,514.0	34.90	25.50	3,040.8	1,449.9	735.6	1,625.7	1.18	-1.16	-0.42
3,608.0	35.40	26.70	3,117.6	1,498.5	759.4	1,679.8	0.91	0.53	1.28
3,703.0	34.20	26.40	3,195.6	1,547.0	783.6	1,734.0	1.28	-1.26	-0.32
3,798.0	35.30	28.00	3,273.7	1,595.1	808.4	1,788.1	1.50	1.16	1.68
3,892.0	34.10	28.30	3,351.0	1,642.3	833.6	1,841.6	1.29	-1.28	0.32
3,987.0	35.40	28.30	3,429.0	1,690.0	859.3	1,895.7	1.37	1.37	0.00
4,081.0	34.20	28.30	3,506.2	1,737.2	884.7	1,949.4	1.28	-1.28	0.00
4,176.0	35.70	28.00	3,584.1	1,785.2	910.4	2,003.7	1.59	1.58	-0.32
4,270.0	34.40	27.20	3,661.0	1,833.0	935.4	2,057.7	1.47	-1.38	-0.85
4,365.0	35.70	29.00	3,738.8	1,881.2	961.1	2,112.2	1.75	1.37	1.89
4,459.0	35.10	29.10	3,815.4	1,928.8	987.6	2,166.6	0.64	-0.64	0.11
4,554.0	33.70	28.40	3,893.8	1,975.8	1,013.4	2,220.2	1.53	-1.47	-0.74
4,648.0	35.00	29.80	3,971.4	2,022.1	1,039.2	2,273.2	1.62	1.38	1.49
4,743.0	33.90	28.40	4,049.8	2,069.1	1,065.3	2,326.9	1.43	-1.16	-1.47
4,837.0	34.80	30.30	4,127.4	2,115.3	1,091.3	2,379.8	1.49	0.96	2.02
4,932.0	34.00	30.30	4,205.7	2,161.7	1,118.4	2,433.3	0.84	-0.84	0.00



Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Nichols 0994-13-18E
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 0994-13-18E	North Reference:	True
Wellbore:	A-1	Survey Calculation Method:	Minimum Curvature
Design:	A-1	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)	
5,026.0	33.70	27.90	4,283.8	2,207.4	1,143.9	2,485.6	1.46	-0.32	-2.55	
5,121.0	33.30	24.80	4,363.0	2,254.4	1,167.2	2,538.0	1.85	-0.42	-3.26	
5,215.0	32.90	24.10	4,441.8	2,301.1	1,188.4	2,589.4	0.59	-0.43	-0.74	
5,310.0	31.00	22.30	4,522.4	2,347.3	1,208.2	2,639.6	2.24	-2.00	-1.89	
5,404.0	27.50	22.80	4,604.4	2,389.7	1,225.8	2,685.4	3.73	-3.72	0.53	
5,499.0	25.90	21.90	4,689.3	2,429.2	1,242.1	2,728.0	1.74	-1.68	-0.95	
5,594.0	22.90	22.00	4,775.8	2,465.6	1,256.7	2,767.1	3.16	-3.16	0.11	
5,688.0	20.20	20.60	4,863.2	2,497.7	1,269.3	2,801.5	2.92	-2.87	-1.49	
5,783.0	17.90	18.80	4,953.0	2,526.9	1,279.8	2,832.3	2.50	-2.42	-1.89	
5,877.0	16.30	22.90	5,042.8	2,552.7	1,289.6	2,859.8	2.13	-1.70	4.36	
5,971.0	15.00	23.10	5,133.3	2,576.1	1,299.5	2,885.1	1.38	-1.38	0.21	
6,066.0	13.00	20.40	5,225.5	2,597.4	1,308.0	2,908.0	2.21	-2.11	-2.84	
6,161.0	11.00	19.80	5,318.4	2,615.9	1,314.8	2,927.7	2.11	-2.11	-0.63	
6,255.0	9.10	21.60	5,411.0	2,631.3	1,320.6	2,944.0	2.05	-2.02	1.91	
6,350.0	6.60	19.90	5,505.1	2,643.4	1,325.2	2,956.9	2.64	-2.63	-1.79	
6,445.0	4.60	32.20	5,599.6	2,651.8	1,329.1	2,966.1	2.44	-2.11	12.95	
6,539.0	3.70	28.60	5,693.4	2,657.6	1,332.6	2,972.9	1.00	-0.96	-3.83	
6,634.0	2.90	21.24	5,788.2	2,662.6	1,334.9	2,978.4	0.95	-0.84	-7.75	
6,729.0	2.68	15.26	5,883.1	2,666.9	1,336.3	2,982.9	0.38	-0.23	-6.29	
6,823.0	2.11	5.86	5,977.0	2,670.8	1,337.1	2,986.7	0.73	-0.61	-10.00	
6,918.0	1.45	347.75	6,072.0	2,673.7	1,337.0	2,989.3	0.90	-0.69	-19.06	
7,013.0	1.14	18.34	6,167.0	2,675.8	1,337.1	2,991.2	0.78	-0.33	32.20	
7,107.0	1.40	64.83	6,260.9	2,677.1	1,338.4	2,993.0	1.10	0.28	49.46	
7,202.0	1.01	58.86	6,355.9	2,678.1	1,340.2	2,994.6	0.43	-0.41	-6.28	
7,296.0	0.79	38.20	6,449.9	2,679.0	1,341.3	2,995.9	0.41	-0.23	-21.98	
7,391.0	0.92	359.18	6,544.9	2,680.3	1,341.7	2,997.3	0.61	0.14	-41.07	
7,485.0	0.75	336.50	6,638.9	2,681.6	1,341.4	2,998.3	0.39	-0.18	-24.13	
7,580.0	1.14	319.19	6,733.9	2,682.9	1,340.6	2,999.1	0.50	0.41	-18.22	
7,674.0	1.63	291.06	6,827.9	2,684.1	1,338.7	2,999.3	0.88	0.52	-29.93	
7,769.0	1.80	284.74	6,922.8	2,684.9	1,336.0	2,998.9	0.27	0.18	-6.65	
7,863.0	1.85	273.93	7,016.8	2,685.4	1,333.0	2,998.1	0.37	0.05	-11.50	
7,958.0	2.37	268.92	7,111.7	2,685.5	1,329.6	2,996.6	0.58	0.55	-5.27	
8,053.0	3.25	254.24	7,206.6	2,684.7	1,325.0	2,993.9	1.19	0.93	-15.45	
8,147.0	3.12	249.32	7,300.4	2,683.1	1,320.0	2,990.2	0.32	-0.14	-5.23	
8,241.0	2.99	248.52	7,394.3	2,681.3	1,315.4	2,986.6	0.15	-0.14	-0.85	
8,281.0	2.90	243.95	7,434.3	2,680.5	1,313.5	2,985.0	0.63	-0.23	-11.43	
Projection to TD @ 8338.0' MD / 7491.2' TVD										
8,338.0	2.90	243.95	7,491.2	2,679.2	1,310.9	2,982.7	0.00	0.00	0.00	



Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Nichols 0994-13-18E
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 0994-13-18E	North Reference:	True
Wellbore:	A-1	Survey Calculation Method:	Minimum Curvature
Design:	A-1	Database:	EDM 5000.1 Single User Db

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
203.0	202.9	4.9	2.8	First MWD Survey @ 203.0' MD / 202.9' TVD	
8,338.0	7,491.2	2,679.2	1,310.9	Projection to TD @ 8338.0' MD / 7491.2' TVD	