



DIRECTIONAL TECHNOLOGIES INC.

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WPX Energy Rocky Mountain, LLC

RU 23-06S-094W

RWF 43-23 Pad

RWF 341-23 - Slot B07

14-09-148

Final Surveys - Feb.16, 2015

License:

UWI:

Survey Report

16 February, 2015





Company:	WPX Energy Rocky Mountain, LLC	Local Co-ordinate Reference:	Well RWF 341-23 - Slot B07
Project:	RU 23-06S-094W	TVD Reference:	KELLY BUSHING @ 5625.00usft (Nabors 577 (26' RKB) mab)
Site:	RWF 43-23 Pad	MD Reference:	KELLY BUSHING @ 5625.00usft (Nabors 577 (26' RKB) mab)
Well:	RWF 341-23	North Reference:	True
Wellbore:	14-09-148	Survey Calculation Method:	Minimum Curvature
Design:	Final Surveys - Feb.16, 2015	Database:	EDM_2011

Project	RU 23-06S-094W, Garfield County, CO, 23-06S-094W		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		Using geodetic scale factor

Site		RWF 43-23 Pad			
Site Position:		Northing:	1,619,204.50 usft	Latitude:	39° 30' 36.053 N
From:	Map	Easting:	2,337,897.00 usft	Longitude:	107° 50' 48.996 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.200 in	Grid Convergence:	-1.48 °

Well	RWF 341-23 - Slot B07					
Well Position	+N/-S	0.00 usft	Northing:	1,619,214.50 usft	Latitude:	39° 30' 36.150 N
	+E/-W	0.00 usft	Easting:	2,337,889.00 usft	Longitude:	107° 50' 49.102 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	5,599.00 usft

Wellbore	14-09-148	Well UWI		License	
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	25/09/2014	9.86	65.69	51,949

Design	Final Surveys - Feb.16, 2015				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	347.71	

Survey Program	Date	16/02/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
56.00	9,147.00	Final Surveys (14-09-148)	MWD+sag	/D v3:standard declination + s	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	5,625.00	0.00	0.00	0.00	0.00	0.00	0.00
56.00	0.18	314.21	56.00	5,569.00	0.06	-0.06	0.07	0.32	0.32	0.00
77.00	0.62	294.17	77.00	5,548.00	0.13	-0.19	0.17	2.17	2.10	-95.43
KOP										
86.00	0.84	304.10	86.00	5,539.00	0.19	-0.29	0.25	2.85	2.49	110.38
107.00	1.41	314.30	106.99	5,518.01	0.46	-0.60	0.57	2.85	2.70	48.55
137.00	2.02	314.74	136.98	5,488.02	1.09	-1.24	1.32	2.03	2.03	1.47
167.00	2.46	328.62	166.96	5,458.04	2.01	-1.95	2.38	2.32	1.47	46.27
198.00	2.99	339.79	197.92	5,427.08	3.33	-2.58	3.81	2.41	1.71	36.03



