

15-42287

RKI Exploration & Production

Eddy County (NM83E)

Sec 22-T26S-R29E

East Pecos Fed 22-7H

Wellbore #1

Survey: MWD Surveys

Standard Survey Report

14 May, 2014

Wolverine Directional, LLC

Survey Report

Company:	RKI Exploration & Production	Local Co-ordinate Reference:	Well East Pecos Fed 22:7H
Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 22-T26S-R29E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	East Pecos Fed 22:7H	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	359.98

Survey Program	Date 2014/05/14			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
100.0	13,310.0	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	0.86	76.52	100.0	0.2	0.7	0.2	0.86	0.86	0.00
200.0	1.21	88.66	200.0	0.4	2.5	0.4	0.41	0.35	12.14
300.0	1.16	132.54	300.0	-0.3	4.3	-0.3	0.89	-0.05	43.88
400.0	1.17	133.79	399.9	-1.7	5.8	-1.7	0.03	0.01	1.25
500.0	1.17	143.68	499.9	-3.2	7.1	-3.2	0.20	0.00	9.89
600.0	1.26	158.09	599.9	-5.0	8.2	-5.1	0.32	0.09	14.41
700.0	1.27	165.69	699.9	-7.1	8.8	-7.1	0.17	0.01	7.60
800.0	1.31	166.20	799.8	-9.3	9.4	-9.3	0.04	0.04	0.51
900.0	1.51	161.64	899.8	-11.7	10.1	-11.7	0.23	0.20	-4.56
1,000.0	1.77	164.34	999.8	-14.4	10.9	-14.4	0.27	0.26	2.70
1,100.0	1.91	168.37	1,099.7	-17.5	11.7	-17.5	0.19	0.14	4.03
1,200.0	2.05	172.14	1,199.7	-20.9	12.2	-21.0	0.19	0.14	3.77
1,300.0	2.17	176.98	1,299.6	-24.6	12.6	-24.6	0.21	0.12	4.84
1,400.0	2.18	176.27	1,399.5	-28.4	12.8	-28.4	0.03	0.01	-0.71
1,500.0	2.18	175.86	1,499.5	-32.2	13.1	-32.2	0.02	0.00	-0.41
1,600.0	1.99	177.25	1,599.4	-35.8	13.3	-35.8	0.20	-0.19	1.39
1,700.0	1.74	178.15	1,699.3	-39.1	13.4	-39.1	0.25	-0.25	0.90
1,800.0	1.72	180.84	1,799.3	-42.1	13.4	-42.1	0.08	-0.02	2.69
1,900.0	1.52	187.12	1,899.2	-44.9	13.3	-44.9	0.27	-0.20	6.28
2,000.0	1.11	192.67	1,999.2	-47.2	12.9	-47.2	0.43	-0.41	5.55
2,100.0	1.06	203.25	2,099.2	-49.0	12.3	-49.0	0.21	-0.05	10.58
2,200.0	1.00	219.57	2,199.2	-50.5	11.4	-50.5	0.30	-0.06	16.32
2,300.0	1.14	122.43	2,299.2	-51.7	11.7	-51.7	1.61	0.14	-97.14
2,400.0	1.67	112.82	2,399.1	-52.8	13.9	-52.8	0.58	0.53	-9.61
2,500.0	2.10	103.70	2,499.1	-53.8	17.0	-53.8	0.52	0.43	-9.12
2,600.0	3.82	106.48	2,599.0	-55.2	22.0	-55.2	1.73	1.72	2.78
2,700.0	4.58	108.52	2,698.7	-57.4	28.9	-57.4	0.77	0.76	2.04
2,800.0	3.83	109.97	2,798.4	-59.8	35.9	-59.8	0.76	-0.75	1.45
2,900.0	3.18	111.71	2,898.2	-62.0	41.6	-62.0	0.66	-0.65	1.74
3,000.0	2.18	112.89	2,998.1	-63.7	45.9	-63.7	1.00	-1.00	1.18
3,100.0	1.88	113.64	3,098.1	-65.1	49.2	-65.1	0.30	-0.30	0.75
3,200.0	1.60	113.23	3,198.0	-66.3	51.9	-66.4	0.28	-0.28	-0.41
3,300.0	1.45	111.15	3,298.0	-67.3	54.4	-67.4	0.16	-0.15	-2.08
3,400.0	1.39	109.68	3,397.9	-68.2	56.7	-68.2	0.07	-0.06	-1.47
3,500.0	1.13	112.32	3,497.9	-69.0	58.8	-69.0	0.27	-0.26	2.64
3,600.0	0.99	121.41	3,597.9	-69.8	60.4	-69.8	0.22	-0.14	9.09
3,700.0	0.89	125.93	3,697.9	-70.7	61.8	-70.7	0.12	-0.10	4.52
3,800.0	0.81	143.83	3,797.9	-71.7	62.8	-71.8	0.28	-0.08	17.90

