



Laramie Energy, LLC

Mesa County, CO

Nichols 24-06A

Nichols 0994-24-05W

B-8

Design: B-8

QES Survey Report

24 December, 2017





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Nichols 0994-24-05W
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 0994-24-05W	North Reference:	True
Wellbore:	B-8	Survey Calculation Method:	Minimum Curvature
Design:	B-8	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 0994-24-05W					
Well Position	+N/-S	0.0 usft	Northing:	1,529,733.31 usft	Latitude:	39.264614
	+E/-W	0.0 usft	Easting:	2,340,206.81 usft	Longitude:	-107.830625
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,137.0 usft

Wellbore	B-8				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/4/2017	9.55	65.42	51,364.23603545

Design	B-8				
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	297.40	

Survey Program	Date	12/24/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
202.0	7,570.0	QES MWD Surveys (B-8)	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 @ 202.0' MD / 201.9' TVD									
202.0	2.30	333.10	201.9	3.6	-1.8	3.3	1.14	1.14	0.00
324.0	3.30	321.20	323.8	8.5	-5.1	8.5	0.94	0.82	-9.75
384.0	3.50	318.70	383.7	11.3	-7.4	11.8	0.41	0.33	-4.17
474.0	4.10	294.40	473.5	14.7	-12.2	17.6	1.89	0.67	-27.00
565.0	5.40	300.60	564.2	18.2	-18.8	25.1	1.53	1.43	6.81
655.0	7.10	299.50	653.6	23.1	-27.3	34.9	1.89	1.89	-1.22
745.0	9.10	297.40	742.7	29.1	-38.5	47.5	2.25	2.22	-2.33
837.0	10.70	296.90	833.4	36.3	-52.5	63.4	1.74	1.74	-0.54
928.0	11.90	296.10	922.6	44.2	-68.5	81.2	1.33	1.32	-0.88



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Wellbore:	B-8	Survey Calculation Method:	Minimum Curvature
Design:	B-8	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)
1,022.0	12.00	295.00	1,014.6	52.6	-86.1	100.6	0.26	0.11	-1.17
1,117.0	13.20	295.50	1,107.3	61.5	-104.8	121.3	1.27	1.26	0.53
1,211.0	14.20	295.50	1,198.6	71.1	-124.9	143.6	1.06	1.06	0.00
1,306.0	16.40	295.30	1,290.2	81.8	-147.5	168.6	2.32	2.32	-0.21
1,400.0	18.00	295.10	1,380.0	93.6	-172.7	196.4	1.70	1.70	-0.21
1,495.0	18.50	293.00	1,470.2	105.8	-199.9	226.1	0.87	0.53	-2.21
1,587.0	18.50	293.30	1,557.5	117.2	-226.7	255.2	0.10	0.00	0.33
1,681.0	18.00	297.70	1,646.8	129.9	-253.3	284.6	1.56	-0.53	4.68
1,776.0	20.20	298.30	1,736.5	144.5	-280.7	315.7	2.32	2.32	0.63
1,870.0	19.40	297.00	1,825.0	159.3	-308.9	347.5	0.97	-0.85	-1.38
1,965.0	18.60	296.60	1,914.8	173.2	-336.5	378.5	0.85	-0.84	-0.42
2,059.0	20.10	301.30	2,003.5	188.3	-363.7	409.6	2.30	1.60	5.00
2,154.0	19.60	299.30	2,092.9	204.6	-391.6	441.8	0.89	-0.53	-2.11
2,248.0	18.40	300.50	2,181.7	219.9	-418.1	472.4	1.34	-1.28	1.28
2,342.0	19.10	300.70	2,270.7	235.2	-444.1	502.5	0.75	0.74	0.21
2,437.0	17.20	300.80	2,361.0	250.4	-469.5	532.1	2.00	-2.00	0.11
2,532.0	17.30	300.90	2,451.7	264.8	-493.7	560.2	0.11	0.11	0.11
2,626.0	17.90	301.50	2,541.3	279.5	-518.0	588.6	0.67	0.64	0.64
2,721.0	20.20	297.80	2,631.1	294.8	-545.0	619.5	2.73	2.42	-3.89
2,815.0	19.90	297.60	2,719.4	309.8	-573.5	651.8	0.33	-0.32	-0.21
2,910.0	19.20	296.60	2,809.0	324.3	-601.8	683.5	0.82	-0.74	-1.05
3,005.0	18.30	295.90	2,898.9	337.8	-629.2	714.1	0.98	-0.95	-0.74
3,100.0	18.60	301.00	2,989.0	352.1	-655.6	744.1	1.73	0.32	5.37
3,194.0	18.30	301.20	3,078.2	367.5	-681.1	773.8	0.33	-0.32	0.21
3,289.0	19.60	301.20	3,168.1	383.5	-707.5	804.6	1.37	1.37	0.00
3,384.0	19.20	300.20	3,257.7	399.6	-734.6	836.1	0.55	-0.42	-1.05
3,478.0	18.80	301.70	3,346.5	415.3	-760.8	866.6	0.67	-0.43	1.60
3,573.0	18.10	300.10	3,436.7	430.7	-786.6	896.6	0.91	-0.74	-1.68
3,667.0	17.40	300.20	3,526.2	445.1	-811.4	925.2	0.75	-0.74	0.11
3,762.0	19.00	300.80	3,616.4	460.2	-837.0	954.9	1.70	1.68	0.63
3,857.0	18.80	299.70	3,706.3	475.7	-863.6	985.6	0.43	-0.21	-1.16
3,951.0	18.30	300.60	3,795.4	490.7	-889.4	1,015.5	0.61	-0.53	0.96
4,046.0	17.80	300.30	3,885.7	505.6	-914.8	1,044.9	0.54	-0.53	-0.32
4,140.0	17.10	298.80	3,975.4	519.5	-939.3	1,073.0	0.89	-0.74	-1.60
4,235.0	18.20	298.70	4,065.9	533.4	-964.6	1,101.8	1.16	1.16	-0.11
4,329.0	17.10	295.50	4,155.5	546.4	-989.9	1,130.3	1.56	-1.17	-3.40
4,424.0	17.70	298.40	4,246.2	559.3	-1,015.2	1,158.7	1.11	0.63	3.05
4,519.0	18.00	297.40	4,336.6	572.9	-1,041.0	1,187.8	0.45	0.32	-1.05
4,614.0	17.50	296.20	4,427.1	586.0	-1,066.8	1,216.8	0.65	-0.53	-1.26
4,708.0	16.20	294.60	4,517.0	597.7	-1,091.4	1,244.0	1.47	-1.38	-1.70
4,802.0	16.20	294.80	4,607.3	608.6	-1,115.2	1,270.2	0.06	0.00	0.21
4,897.0	15.30	296.40	4,698.7	619.8	-1,138.5	1,296.0	1.05	-0.95	1.68
4,991.0	13.90	296.60	4,789.7	630.3	-1,159.7	1,319.7	1.49	-1.49	0.21