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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	SS (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
228.00	3.78	337.68	227.87	5,397.13	4.98	-3.22	5.55	2.67	2.63	-7.03
259.00	4.13	348.93	258.80	5,366.20	7.02	-3.83	7.68	2.74	1.13	36.29
289.00	4.93	352.53	288.70	5,336.30	9.36	-4.20	10.04	2.83	2.67	12.00
319.00	5.89	351.83	318.57	5,306.43	12.16	-4.59	12.86	3.21	3.20	-2.33
349.00	6.69	353.67	348.39	5,276.61	15.42	-5.00	16.14	2.75	2.67	6.13
379.00	7.83	353.76	378.15	5,246.85	19.19	-5.41	19.91	3.80	3.80	0.30
410.00	8.97	354.37	408.81	5,216.19	23.70	-5.88	24.41	3.69	3.68	1.97
440.00	10.73	354.37	438.37	5,186.63	28.80	-6.38	29.50	5.87	5.87	0.00
470.00	11.52	351.39	467.81	5,157.19	34.55	-7.11	35.27	3.26	2.63	-9.93
530.00	13.37	348.57	526.40	5,098.60	47.27	-9.38	48.18	3.24	3.08	-4.70
601.00	16.19	345.73	595.04	5,029.96	64.91	-13.45	66.29	4.10	3.97	-4.00
693.00	19.65	345.89	682.56	4,942.44	92.35	-20.38	94.57	3.76	3.76	0.17
784.00	22.73	346.59	767.40	4,857.60	124.30	-28.19	127.45	3.40	3.38	0.77
874.00	25.22	347.23	849.63	4,775.37	159.92	-36.46	164.02	2.78	2.77	0.71
964.00	28.23	347.91	930.01	4,694.99	199.44	-45.16	204.49	3.36	3.34	0.76
1,060.00	31.20	348.34	1,013.37	4,611.63	246.01	-54.94	252.06	3.10	3.09	0.45
1,140.00	33.02	348.51	1,081.13	4,543.87	287.66	-63.47	294.58	2.28	2.28	0.21
Surface Casing										
1,190.00	33.24	348.15	1,123.00	4,502.00	314.43	-69.00	321.91	0.59	0.44	-0.72
1,246.00	33.49	347.75	1,169.77	4,455.23	344.55	-75.43	352.71	0.59	0.44	-0.71
1,340.00	31.60	346.69	1,249.01	4,375.99	393.86	-86.61	403.27	2.10	-2.01	-1.13
1,435.00	31.82	345.73	1,329.83	4,295.17	442.35	-98.51	453.18	0.58	0.23	-1.01
1,531.00	31.30	346.26	1,411.63	4,213.37	491.10	-110.67	503.41	0.61	-0.54	0.55
1,626.00	30.90	349.24	1,492.98	4,132.02	539.04	-121.09	552.46	1.67	-0.42	3.14
1,722.00	31.08	348.19	1,575.28	4,049.72	587.51	-130.76	601.88	0.59	0.19	-1.09
1,817.00	30.86	347.22	1,656.73	3,968.27	635.28	-141.17	650.77	0.57	-0.23	-1.02
1,913.00	31.12	345.29	1,739.03	3,885.97	683.29	-152.92	700.18	1.07	0.27	-2.01
2,008.00	31.21	347.31	1,820.32	3,804.68	731.04	-164.56	749.32	1.10	0.09	2.13
2,102.00	31.25	349.77	1,900.71	3,724.29	778.80	-174.24	798.04	1.36	0.04	2.62
2,198.00	30.90	348.72	1,982.93	3,642.07	827.48	-183.48	847.57	0.67	-0.36	-1.09
2,294.00	31.56	349.95	2,065.02	3,559.98	876.39	-192.69	897.32	0.96	0.69	1.28
2,389.00	32.57	350.56	2,145.53	3,479.47	926.10	-201.22	947.70	1.12	1.06	0.64
2,485.00	32.48	350.39	2,226.47	3,398.53	977.00	-209.76	999.26	0.13	-0.09	-0.18
2,580.00	32.22	349.07	2,306.73	3,318.27	1,027.02	-218.82	1,050.06	0.79	-0.27	-1.39
2,676.00	32.31	348.37	2,387.90	3,237.10	1,077.28	-228.85	1,101.30	0.40	0.09	-0.73
2,771.00	32.18	347.66	2,468.25	3,156.75	1,126.86	-239.37	1,151.98	0.42	-0.14	-0.75
2,867.00	30.46	347.75	2,550.26	3,074.74	1,175.61	-250.00	1,201.89	1.79	-1.79	0.09
2,962.00	32.75	348.54	2,631.16	2,993.84	1,224.33	-260.21	1,251.67	2.45	2.41	0.83
3,056.00	32.13	348.10	2,710.50	2,914.50	1,273.71	-270.42	1,302.08	0.71	-0.66	-0.47
3,152.00	31.60	347.05	2,792.03	2,832.97	1,323.21	-281.32	1,352.76	0.80	-0.55	-1.09
3,247.00	33.06	347.22	2,872.30	2,752.70	1,372.73	-292.63	1,403.56	1.54	1.54	0.18



