

30-015-41269

RKI Exploration & Production

Eddy County (NM83E)

Sec 21-T26S-R30E

RDX 21-41

Wellbore #1

Survey: Survey #1

Standard Survey Report

16 November, 2013

Wolverine Directional, LLC

Survey Report

Company: RKI Exploration & Production
Project: Eddy County (NM83E)
Site: Sec 21-T26S-R30E
Well: RDX 21-41
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well RDX 21-41
TVD Reference: WELL @ 0.0ft (Original Well Elev)
MD Reference: WELL @ 0.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.21 Single User Db

Design: Wellbore #1

Audit Notes:

Version: 1.0 **Phase:** ACTUAL **Tie On Depth:** 0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	294.31

Survey Program **Date:** 2013/11/16

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
782.0	7,470.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
782.0	0.40	108.70	782.0	-0.9	2.6	-2.7	0.05	0.05	0.00
First MWD Survey									
873.0	0.60	154.50	873.0	-1.4	3.1	-3.4	0.47	0.22	50.33
935.0	0.70	158.90	935.0	-2.1	3.4	-3.9	0.18	0.16	7.10
966.0	0.80	181.40	966.0	-2.4	3.4	-4.1	1.00	0.32	72.58
996.0	1.10	202.60	996.0	-2.9	3.3	-4.2	1.52	1.00	70.67
1,027.0	1.50	221.80	1,027.0	-3.5	2.9	-4.1	1.89	1.29	61.94
1,058.0	1.90	238.40	1,058.0	-4.1	2.2	-3.7	2.03	1.29	53.55
1,089.0	2.40	248.40	1,088.9	-4.6	1.2	-3.0	2.01	1.61	32.26
1,119.0	2.80	260.40	1,118.9	-4.9	-0.1	-1.9	2.24	1.33	40.00
1,150.0	3.00	274.60	1,149.9	-5.0	-1.7	-0.5	2.40	0.65	45.81
1,181.0	3.90	285.90	1,180.8	-4.6	-3.5	1.3	3.63	2.90	36.45
1,212.0	4.40	293.70	1,211.7	-3.9	-5.6	3.5	2.43	1.61	25.16
1,242.0	5.00	299.10	1,241.6	-2.8	-7.8	6.0	2.48	2.00	18.00
1,274.0	5.60	299.20	1,273.5	-1.3	-10.4	8.9	1.88	1.88	0.31
1,305.0	6.30	301.00	1,304.3	0.3	-13.2	12.1	2.34	2.26	5.81
1,337.0	7.00	299.80	1,336.1	2.2	-16.4	15.8	2.23	2.19	-3.75
1,369.0	7.70	300.90	1,367.8	4.2	-19.9	19.9	2.23	2.19	3.44
1,400.0	8.20	299.70	1,398.5	6.4	-23.6	24.1	1.70	1.61	-3.87
1,432.0	9.00	298.20	1,430.2	8.7	-27.8	28.9	2.60	2.50	-4.69
1,464.0	9.70	298.10	1,461.8	11.2	-32.4	34.1	2.19	2.19	-0.31
1,495.0	10.30	299.20	1,492.3	13.7	-37.1	39.5	2.03	1.94	3.55
1,527.0	10.90	298.00	1,523.7	16.5	-42.3	45.3	2.00	1.88	-3.75
1,559.0	11.50	296.50	1,555.1	19.4	-47.8	51.5	2.08	1.88	-4.69
1,591.0	11.90	295.50	1,586.5	22.2	-53.6	58.0	1.40	1.25	-3.13
1,623.0	12.50	294.00	1,617.7	25.1	-59.8	64.8	2.12	1.88	-4.69
1,654.0	12.80	293.30	1,648.0	27.8	-66.0	71.6	1.09	0.97	-2.26
1,685.0	13.60	292.70	1,678.2	30.6	-72.5	78.6	2.62	2.58	-1.94
1,717.0	14.20	292.10	1,709.2	33.5	-79.6	86.3	1.93	1.88	-1.88
1,749.0	14.80	291.70	1,740.2	36.5	-87.0	94.3	1.90	1.88	-1.25
1,781.0	14.90	291.10	1,771.2	39.5	-94.7	102.5	0.57	0.31	-1.88
1,813.0	14.60	289.60	1,802.1	42.3	-102.3	110.6	1.52	-0.94	-4.69
1,844.0	14.60	290.20	1,832.1	45.0	-109.7	118.4	0.49	0.00	1.94
1,876.0	14.40	292.50	1,863.1	47.9	-117.1	126.4	1.90	-0.63	7.19
1,908.0	14.40	294.00	1,894.1	51.0	-124.4	134.4	1.17	0.00	4.69
1,939.0	14.50	294.00	1,924.1	54.2	-131.5	142.1	0.32	0.32	0.00
1,971.0	14.70	293.10	1,955.1	57.4	-138.9	150.2	0.95	0.63	-2.81
2,002.0	14.60	293.50	1,985.0	60.5	-146.1	158.0	0.46	-0.32	1.29