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5,086.0	12.90	295.30	4,882.1	640.0	-1,179.5	1,341.7	1.10	-1.05	-1.37	
5,181.0	12.30	298.90	4,974.8	649.4	-1,197.9	1,362.4	1.04	-0.63	3.79	
5,275.0	10.00	298.70	5,067.0	658.2	-1,213.9	1,380.6	2.45	-2.45	-0.21	
5,370.0	9.40	298.40	5,160.7	665.8	-1,227.9	1,396.6	0.63	-0.63	-0.32	
5,464.0	7.00	302.10	5,253.7	672.5	-1,239.5	1,410.0	2.61	-2.55	3.94	
5,558.0	6.60	296.70	5,347.1	678.0	-1,249.2	1,421.1	0.80	-0.43	-5.74	
5,653.0	4.00	288.60	5,441.7	681.5	-1,257.2	1,429.8	2.84	-2.74	-8.53	
5,747.0	4.00	292.70	5,535.4	683.8	-1,263.4	1,436.3	0.30	0.00	4.36	
5,842.0	3.10	281.20	5,630.2	685.6	-1,268.9	1,442.1	1.20	-0.95	-12.11	
5,936.0	3.00	290.90	5,724.1	686.9	-1,273.7	1,447.0	0.56	-0.11	10.32	
6,031.0	3.30	331.10	5,819.0	690.2	-1,277.4	1,451.7	2.30	0.32	42.32	
6,125.0	3.20	326.20	5,912.8	694.8	-1,280.1	1,456.3	0.31	-0.11	-5.21	
6,220.0	0.40	315.00	6,007.8	697.2	-1,281.9	1,458.9	2.96	-2.95	-11.79	
6,315.0	0.20	261.30	6,102.8	697.4	-1,282.3	1,459.4	0.34	-0.21	-56.53	
6,409.0	0.62	295.28	6,196.8	697.6	-1,282.9	1,460.0	0.50	0.45	36.15	
6,504.0	1.01	268.04	6,291.8	697.8	-1,284.2	1,461.2	0.57	0.41	-28.67	
6,599.0	2.81	246.85	6,386.7	696.9	-1,287.2	1,463.4	2.00	1.89	-22.31	
6,693.0	1.01	225.06	6,480.6	695.4	-1,289.9	1,465.2	2.03	-1.91	-23.18	
6,787.0	1.32	242.64	6,574.6	694.3	-1,291.4	1,466.0	0.50	0.33	18.70	
6,882.0	2.46	243.25	6,669.6	692.9	-1,294.2	1,467.9	1.20	1.20	0.64	
6,977.0	2.64	250.46	6,764.5	691.2	-1,298.1	1,470.6	0.39	0.19	7.59	
7,071.0	3.07	260.30	6,858.4	690.1	-1,302.6	1,474.0	0.69	0.46	10.47	
7,166.0	3.16	254.97	6,953.2	689.0	-1,307.6	1,478.0	0.32	0.09	-5.61	
7,260.0	3.21	274.10	7,047.1	688.5	-1,312.8	1,482.3	1.13	0.05	20.35	
7,355.0	3.56	270.15	7,141.9	688.7	-1,318.4	1,487.4	0.44	0.37	-4.16	
7,450.0	3.52	269.53	7,236.7	688.7	-1,324.2	1,492.6	0.06	-0.04	-0.65	
7,516.0	3.08	266.63	7,302.6	688.5	-1,328.0	1,495.9	0.71	-0.67	-4.39	
Projection to TD @ 7570.0' MD / 7356.4' TVD										
7,570.0	3.08	266.63	7,356.5	688.4	-1,330.9	1,498.4	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
202.0	201.9	3.6	-1.8	First MWD Survey @ 202.0' MD / 201.9' TVD	
7,570.0	7,356.5	688.4	-1,330.9	Projection to TD @ 7570.0' MD / 7356.4' TVD	

Checked By: _____	Approved By: _____	Date: _____
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