



#### Well Details: RWF 421-10

TVD Reference: GL 6720' & RKB 24' @ 6744.00usft		Grid Level: 6720.00		Well: RWF 421-10 (B17)	
+N/-S	+E/-W	North	East	Latitude	Longitude
0.00	0.00	1634868.43	2329797.04	39.5524260	-107.8770847

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well RWF 421-10 - Slot RWF 421-10 (B17), True North  
 Vertical (TVD) Reference: GL 6720' & RKB 24' @ 6744.00usft  
 Section (VS) Reference: Slot - RWF 421-10 (B17)(0.00N, 0.00E)  
 Measured Depth Reference: GL 6720' & RKB 24' @ 6744.00usft  
 Calculation Method: Minimum Curvature

#### PROJECT DETAILS: Garfield County, CO NAD83

Geodetic System: US State Plane 1983  
 Datum: North American Datum 1983  
 Ellipsoid: GRS 1980  
 Zone: Colorado Central Zone

System Datum: Mean Sea Level

Plan: OH

17:38, January 14 2019  
 Created By: Mel Mireles Jr.



## Directional Survey Certification

2948 I-70 Business Loop  
Grand Junction, CO 81504  
(970)-245-9447 Fax (970)-245-9454

<b>Operator</b>	TEP Rocky Mountain, LLC.
<b>Well Name &amp; No.</b>	RWF 421-10
<b>County &amp; State</b>	Garfield County, CO
<b>SDI Job No.</b>	OP.015340
<b>Rig</b>	H&P 318

I, Mel Mireles Jr., having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 121 feet to a measured depth of 10,318 feet is true and correct as determined from all available records.

A handwritten signature in black ink, appearing to read 'Mel Mireles Jr.', written over a horizontal line.

Signature

14-Jan-19

Date

### **Mel Mireles Jr.**

Grand Junction Assistant Well Planner  
Scientific Drilling - Colorado District

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well RWF 421-10 - Slot RWF 421-10 (B17)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6720' & RKB 24' @ 6744.00usft
<b>Site:</b>	NR 23-3 Pad	<b>MD Reference:</b>	GL 6720' & RKB 24' @ 6744.00usft
<b>Well:</b>	RWF 421-10	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

<b>Project</b>	Garfield County, CO NAD83		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Central Zone		

Site		NR 23-3 Pad			
Site Position:		Northing:	1,634,904.55 usft	Latitude:	39.5525224
From:	Map	Easting:	2,329,757.66 usft	Longitude:	-107.8772377
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.50 °

Well		RWF 421-10 - Slot RWF 421-10 (B17)				
Well Position	+N/-S	0.00 usft	Northing:	1,634,868.43 usft	Latitude:	39.5524261
	+E/-W	0.00 usft	Easting:	2,329,797.04 usft	Longitude:	-107.8770947
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,720.00 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	1/2/2019	9.40	65.78	51,503

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	190.25	

<b>Survey Program</b>	<b>Date</b>	1/14/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
121.00	560.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
652.00	1,060.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,181.00	10,318.00	Survey #3 - Production MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
121.00	0.88	191.51	121.00	-0.91	-0.19	0.93	0.73	0.73	0.00	
<b>First SDI Gyro MWD Survey</b>										
213.00	3.87	163.83	212.91	-4.59	0.54	4.42	3.39	3.25	-30.09	
305.00	6.16	166.90	304.55	-12.38	2.52	11.73	2.51	2.49	3.34	
398.00	8.18	169.54	396.82	-23.74	4.85	22.50	2.20	2.17	2.84	
489.00	10.21	179.38	486.65	-38.18	6.12	36.48	2.81	2.23	10.81	
560.00	10.89	179.73	556.45	-51.18	6.22	49.25	0.96	0.96	0.49	