Wolverine Directional, LLC

Survey Report

Company:	RKI Exploration & Production	Local Co-ordinate Reference:	Well RDX 21-41
Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 21-T26S-R30E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	RDX 21-41	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)
2,033.0	14.90	290.70	2,015.0	63.4	-153.4	165.9	2.49	0.97	-9.03
2,065.0	14.90	289.40	2,046.0	66.3	-161.1	174.1	1.04	0.00	-4.06
2,097.0	14.40	290.20	2,076.9	69.0	-168.7	182.2	1.69	-1.56	2.50
2,129.0	14.70	289.70	2,107.9	71.8	-176.3	190.2	1.02	0.94	-1.56
2,161.0	13.60	291.70	2,138.9	74.5	-183.6	198.0	3.76	-3.44	6.25
2,193.0	13.40	293.30	2,170.0	77.4	-190.5	205.5	1.32	-0.63	5.00
2,224.0	12.80	296.80	2,200.2	80.3	-196.9	212.5	3.21	-1.94	11.29
2,256.0	12.90	298.20	2,231.4	83.6	-203.2	219.6	1.02	0.31	4.38
2,287.0	13.10	297.40	2,261.6	86.9	-209.4	226.6	0.87	0.65	-2.58
2,319.0	13.00	297.60	2,292.8	90.2	-215.8	233.8	0.34	-0.31	0.63
2,350.0	12.80	296.60	2,323.0	93.4	-221.9	240.7	0.97	-0.65	-3.23
2,382.0	12.80	295.60	2,354.2	96.5	-228.3	247.8	0.69	0.00	-3.13
2,414.0	13.30	295.70	2,385.4	99.6	-234.8	255.0	1.56	1.56	0.31
2,446.0	13.10	294.40	2,416.6	102.7	-241.4	262.3	1.12	-0.63	-4.06
2,477.0	13.30	292.80	2,446.7	105.5	-247.9	269.4	1.34	0.65	-5.16
2,509.0	13.60	293.10	2,477.9	108.4	-254.8	276.8	0.96	0.94	0.94
2,540.0	13.90	294.50	2,508.0	111.4	-261.5	284.2	1.45	0.97	4.52
2,572.0	14.00	295.50	2,539.0	114.7	-268.5	291.9	0.82	0.31	3.13
2,603.0	14.10	295.20	2,569.1	117.9	-275.3	299.4	0.40	0.32	-0.97
2,635.0	14.00	294.00	2,600.1	121.1	-282.4	307.2	0.96	-0.31	-3.75
2,666.0	13.90	293.50	2,630.2	124.1	-289.2	314.7	0.51	-0.32	-1.61
2,698.0	13.90	294.00	2,661.3	127.2	-296.2	322.4	0.38	0.00	1.56
2,729.0	13.80	295.20	2,691.4	130.3	-303.0	329.8	0.98	-0.32	3.87
2,761.0	13.40	295.50	2,722.5	133.6	-309.8	337.3	1.27	-1.25	0.94
2,793.0	12.80	295.60	2,753.7	136.7	-316.3	344.6	1.88	-1.88	0.31