Wolverine Directional, LLC

Survey Report

Company:	RKI Exploration & Production	Local Co-ordinate Reference:	Well: East Pecos Fed 22-7H
Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 22-T26S-R29E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	East Pecos Fed 22-7H	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)
3,900.0	0.63	148.20	3,897.9	-72.8	63.5	-72.8	0.19	-0.18	4.37
4,000.0	0.64	148.25	3,997.9	-73.7	64.1	-73.7	0.01	0.01	0.05
4,100.0	0.47	144.22	4,097.9	-74.5	64.7	-74.6	0.17	-0.17	-4.03
4,200.0	0.48	139.30	4,197.9	-75.2	65.2	-75.2	0.04	0.01	-4.92
4,300.0	0.52	161.15	4,297.9	-75.9	65.6	-76.0	0.19	0.04	21.85
4,400.0	0.51	169.20	4,397.8	-76.8	65.8	-76.8	0.07	-0.01	8.05
4,500.0	0.62	164.88	4,497.8	-77.8	66.1	-77.8	0.12	0.11	-4.32
4,600.0	0.68	162.77	4,597.8	-78.8	66.4	-78.9	0.06	0.06	-2.11
4,700.0	0.73	166.56	4,697.8	-80.0	66.7	-80.1	0.07	0.05	3.79
4,800.0	0.73	170.11	4,797.8	-81.3	67.0	-81.3	0.05	0.00	3.55
4,900.0	0.79	182.88	4,897.8	-82.6	67.0	-82.6	0.18	0.06	12.77
5,000.0	0.43	178.15	4,997.8	-83.7	67.0	-83.7	0.36	-0.36	-4.73
5,100.0	0.71	164.21	5,097.8	-84.6	67.2	-84.7	0.31	0.28	-13.94
5,200.0	0.82	158.10	5,197.8	-85.9	67.6	-85.9	0.14	0.11	-6.11
5,300.0	0.90	156.69	5,297.8	-87.3	68.2	-87.3	0.08	0.08	-1.41
5,400.0	0.87	156.46	5,397.8	-88.7	68.8	-88.7	0.03	-0.03	-0.23
5,500.0	0.84	150.99	5,497.8	-90.0	69.5	-90.1	0.09	-0.03	-5.47
5,600.0	0.73	165.22	5,597.7	-91.3	70.0	-91.3	0.22	-0.11	14.23
5,700.0	0.79	159.53	5,697.7	-92.5	70.4	-92.6	0.10	0.06	-5.69
5,800.0	0.90	156.20	5,797.7	-93.9	71.0	-93.9	0.12	0.11	-3.33
5,900.0	0.96	156.57	5,897.7	-95.4	71.6	-95.4	0.06	0.06	0.37
6,000.0	1.32	154.76	5,997.7	-97.2	72.4	-97.2	0.36	0.36	-1.81
6,100.0	1.52	149.03	6,097.7	-99.4	73.6	-99.4	0.25	0.20	-5.73
6,200.0	1.49	149.33	6,197.6	-101.6	74.9	-101.7	0.03	-0.03	0.30
6,300.0	1.37	165.22	6,297.6	-103.9	75.9	-103.9	0.41	-0.12	15.89
6,400.0	1.51	174.36	6,397.6	-106.4	76.3	-106.4	0.27	0.14	9.14
6,500.0	1.67	177.77	6,497.5	-109.2	76.5	-109.2	0.19	0.16	3.41
6,600.0	1.77	178.53	6,597.5	-112.2	76.6	-112.2	0.10	0.10	0.76
6,700.0	1.66	178.54	6,697.4	-115.1	76.7	-115.2	0.11	-0.11	0.01
6,800.0	1.77	175.25	6,797.4	-118.1	76.9	-118.2	0.15	0.11	-3.29
6,900.0	1.73	186.45	6,897.3	-121.2	76.8	-121.2	0.34	-0.04	11.20
7,000.0	1.53	208.12	6,997.3	-123.8	76.0	-123.9	0.64	-0.20	21.67
7,100.0	1.41	227.36	7,097.3	-125.9	74.5	-125.9	0.51	-0.12	19.24
7,200.0	1.74	241.50	7,197.2	-127.4	72.3	-127.4	0.51	0.33	14.14
7,300.0	0.78	241.71	7,297.2	-128.5	70.3	-128.5	0.96	-0.96	0.21
7,400.0	0.55	235.53	7,397.2	-129.1	69.3	-129.1	0.24	-0.23	-6.18
7,500.0	1.22	0.51	7,497.2	-128.3	68.9	-128.3	1.60	0.67	124.98
7,600.0	1.17	330.22	7,597.2	-126.3	68.4	-126.3	0.63	-0.05	-30.29
7,700.0	0.99	319.54	7,697.2	-124.8	67.4	-124.8	0.27	-0.18	-10.68
7,800.0	0.85	267.71	7,797.1	-124.1	66.1	-124.2	0.81	-0.14	-51.83
7,850.0	0.60	286.15	7,847.1	-124.1	65.5	-124.1	0.68	-0.50	36.88
Last GYRO Survey									
7,896.0	1.30	298.90	7,893.1	-123.8	64.8	-123.8	1.58	1.52	27.72
First MWD Survey									
7,923.0	1.50	306.40	7,920.1	-123.4	64.2	-123.4	1.00	0.74	27.78
7,954.0	1.60	342.30	7,951.1	-122.8	63.8	-122.8	3.10	0.32	115.81
7,986.0	3.00	2.20	7,983.1	-121.5	63.6	-121.5	4.97	4.38	62.19
8,017.0	5.50	2.90	8,014.0	-119.2	63.8	-119.2	8.07	8.06	2.26
8,049.0	8.10	0.40	8,045.8	-115.4	63.8	-115.4	8.18	8.13	-7.81
8,081.0	11.10	358.30	8,077.3	-110.1	63.8	-110.1	9.44	9.38	-6.56
8,112.0	14.20	357.80	8,107.6	-103.3	63.5	-103.3	10.01	10.00	-1.61
8,144.0	17.20	357.40	8,138.4	-94.6	63.2	-94.7	9.38	9.38	-1.25
8,176.0	20.10	357.20	8,168.7	-84.4	62.7	-84.4	9.06	9.06	-0.63
8,207.0	22.40	356.70	8,197.6	-73.2	62.1	-73.2	7.44	7.42	-1.61