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well RWF 421-10 - Slot RWF 421-10 (B17)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6720' & RKB 24' @ 6744.00usft
<b>Site:</b>	NR 23-3 Pad	<b>MD Reference:</b>	GL 6720' & RKB 24' @ 6744.00usft
<b>Well:</b>	RWF 421-10	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
<b>Last SDI Gyro MWD Survey</b>									
652.00	12.54	181.36	646.53	-69.85	6.02	67.67	1.83	1.79	1.77
<b>First SDI Surface MWD Survey</b>									
746.00	15.39	185.44	737.74	-92.48	4.60	90.18	3.21	3.03	4.34
841.00	18.27	184.59	828.67	-119.87	2.21	117.57	3.04	3.03	-0.89
936.00	21.60	186.71	917.96	-152.09	-1.03	149.85	3.59	3.51	2.23
1,030.00	23.99	188.42	1,004.61	-188.19	-5.85	186.22	2.64	2.54	1.82
1,060.00	24.18	189.49	1,032.00	-200.28	-7.75	198.46	1.59	0.63	3.57
<b>Last SDI Surface MWD Survey</b>									
1,181.00	25.85	190.65	1,141.65	-250.65	-16.72	249.62	1.44	1.38	0.96
<b>First SDI Production MWD Survey</b>									
1,276.00	25.24	190.23	1,227.36	-290.94	-24.14	290.59	0.67	-0.64	-0.44
1,371.00	24.83	191.09	1,313.44	-330.44	-31.57	330.79	0.58	-0.43	0.91
1,465.00	24.38	189.90	1,398.90	-368.92	-38.71	369.92	0.71	-0.48	-1.27
1,559.00	25.47	191.12	1,484.15	-407.87	-45.94	409.53	1.28	1.16	1.30
1,654.00	24.89	190.02	1,570.12	-447.60	-53.36	449.95	0.78	-0.61	-1.16
1,749.00	24.71	189.31	1,656.36	-486.88	-60.05	489.80	0.37	-0.19	-0.75
1,845.00	23.56	186.34	1,743.97	-525.75	-65.41	529.00	1.74	-1.20	-3.09
1,938.00	23.92	187.55	1,829.10	-562.92	-69.94	566.38	0.65	0.39	1.30
2,033.00	24.72	188.82	1,915.67	-601.64	-75.52	605.48	1.01	0.84	1.34
2,128.00	23.72	188.09	2,002.31	-640.19	-81.26	644.43	1.10	-1.05	-0.77
2,222.00	25.01	189.96	2,087.93	-678.48	-87.35	683.19	1.60	1.37	1.99
2,317.00	24.52	188.51	2,174.20	-717.75	-93.74	722.98	0.82	-0.52	-1.53
2,412.00	25.75	190.82	2,260.20	-757.52	-100.54	763.32	1.66	1.29	2.43
2,507.00	24.99	190.81	2,346.04	-797.50	-108.17	804.02	0.80	-0.80	-0.01
2,601.00	24.18	190.28	2,431.52	-835.95	-115.33	843.13	0.89	-0.86	-0.56
2,696.00	25.94	191.16	2,517.57	-875.48	-122.83	883.37	1.89	1.85	0.93
2,790.00	25.14	191.11	2,602.39	-915.25	-130.65	923.89	0.85	-0.85	-0.05
2,885.00	24.62	189.66	2,688.57	-954.56	-137.86	963.85	0.84	-0.55	-1.53
2,979.00	24.97	192.48	2,773.91	-993.23	-145.44	1,003.26	1.31	0.37	3.00
3,073.00	24.46	191.65	2,859.30	-1,031.66	-153.65	1,042.54	0.66	-0.54	-0.88
3,168.00	25.35	193.46	2,945.46	-1,070.71	-162.36	1,082.51	1.23	0.94	1.91
3,263.00	25.23	191.76	3,031.36	-1,110.31	-171.22	1,123.05	0.77	-0.13	-1.79
3,357.00	24.62	191.16	3,116.60	-1,149.13	-179.09	1,162.66	0.70	-0.65	-0.64
3,451.00	24.98	196.00	3,201.94	-1,187.42	-188.35	1,201.99	2.19	0.38	5.15
3,546.00	26.21	197.92	3,287.62	-1,226.67	-200.34	1,242.74	1.56	1.29	2.02
3,650.00	25.38	197.01	3,381.26	-1,269.84	-213.93	1,287.64	0.88	-0.80	-0.88
3,735.00	23.34	197.62	3,458.69	-1,303.31	-224.35	1,322.43	2.42	-2.40	0.72
3,829.00	23.77	197.58	3,544.85	-1,339.11	-235.71	1,359.69	0.46	0.46	-0.04
3,924.00	24.97	195.29	3,631.39	-1,376.71	-246.78	1,398.65	1.61	1.26	-2.41
4,018.00	26.47	192.04	3,716.08	-1,416.34	-256.39	1,439.36	2.19	1.60	-3.46
4,112.00	25.36	191.92	3,800.62	-1,456.53	-264.91	1,480.42	1.18	-1.18	-0.13
4,205.00	27.26	191.13	3,883.99	-1,496.91	-273.14	1,521.63	2.08	2.04	-0.85
4,299.00	26.06	191.04	3,967.99	-1,538.30	-281.25	1,563.80	1.28	-1.28	-0.10

