



Laramie Energy, LLC

Mesa County, CO

Nichols 24-06A

Nichols 0994-13-20E

A-2

Design: A-2

QES Survey Report

06 February, 2018





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Nichols 0994-13-20E
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 0994-13-20E	North Reference:	True
Wellbore:	A-2	Survey Calculation Method:	Minimum Curvature
Design:	A-2	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 0994-13-20E					
Well Position	+N/-S	0.0 usft	Northing:	1,529,770.11 usft	Latitude:	39.264717
	+E/-W	0.0 usft	Easting:	2,340,235.22 usft	Longitude:	-107.830528
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,137.0 usft

Wellbore	A-2				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/24/2018	9.53	65.42	51,348.78605103

Design	A-2				
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	32.04	

Survey Program	Date	2/6/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
112.0	8,130.0	QES MWD Surveys (A-2)	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 @ 112.0' MD / 112.0' TVD									
112.0	0.30	35.80	112.0	0.2	0.2	0.3	0.27	0.27	0.00
294.0	3.30	32.70	293.9	5.0	3.3	6.0	1.65	1.65	-1.70
384.0	3.90	33.60	383.7	9.8	6.4	11.7	0.67	0.67	1.00
475.0	5.90	33.10	474.4	16.3	10.6	19.4	2.20	2.20	-0.55
566.0	8.10	36.10	564.7	25.4	17.0	30.5	2.45	2.42	3.30
656.0	11.20	35.00	653.4	37.6	25.7	45.6	3.45	3.44	-1.22
746.0	14.20	34.20	741.2	53.9	36.9	65.3	3.34	3.33	-0.89
837.0	17.40	32.10	828.7	74.7	50.5	90.1	3.57	3.52	-2.31
929.0	20.20	29.50	915.8	100.2	65.6	119.7	3.18	3.04	-2.83