Wolverine Directional, LLC

Survey Report

Company:	RKI Exploration & Production	Local Co-ordinate Reference:	Well-East Pecos Fed 22-7H
Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 22-T26S-R29E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	East Pecos Fed 22-7H	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)
8,239.0	24.80	356.50	8,226.9	-60.4	61.3	-60.4	7.50	7.50	-0.63
8,270.0	26.90	356.50	8,254.8	-46.9	60.5	-46.9	6.77	6.77	0.00
8,302.0	28.80	356.70	8,283.1	-32.0	59.6	-32.0	5.94	5.94	0.63
8,333.0	31.00	358.10	8,310.0	-16.6	58.9	-16.6	7.44	7.10	4.52
8,365.0	34.20	358.10	8,336.9	0.7	58.4	0.6	10.00	10.00	0.00
8,397.0	36.70	356.90	8,363.0	19.2	57.5	19.2	8.11	7.81	-3.75
8,428.0	39.90	357.10	8,387.3	38.4	56.5	38.4	10.33	10.32	0.65
8,460.0	43.00	357.20	8,411.3	59.5	55.5	59.5	9.69	9.69	0.31
8,492.0	44.90	357.40	8,434.3	81.7	54.4	81.7	5.95	5.94	0.63
8,524.0	46.00	357.40	8,456.8	104.5	53.4	104.5	3.44	3.44	0.00
8,556.0	46.90	357.20	8,478.8	127.7	52.3	127.7	2.85	2.81	-0.63
8,588.0	48.50	356.70	8,500.4	151.3	51.0	151.3	5.13	5.00	-1.56
8,620.0	51.20	356.70	8,521.0	175.7	49.6	175.7	8.44	8.44	0.00
8,651.0	53.70	357.90	8,539.9	200.3	48.5	200.3	8.63	8.06	3.87
8,682.0	56.60	358.70	8,557.6	225.7	47.7	225.7	9.59	9.35	2.58
8,714.0	59.90	359.70	8,574.4	252.9	47.4	252.9	10.65	10.31	3.13
8,745.0	63.50	0.10	8,589.1	280.2	47.3	280.2	11.67	11.61	1.29
8,777.0	66.20	0.80	8,602.7	309.2	47.5	309.1	8.67	8.44	2.19
8,809.0	68.70	1.10	8,615.0	338.7	48.0	338.7	7.86	7.81	0.94
8,840.0	70.50	1.50	8,625.8	367.7	48.7	367.7	5.93	5.81	1.29
8,872.0	72.30	1.80	8,636.0	398.1	49.6	398.0	5.69	5.63	0.94
8,904.0	74.90	1.60	8,645.0	428.7	50.5	428.7	8.15	8.13	-0.63
8,936.0	77.60	1.30	8,652.6	459.8	51.3	459.8	8.49	8.44	-0.94
8,968.0	81.10	0.90	8,658.6	491.3	51.9	491.2	11.01	10.94	-1.25
8,987.0	83.00	0.90	8,661.2	510.1	52.2	510.0	10.00	10.00	0.00