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3,343.00	32.79	346.78	2,952.88	2,672.12	1,423.58	-304.37	1,455.74	0.38	-0.28	-0.46
3,438.00	33.01	346.26	3,032.64	2,592.36	1,473.76	-316.40	1,507.33	0.38	0.23	-0.55
3,533.00	32.79	346.08	3,112.41	2,512.59	1,523.86	-328.73	1,558.91	0.25	-0.23	-0.19
3,629.00	32.88	345.02	3,193.07	2,431.93	1,574.27	-341.72	1,610.93	0.61	0.09	-1.10
3,724.00	32.35	345.90	3,273.09	2,351.91	1,623.83	-354.58	1,662.09	0.75	-0.56	0.93
3,819.00	31.74	349.51	3,353.62	2,271.38	1,673.06	-365.32	1,712.48	2.12	-0.64	3.80
3,914.00	31.25	348.45	3,434.63	2,190.37	1,721.77	-374.80	1,762.09	0.78	-0.52	-1.12
4,010.00	31.30	348.54	3,516.68	2,108.32	1,770.61	-384.74	1,811.92	0.07	0.05	0.09
4,122.00	31.03	346.78	3,612.52	2,012.48	1,827.22	-397.13	1,869.88	0.85	-0.24	-1.57
4,218.00	31.34	348.01	3,694.65	1,930.35	1,875.73	-407.97	1,919.59	0.74	0.32	1.28
4,313.00	30.90	346.96	3,775.97	1,849.03	1,923.66	-418.61	1,968.68	0.74	-0.46	-1.11
4,407.00	30.42	346.43	3,856.83	1,768.17	1,970.31	-429.64	2,016.61	0.59	-0.51	-0.56
4,502.00	30.11	347.75	3,938.89	1,686.11	2,016.98	-440.34	2,064.48	0.77	-0.33	1.39
4,598.00	28.88	347.66	4,022.44	1,602.56	2,063.16	-450.40	2,111.75	1.28	-1.28	-0.09
4,693.00	28.31	346.52	4,105.86	1,519.14	2,107.48	-460.56	2,157.21	0.83	-0.60	-1.20
4,788.00	27.91	346.78	4,189.65	1,435.35	2,151.03	-470.89	2,201.96	0.44	-0.42	0.27
4,885.00	25.67	350.21	4,276.24	1,348.76	2,193.84	-479.66	2,245.66	2.81	-2.31	3.54
4,980.00	25.01	349.07	4,362.10	1,262.90	2,233.83	-486.96	2,286.30	0.86	-0.69	-1.20
5,076.00	24.53	349.95	4,449.26	1,175.74	2,273.38	-494.29	2,326.50	0.63	-0.50	0.92
5,171.00	22.90	349.24	4,536.24	1,088.76	2,310.96	-501.18	2,364.68	1.74	-1.72	-0.75
5,267.00	20.53	349.51	4,625.42	999.58	2,345.87	-507.73	2,400.18	2.47	-2.47	0.28
5,362.00	17.67	347.49	4,715.18	909.82	2,376.33	-513.89	2,431.26	3.09	-3.01	-2.13
5,457.00	16.35	345.90	4,806.03	818.97	2,403.37	-520.27	2,459.04	1.47	-1.39	-1.67
5,552.00	13.85	347.66	4,897.74	727.26	2,427.46	-525.96	2,483.78	2.68	-2.63	1.85
5,647.00	11.25	347.31	4,990.46	634.54	2,447.61	-530.43	2,504.42	2.74	-2.74	-0.37
5,742.00	8.92	344.94	5,083.99	541.01	2,463.76	-534.38	2,521.05	2.49	-2.45	-2.49
5,837.00	7.12	350.12	5,178.06	446.94	2,476.68	-537.30	2,534.29	2.04	-1.89	5.45
5,932.00	5.32	350.83	5,272.49	352.51	2,486.82	-539.01	2,544.57	1.90	-1.89	0.75
6,028.00	3.65	342.39	5,368.20	256.80	2,494.13	-540.65	2,552.05	1.87	-1.74	-8.79
6,124.00	3.08	337.12	5,464.03	160.97	2,499.42	-542.57	2,557.63	0.67	-0.59	-5.49
6,219.00	2.68	333.07	5,558.91	66.09	2,503.75	-544.57	2,562.29	0.47	-0.42	-4.26
6,315.00	2.07	324.46	5,654.83	-29.83	2,507.16	-546.60	2,566.05	0.73	-0.64	-8.97
6,410.00	1.93	312.07	5,749.77	-124.77	2,509.63	-548.78	2,568.93	0.48	-0.15	-13.04
6,505.00	1.93	302.22	5,844.72	-219.72	2,511.56	-551.32	2,571.35	0.35	0.00	-10.37
6,600.00	1.32	338.96	5,939.68	-314.68	2,513.43	-553.07	2,573.56	1.24	-0.64	38.67
6,696.00	0.44	14.03	6,035.67	-410.67	2,514.82	-553.38	2,574.98	1.03	-0.92	36.53
6,791.00	0.31	33.98	6,130.67	-505.67	2,515.39	-553.15	2,575.48	0.19	-0.14	21.00
6,886.00	2.15	49.45	6,225.64	-600.64	2,516.76	-551.65	2,576.50	1.95	1.94	16.28
6,981.00	1.80	56.74	6,320.58	-695.58	2,518.74	-549.05	2,577.88	0.45	-0.37	7.67
7,076.00	1.41	69.75	6,415.55	-790.55	2,519.96	-546.70	2,578.58	0.56	-0.41	13.69
7,172.00	0.88	63.95	6,511.53	-886.53	2,520.69	-544.93	2,578.92	0.56	-0.55	-6.04



