

RKI Exploration & Production

Eddy County (NM83E)

Sec 6-T23S-R29E

Longview Fed 31-1H

Wellbore #1

Survey: Survey #1

30-015-42049

Standard Survey Report

17 August, 2014

Wolverine Directinal, LLC

Survey Report

Company:	RKI Exploration & Production	Local Co-ordinate Reference:	Well Longview Fed 31-1H
Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 6-T23S-R29E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	Longview Fed 31-1H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

Project		Eddy County (NM83E)	
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Survey Program		Date: 08/17/14		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
469.0	12,627.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
Longview 3131									
0.3	0.00	171.40	0.3	0.0	0.0	0.0	0.00	0.00	0.00
Longview 6-11									
469.0	0.60	171.40	469.0	-2.4	0.4	-2.5	0.13	0.13	0.00
First MWD Survey									
745.0	1.00	212.70	745.0	-5.9	-0.7	-5.6	0.25	0.14	14.96
959.0	1.90	211.90	958.9	-10.5	-3.6	-9.6	0.42	0.42	-0.37
1,205.0	1.80	211.90	1,204.8	-17.2	-7.8	-15.5	0.04	-0.04	0.00
1,358.0	1.60	208.00	1,357.7	-21.1	-10.1	-18.9	0.15	-0.13	-2.55
1,389.0	1.70	218.40	1,388.7	-21.9	-10.6	-19.5	1.02	0.32	33.55
1,420.0	1.60	231.00	1,419.7	-22.5	-11.2	-20.1	1.21	-0.32	40.65
1,451.0	1.80	219.90	1,450.7	-23.2	-11.8	-20.6	1.24	0.65	-35.81
1,481.0	1.90	231.40	1,480.6	-23.8	-12.5	-21.1	1.28	0.33	38.33
1,511.0	2.20	240.70	1,510.6	-24.4	-13.4	-21.5	1.49	1.00	31.00
1,542.0	2.30	246.70	1,541.6	-25.0	-14.5	-21.8	0.83	0.32	19.35
1,573.0	2.60	255.50	1,572.6	-25.4	-15.8	-22.0	1.55	0.97	28.39
1,603.0	3.20	263.90	1,602.5	-25.6	-17.2	-22.0	2.45	2.00	28.00
1,634.0	3.80	270.00	1,633.5	-25.7	-19.1	-21.7	2.28	1.94	19.68
1,665.0	4.40	272.20	1,664.4	-25.7	-21.3	-21.3	2.00	1.94	7.10
1,695.0	5.20	271.10	1,694.3	-25.6	-23.9	-20.8	2.68	2.67	-3.67
1,726.0	6.00	273.60	1,725.1	-25.5	-26.9	-20.1	2.70	2.58	8.06
1,757.0	6.90	276.90	1,755.9	-25.2	-30.3	-19.1	3.14	2.90	10.65
1,787.0	7.70	276.40	1,785.7	-24.7	-34.1	-18.0	2.68	2.67	-1.67
1,818.0	8.40	275.30	1,816.4	-24.3	-38.4	-16.7	2.31	2.26	-3.55
1,849.0	9.10	274.80	1,847.0	-23.9	-43.1	-15.5	2.27	2.26	-1.61
1,880.0	9.40	274.30	1,877.6	-23.5	-48.1	-14.2	1.00	0.97	-1.61
1,911.0	10.10	272.20	1,908.2	-23.2	-53.4	-12.9	2.53	2.26	-6.77
1,943.0	10.50	271.80	1,939.7	-23.0	-59.1	-11.6	1.27	1.25	-1.25
1,975.0	10.40	269.90	1,971.1	-22.9	-64.9	-10.5	1.12	-0.31	-5.94
2,006.0	10.60	267.80	2,001.6	-23.0	-70.5	-9.6	1.39	0.65	-6.77
2,038.0	10.30	265.10	2,033.1	-23.4	-76.3	-8.8	1.79	-0.94	-8.44
2,069.0	10.20	263.40	2,063.6	-23.9	-81.8	-8.4	1.03	-0.32	-5.48
2,101.0	10.50	263.20	2,095.1	-24.6	-87.5	-8.0	0.94	0.94	-0.63
2,133.0	10.90	262.70	2,126.5	-25.3	-93.4	-7.6	1.28	1.25	-1.56
2,164.0	11.40	262.30	2,156.9	-26.1	-99.4	-7.3	1.63	1.61	-1.29
2,196.0	11.30	263.70	2,188.3	-26.9	-105.6	-6.9	0.92	-0.31	4.38
2,228.0	11.20	264.60	2,219.7	-27.5	-111.8	-6.3	0.63	-0.31	2.81
2,259.0	11.30	266.00	2,250.1	-28.0	-117.8	-5.7	0.94	0.32	4.52
2,291.0	11.80	267.90	2,281.4	-28.3	-124.2	-4.8	1.96	1.56	5.94
2,322.0	12.00	267.40	2,311.8	-28.6	-130.6	-3.9	0.73	0.65	-1.61

