



Laramie Energy, LLC

Mesa County, CO

Nichols 24-06A

Nichols 0994-24-07W

B-10

Design: B-10

Survey Report - Geographic

08 December, 2017





Survey Report - Geographic



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Nichols 0994-24-07W
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 0994-24-07W	North Reference:	True
Wellbore:	B-10	Survey Calculation Method:	Minimum Curvature
Design:	B-10	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 0994-24-07W					
Well Position	+N/-S	0.0 usft	Northing:	1,529,720.34 usft	Latitude:	39.264578
	+E/-W	0.0 usft	Easting:	2,340,201.09 usft	Longitude:	-107.830644
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,137.0 usft

Wellbore	B-10				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/14/2017	9.55	65.42	51,370.29643415

Design	B-10				
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	279.05	

Survey Program	Date	12/8/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
201.0	7,531.0	MWD Surveys (B-10)	MWD default	MWD - Standard	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	1,529,720.34	2,340,201.09	39.264578	-107.830644
201.0	1.30	205.20	201.0	-2.1	-1.0	1,529,718.31	2,340,200.07	39.264572	-107.830648
First MWD Survey @ 201.0' MD / 201.0' TVD									
292.0	0.40	258.80	292.0	-3.1	-1.7	1,529,717.33	2,340,199.29	39.264570	-107.830650
413.0	0.00	279.60	413.0	-3.1	-2.1	1,529,717.26	2,340,198.88	39.264569	-107.830652
473.0	0.70	298.40	473.0	-3.0	-2.5	1,529,717.44	2,340,198.56	39.264570	-107.830653
564.0	2.40	291.70	563.9	-2.0	-4.7	1,529,718.47	2,340,196.33	39.264573	-107.830661
654.0	3.80	287.90	653.8	-0.4	-9.3	1,529,720.20	2,340,191.78	39.264577	-107.830677
744.0	5.80	279.10	743.5	1.3	-16.6	1,529,722.02	2,340,184.49	39.264581	-107.830703
835.0	8.30	283.20	833.8	3.5	-27.6	1,529,724.53	2,340,173.62	39.264588	-107.830742
927.0	10.60	280.70	924.5	6.6	-42.4	1,529,728.00	2,340,158.92	39.264596	-107.830794
1,021.0	13.80	280.00	1,016.4	10.1	-61.9	1,529,732.05	2,340,139.48	39.264606	-107.830863



