



Laramie Energy, LLC

**Mesa County, CO
Nichols 24-07 Pad
Nichols 0994-24-10W**

Wellbore #1

Design: Wellbore #1

QES Survey Report

25 February, 2018





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Nichols 0994-24-10W
Project:	Mesa County, CO	TVD Reference:	well @ 7236.0usft (H&P #290)
Site:	Nichols 24-07 Pad	MD Reference:	well @ 7236.0usft (H&P #290)
Well:	Nichols 0994-24-10W	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #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 24-07 Pad				
Site Position:		Northing:	1,529,213.07 usft	Latitude:	39.263181
From:	Lat/Long	Easting:	2,340,128.94 usft	Longitude:	-107.830853
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.47 °

Well	Nichols 0994-24-10W					
Well Position	+N/-S	0.0 usft	Northing:	1,529,289.01 usft	Latitude:	39.263389
	+E/-W	0.0 usft	Easting:	2,340,128.56 usft	Longitude:	-107.830861
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,212.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	2/13/2018	9.45	65.40	51,323.70000000

Design	Wellbore #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	264.15	

Survey Program	Date	2/25/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
112.0	7,531.0	QES MWD Surveys (Wellbore #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 @ 112.0' MD / 112.0' TVD										
112.0	1.10	337.30	112.0	1.0	-0.4	0.3	0.98	0.98	0.00	
201.0	2.30	344.80	201.0	3.5	-1.2	0.8	1.37	1.35	8.43	
290.0	2.30	357.90	289.9	7.0	-1.7	1.0	0.59	0.00	14.72	
380.0	3.70	339.30	379.8	11.5	-2.8	1.6	1.88	1.56	-20.67	
470.0	4.80	328.90	469.5	17.5	-5.8	4.0	1.49	1.22	-11.56	
560.0	7.30	317.70	559.0	24.9	-11.6	9.0	3.06	2.78	-12.44	
650.0	8.60	300.30	648.2	32.6	-21.3	17.8	3.02	1.44	-19.33	
740.0	9.40	287.40	737.1	38.1	-34.1	30.0	2.41	0.89	-14.33	
830.0	11.60	277.00	825.5	41.4	-50.1	45.6	3.22	2.44	-11.56	



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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)
924.0	13.80	273.90	917.2	43.4	-70.7	65.9	2.45	2.34	-3.30
1,019.0	15.60	264.80	1,009.1	43.0	-94.7	89.8	3.08	1.89	-9.58
1,113.0	15.40	263.60	1,099.7	40.4	-119.7	114.9	0.40	-0.21	-1.28
1,208.0	16.50	264.90	1,191.1	37.8	-145.7	141.0	1.22	1.16	1.37
1,303.0	15.90	266.50	1,282.3	35.8	-172.1	167.5	0.79	-0.63	1.68
1,397.0	17.20	265.20	1,372.4	33.9	-198.8	194.3	1.44	1.38	-1.38
1,491.0	18.20	259.10	1,462.0	30.0	-227.0	222.8	2.24	1.06	-6.49
1,579.0	18.10	259.20	1,545.6	24.8	-254.0	250.1	0.12	-0.11	0.11
1,673.0	17.40	258.80	1,635.1	19.3	-282.1	278.7	0.76	-0.74	-0.43
1,767.0	16.90	259.20	1,724.9	14.0	-309.3	306.3	0.55	-0.53	0.43
1,862.0	16.20	258.00	1,816.0	8.7	-335.8	333.2	0.82	-0.74	-1.26
1,956.0	16.90	266.10	1,906.1	5.0	-362.3	359.9	2.56	0.74	8.62
2,051.0	16.00	264.40	1,997.2	2.8	-389.1	386.8	1.07	-0.95	-1.79
2,145.0	15.10	262.90	2,087.8	0.0	-414.1	412.0	1.05	-0.96	-1.60
2,240.0	14.50	260.80	2,179.6	-3.4	-438.2	436.2	0.85	-0.63	-2.21
2,335.0	13.50	259.90	2,271.8	-7.2	-460.8	459.2	1.08	-1.05	-0.95
2,429.0	13.80	266.20	2,363.1	-9.9	-482.8	481.3	1.61	0.32	6.70
2,523.0	15.10	267.20	2,454.2	-11.2	-506.2	504.7	1.41	1.38	1.06
2,618.0	14.60	266.60	2,546.0	-12.6	-530.5	529.1	0.55	-0.53	-0.63
2,712.0	15.60	266.40	2,636.8	-14.1	-555.0	553.5	1.07	1.06	-0.21
2,807.0	15.80	260.40	2,728.2	-17.0	-580.5	579.2	1.72	0.21	-6.32
2,902.0	15.10	259.90	2,819.8	-21.3	-605.4	604.4	0.75	-0.74	-0.53
2,996.0	14.40	258.90	2,910.7	-25.7	-628.9	628.3	0.79	-0.74	-1.06
3,091.0	15.40	264.00	3,002.5	-29.3	-653.1	652.7	1.74	1.05	5.37
3,185.0	14.90	263.30	3,093.2	-32.0	-677.5	677.2	0.57	-0.53	-0.74
3,279.0	14.10	263.30	3,184.2	-34.8	-700.9	700.8	0.85	-0.85	0.00
3,374.0	15.40	262.50	3,276.1	-37.8	-724.9	724.9	1.39	1.37	-0.84
3,469.0	14.90	262.80	3,367.8	-41.0	-749.5	749.8	0.53	-0.53	0.32
3,563.0	14.10	262.50	3,458.8	-44.0	-772.8	773.3	0.85	-0.85	-0.32
3,658.0	15.20	263.40	3,550.7	-46.9	-796.7	797.3	1.18	1.16	0.95
3,753.0	14.50	263.40	3,642.5	-49.7	-820.9	821.7	0.74	-0.74	0.00
3,847.0	15.20	261.40	3,733.4	-52.9	-844.7	845.7	0.92	0.74	-2.13
3,942.0	14.50	261.40	3,825.2	-56.6	-868.8	870.1	0.74	-0.74	0.00
4,037.0	15.30	259.30	3,917.0	-60.7	-892.9	894.4	1.02	0.84	-2.21
4,131.0	14.90	259.20	4,007.8	-65.2	-917.0	918.8	0.43	-0.43	-0.11
4,226.0	15.60	260.00	4,099.4	-69.7	-941.5	943.7	0.77	0.74	0.84
4,320.0	14.60	258.00	4,190.2	-74.4	-965.6	968.1	1.20	-1.06	-2.13
4,415.0	15.10	260.50	4,282.0	-78.9	-989.5	992.4	0.86	0.53	2.63
4,510.0	15.90	261.10	4,373.6	-83.0	-1,014.5	1,017.7	0.86	0.84	0.63
4,604.0	15.20	260.60	4,464.1	-87.0	-1,039.4	1,042.9	0.76	-0.74	-0.53
4,699.0	13.80	258.60	4,556.1	-91.3	-1,062.8	1,066.6	1.56	-1.47	-2.11
4,793.0	13.20	260.10	4,647.5	-95.3	-1,084.4	1,088.4	0.74	-0.64	1.60
4,888.0	14.20	261.40	4,739.8	-98.9	-1,106.6	1,110.9	1.10	1.05	1.37