Wolverine Directinal, LLC

Survey Report

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Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 6-T23S-R29E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	Longview Fed 31-1H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
2,354.0	11.90	268.10	2,343.1	-28.9	-137.2	-3.0	0.55	-0.31	2.19
2,449.0	12.30	266.90	2,436.0	-29.7	-157.1	-0.1	0.50	0.42	-1.26
2,544.0	11.70	267.90	2,528.9	-30.6	-176.9	2.6	0.67	-0.63	1.05
2,670.0	11.80	264.90	2,652.3	-32.2	-202.5	5.8	0.49	0.08	-2.38
2,733.0	11.10	267.90	2,714.0	-33.0	-214.9	7.3	1.46	-1.11	4.76
2,828.0	10.60	267.80	2,807.3	-33.7	-232.8	10.0	0.53	-0.53	-0.11
2,923.0	10.40	267.40	2,900.7	-34.4	-250.1	12.5	0.22	-0.21	-0.42
3,018.0	11.10	268.50	2,994.1	-35.1	-267.8	15.1	0.77	0.74	1.16
3,113.0	12.00	266.90	3,087.1	-35.8	-286.8	17.9	1.01	0.95	-1.68
3,208.0	12.40	266.50	3,180.0	-37.0	-306.9	20.5	0.43	0.42	-0.42
3,303.0	12.60	265.70	3,272.7	-38.4	-327.4	22.9	0.28	0.21	-0.84
3,397.0	12.50	264.60	3,364.5	-40.1	-347.7	25.0	0.28	-0.11	-1.17
3,492.0	12.80	264.90	3,457.2	-42.0	-368.4	26.9	0.32	0.32	0.32
3,587.0	12.00	262.80	3,550.0	-44.2	-388.7	28.5	0.97	-0.84	-2.21
3,682.0	11.20	267.60	3,643.0	-45.8	-407.7	30.5	1.32	-0.84	5.05
3,777.0	11.30	265.50	3,736.2	-46.9	-426.2	32.8	0.44	0.11	-2.21
3,872.0	11.40	267.20	3,829.3	-48.1	-444.9	35.1	0.37	0.11	1.79
3,967.0	11.90	267.20	3,922.4	-49.1	-464.1	37.7	0.53	0.53	0.00
3,998.0	12.10	267.10	3,952.7	-49.4	-470.5	38.6	0.65	0.65	-0.32
4,094.0	12.60	266.50	4,046.5	-50.5	-491.0	41.2	0.54	0.52	-0.63
4,189.0	11.10	270.20	4,139.5	-51.1	-510.5	44.3	1.77	-1.58	3.89
4,284.0	11.20	270.60	4,232.7	-51.0	-528.9	47.8	0.13	0.11	0.42
4,378.0	11.10	271.80	4,324.9	-50.6	-547.0	51.5	0.27	-0.11	1.28
4,473.0	9.80	267.90	4,418.3	-50.6	-564.2	54.7	1.56	-1.37	-4.11
4,568.0	9.80	267.60	4,511.9	-51.3	-580.4	57.1	0.05	0.00	-0.32
