

RKI Exploration & Production

Eddy County (NM83E)

Sec 10-T26S-R30E

RDX 10-5H

Wellbore #1

30-015-41087

Survey: MWD Surveys

Standard Survey Report

10 April, 2013



Wolverine Directional, LLC

Survey Report

Company:	RKI Exploration & Production	Local Co-ordinate Reference:	Well RDX 10-5H
Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 10-T26S-R30E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	RDX 10-5H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.0	0.0	0.0	179.28

Survey Program	Date 04/10/13			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
100.0	13,347.0	MWD Surveys (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
100.0	0.19	95.18	100.0	0.0	0.2	0.0	0.19	0.19	0.00
First GYRO Survey									
200.0	0.28	262.85	200.0	-0.1	0.1	0.1	0.47	0.09	167.67
300.0	0.42	296.93	300.0	0.1	-0.5	-0.1	0.24	0.14	34.08
400.0	0.14	290.15	400.0	0.3	-0.9	-0.3	0.28	-0.28	-6.78
500.0	0.13	118.48	500.0	0.3	-0.9	-0.3	0.27	-0.01	-171.67
600.0	0.72	161.33	600.0	-0.4	-0.6	0.4	0.63	0.59	42.85
700.0	1.25	169.72	700.0	-2.0	-0.2	2.0	0.55	0.53	8.39
800.0	1.55	181.44	799.9	-4.5	-0.1	4.5	0.41	0.30	11.72
900.0	1.59	178.81	899.9	-7.2	-0.1	7.2	0.08	0.04	-2.63
1,000.0	1.55	187.49	999.9	-9.9	-0.2	9.9	0.24	-0.04	8.68
1,100.0	1.29	182.04	1,099.8	-12.4	-0.4	12.4	0.29	-0.26	-5.45
1,200.0	1.54	184.41	1,199.8	-14.9	-0.6	14.9	0.26	0.25	2.37
1,300.0	1.37	182.41	1,299.8	-17.4	-0.7	17.4	0.18	-0.17	-2.00
1,400.0	1.07	183.39	1,399.8	-19.5	-0.9	19.5	0.30	-0.30	0.98
1,500.0	0.96	175.30	1,499.7	-21.3	-0.8	21.3	0.18	-0.11	-8.09
1,600.0	1.55	170.70	1,599.7	-23.5	-0.6	23.5	0.60	0.59	-4.60
1,700.0	1.77	174.02	1,699.7	-26.3	-0.2	26.3	0.24	0.22	3.32
1,800.0	1.98	170.61	1,799.6	-29.6	0.3	29.6	0.24	0.21	-3.41
1,900.0	2.39	176.65	1,899.5	-33.4	0.7	33.4	0.47	0.41	6.04
2,000.0	2.64	173.52	1,999.5	-37.7	1.1	37.7	0.29	0.25	-3.13
2,100.0	2.38	181.47	2,099.4	-42.1	1.3	42.1	0.43	-0.26	7.95
2,200.0	2.03	191.48	2,199.3	-45.9	0.9	45.9	0.52	-0.35	10.01
2,300.0	1.70	192.27	2,299.2	-49.1	0.2	49.1	0.33	-0.33	0.79
2,400.0	1.50	189.33	2,399.2	-51.8	-0.3	51.8	0.22	-0.20	-2.94
2,500.0	1.30	207.19	2,499.2	-54.1	-1.1	54.1	0.48	-0.20	17.86
2,600.0	1.05	211.10	2,599.1	-55.9	-2.1	55.9	0.26	-0.25	3.91
2,700.0	0.70	214.99	2,699.1	-57.2	-2.9	57.2	0.35	-0.35	3.89
2,800.0	0.51	213.25	2,799.1	-58.1	-3.5	58.0	0.19	-0.19	-1.74
2,900.0	0.42	152.17	2,899.1	-58.8	-3.5	58.7	0.48	-0.09	-61.08
3,000.0	0.86	130.37	2,999.1	-59.6	-2.8	59.6	0.50	0.44	-21.80
3,100.0	1.40	118.78	3,099.1	-60.7	-1.2	60.6	0.58	0.54	-11.59
3,200.0	1.49	116.50	3,199.1	-61.8	1.1	61.8	0.11	0.09	-2.28
3,300.0	2.18	120.03	3,299.0	-63.4	3.9	63.4	0.70	0.69	3.53
3,400.0	2.73	127.07	3,398.9	-65.8	7.4	65.8	0.63	0.55	7.04
3,500.0	2.71	134.16	3,498.8	-68.8	11.0	69.0	0.34	-0.02	7.09
3,600.0	2.26	135.15	3,598.7	-71.9	14.1	72.1	0.45	-0.45	0.99
3,700.0	1.60	130.44	3,698.7	-74.2	16.6	74.4	0.68	-0.66	-4.71