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Site:	Nichols 24-06A	MD Reference:	well @ 7161.0usft (H&P #290)
Well:	Nichols 0994-24-07W	North Reference:	True
Wellbore:	B-10	Survey Calculation Method:	Minimum Curvature
Design:	B-10	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,116.0	17.30	281.60	1,107.9	14.9	-86.9	1,529,737.50	2,340,114.61	39.264619	-107.830951
1,210.0	19.20	280.60	1,197.2	20.6	-115.8	1,529,743.89	2,340,085.87	39.264635	-107.831053
1,305.0	19.60	280.10	1,286.8	26.3	-146.8	1,529,750.35	2,340,054.99	39.264650	-107.831163
1,399.0	19.90	279.40	1,375.3	31.6	-178.1	1,529,756.53	2,340,023.83	39.264665	-107.831273
1,493.0	19.60	280.30	1,463.7	37.1	-209.4	1,529,762.77	2,339,992.69	39.264680	-107.831384
1,587.0	19.10	277.30	1,552.4	41.8	-240.2	1,529,768.33	2,339,962.05	39.264693	-107.831493
1,682.0	19.00	276.90	1,642.2	45.7	-271.0	1,529,772.95	2,339,931.39	39.264703	-107.831601
1,777.0	18.60	274.60	1,732.1	48.7	-301.4	1,529,776.80	2,339,901.02	39.264712	-107.831709
1,871.0	18.40	274.90	1,821.3	51.2	-331.1	1,529,780.03	2,339,871.37	39.264719	-107.831814
1,965.0	18.10	275.20	1,910.6	53.8	-360.5	1,529,783.37	2,339,842.13	39.264726	-107.831917
2,059.0	18.10	273.90	1,999.9	56.1	-389.6	1,529,786.44	2,339,813.08	39.264732	-107.832020
2,154.0	17.70	272.30	2,090.3	57.7	-418.7	1,529,788.77	2,339,783.98	39.264736	-107.832123
2,248.0	17.00	278.70	2,180.0	60.4	-446.6	1,529,792.13	2,339,756.19	39.264744	-107.832222
2,343.0	16.70	277.90	2,271.0	64.3	-473.8	1,529,796.81	2,339,729.06	39.264755	-107.832318
2,437.0	16.40	277.40	2,361.1	67.9	-500.4	1,529,801.05	2,339,702.62	39.264764	-107.832412
2,532.0	16.60	276.90	2,452.2	71.3	-527.2	1,529,805.10	2,339,675.94	39.264774	-107.832506
2,627.0	16.00	278.50	2,543.3	74.8	-553.6	1,529,809.34	2,339,649.62	39.264783	-107.832599
2,721.0	16.10	278.40	2,633.7	78.6	-579.3	1,529,813.81	2,339,624.02	39.264794	-107.832690
2,816.0	16.10	278.30	2,724.9	82.5	-605.3	1,529,818.31	2,339,598.06	39.264804	-107.832782
2,910.0	16.10	277.70	2,815.3	86.1	-631.2	1,529,822.60	2,339,572.35	39.264814	-107.832874
3,005.0	16.20	276.30	2,906.5	89.3	-657.4	1,529,826.49	2,339,546.22	39.264823	-107.832966
3,100.0	15.80	282.00	2,997.8	93.5	-683.2	1,529,831.29	2,339,520.51	39.264835	-107.833057
3,194.0	15.60	283.50	3,088.3	99.1	-708.0	1,529,837.54	2,339,495.85	39.264850	-107.833145
3,289.0	15.50	283.90	3,179.9	105.1	-732.8	1,529,844.20	2,339,471.27	39.264867	-107.833232
3,384.0	15.70	284.30	3,271.4	111.3	-757.5	1,529,851.06	2,339,446.66	39.264884	-107.833320
3,479.0	15.50	283.30	3,362.9	117.4	-782.3	1,529,857.79	2,339,422.02	39.264900	-107.833408
3,573.0	15.70	282.50	3,453.4	123.1	-807.0	1,529,864.06	2,339,397.53	39.264916	-107.833495
3,668.0	16.50	283.00	3,544.7	128.9	-832.7	1,529,870.54	2,339,371.99	39.264932	-107.833585
3,763.0	16.40	284.10	3,635.8	135.2	-858.8	1,529,877.51	2,339,346.01	39.264949	-107.833678
3,857.0	16.20	284.10	3,726.0	141.6	-884.4	1,529,884.59	2,339,320.60	39.264967	-107.833768
3,952.0	16.00	282.50	3,817.3	147.7	-910.1	1,529,891.31	2,339,295.13	39.264983	-107.833859
4,046.0	16.00	282.60	3,907.6	153.3	-935.3	1,529,897.58	2,339,269.99	39.264999	-107.833948
4,141.0	15.50	281.70	3,999.1	158.7	-960.6	1,529,903.66	2,339,244.93	39.265014	-107.834037
4,235.0	15.30	282.50	4,089.7	164.0	-985.0	1,529,909.51	2,339,220.66	39.265028	-107.834123
4,330.0	14.80	283.30	4,181.4	169.5	-1,009.0	1,529,915.63	2,339,196.77	39.265043	-107.834208
4,425.0	14.40	282.30	4,273.4	174.8	-1,032.4	1,529,921.54	2,339,173.56	39.265058	-107.834291
4,519.0	14.00	283.20	4,364.5	179.9	-1,054.8	1,529,927.20	2,339,151.21	39.265072	-107.834370
4,614.0	14.00	282.50	4,456.7	185.0	-1,077.3	1,529,932.88	2,339,128.94	39.265086	-107.834449
4,708.0	13.20	281.70	4,548.0	189.6	-1,098.9	1,529,938.07	2,339,107.46	39.265099	-107.834525
4,803.0	12.50	281.80	4,640.7	193.9	-1,119.5	1,529,942.91	2,339,086.89	39.265110	-107.834599
4,897.0	11.80	281.40	4,732.5	197.9	-1,138.9	1,529,947.38	2,339,067.62	39.265121	-107.834667
4,992.0	11.60	279.70	4,825.6	201.4	-1,157.9	1,529,951.40	2,339,048.78	39.265131	-107.834734
5,086.0	10.80	284.60	4,917.8	205.2	-1,175.7	1,529,955.66	2,339,031.04	39.265141	-107.834797
5,181.0	9.30	284.50	5,011.3	209.4	-1,191.7	1,529,960.24	2,339,015.11	39.265153	-107.834854
5,275.0	9.20	284.70	5,104.1	213.2	-1,206.4	1,529,964.42	2,339,000.59	39.265163	-107.834905
5,370.0	7.10	289.70	5,198.1	217.1	-1,219.2	1,529,968.66	2,338,987.82	39.265174	-107.834951
5,454.0	7.20	289.60	5,281.5	220.6	-1,229.1	1,529,972.43	2,338,978.06	39.265184	-107.834985
5,559.0	7.10	285.70	5,385.7	224.6	-1,241.5	1,529,976.71	2,338,965.72	39.265195	-107.835029
5,653.0	6.70	283.60	5,479.0	227.4	-1,252.5	1,529,979.85	2,338,954.88	39.265202	-107.835068
5,748.0	6.20	286.00	5,573.4	230.2	-1,262.8	1,529,982.83	2,338,944.63	39.265210	-107.835104
5,842.0	4.10	281.10	5,667.0	232.2	-1,271.0	1,529,985.08	2,338,936.51	39.265216	-107.835133
5,937.0	2.50	281.00	5,761.8	233.3	-1,276.3	1,529,986.27	2,338,931.17	39.265218	-107.835152
6,031.0	0.90	274.30	5,855.8	233.7	-1,279.1	1,529,986.79	2,338,928.44	39.265220	-107.835162
6,126.0	0.40	52.80	5,950.8	234.0	-1,279.6	1,529,987.06	2,338,927.96	39.265220	-107.835164
6,220.0	0.60	54.90	6,044.8	234.4	-1,278.9	1,529,987.52	2,338,928.64	39.265222	-107.835161