4,663.0	10.00	268.80	4,605.5	-51.8	-596.7	59.6	0.30	0.21	1.26
4,758.0	10.40	269.00	4,699.0	-52.1	-613.5	62.4	0.42	0.42	0.21
4,853.0	9.80	263.90	4,792.5	-53.1	-630.2	64.5	1.13	-0.63	-5.37
4,947.0	10.00	263.00	4,885.1	-55.0	-646.2	65.6	0.27	0.21	-0.96
5,042.0	9.60	264.20	4,978.8	-56.8	-662.3	66.8	0.47	-0.42	1.26
5,136.0	9.20	263.00	5,071.5	-58.5	-677.5	68.0	0.47	-0.43	-1.28
5,230.0	10.30	263.40	5,164.1	-60.3	-693.3	69.1	1.17	1.17	0.43
5,324.0	9.90	265.50	5,256.7	-61.9	-709.8	70.5	0.58	-0.43	2.23
5,418.0	10.20	266.70	5,349.2	-63.1	-726.1	72.5	0.39	0.32	1.28
5,513.0	10.60	267.60	5,442.7	-63.9	-743.2	74.8	0.45	0.42	0.95
5,608.0	10.30	268.30	5,536.1	-64.5	-760.5	77.4	0.34	-0.32	0.74
5,702.0	8.90	263.90	5,628.8	-65.6	-776.1	79.3	1.68	-1.49	-4.68
5,797.0	8.60	264.10	5,722.7	-67.1	-790.5	80.4	0.32	-0.32	0.21
5,892.0	9.30	266.20	5,816.5	-68.3	-805.2	81.9	0.81	0.74	2.21
5,986.0	9.10	266.20	5,909.3	-69.3	-820.2	83.7	0.21	-0.21	0.00
6,081.0	9.70	266.00	6,003.0	-70.4	-835.7	85.6	0.63	0.63	-0.21
6,176.0	9.70	264.90	6,096.7	-71.6	-851.6	87.3	0.20	0.00	-1.16
6,271.0	9.30	264.60	6,190.4	-73.1	-867.2	88.8	0.42	-0.42	-0.32
6,366.0	8.90	264.80	6,284.2	-74.4	-882.2	90.2	0.42	-0.42	0.21
6,461.0	7.70	265.70	6,378.2	-75.6	-895.9	91.6	1.27	-1.26	0.95
6,556.0	5.80	263.90	6,472.5	-76.6	-907.0	92.7	2.01	-2.00	-1.89
6,651.0	3.70	276.60	6,567.2	-76.7	-914.8	93.9	2.46	-2.21	13.37
6,746.0	2.20	288.00	6,662.1	-75.8	-919.6	95.7	1.69	-1.58	12.00
6,841.0	1.00	274.30	6,757.0	-75.2	-922.1	96.8	1.32	-1.26	-14.42
6,936.0	1.20	256.20	6,852.0	-75.4	-923.9	97.0	0.42	0.21	-19.05
6,999.0	1.00	259.10	6,915.0	-75.6	-925.1	96.9	0.33	-0.32	4.60
7,027.0	1.00	274.10	6,943.0	-75.7	-925.6	97.0	0.93	0.00	53.57
7,059.0	2.50	349.50	6,975.0	-75.0	-926.0	97.8	7.65	4.69	235.63
7,065.8	3.27	354.37	6,981.8	-74.6	-926.1	98.1	11.91	11.36	71.68