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7,267.00	0.53	69.40	6,606.52	-981.52	2,521.17	-543.86	2,579.15	0.37	-0.37	5.74
7,362.00	1.41	43.91	6,701.51	-1,076.51	2,522.16	-542.64	2,579.87	1.01	0.93	-26.83
7,456.00	1.27	48.48	6,795.48	-1,170.48	2,523.69	-541.06	2,581.02	0.19	-0.15	4.86
7,552.00	0.70	33.28	6,891.47	-1,266.47	2,524.88	-539.94	2,581.95	0.65	-0.59	-15.83
7,647.00	0.26	50.41	6,986.46	-1,361.46	2,525.50	-539.46	2,582.46	0.48	-0.46	18.03
7,743.00	0.26	254.06	7,082.46	-1,457.46	2,525.58	-539.50	2,582.54	0.53	0.00	-162.86
7,839.00	0.70	238.59	7,178.46	-1,553.46	2,525.22	-540.21	2,582.34	0.47	0.46	-16.11
7,934.00	0.70	211.52	7,273.45	-1,648.45	2,524.42	-541.01	2,581.73	0.34	0.00	-28.49
8,029.00	0.83	152.46	7,368.44	-1,743.44	2,523.32	-540.99	2,580.64	0.80	0.14	-62.17
8,124.00	1.01	178.12	7,463.43	-1,838.43	2,521.87	-540.65	2,579.16	0.47	0.19	27.01
8,220.00	1.63	195.52	7,559.41	-1,934.41	2,519.71	-540.98	2,577.12	0.76	0.65	18.13
8,316.00	2.24	200.62	7,655.35	-2,030.35	2,516.64	-542.01	2,574.33	0.66	0.64	5.31
8,411.00	2.90	198.42	7,750.26	-2,125.26	2,512.62	-543.42	2,570.71	0.70	0.69	-2.32
8,507.00	3.96	199.65	7,846.08	-2,221.08	2,507.19	-545.31	2,565.81	1.11	1.10	1.28
8,602.00	5.32	208.27	7,940.77	-2,315.77	2,500.22	-548.50	2,559.68	1.60	1.43	9.07
8,698.00	4.88	206.16	8,036.39	-2,411.39	2,492.64	-552.40	2,553.10	0.50	-0.46	-2.20
8,793.00	3.21	198.78	8,131.15	-2,506.15	2,486.49	-555.04	2,547.66	1.84	-1.76	-7.77
8,889.00	3.82	196.49	8,226.97	-2,601.97	2,480.88	-556.81	2,542.55	0.65	0.64	-2.39
8,985.00	4.66	199.39	8,322.71	-2,697.71	2,474.14	-559.02	2,536.43	0.90	0.88	3.02
9,080.00	5.32	204.93	8,417.35	-2,792.35	2,466.50	-562.15	2,529.64	0.86	0.69	5.83
Last Survey @ 9097usft										
9,097.00	5.32	206.16	8,434.27	-2,809.27	2,465.08	-562.83	2,528.39	0.67	0.00	7.24
Extrapolation to TD @ 9147usft										
9,147.00	5.32	206.16	8,484.06	-2,859.06	2,460.92	-564.88	2,524.76	0.00	0.00	0.00