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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 0994-24-07W	North Reference:	True
Wellbore:	B-10	Survey Calculation Method:	Minimum Curvature
Design:	B-10	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,315.0	0.00	35.30	6,139.8	234.7	-1,278.5	1,529,987.80	2,338,929.05	39.265222	-107.835160
6,410.0	0.30	218.20	6,234.8	234.5	-1,278.6	1,529,987.60	2,338,928.90	39.265222	-107.835160
6,504.0	0.70	236.50	6,328.8	234.0	-1,279.3	1,529,987.11	2,338,928.25	39.265220	-107.835163
6,599.0	1.50	231.30	6,423.8	232.9	-1,280.7	1,529,986.05	2,338,926.77	39.265217	-107.835168
6,693.0	1.70	230.60	6,517.7	231.3	-1,282.8	1,529,984.45	2,338,924.69	39.265213	-107.835175
6,787.0	2.20	239.60	6,611.7	229.5	-1,285.4	1,529,982.72	2,338,922.01	39.265208	-107.835184
6,882.0	1.80	256.80	6,706.6	228.2	-1,288.4	1,529,981.53	2,338,918.95	39.265205	-107.835195
6,977.0	2.40	262.30	6,801.6	227.6	-1,291.8	1,529,981.01	2,338,915.52	39.265203	-107.835207
7,071.0	2.60	258.20	6,895.5	226.9	-1,295.9	1,529,980.42	2,338,911.46	39.265201	-107.835221
7,166.0	2.60	255.70	6,990.4	225.9	-1,300.1	1,529,979.55	2,338,907.24	39.265198	-107.835236
7,261.0	3.00	251.70	7,085.3	224.6	-1,304.5	1,529,978.35	2,338,902.76	39.265195	-107.835252
7,355.0	3.00	250.40	7,179.1	223.0	-1,309.2	1,529,976.88	2,338,898.07	39.265190	-107.835268
7,450.0	3.00	250.80	7,274.0	221.4	-1,313.9	1,529,975.35	2,338,893.34	39.265186	-107.835285
7,473.0	3.00	248.00	7,297.0	220.9	-1,315.0	1,529,974.95	2,338,892.20	39.265185	-107.835289
7,531.0	3.00	248.00	7,354.9	219.8	-1,317.8	1,529,973.89	2,338,889.36	39.265181	-107.835299
Projection to TD @ 7531.0' MD / 7354.9' TVD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
201.0	201.0	-2.1	-1.0	First MWD Survey @ 201.0' MD / 201.0' TVD
7,531.0	7,354.9	219.8	-1,317.8	Projection to TD @ 7531.0' MD / 7354.9' TVD