Wolverine Directional, LLC

Survey Report

Company:	RKI Exploration & Production	Local Co-ordinate Reference:	Well RDX 10-5H
Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 10-T26S-R30E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	RDX 10-5H	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)	
3,800.0	1.47	127.65	3,798.6	-75.9	18.6	76.1	0.15	-0.13	-2.79	
3,900.0	1.13	126.50	3,898.6	-77.2	20.5	77.5	0.34	-0.34	-1.15	
4,000.0	1.05	124.74	3,998.6	-78.4	22.0	78.6	0.09	-0.08	-1.76	
4,100.0	0.94	127.58	4,098.6	-79.4	23.4	79.7	0.12	-0.11	2.84	
4,200.0	0.89	133.07	4,198.5	-80.4	24.6	80.7	0.10	-0.05	5.49	
4,300.0	1.00	139.61	4,298.5	-81.6	25.8	81.9	0.15	0.11	6.54	
4,400.0	1.12	138.03	4,398.5	-83.0	27.0	83.3	0.12	0.12	-1.58	
4,500.0	1.04	133.99	4,498.5	-84.3	28.3	84.7	0.11	-0.08	-4.04	
4,600.0	0.75	127.28	4,598.5	-85.4	29.5	85.7	0.31	-0.29	-6.71	
4,700.0	0.78	117.69	4,698.5	-86.1	30.6	86.5	0.13	0.03	-9.59	
4,800.0	0.64	115.35	4,798.5	-86.6	31.7	87.0	0.14	-0.14	-2.34	
4,900.0	0.54	110.09	4,898.5	-87.0	32.6	87.4	0.11	-0.10	-5.26	
5,000.0	0.60	113.17	4,998.5	-87.4	33.6	87.8	0.07	0.06	3.08	
5,100.0	0.56	109.25	5,098.5	-87.8	34.5	88.2	0.06	-0.04	-3.92	
5,200.0	0.49	104.98	5,198.4	-88.1	35.4	88.5	0.08	-0.07	-4.27	
5,300.0	0.41	56.75	5,298.4	-88.0	36.1	88.4	0.37	-0.08	-48.23	
5,400.0	0.40	121.03	5,398.4	-87.9	36.7	88.4	0.43	-0.01	64.28	
5,500.0	0.44	125.93	5,498.4	-88.4	37.3	88.8	0.05	0.04	4.90	
5,600.0	0.43	137.19	5,598.4	-88.9	37.9	89.3	0.09	-0.01	11.26	
5,700.0	0.62	119.70	5,698.4	-89.4	38.6	89.9	0.25	0.19	-17.49	
5,800.0	0.52	88.41	5,798.4	-89.7	39.5	90.1	0.32	-0.10	-31.29	
5,900.0	0.28	90.92	5,898.4	-89.6	40.2	90.1	0.24	-0.24	2.51	
6,000.0	0.18	114.30	5,998.4	-89.7	40.6	90.2	0.14	-0.10	23.38	
6,100.0	0.31	119.31	6,098.4	-89.9	41.0	90.4	0.13	0.13	5.01	
6,200.0	0.45	118.94	6,198.4	-90.2	41.5	90.7	0.14	0.14	-0.37	
6,300.0	0.32	134.81	6,298.4	-90.6	42.1	91.1	0.17	-0.13	15.87	
6,400.0	0.49	113.26	6,398.4	-91.0	42.7	91.5	0.23	0.17	-21.55	
6,500.0	0.42	107.84	6,498.4	-91.3	43.4	91.8	0.08	-0.07	-5.42	
6,600.0	0.58	136.00	6,598.4	-91.7	44.1	92.3	0.29	0.16	28.16	
6,700.0	0.91	112.67	6,698.4	-92.4	45.2	93.0	0.44	0.33	-23.33	
6,800.0	1.01	122.82	6,798.4	-93.2	46.7	93.8	0.20	0.10	10.15	
6,900.0	1.07	115.44	6,898.4	-94.1	48.3	94.7	0.15	0.06	-7.38	
7,000.0	1.16	127.68	6,998.4	-95.1	49.9	95.7	0.25	0.09	12.24	
7,100.0	1.10	118.30	7,098.3	-96.2	51.6	96.8	0.19	-0.06	-9.38	
7,200.0	1.00	129.65	7,198.3	-97.2	53.1	97.8	0.23	-0.10	11.35	
7,300.0	1.16	120.27	7,298.3	-98.2	54.6	98.9	0.24	0.16	-9.38	
7,400.0	1.10	136.60	7,398.3	-99.5	56.2	100.1	0.33	-0.06	16.33	
7,500.0	1.39	121.74	7,498.3	-100.8	57.8	101.5	0.43	0.29	-14.86	
7,600.0	1.11	151.85	7,598.2	-102.3	59.3	103.0	0.70	-0.28	30.11	
7,631.4	1.14	166.11	7,629.6	-102.9	59.6	103.6	0.89	0.10	45.41	
Last GYRO Survey										
7,673.0	0.70	184.30	7,671.2	-103.5	59.6	104.2	1.26	-1.06	43.73	
First MWD Survey										
7,704.0	1.30	178.90	7,702.2	-104.0	59.6	104.8	1.96	1.94	-17.42	
7,737.0	4.30	173.10	7,735.2	-105.7	59.8	106.4	9.12	9.09	-17.58	
7,769.0	7.50	181.60	7,767.0	-108.9	59.9	109.7	10.34	10.00	26.56	
7,801.0	10.30	187.00	7,798.6	-113.9	59.5	114.6	9.12	8.75	16.88	
7,832.0	12.90	189.20	7,829.0	-120.0	58.6	120.7	8.51	8.39	7.10	
7,864.0	16.80	189.00	7,859.9	-128.1	57.3	128.8	12.19	12.19	-0.63	
7,897.0	20.20	189.00	7,891.2	-138.5	55.6	139.1	10.30	10.30	0.00	
7,928.0	23.60	189.30	7,920.0	-149.9	53.8	150.5	10.97	10.97	0.97	
7,960.0	27.00	189.90	7,948.9	-163.4	51.5	164.0	10.66	10.63	1.88	
7,993.0	31.00	189.50	7,977.7	-179.1	48.8	179.7	12.14	12.12	-1.21	
8,025.0	34.80	189.00	8,004.6	-196.3	46.0	196.8	11.91	11.88	-1.56	