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)
1,190.00	1,123.00	Surface Casing		

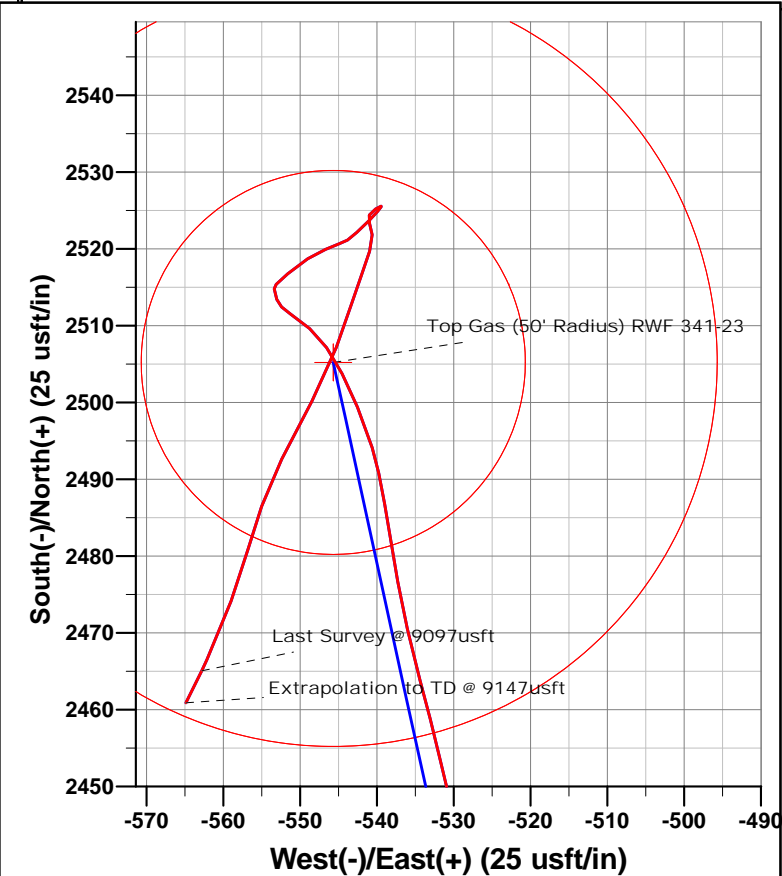
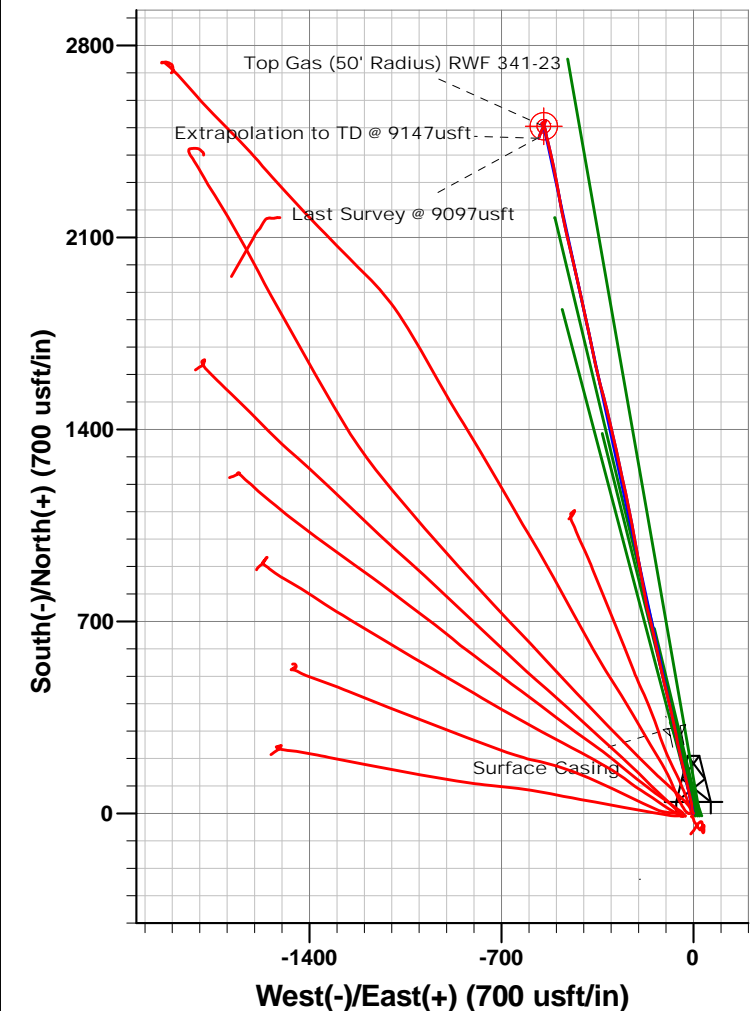
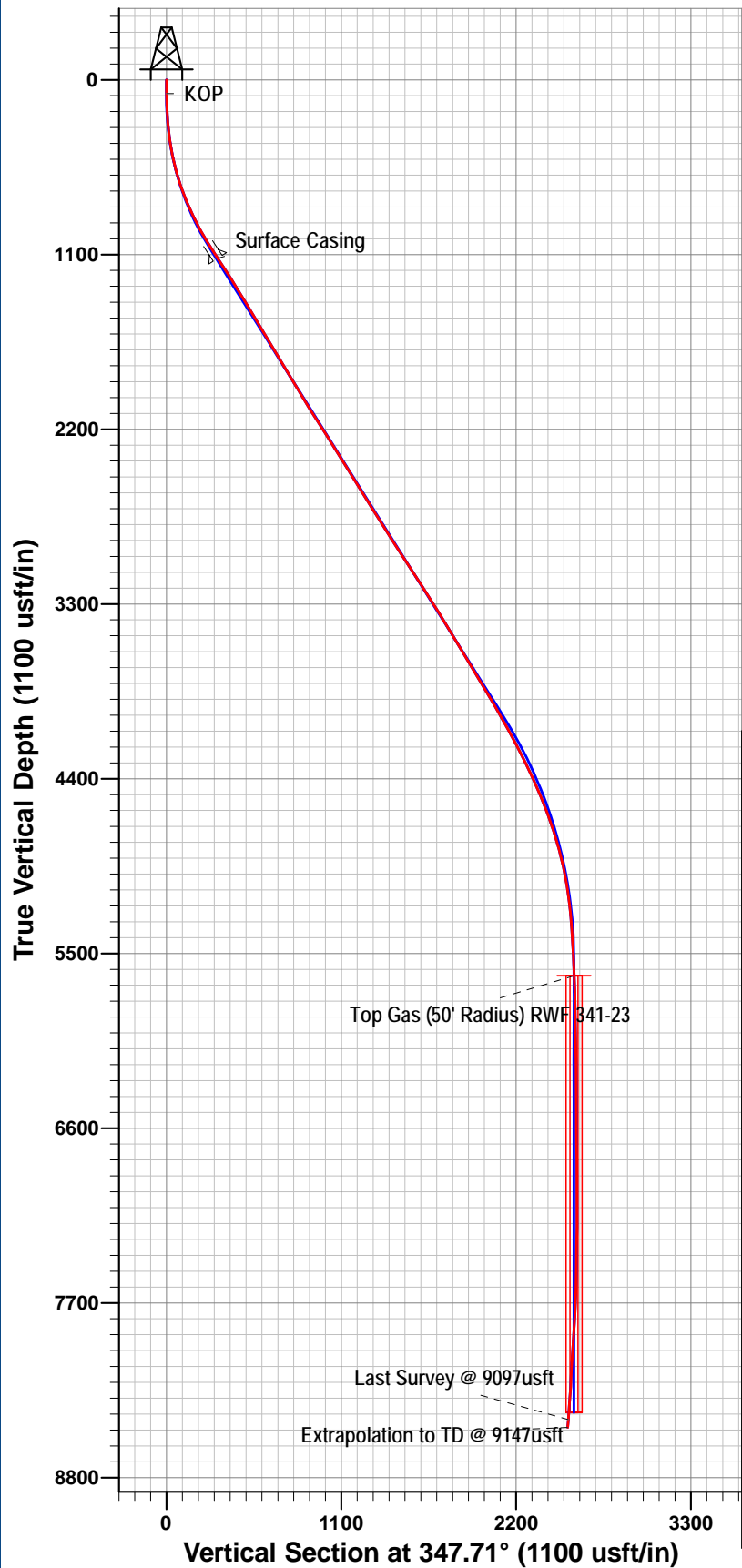
Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
86.00	86.00	0.19	-0.29	KOP
9,097.00	8,434.27	2,465.08	-562.83	Last Survey @ 9097usft
9,147.00	8,484.06	2,460.92	-564.88	Extrapolation to TD @ 9147usft