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4,982.0	13.50	260.60	4,831.1	-102.4	-1,128.8	1,133.4	0.77	-0.74	-0.85	
5,077.0	10.90	257.10	4,923.9	-106.3	-1,148.5	1,153.4	2.84	-2.74	-3.68	
5,171.0	9.10	257.80	5,016.5	-109.8	-1,164.4	1,169.6	1.92	-1.91	0.74	
5,266.0	7.50	251.50	5,110.5	-113.4	-1,177.7	1,183.1	1.93	-1.68	-6.63	
5,361.0	4.70	254.20	5,204.9	-116.4	-1,187.3	1,193.0	2.96	-2.95	2.84	
5,455.0	2.60	251.00	5,298.7	-118.1	-1,193.0	1,198.8	2.24	-2.23	-3.40	
5,550.0	1.30	269.20	5,393.7	-118.9	-1,196.1	1,202.0	1.50	-1.37	19.16	
5,644.0	1.41	265.84	5,487.7	-119.0	-1,198.3	1,204.2	0.14	0.12	-3.57	
5,739.0	1.63	258.98	5,582.6	-119.3	-1,200.8	1,206.7	0.30	0.23	-7.22	
5,834.0	1.90	242.40	5,677.6	-120.3	-1,203.6	1,209.6	0.61	0.28	-17.45	
5,928.0	1.01	284.03	5,771.5	-120.8	-1,205.7	1,211.8	1.41	-0.95	44.29	
6,023.0	0.88	281.84	5,866.5	-120.5	-1,207.3	1,213.3	0.14	-0.14	-2.31	
6,118.0	0.97	274.36	5,961.5	-120.2	-1,208.8	1,214.7	0.16	0.09	-7.87	
6,212.0	1.27	271.29	6,055.5	-120.2	-1,210.6	1,216.6	0.33	0.32	-3.27	
6,307.0	1.27	265.05	6,150.5	-120.2	-1,212.7	1,218.7	0.15	0.00	-6.57	
6,402.0	1.19	249.84	6,245.5	-120.7	-1,214.7	1,220.7	0.35	-0.08	-16.01	
6,497.0	1.19	262.50	6,340.4	-121.1	-1,216.6	1,222.6	0.28	0.00	13.33	
6,591.0	1.14	265.31	6,434.4	-121.3	-1,218.5	1,224.5	0.08	-0.05	2.99	
6,686.0	1.10	265.84	6,529.4	-121.5	-1,220.4	1,226.4	0.04	-0.04	0.56	
6,780.0	1.58	261.18	6,623.4	-121.7	-1,222.5	1,228.6	0.52	0.51	-4.96	
6,875.0	1.76	263.03	6,718.3	-122.1	-1,225.3	1,231.3	0.20	0.19	1.95	
6,970.0	2.15	252.66	6,813.3	-122.8	-1,228.4	1,234.5	0.55	0.41	-10.92	
7,065.0	2.55	244.13	6,908.2	-124.3	-1,232.0	1,238.3	0.56	0.42	-8.98	
7,159.0	2.59	246.68	7,002.1	-126.0	-1,235.9	1,242.3	0.13	0.04	2.71	
7,254.0	2.77	248.70	7,097.0	-127.7	-1,240.0	1,246.5	0.21	0.19	2.13	
7,348.0	2.63	250.37	7,190.9	-129.3	-1,244.1	1,250.8	0.17	-0.15	1.78	
7,443.0	2.64	248.09	7,285.8	-130.8	-1,248.2	1,255.0	0.11	0.01	-2.40	
7,473.0	2.59	244.04	7,315.8	-131.4	-1,249.5	1,256.3	0.64	-0.17	-13.50	
Projection to TD @ 7531.0' MD / 7373.7' TVD										
7,531.0	2.59	244.04	7,373.7	-132.5	-1,251.8	1,258.8	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	1.0	-0.4	First MWD Survey @ 112.0' MD / 112.0' TVD	
7,531.0	7,373.7	-132.5	-1,251.8	Projection to TD @ 7531.0' MD / 7373.7' TVD	