



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols 0994-24-10E

Wellbore #1

Design: Wellbore #1

QES Survey Report

03 March, 2018





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Nichols 0994-24-10E
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 0994-24-10E	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 0994-24-10E				
Well Position	+N/-S	0.0 usft	Northing:	1,529,287.65 usft	Latitude: 39.263386
	+E/-W	0.0 usft	Easting:	2,340,138.73 usft	Longitude: -107.830825
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	88.42	

Survey Program	Date	3/3/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
201.0	8,288.0	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 @ 201.0' MD / 201.0' TVD									
201.0	1.80	40.70	201.0	2.4	2.1	2.1	0.90	0.90	0.00
290.0	2.50	25.90	289.9	5.2	3.8	4.0	1.00	0.79	-16.63
380.0	2.50	33.60	379.8	8.6	5.8	6.0	0.37	0.00	8.56
470.0	2.10	37.30	469.7	11.5	7.8	8.2	0.47	-0.44	4.11
560.0	2.00	32.10	559.7	14.2	9.7	10.1	0.23	-0.11	-5.78
650.0	3.20	34.80	649.6	17.6	11.9	12.4	1.34	1.33	3.00
740.0	5.50	58.20	739.3	21.9	17.0	17.6	3.18	2.56	26.00
830.0	8.40	61.70	828.7	27.3	26.5	27.2	3.25	3.22	3.89
924.0	9.90	68.30	921.5	33.6	40.1	41.0	1.95	1.60	7.02



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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)
1,019.0	11.70	71.80	1,014.8	39.6	56.8	57.9	2.02	1.89	3.68
1,114.0	15.00	77.20	1,107.2	45.3	77.9	79.2	3.71	3.47	5.68
1,208.0	17.30	85.30	1,197.5	49.2	103.7	105.1	3.42	2.45	8.62
1,303.0	18.90	88.90	1,287.8	50.6	133.2	134.6	2.05	1.68	3.79
1,397.0	18.60	88.90	1,376.8	51.2	163.4	164.8	0.32	-0.32	0.00
1,492.0	18.19	89.25	1,467.0	51.7	193.4	194.7	0.45	-0.43	0.37
1,673.0	16.40	88.20	1,639.8	52.8	247.2	248.5	1.00	-0.99	-0.58
1,767.0	16.50	85.70	1,729.9	54.3	273.8	275.2	0.76	0.11	-2.66
1,862.0	16.90	87.10	1,820.9	56.0	301.0	302.4	0.60	0.42	1.47
1,956.0	17.80	88.70	1,910.6	57.0	329.0	330.5	1.08	0.96	1.70
2,051.0	18.50	89.10	2,000.9	57.6	358.6	360.1	0.75	0.74	0.42
2,145.0	17.40	88.60	2,090.3	58.1	387.6	389.0	1.18	-1.17	-0.53
2,240.0	18.50	88.50	2,180.7	58.9	416.8	418.3	1.16	1.16	-0.11
2,335.0	18.10	91.70	2,270.9	58.8	446.7	448.1	1.14	-0.42	3.37
2,429.0	17.80	92.60	2,360.3	57.7	475.6	477.0	0.43	-0.32	0.96
2,523.0	17.30	89.50	2,450.0	57.2	503.9	505.3	1.13	-0.53	-3.30
2,618.0	19.10	90.60	2,540.2	57.2	533.6	535.0	1.93	1.89	1.16
2,712.0	18.50	89.20	2,629.2	57.2	563.9	565.3	0.80	-0.64	-1.49
2,807.0	18.80	90.00	2,719.2	57.4	594.3	595.6	0.42	0.32	0.84
2,902.0	18.10	88.60	2,809.3	57.8	624.3	625.7	0.87	-0.74	-1.47
2,996.0	18.50	90.20	2,898.6	58.1	653.8	655.2	0.68	0.43	1.70
3,091.0	17.80	90.60	2,988.8	57.9	683.4	684.8	0.75	-0.74	0.42
3,185.0	17.10	90.40	3,078.5	57.7	711.6	712.9	0.75	-0.74	-0.21
3,279.0	16.60	89.30	3,168.5	57.7	738.9	740.2	0.63	-0.53	-1.17
3,374.0	17.30	91.50	3,259.3	57.5	766.6	767.8	1.00	0.74	2.32
3,469.0	17.00	90.30	3,350.1	57.1	794.6	795.8	0.49	-0.32	-1.26
3,563.0	16.30	92.20	3,440.2	56.5	821.5	822.7	0.94	-0.74	2.02
3,658.0	17.10	89.50	3,531.2	56.1	848.8	850.0	1.17	0.84	-2.84
3,753.0	16.70	90.00	3,622.1	56.2	876.4	877.6	0.45	-0.42	0.53
3,847.0	16.10	89.90	3,712.2	56.2	902.9	904.1	0.64	-0.64	-0.11
3,942.0	16.80	91.50	3,803.4	55.9	929.8	931.0	0.88	0.74	1.68
4,037.0	17.80	90.50	3,894.1	55.4	958.1	959.2	1.10	1.05	-1.05
4,131.0	17.20	92.40	3,983.7	54.7	986.3	987.5	0.88	-0.64	2.02
4,226.0	16.80	92.20	4,074.6	53.6	1,014.1	1,015.2	0.43	-0.42	-0.21
4,320.0	16.10	91.30	4,164.7	52.8	1,040.7	1,041.7	0.79	-0.74	-0.96
4,415.0	17.10	90.70	4,255.7	52.3	1,067.8	1,068.9	1.07	1.05	-0.63
4,510.0	16.10	91.30	4,346.8	51.8	1,095.0	1,096.0	1.07	-1.05	0.63
4,604.0	17.20	91.40	4,436.8	51.2	1,121.9	1,122.9	1.17	1.17	0.11
4,699.0	17.40	91.20	4,527.5	50.6	1,150.1	1,151.1	0.22	0.21	-0.21
4,793.0	17.90	90.10	4,617.1	50.3	1,178.6	1,179.6	0.64	0.53	-1.17
4,888.0	16.50	90.30	4,707.9	50.2	1,206.7	1,207.6	1.47	-1.47	0.21
4,982.0	14.70	88.40	4,798.4	50.4	1,232.0	1,232.9	1.99	-1.91	-2.02
5,077.0	13.90	90.40	4,890.5	50.7	1,255.4	1,256.4	0.99	-0.84	2.11