REFERENCE INFORMATION
Magnetic Declination - 9.86°
Magnetic Dip Angle - 65.69°
Field Strength - 51949
KB Elevation - KELLY BUSHING @ 5625.00usft (Nabors 577 (26' RKB) mab)
Ground Level - 5599.00
Well Center Northing - 1619214.50
Well Center Easting - 2337889.00
Calculation Method - Minimum Curvature
Geodetic System - US State Plane 1983
Geodetic Datum - North American Datum 1983
Map Zone - Colorado Central Zone

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W
W/C_RWF_32-23	0.00	-0.97	-37.50
W/C_RWF_331-23	0.00	-0.39	-15.00
W/C_RWF_332-23	0.00	-10.77	-29.73
W/C_RWF_341-23	0.00	0.00	0.00
W/C_RWF_342-23	0.00	-10.00	0.26
W/C_RWF_41-23	0.00	0.40	15.00
W/C_RWF_42-23	0.00	-9.61	15.25
W/C_RWF_431-23	0.00	-1.16	-44.99
W/C_RWF_432-23	0.00	-11.16	-44.73
W/C_RWF_43-23	0.00	-10.19	-7.24
W/C_RWF_441-23	0.00	-9.80	7.76
W/C_RWF_442-23	0.00	-9.42	22.75
W/C_RWF_531-23	0.00	-0.19	-7.50
W/C_RWF_541-23	0.00	0.58	22.49
W/C_RWF_542-23	0.00	-9.22	30.25
W/C_RWF_633-23	0.00	-10.97	-37.23
Top Gas (25' Radius) RWF 341-23	5640.00	2505.24	-545.72
Top Gas (50' Radius) RWF 341-23	5640.00	2505.24	-545.72



Survey: Final Surveys (RWF 341-23/14-09-148)