Wolverine Directional, LLC

Survey Report

Company:	RKI Exploration & Production	Local Co-ordinate Reference:	Well: RDX-10-5H
Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 10-T26S-R30E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

Survey									
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8,056.0	38.50	187.80	8,029.5	-214.6	43.3	215.1	12.16	11.94	-3.87
8,088.0	42.40	186.40	8,053.8	-235.2	40.8	235.7	12.51	12.19	-4.38
8,120.0	46.20	185.60	8,076.7	-257.4	38.4	257.9	12.00	11.88	-2.50
8,152.0	50.10	183.50	8,098.1	-281.2	36.6	281.6	13.13	12.19	-6.56
8,184.0	54.20	180.70	8,117.7	-306.4	35.7	306.8	14.55	12.81	-8.75
8,216.0	58.30	178.10	8,135.5	-333.0	36.0	333.4	14.48	12.81	-8.13
8,248.0	60.70	176.90	8,151.7	-360.5	37.2	361.0	8.17	7.50	-3.75
8,280.0	62.50	177.40	8,166.9	-388.7	38.6	389.1	5.79	5.63	1.56
8,313.0	65.50	178.00	8,181.4	-418.3	39.7	418.7	9.24	9.09	1.82
8,345.0	68.90	178.40	8,193.8	-447.8	40.7	448.2	10.69	10.63	1.25
8,377.0	73.00	179.70	8,204.2	-478.0	41.2	478.5	13.38	12.81	4.06
8,409.0	76.60	180.00	8,212.6	-508.9	41.3	509.4	11.29	11.25	0.94
8,441.0	78.60	180.40	8,219.5	-540.1	41.1	540.6	6.37	6.25	1.25
8,473.0	79.20	179.50	8,225.7	-571.5	41.2	572.0	3.34	1.88	-2.81
8,505.0	81.40	176.50	8,231.0	-603.0	42.3	603.5	11.52	6.88	-9.38
8,537.0	83.10	174.20	8,235.4	-634.6	44.8	635.2	8.88	5.31	-7.19
8,567.0	85.90	173.30	8,238.2	-664.3	48.1	664.9	9.80	9.33	-3.00
8,598.0	88.40	172.90	8,239.8	-695.1	51.8	695.7	8.17	8.06	-1.29
8,629.0	90.30	172.50	8,240.1	-725.8	55.8	726.4	6.26	6.13	-1.29
8,659.0	90.50	172.70	8,239.9	-755.6	59.6	756.2	0.94	0.67	0.67
8,690.0	90.80	173.40	8,239.6	-786.3	63.4	787.1	2.46	0.97	2.26
8,722.0	91.00	175.00	8,239.1	-818.2	66.6	818.9	5.04	0.63	5.00
8,754.0	91.20	176.00	8,238.5	-850.1	69.1	850.9	3.19	0.63	3.13
8,786.0	91.00	176.20	8,237.8	-882.0	71.3	882.8	0.88	-0.63	0.63
8,882.0	90.50	178.10	8,236.6	-977.8	76.1	978.7	2.05	-0.52	1.98