Wolverine Directinal, LLC

Survey Report

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LF 31-1H TGT #1									
7,090.0	6.10	1.50	7,005.9	-72.6	-926.1	100.1	11.91	11.68	29.45
7,122.0	9.60	2.50	7,037.6	-68.3	-925.9	104.3	10.95	10.94	3.13
7,154.0	12.70	1.60	7,069.0	-62.1	-925.7	110.4	9.70	9.69	-2.81
7,185.0	15.40	1.80	7,099.0	-54.6	-925.5	117.7	8.71	8.71	0.65
7,217.0	17.50	4.80	7,129.7	-45.5	-925.0	126.5	7.08	6.56	9.38
7,249.0	19.50	6.70	7,160.1	-35.4	-923.9	136.2	6.53	6.25	5.94
7,280.0	21.50	7.10	7,189.1	-24.6	-922.6	146.6	6.47	6.45	1.29
7,312.0	24.00	6.00	7,218.6	-12.4	-921.2	158.4	7.92	7.81	-3.44
7,343.0	27.30	4.30	7,246.6	1.0	-920.0	171.3	10.91	10.65	-5.48
7,374.0	31.00	3.60	7,273.6	16.1	-919.0	185.9	11.99	11.94	-2.26
7,406.0	34.90	3.00	7,300.5	33.4	-918.0	202.8	12.23	12.19	-1.88
7,437.0	37.40	3.40	7,325.5	51.7	-917.0	220.6	8.10	8.06	1.29
7,469.0	40.40	3.70	7,350.4	71.8	-915.7	240.0	9.39	9.38	0.94
7,500.0	44.30	3.90	7,373.3	92.6	-914.3	260.3	12.59	12.58	0.65
7,531.0	45.70	4.30	7,395.2	114.4	-912.8	281.5	4.61	4.52	1.29
7,563.0	45.80	4.30	7,417.6	137.3	-911.0	303.6	0.31	0.31	0.00
7,594.0	45.50	4.30	7,439.2	159.4	-909.4	325.0	0.97	-0.97	0.00
7,626.0	47.70	4.80	7,461.2	182.6	-907.5	347.4	6.97	6.88	1.56
7,657.0	51.40	5.00	7,481.3	206.1	-905.5	370.2	11.95	11.94	0.65
7,689.0	54.60	5.00	7,500.6	231.5	-903.3	394.8	10.00	10.00	0.00
7,720.0	57.90	4.40	7,517.8	257.2	-901.2	419.6	10.77	10.65	-1.94
7,751.0	61.60	4.40	7,533.4	283.9	-899.1	445.5	11.94	11.94	0.00
7,783.0	64.40	4.10	7,547.9	312.4	-897.0	473.0	8.79	8.75	-0.94
7,814.0	67.00	4.30	7,560.7	340.5	-895.0	500.3	8.41	8.39	0.65
7,845.0	69.60	4.40	7,572.2	369.2	-892.8	528.1	8.39	8.39	0.32
7,877.0	71.60	4.40	7,582.8	399.3	-890.5	557.3	6.25	6.25	0.00
7,909.0	73.20	4.60	7,592.5	429.7	-888.1	586.7	5.04	5.00	0.63
7,940.0	75.60	3.90	7,600.8	459.5	-885.8	615.6	8.04	7.74	-2.26
7,971.0	78.10	3.40	7,607.9	489.6	-883.9	644.8	8.22	8.06	-1.61
8,004.0	79.70	3.60	7,614.2	522.0	-882.0	676.2	4.88	4.85	0.61
8,035.0	82.70	3.20	7,618.9	552.5	-880.1	705.9	9.76	9.68	-1.29
8,067.0	86.30	2.70	7,622.0	584.3	-878.5	736.9	11.36	11.25	-1.56
8,099.0	89.30	1.60	7,623.2	616.3	-877.3	768.1	9.98	9.38	-3.44
8,130.0	90.20	1.50	7,623.4	647.3	-876.5	798.4	2.92	2.90	-0.32
8,161.0	90.60	1.60	7,623.2	678.3	-875.6	828.7	1.33	1.29	0.32
8,193.0	90.90	1.60	7,622.7	710.3	-874.7	859.9	0.94	0.94	0.00
8,287.0	90.10	0.60	7,621.9	804.2	-872.9	951.9	1.36	-0.85	-1.06
8,382.0	88.70	359.30	7,622.9	899.2	-873.0	1,045.3	2.01	-1.47	-1.37
8,476.0	91.50	358.60	7,622.8	993.2	-874.7	1,138.0	3.07	2.98	-0.74
8,571.0	91.40	358.50	7,620.3	1,088.1	-877.1	1,231.7	0.15	-0.11	-0.11
8,666.0	89.10	357.60	7,619.9	1,183.1	-880.4	1,325.6	2.60	-2.42	-0.95
8,761.0	90.00	357.90	7,620.7	1,278.0	-884.1	1,419.6	1.00	0.95	0.32
8,857.0	90.60	357.60	7,620.2	1,373.9	-887.9	1,514.5	0.70	0.63	-0.31
8,952.0	91.50	356.90	7,618.4	1,468.8	-892.4	1,608.6	1.20	0.95	-0.74
9,074.0	91.80	356.50	7,614.9	1,590.5	-899.4	1,729.6	0.41	0.25	-0.33
9,170.0	91.50	355.80	7,612.2	1,686.3	-905.9	1,824.8	0.79	-0.31	-0.73
9,264.0	92.00	356.40	7,609.3	1,780.0	-912.3	1,918.1	0.83	0.53	0.64
9,360.0	91.00	357.80	7,606.8	1,875.9	-917.1	2,013.2	1.79	-1.04	1.46
9,454.0	90.60	357.60	7,605.5	1,969.8	-920.9	2,106.2	0.48	-0.43	-0.21
9,548.0	90.70	357.10	7,604.4	2,063.7	-925.2	2,199.3	0.54	0.11	-0.53
9,641.0	90.70	358.10	7,603.3	2,156.6	-929.1	2,291.3	1.08	0.00	1.08
9,735.0	90.50	359.90	7,602.3	2,250.6	-930.8	2,384.0	1.93	-0.21	1.91
9,829.0	91.00	359.70	7,601.0	2,344.6	-931.1	2,476.4	0.57	0.53	-0.21