9,019.0	85.40	0.60	8,664.4	541.9	52.6	541.9	7.56	7.50	-0.94
9,051.0	87.80	0.60	8,666.3	573.8	52.9	573.8	7.50	7.50	0.00
9,083.0	90.00	0.20	8,666.9	605.8	53.1	605.8	6.99	6.88	-1.25
9,114.0	91.50	0.20	8,666.5	636.8	53.2	636.8	4.84	4.84	0.00
9,146.0	92.30	0.40	8,665.5	668.8	53.4	668.8	2.58	2.50	0.63
9,178.0	92.30	0.40	8,664.2	700.8	53.6	700.8	0.00	0.00	0.00
9,273.0	90.40	0.60	8,661.9	795.7	54.5	795.7	2.01	-2.00	0.21
9,367.0	91.30	0.40	8,660.6	889.7	55.3	889.7	0.98	0.96	-0.21
9,462.0	92.30	0.10	8,657.6	984.7	55.7	984.7	1.10	1.05	-0.32
9,557.0	91.60	359.00	8,654.3	1,079.6	55.0	1,079.6	1.37	-0.74	-1.16
9,653.0	91.20	359.50	8,652.0	1,175.6	53.7	1,175.6	0.67	-0.42	0.52
9,748.0	89.90	0.40	8,651.1	1,270.6	53.6	1,270.6	1.66	-1.37	0.95
9,843.0	90.10	358.70	8,651.1	1,365.6	52.9	1,365.5	1.80	0.21	-1.79
9,938.0	90.80	358.50	8,650.3	1,460.5	50.5	1,460.5	0.77	0.74	-0.21
10,033.0	91.80	357.90	8,648.2	1,555.5	47.6	1,555.4	1.23	1.05	-0.63
10,128.0	90.70	357.90	8,646.1	1,650.4	44.1	1,650.4	1.16	-1.16	0.00
10,223.0	91.20	358.10	8,644.5	1,745.3	40.8	1,745.3	0.57	0.53	0.21
10,317.0	91.60	356.90	8,642.2	1,839.2	36.7	1,839.2	1.35	0.43	-1.28
10,412.0	89.50	356.50	8,641.3	1,934.0	31.2	1,934.0	2.25	-2.21	-0.42
10,507.0	90.50	356.70	8,641.3	2,028.8	25.6	2,028.8	1.07	1.05	0.21
10,601.0	88.30	357.80	8,642.3	2,122.7	21.1	2,122.7	2.62	-2.34	1.17
10,697.0	88.30	357.90	8,645.2	2,218.6	17.5	2,218.6	0.10	0.00	0.10
10,792.0	89.70	359.00	8,646.8	2,313.6	14.9	2,313.6	1.87	1.47	1.16
10,897.0	90.40	0.20	8,646.7	2,418.6	14.2	2,418.6	1.32	0.67	1.14
10,991.0	91.20	0.10	8,645.4	2,512.6	14.4	2,512.5	0.86	0.85	-0.11
11,086.0	92.20	0.20	8,642.6	2,607.5	14.6	2,607.5	1.06	1.05	0.11
11,181.0	92.70	359.70	8,638.5	2,702.4	14.6	2,702.4	0.74	0.53	-0.53
11,276.0	91.60	1.10	8,635.0	2,797.3	15.2	2,797.3	1.87	-1.16	1.47
11,371.0	92.40	0.80	8,631.6	2,892.3	16.8	2,892.3	0.90	0.84	-0.32