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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	23.80	31.30	1,003.0	130.5	83.4	154.9	3.90	3.83	1.91
1,117.0	26.50	32.60	1,088.1	164.4	104.6	194.9	2.93	2.87	1.38
1,212.0	28.30	31.60	1,172.4	201.4	127.8	238.6	1.96	1.89	-1.05
1,306.0	30.90	32.60	1,254.1	240.8	152.5	285.0	2.82	2.77	1.06
1,401.0	31.40	32.50	1,335.4	282.2	178.9	334.1	0.53	0.53	-0.11
1,495.0	32.20	31.60	1,415.3	324.2	205.2	383.7	0.99	0.85	-0.96
1,620.0	31.70	31.20	1,521.4	380.6	239.7	449.8	0.43	-0.40	-0.32
1,715.0	30.40	31.00	1,602.8	422.6	265.0	498.8	1.37	-1.37	-0.21
1,810.0	31.30	32.20	1,684.3	464.1	290.5	547.5	1.15	0.95	1.26
1,904.0	30.50	31.40	1,765.0	505.1	316.0	595.8	0.96	-0.85	-0.85
1,999.0	31.30	32.80	1,846.5	546.4	341.9	644.6	1.13	0.84	1.47
2,094.0	30.30	33.10	1,928.1	587.2	368.4	693.2	1.06	-1.05	0.32
2,188.0	31.50	33.50	2,008.8	627.6	394.9	741.5	1.30	1.28	0.43
2,283.0	30.40	33.60	2,090.2	668.3	421.9	790.3	1.16	-1.16	0.11
2,378.0	31.70	33.50	2,171.6	709.1	448.9	839.3	1.37	1.37	-0.11
2,472.0	30.20	33.50	2,252.2	749.4	475.6	887.6	1.60	-1.60	0.00
2,567.0	31.10	32.90	2,334.0	790.0	502.1	936.0	1.00	0.95	-0.63
2,662.0	30.10	32.50	2,415.7	830.7	528.3	984.4	1.07	-1.05	-0.42
2,756.0	30.60	33.50	2,496.8	870.5	554.1	1,031.9	0.76	0.53	1.06
2,851.0	31.90	32.20	2,578.1	911.9	580.9	1,081.1	1.54	1.37	-1.37
2,946.0	31.00	32.00	2,659.1	953.9	607.2	1,130.7	0.95	-0.95	-0.21
3,040.0	30.30	31.70	2,740.0	994.6	632.5	1,178.6	0.76	-0.74	-0.32
3,132.0	29.20	31.20	2,819.8	1,033.5	656.3	1,224.3	1.23	-1.20	-0.54
3,229.0	31.20	33.50	2,903.7	1,074.7	682.4	1,273.1	2.38	2.06	2.37
3,324.0	30.20	34.20	2,985.4	1,115.0	709.4	1,321.5	1.12	-1.05	0.74
3,418.0	29.20	34.30	3,067.0	1,153.5	735.7	1,368.1	1.07	-1.06	0.11
3,513.0	31.20	31.30	3,149.1	1,193.7	761.5	1,415.8	2.64	2.11	-3.16
3,608.0	30.50	30.30	3,230.7	1,235.5	786.4	1,464.5	0.91	-0.74	-1.05
3,702.0	29.60	30.40	3,312.0	1,276.1	810.2	1,511.6	0.96	-0.96	0.11
3,797.0	31.80	31.10	3,393.7	1,317.8	835.0	1,560.1	2.35	2.32	0.74
3,891.0	30.90	31.10	3,474.0	1,359.7	860.3	1,609.0	0.96	-0.96	0.00
3,986.0	30.50	30.90	3,555.7	1,401.3	885.3	1,657.5	0.43	-0.42	-0.21
4,080.0	29.70	30.50	3,637.0	1,441.8	909.3	1,704.6	0.88	-0.85	-0.43
4,175.0	30.50	30.70	3,719.2	1,482.8	933.6	1,752.2	0.85	0.84	0.21
4,269.0	31.60	32.20	3,799.7	1,524.2	958.9	1,800.7	1.43	1.17	1.60
4,364.0	30.40	32.70	3,881.2	1,565.5	985.2	1,849.6	1.29	-1.26	0.53
4,458.0	29.90	32.10	3,962.4	1,605.3	1,010.5	1,896.8	0.62	-0.53	-0.64
4,553.0	31.00	34.20	4,044.3	1,645.6	1,036.8	1,945.0	1.61	1.16	2.21
4,647.0	30.20	33.30	4,125.2	1,685.4	1,063.4	1,992.8	0.98	-0.85	-0.96
4,742.0	28.50	33.70	4,208.0	1,724.2	1,089.1	2,039.3	1.80	-1.79	0.42
4,836.0	29.40	34.40	4,290.3	1,761.9	1,114.5	2,084.8	1.02	0.96	0.74
4,931.0	28.40	34.10	4,373.5	1,799.9	1,140.4	2,130.7	1.06	-1.05	-0.32
5,025.0	29.20	33.90	4,455.8	1,837.4	1,165.7	2,176.0	0.86	0.85	-0.21