8,978.0	90.50	179.90	8,235.7	-1,073.8	77.7	1,074.7	1.87	0.00	1.88
9,072.0	90.50	180.00	8,234.9	-1,167.8	77.8	1,168.7	0.11	0.00	0.11
9,167.0	90.90	179.80	8,233.8	-1,262.8	78.0	1,263.7	0.47	0.42	-0.21
9,264.0	90.20	179.30	8,232.8	-1,359.8	78.7	1,360.7	0.89	-0.72	-0.52
9,360.0	90.00	178.30	8,232.7	-1,455.8	80.8	1,456.7	1.06	-0.21	-1.04
9,457.0	90.10	179.10	8,232.6	-1,552.8	83.0	1,553.7	0.83	0.10	0.82
9,552.0	91.20	179.80	8,231.5	-1,647.7	83.9	1,648.7	1.37	1.16	0.74
9,647.0	91.60	180.70	8,229.2	-1,742.7	83.5	1,743.6	1.04	0.42	0.95
9,743.0	91.50	180.40	8,226.6	-1,838.7	82.5	1,839.6	0.33	-0.10	-0.31
9,838.0	91.50	179.70	8,224.1	-1,933.6	82.4	1,934.5	0.74	0.00	-0.74
9,934.0	91.50	180.70	8,221.6	-2,029.6	82.1	2,030.5	1.04	0.00	1.04
10,029.0	92.10	181.50	8,218.6	-2,124.5	80.3	2,125.4	1.05	0.63	0.84
10,125.0	91.20	182.70	8,215.8	-2,220.4	76.8	2,221.2	1.56	-0.94	1.25
10,222.0	91.10	182.00	8,213.9	-2,317.3	72.8	2,318.1	0.73	-0.10	-0.72
10,318.0	89.70	180.60	8,213.2	-2,413.3	70.6	2,414.0	2.06	-1.46	-1.46
10,414.0	89.80	181.10	8,213.6	-2,509.3	69.2	2,510.0	0.53	0.10	0.52
10,509.0	89.30	181.50	8,214.4	-2,604.3	67.0	2,604.9	0.67	-0.53	0.42
10,605.0	90.30	179.70	8,214.7	-2,700.2	66.0	2,700.9	2.14	1.04	-1.88
10,702.0	90.90	179.60	8,213.7	-2,797.2	66.6	2,797.9	0.63	0.62	-0.10
10,797.0	90.80	179.20	8,212.3	-2,892.2	67.6	2,892.8	0.43	-0.11	-0.42
10,892.0	89.90	179.90	8,211.7	-2,987.2	68.4	2,987.8	1.20	-0.95	0.74
10,986.0	89.70	180.30	8,212.0	-3,081.2	68.2	3,081.8	0.48	-0.21	0.43
11,081.0	91.00	180.10	8,211.5	-3,176.2	67.9	3,176.8	1.38	1.37	-0.21
11,177.0	92.80	180.30	8,208.3	-3,272.2	67.5	3,272.7	1.89	1.88	0.21
11,272.0	94.10	181.40	8,202.6	-3,367.0	66.1	3,367.5	1.79	1.37	1.16
11,368.0	92.90	180.60	8,196.7	-3,462.8	64.5	3,463.3	1.50	-1.25	-0.83
11,465.0	88.90	179.50	8,195.2	-3,559.7	64.4	3,560.3	4.28	-4.12	-1.13
11,560.0	90.80	180.40	8,195.4	-3,654.7	64.5	3,655.3	2.21	2.00	0.95
11,655.0	91.20	180.90	8,193.8	-3,749.7	63.4	3,750.2	0.67	0.42	0.53