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5,171.0	14.50	90.00	4,981.6	50.6	1,278.5	1,279.4	0.65	0.64	-0.43	
5,266.0	13.10	90.70	5,073.8	50.5	1,301.2	1,302.1	1.48	-1.47	0.74	
5,361.0	11.50	90.70	5,166.7	50.2	1,321.4	1,322.3	1.68	-1.68	0.00	
5,455.0	10.80	91.30	5,258.9	49.9	1,339.6	1,340.4	0.75	-0.74	0.64	
5,550.0	9.10	90.90	5,352.5	49.6	1,356.0	1,356.8	1.79	-1.79	-0.42	
5,644.0	7.80	91.50	5,445.4	49.3	1,369.8	1,370.6	1.39	-1.38	0.64	
5,739.0	7.20	92.40	5,539.6	48.9	1,382.2	1,383.0	0.64	-0.63	0.95	
5,834.0	6.30	93.70	5,634.0	48.3	1,393.3	1,394.1	0.96	-0.95	1.37	
5,928.0	4.60	90.00	5,727.5	48.0	1,402.3	1,403.0	1.85	-1.81	-3.94	
6,023.0	4.20	88.30	5,822.3	48.1	1,409.5	1,410.3	0.44	-0.42	-1.79	
6,118.0	3.40	92.60	5,917.0	48.0	1,415.8	1,416.6	0.89	-0.84	4.53	
6,212.0	3.03	107.45	6,010.9	47.2	1,421.0	1,421.7	0.97	-0.39	15.80	
6,307.0	2.24	97.96	6,105.8	46.2	1,425.2	1,426.0	0.95	-0.83	-9.99	
6,402.0	1.76	95.67	6,200.7	45.8	1,428.5	1,429.2	0.51	-0.51	-2.41	
6,497.0	1.45	113.86	6,295.7	45.1	1,431.1	1,431.8	0.62	-0.33	19.15	
6,591.0	1.23	112.28	6,389.7	44.3	1,433.1	1,433.8	0.24	-0.23	-1.68	
6,686.0	0.40	24.20	6,484.7	44.2	1,434.2	1,434.8	1.35	-0.87	-92.72	
6,780.0	1.40	327.50	6,578.7	45.4	1,433.7	1,434.4	1.31	1.06	-60.32	
6,875.0	1.58	327.79	6,673.6	47.5	1,432.4	1,433.1	0.19	0.19	0.31	
6,970.0	1.58	317.77	6,768.6	49.6	1,430.8	1,431.6	0.29	0.00	-10.55	
7,065.0	1.58	305.73	6,863.6	51.3	1,428.8	1,429.7	0.35	0.00	-12.67	
7,159.0	1.58	280.42	6,957.5	52.3	1,426.5	1,427.4	0.74	0.00	-26.93	
7,254.0	2.29	255.10	7,052.5	52.1	1,423.4	1,424.3	1.15	0.75	-26.65	
7,348.0	2.64	240.95	7,146.4	50.6	1,419.7	1,420.5	0.74	0.37	-15.05	
7,443.0	2.55	243.24	7,241.3	48.5	1,415.9	1,416.7	0.14	-0.09	2.41	
7,537.0	2.37	238.32	7,335.2	46.6	1,412.4	1,413.1	0.30	-0.19	-5.23	
7,632.0	2.64	235.59	7,430.1	44.3	1,408.9	1,409.6	0.31	0.28	-2.87	
7,727.0	2.55	221.27	7,525.0	41.5	1,405.7	1,406.3	0.69	-0.09	-15.07	
7,821.0	2.59	228.39	7,618.9	38.5	1,402.7	1,403.2	0.34	0.04	7.57	
7,916.0	2.33	231.99	7,713.8	35.9	1,399.6	1,400.0	0.32	-0.27	3.79	
8,010.0	2.46	223.55	7,807.7	33.2	1,396.7	1,397.1	0.40	0.14	-8.98	
8,105.0	2.50	221.53	7,902.7	30.2	1,393.9	1,394.2	0.10	0.04	-2.13	
8,200.0	2.42	225.13	7,997.6	27.3	1,391.1	1,391.3	0.18	-0.08	3.79	
8,230.0	2.68	223.20	8,027.5	26.3	1,390.2	1,390.4	0.91	0.87	-6.43	
Projection to TD @ 8288.0' MD / 8085.5' TVD										
8,288.0	2.68	223.20	8,085.5	24.3	1,388.3	1,388.5	0.00	0.00	0.00	



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Design:	Wellbore #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)	
201.0	201.0	2.4	2.1	First MWD Survey @ 201.0' MD / 201.0' TVD
8,288.0	8,085.5	24.3	1,388.3	Projection to TD @ 8288.0' MD / 8085.5' TVD

Checked By: _____ Approved By: _____ Date: _____