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Survey										
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5,120.0	29.00	33.40	4,538.8	1,875.9	1,191.3	2,222.1	0.33	-0.21	-0.53	
5,214.0	26.60	32.80	4,622.0	1,912.6	1,215.3	2,266.0	2.57	-2.55	-0.64	
5,309.0	24.50	31.00	4,707.7	1,947.4	1,236.9	2,306.9	2.36	-2.21	-1.89	
5,403.0	22.70	33.40	4,793.8	1,979.2	1,257.0	2,344.6	2.17	-1.91	2.55	
5,498.0	20.70	30.70	4,882.1	2,008.9	1,275.6	2,379.7	2.35	-2.11	-2.84	
5,593.0	18.10	34.20	4,971.7	2,035.6	1,292.5	2,411.2	3.00	-2.74	3.68	
5,687.0	17.40	32.40	5,061.2	2,059.5	1,308.2	2,439.9	0.95	-0.74	-1.91	
5,782.0	15.20	30.20	5,152.4	2,082.3	1,322.1	2,466.5	2.40	-2.32	-2.32	
5,876.0	12.60	32.50	5,243.6	2,101.6	1,333.8	2,489.1	2.83	-2.77	2.45	
5,971.0	11.70	31.90	5,336.5	2,118.5	1,344.5	2,509.1	0.96	-0.95	-0.63	
6,065.0	10.00	30.60	5,428.8	2,133.6	1,353.7	2,526.8	1.83	-1.81	-1.38	
6,160.0	7.50	27.60	5,522.7	2,146.2	1,360.7	2,541.2	2.67	-2.63	-3.16	
6,254.0	6.20	34.60	5,616.0	2,155.8	1,366.5	2,552.4	1.64	-1.38	7.45	
6,349.0	5.60	32.00	5,710.5	2,164.0	1,371.8	2,562.1	0.69	-0.63	-2.74	
6,444.0	4.10	34.30	5,805.2	2,170.7	1,376.2	2,570.2	1.59	-1.58	2.42	
6,538.0	2.40	32.40	5,899.0	2,175.2	1,379.1	2,575.5	1.81	-1.81	-2.02	
6,633.0	2.40	31.40	5,994.0	2,178.6	1,381.3	2,579.5	0.04	0.00	-1.05	
6,728.0	1.93	27.13	6,088.9	2,181.7	1,383.0	2,583.1	0.52	-0.49	-4.49	
6,823.0	1.36	15.61	6,183.9	2,184.2	1,384.0	2,585.7	0.69	-0.60	-12.13	
6,917.0	0.88	337.21	6,277.8	2,185.9	1,384.1	2,587.2	0.92	-0.51	-40.85	
7,012.0	1.10	333.95	6,372.8	2,187.4	1,383.4	2,588.1	0.24	0.23	-3.43	
7,106.0	0.88	312.07	6,466.8	2,188.7	1,382.5	2,588.7	0.46	-0.23	-23.28	
7,201.0	1.01	304.07	6,561.8	2,189.7	1,381.2	2,588.9	0.19	0.14	-8.42	
7,295.0	1.36	313.74	6,655.8	2,190.9	1,379.7	2,589.1	0.43	0.37	10.29	
7,390.0	1.85	291.59	6,750.7	2,192.2	1,377.5	2,589.1	0.82	0.52	-23.32	
7,484.0	2.46	271.90	6,844.7	2,192.9	1,374.1	2,587.8	1.01	0.65	-20.95	
7,579.0	3.56	266.89	6,939.5	2,192.8	1,369.1	2,585.1	1.19	1.16	-5.27	
7,673.0	3.69	268.12	7,033.4	2,192.5	1,363.1	2,581.7	0.16	0.14	1.31	
7,768.0	4.09	264.52	7,128.1	2,192.1	1,356.7	2,577.9	0.49	0.42	-3.79	
7,863.0	4.09	259.51	7,222.9	2,191.2	1,350.0	2,573.6	0.38	0.00	-5.27	
7,957.0	4.09	260.83	7,316.7	2,190.0	1,343.4	2,569.1	0.10	0.00	1.40	
8,052.0	3.96	262.94	7,411.4	2,189.1	1,336.8	2,564.8	0.21	-0.14	2.22	
Projection to TD @ 8130.0' MD / 7489.2' TVD										
8,130.0	3.96	262.94	7,489.2	2,188.4	1,331.5	2,561.4	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
112.0	112.0	0.2	0.2	First MWD Survey @ 112.0' MD / 112.0' TVD	
8,130.0	7,489.2	2,188.4	1,331.5	Projection to TD @ 8130.0' MD / 7489.2' TVD	



Survey Report



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Checked By: _____	Approved By: _____	Date: _____
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