Wolverine Directional, LLC

Survey Report

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Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 10-T26S-R30E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	RDX-10-5H	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)
11,751.0	89.40	180.60	8,193.3	-3,845.7	62.1	3,846.2	1.90	-1.88	-0.31
11,846.0	89.50	180.70	8,194.2	-3,940.7	61.0	3,941.1	0.15	0.11	0.11
11,943.0	90.90	181.80	8,193.8	-4,037.7	58.9	4,038.1	1.84	1.44	1.13
12,039.0	90.60	180.60	8,192.6	-4,133.6	56.9	4,134.0	1.29	-0.31	-1.25
12,135.0	90.10	178.70	8,192.0	-4,229.6	57.5	4,230.0	2.05	-0.52	-1.98
12,232.0	89.40	177.80	8,192.4	-4,326.6	60.5	4,327.0	1.18	-0.72	-0.93
12,328.0	89.20	177.60	8,193.6	-4,422.5	64.3	4,422.9	0.29	-0.21	-0.21
12,424.0	88.20	176.50	8,195.8	-4,518.3	69.3	4,518.8	1.55	-1.04	-1.15
12,520.0	88.50	177.80	8,198.5	-4,614.2	74.0	4,614.7	1.39	0.31	1.35
12,615.0	89.30	177.70	8,200.4	-4,709.1	77.8	4,709.7	0.85	0.84	-0.11
12,711.0	91.70	177.30	8,199.5	-4,805.0	81.9	4,805.6	2.53	2.50	-0.42
12,806.0	92.20	177.40	8,196.3	-4,899.8	86.3	4,900.5	0.54	0.53	0.11
12,903.0	92.40	177.80	8,192.4	-4,996.7	90.4	4,997.4	0.46	0.21	0.41
12,999.0	91.80	179.40	8,188.9	-5,092.6	92.7	5,093.3	1.78	-0.63	1.67
13,095.0	92.30	179.80	8,185.4	-5,188.5	93.4	5,189.3	0.67	0.52	0.42
13,191.0	92.60	179.90	8,181.3	-5,284.4	93.7	5,285.2	0.33	0.31	0.10
13,287.0	91.70	181.30	8,177.7	-5,380.3	92.7	5,381.1	1.73	-0.94	1.46
Last MWD Survey									
13,347.0	91.70	181.30	8,176.0	-5,440.3	91.3	5,441.0	0.00	0.00	0.00
Proj to TD - RDX-10-5H PBHL									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
100.0	100.0	0.0	0.2	First GYRO Survey
7,631.4	7,629.6	-102.9	59.6	Last GYRO Survey
7,673.0	7,671.2	-103.5	59.6	First MWD Survey
13,287.0	8,177.7	-5,380.3	92.7	Last MWD Survey
13,347.0	8,176.0	-5,440.3	91.3	Proj to TD

Checked By: _____ Approved By: _____ Date: _____