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Survey Report

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Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 6, T23S-R29E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	Longview Fed 31-1H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003 21 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,923.0	91.70	359.30	7,598.8	2,438.5	-931.9	2,568.9	0.86	0.74	-0.43
10,018.0	92.80	359.00	7,595.1	2,533.4	-933.3	2,662.4	1.20	1.16	-0.32
10,113.0	91.50	359.50	7,591.5	2,628.4	-934.6	2,755.9	1.47	-1.37	0.53
10,208.0	92.40	359.20	7,588.3	2,723.3	-935.7	2,849.4	1.00	0.95	-0.32
10,303.0	90.70	358.80	7,585.7	2,818.2	-937.3	2,943.1	1.84	-1.79	-0.42
10,397.0	90.70	359.90	7,584.6	2,912.2	-938.4	3,035.6	1.17	0.00	1.17
10,491.0	91.50	359.90	7,582.8	3,006.2	-938.5	3,128.0	0.85	0.85	0.00
10,587.0	90.20	359.90	7,581.4	3,102.2	-938.7	3,222.4	1.35	-1.35	0.00
10,682.0	91.10	359.70	7,580.3	3,197.2	-939.0	3,315.8	0.97	0.95	-0.21
10,778.0	92.20	359.50	7,577.5	3,293.1	-939.7	3,410.2	1.16	1.15	-0.21
10,873.0	90.50	359.50	7,575.3	3,388.1	-940.5	3,503.7	1.79	-1.79	0.00
10,968.0	91.50	359.50	7,573.6	3,483.1	-941.4	3,597.2	1.05	1.05	0.00
11,063.0	89.60	359.90	7,572.7	3,578.1	-941.9	3,690.6	2.04	-2.00	0.42
11,158.0	90.40	359.50	7,572.7	3,673.1	-942.4	3,784.0	0.94	0.84	-0.42
11,253.0	91.20	359.20	7,571.4	3,768.1	-943.4	3,877.6	0.90	0.84	-0.32
11,348.0	90.00	359.50	7,570.4	3,863.1	-944.5	3,971.1	1.30	-1.26	0.32
11,443.0	91.20	359.00	7,569.4	3,958.0	-945.8	4,064.7	1.37	1.26	-0.53
11,537.0	89.90	0.20	7,568.5	4,052.0	-946.4	4,157.2	1.88	-1.38	1.28
11,632.0	91.30	0.20	7,567.5	4,147.0	-946.1	4,250.5	1.47	1.47	0.00
11,727.0	89.70	359.30	7,566.7	4,242.0	-946.5	4,343.9	1.93	-1.68	-0.95
11,821.0	90.00	359.00	7,566.9	4,336.0	-947.9	4,436.5	0.45	0.32	-0.32
11,916.0	88.70	358.50	7,568.0	4,431.0	-950.0	4,530.2	1.47	-1.37	-0.53
12,010.0	87.80	357.20	7,570.9	4,524.9	-953.5	4,623.2	1.68	-0.96	-1.38
12,105.0	89.40	358.60	7,573.2	4,619.8	-957.0	4,717.1	2.24	1.68	1.47
12,200.0	90.90	359.70	7,572.9	4,714.7	-958.4	4,810.7	1.96	1.58	1.16
12,295.0	89.00	358.60	7,573.0	4,809.7	-959.8	4,904.3	2.31	-2.00	-1.16
12,391.0	92.30	0.80	7,571.9	4,905.7	-960.3	4,998.7	4.13	3.44	2.29
12,486.0	91.60	0.90	7,568.7	5,000.6	-958.9	5,091.7	0.74	-0.74	0.11
12,580.0	92.50	0.80	7,565.3	5,094.6	-957.5	5,183.8	0.96	0.96	-0.11
Last MWD Survey									
12,627.0	92.50	0.80	7,563.3	5,141.5	-956.8	5,229.8	0.00	0.00	0.00
Proj to TD - LF 31-1H PBHL									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
469.0	469.0	-2.4	0.4	First MWD Survey
12,580.0	7,565.3	5,094.6	-957.5	Last MWD Survey
12,627.0	7,563.3	5,141.5	-956.8	Proj to TD

Checked By: _____ Approved By: _____ Date: _____