2,824.0	12.40	296.10	2,783.9	139.6	-322.4	351.3	1.34	-1.29	1.61
2,856.0	12.30	295.50	2,815.2	142.6	-328.6	358.2	0.51	-0.31	-1.88
2,888.0	12.60	295.40	2,846.4	145.6	-334.8	365.1	0.94	0.94	-0.31
2,919.0	12.80	294.20	2,876.7	148.4	-341.0	371.9	1.07	0.65	-3.87
2,951.0	12.70	294.10	2,907.9	151.3	-347.4	378.9	0.32	-0.31	-0.31
2,983.0	12.30	291.40	2,939.1	154.0	-353.8	385.9	2.21	-1.25	-8.44
3,014.0	12.20	292.00	2,969.4	156.4	-359.9	392.4	0.52	-0.32	1.94
3,046.0	12.10	291.20	3,000.7	158.9	-366.2	399.2	0.61	-0.31	-2.50
3,077.0	12.30	291.10	3,031.0	161.3	-372.3	405.7	0.65	0.65	-0.32
3,109.0	12.20	295.60	3,062.3	164.0	-378.5	412.5	3.00	-0.31	14.06
3,141.0	12.80	297.60	3,093.5	167.1	-384.7	419.4	2.31	1.88	6.25
3,172.0	12.80	298.40	3,123.7	170.3	-390.8	426.3	0.57	0.00	2.58
3,204.0	12.60	298.30	3,154.9	173.6	-397.0	433.3	0.63	-0.63	-0.31
3,235.0	12.70	299.00	3,185.2	176.9	-402.9	440.0	0.59	0.32	2.26
3,267.0	12.50	298.10	3,216.4	180.2	-409.1	447.0	0.88	-0.63	-2.81
3,299.0	12.40	297.20	3,247.7	183.4	-415.2	453.9	0.68	-0.31	-2.81
3,330.0	12.50	296.20	3,277.9	186.4	-421.2	460.6	0.77	0.32	-3.23
3,361.0	12.60	296.10	3,308.2	189.4	-427.2	467.3	0.33	0.32	-0.32
3,424.0	12.50	295.80	3,369.7	195.4	-439.5	481.0	0.19	-0.16	-0.48
3,455.0	12.20	294.90	3,400.0	198.2	-445.5	487.6	1.15	-0.97	-2.90
3,487.0	12.40	297.10	3,431.2	201.2	-451.6	494.4	1.59	0.63	6.88
3,519.0	12.90	299.50	3,462.5	204.5	-457.8	501.4	2.27	1.56	7.50
3,551.0	13.10	300.40	3,493.6	208.1	-464.0	508.6	0.89	0.63	2.81
3,582.0	12.90	299.10	3,523.9	211.6	-470.1	515.5	1.14	-0.65	-4.19
3,614.0	13.10	298.40	3,555.0	215.1	-476.4	522.7	0.80	0.63	-2.19
3,646.0	12.50	295.80	3,586.2	218.3	-482.7	529.8	2.60	-1.88	-8.13
3,678.0	11.20	292.00	3,617.6	221.0	-488.7	536.3	4.74	-4.06	-11.88
3,709.0	10.80	290.40	3,648.0	223.1	-494.2	542.2	1.62	-1.29	-5.16
3,741.0	10.60	288.70	3,679.4	225.1	-499.8	548.2	1.17	-0.63	-5.31