Wolverine Directional, LLC

Survey Report

Company:	RKI Exploration & Production	Local Co-ordinate Reference:	Well: East Pecos Fed 22-7H
Project:	Eddy County (NM83E)	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Sec 22-T26S-R29E	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	East Pecos Fed 22-7H	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)
11,466.0	93.30	0.10	8,626.9	2,987.2	17.5	2,987.1	1.20	0.95	-0.74
11,560.0	92.90	0.40	8,621.8	3,081.0	18.0	3,081.0	0.53	-0.43	0.32
11,656.0	90.30	0.40	8,619.2	3,177.0	18.6	3,177.0	2.71	-2.71	0.00
11,750.0	90.70	0.80	8,618.3	3,271.0	19.6	3,270.9	0.60	0.43	0.43
11,845.0	92.40	0.80	8,615.8	3,365.9	20.9	3,365.9	1.79	1.79	0.00
11,941.0	90.30	0.80	8,613.5	3,461.9	22.3	3,461.9	2.19	-2.19	0.00
12,035.0	91.20	0.40	8,612.3	3,555.9	23.3	3,555.8	1.05	0.96	-0.43
12,130.0	91.50	359.20	8,610.0	3,650.8	22.9	3,650.8	1.30	0.32	-1.26
12,225.0	89.50	359.70	8,609.2	3,745.8	22.0	3,745.8	2.17	-2.11	0.53
12,320.0	90.10	359.40	8,609.5	3,840.8	21.3	3,840.8	0.71	0.63	-0.32
12,415.0	90.70	358.80	8,608.9	3,935.8	19.8	3,935.8	0.89	0.63	-0.63
12,509.0	91.60	358.10	8,607.0	4,029.7	17.2	4,029.7	1.21	0.96	-0.74
12,604.0	93.60	357.60	8,602.7	4,124.6	13.7	4,124.6	2.17	2.11	-0.53
12,699.0	91.60	357.60	8,598.4	4,219.4	9.7	4,219.4	2.11	-2.11	0.00
12,794.0	91.50	357.90	8,595.8	4,314.3	6.0	4,314.3	0.33	-0.11	0.32
12,889.0	90.60	359.00	8,594.1	4,409.2	3.4	4,409.2	1.50	-0.95	1.16
12,985.0	91.00	358.80	8,592.7	4,505.2	1.6	4,505.2	0.47	0.42	-0.21
13,080.0	90.60	357.20	8,591.4	4,600.1	-1.7	4,600.1	1.74	-0.42	-1.68
13,176.0	89.80	356.20	8,591.1	4,696.0	-7.3	4,696.0	1.33	-0.83	-1.04
13,262.0	91.60	356.00	8,590.0	4,781.8	-13.1	4,781.8	2.11	2.09	-0.23
Last MWD Survey									
13,310.0	91.60	356.00	8,588.7	4,829.6	-16.5	4,829.6	0.00	0.00	0.00
Proj to TD East Pecos Fed 22-7H PBHL									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
7,850.0	7,847.1	-124.1	65.5	Last GYRO Survey
7,896.0	7,893.1	-123.8	64.8	First MWD Survey
13,262.0	8,590.0	4,781.8	-13.1	Last MWD Survey
13,310.0	8,588.7	4,829.6	-16.5	Proj to TD

Checked By: _____ Approved By: _____ Date: _____