Wolverine Directional, LLC

Survey Report

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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)
3,772.0	10.10	289.70	3,709.9	226.9	-505.1	553.7	1.71	-1.61	3.23
3,804.0	8.80	295.20	3,741.5	228.9	-509.9	559.0	4.94	-4.06	17.19
3,836.0	8.30	301.40	3,773.1	231.1	-514.1	563.7	3.27	-1.56	19.38
3,868.0	8.10	304.50	3,804.8	233.6	-518.0	568.2	1.52	-0.63	9.69
3,900.0	7.20	306.40	3,836.5	236.1	-521.4	572.4	2.92	-2.81	5.94
3,931.0	5.90	305.20	3,867.3	238.2	-524.3	575.9	4.22	-4.19	-3.87
3,963.0	4.90	293.90	3,899.2	239.7	-526.9	578.8	4.55	-3.13	-35.31
3,995.0	4.20	284.80	3,931.1	240.5	-529.3	581.4	3.14	-2.19	-28.44
4,027.0	3.80	274.90	3,963.0	240.9	-531.5	583.5	2.49	-1.25	-30.94
4,058.0	2.60	275.40	3,994.0	241.1	-533.2	585.1	3.87	-3.87	1.61
4,090.0	1.20	261.90	4,025.9	241.1	-534.2	586.1	4.56	-4.38	-42.19
4,121.0	0.80	256.10	4,056.9	241.0	-534.8	586.6	1.33	-1.29	-18.71
4,153.0	0.60	249.50	4,088.9	240.9	-535.1	586.9	0.67	-0.63	-20.63
4,217.0	0.70	259.10	4,152.9	240.7	-535.8	587.4	0.23	0.16	15.00
4,312.0	1.30	129.80	4,247.9	239.9	-535.6	586.8	1.92	0.63	-136.11
4,406.0	1.10	125.50	4,341.9	238.7	-534.0	584.9	0.23	-0.21	-4.57
4,502.0	1.10	112.70	4,437.9	237.8	-532.4	583.1	0.26	0.00	-13.33
4,597.0	0.90	119.00	4,532.9	237.1	-530.9	581.5	0.24	-0.21	6.63
4,691.0	1.10	116.00	4,626.8	236.3	-529.5	579.8	0.22	0.21	-3.19
4,786.0	1.30	106.80	4,721.8	235.6	-527.6	577.8	0.29	0.21	-9.68
4,881.0	1.00	119.80	4,816.8	234.9	-525.9	575.9	0.42	-0.32	13.68
4,976.0	0.90	137.50	4,911.8	233.9	-524.6	574.4	0.32	-0.11	18.63
5,071.0	1.00	130.80	5,006.8	232.8	-523.5	572.9	0.16	0.11	-7.05
5,167.0	0.80	155.40	5,102.8	231.7	-522.6	571.6	0.45	-0.21	25.63
5,262.0	0.80	178.40	5,197.8	230.4	-522.3	570.9	0.34	0.00	24.21
5,357.0	0.80	172.80	5,292.8	229.1	-522.2	570.2	0.08	0.00	-5.89
5,452.0	1.10	114.90	5,387.7	228.0	-521.3	569.0	1.01	0.32	-60.95
5,547.0	1.00	122.60	5,482.7	227.2	-519.8	567.2	0.18	-0.11	8.11
5,643.0	0.80	144.90	5,578.7	226.2	-518.7	565.8	0.42	-0.21	23.23
5,738.0	1.00	164.80	5,673.7	224.9	-518.1	564.7	0.39	0.21	20.95
5,832.0	1.00	186.30	5,767.7	223.3	-518.0	563.9	0.40	0.00	22.87
5,926.0	0.40	100.80	5,861.7	222.4	-517.7	563.4	1.11	-0.64	-90.96
6,021.0	0.10	127.70	5,956.7	222.3	-517.3	563.0	0.33	-0.32	28.32
6,116.0	0.50	164.10	6,051.7	221.8	-517.2	562.6	0.45	0.42	38.32
6,211.0	0.90	127.40	6,146.7	221.0	-516.4	561.6	0.61	0.42	-38.63
6,306.0	1.00	143.00	6,241.7	219.9	-515.4	560.2	0.29	0.11	16.42
6,400.0	0.80	72.70	6,335.7	219.4	-514.2	559.0	1.12	-0.21	-74.79
6,495.0	0.70	74.10	6,430.6	219.8	-513.0	558.0	0.11	-0.11	1.47
6,590.0	1.20	80.60	6,525.6	220.1	-511.5	556.8	0.54	0.53	6.84
6,685.0	0.80	74.00	6,620.6	220.4	-509.9	555.4	0.44	-0.42	-6.95
6,779.0	0.50	104.60	6,714.6	220.5	-508.9	554.5	0.48	-0.32	32.55
6,874.0	0.60	122.10	6,809.6	220.1	-508.0	553.6	0.20	0.11	18.42
6,970.0	0.30	145.10	6,905.6	219.7	-507.5	552.9	0.36	-0.31	23.96
7,064.0	0.20	103.10	6,999.6	219.4	-507.2	552.5	0.21	-0.11	-44.68
7,159.0	0.40	234.50	7,094.6	219.2	-507.3	552.5	0.58	0.21	138.32
7,254.0	0.40	311.00	7,189.6	219.2	-507.8	553.0	0.52	0.00	80.53
7,349.0	0.30	298.40	7,284.6	219.6	-508.3	553.6	0.13	-0.11	-13.26
7,419.0	0.70	256.30	7,354.6	219.5	-508.8	554.1	0.74	0.57	-60.14
Last MWD Survey									
7,470.0	0.70	256.30	7,405.6	219.4	-509.4	554.6	0.00	0.00	0.00
Proj to TD - RDX 21-41 PBHL									

Wolverine Directional, LLC

Survey Report

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Site: Sec 21-T26S-R30E
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Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well RDX 21-41
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North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.21 Single User Db

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N-S (ft)	+E-W (ft)	
782.0	782.0	-0.9	2.6	First MWD Survey
7,419.0	7,354.6	219.5	-508.8	Last MWD Survey
7,470.0	7,405.6	219.4	-509.4	Proj to TD

Checked By: _____ Approved By: _____ Date: _____