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well RWF 421-10 - Slot RWF 421-10 (B17)
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<b>Site:</b>	NR 23-3 Pad	<b>MD Reference:</b>	GL 6720' & RKB 24' @ 6744.00usft
<b>Well:</b>	RWF 421-10	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,394.00	25.17	190.86	4,053.65	-1,578.63	-289.05	1,604.87	0.94	-0.94	-0.19
4,489.00	24.16	189.93	4,139.99	-1,617.62	-296.21	1,644.51	1.14	-1.06	-0.98
4,583.00	25.25	192.23	4,225.38	-1,656.16	-303.77	1,683.79	1.55	1.16	2.45
4,677.00	23.84	192.38	4,310.89	-1,694.31	-312.10	1,722.81	1.50	-1.50	0.16
4,772.00	25.21	193.18	4,397.31	-1,732.77	-320.82	1,762.20	1.48	1.44	0.84
4,866.00	24.29	194.69	4,482.68	-1,770.96	-330.29	1,801.47	1.19	-0.98	1.61
4,960.00	25.40	189.97	4,567.99	-1,809.52	-338.69	1,840.91	2.42	1.18	-5.02
5,054.00	24.54	188.84	4,653.20	-1,848.67	-345.18	1,880.59	1.05	-0.91	-1.20
5,149.00	25.50	189.58	4,739.28	-1,888.33	-351.61	1,920.76	1.06	1.01	0.78
5,244.00	24.63	189.24	4,825.34	-1,928.03	-358.19	1,961.00	0.93	-0.92	-0.36
5,338.00	25.11	188.91	4,910.62	-1,967.07	-364.43	2,000.52	0.53	0.51	-0.35
5,432.00	24.31	188.62	4,996.01	-2,005.90	-370.42	2,039.80	0.86	-0.85	-0.31
5,527.00	25.22	187.36	5,082.27	-2,045.31	-375.94	2,079.56	1.11	0.96	-1.33
5,621.00	24.13	188.96	5,167.69	-2,084.15	-381.50	2,118.78	1.36	-1.16	1.70
5,716.00	23.22	189.68	5,254.70	-2,121.80	-387.67	2,156.92	1.01	-0.96	0.76
5,810.00	24.23	187.06	5,340.75	-2,159.21	-393.16	2,194.71	1.55	1.07	-2.79
5,905.00	22.85	188.24	5,427.84	-2,196.81	-398.20	2,232.61	1.53	-1.45	1.24
5,999.00	22.08	188.65	5,514.71	-2,232.34	-403.47	2,268.51	0.84	-0.82	0.44
6,094.00	21.47	187.56	5,602.93	-2,267.23	-408.45	2,303.72	0.77	-0.64	-1.15
6,189.00	20.16	187.39	5,691.73	-2,300.70	-412.84	2,337.44	1.38	-1.38	-0.18
6,283.00	18.45	187.68	5,780.44	-2,331.50	-416.91	2,368.48	1.82	-1.82	0.31
6,378.00	16.36	188.17	5,871.09	-2,359.65	-420.82	2,396.87	2.21	-2.20	0.52
6,472.00	16.18	189.22	5,961.32	-2,385.68	-424.80	2,423.20	0.37	-0.19	1.12
6,569.00	15.48	189.22	6,054.64	-2,411.80	-429.04	2,449.65	0.72	-0.72	0.00
6,663.00	15.39	189.75	6,145.25	-2,436.47	-433.16	2,474.67	0.18	-0.10	0.56
6,755.00	13.37	191.25	6,234.37	-2,458.94	-437.31	2,497.51	2.23	-2.20	1.63
6,850.00	13.37	192.30	6,326.79	-2,480.45	-441.79	2,519.47	0.26	0.00	1.11
6,944.00	12.31	191.69	6,418.44	-2,500.88	-446.13	2,540.35	1.14	-1.13	-0.65
7,039.00	11.26	191.07	6,511.44	-2,519.90	-449.97	2,559.75	1.11	-1.11	-0.65
7,133.00	9.06	190.10	6,603.96	-2,536.19	-453.03	2,576.33	2.35	-2.34	-1.03
7,227.00	6.95	185.88	6,697.04	-2,549.14	-454.91	2,589.40	2.33	-2.24	-4.49
7,322.00	6.51	187.99	6,791.38	-2,560.19	-456.25	2,600.51	0.53	-0.46	2.22
7,416.00	5.98	187.55	6,884.82	-2,570.32	-457.63	2,610.73	0.57	-0.56	-0.47
7,510.00	4.37	183.64	6,978.44	-2,578.75	-458.50	2,619.18	1.75	-1.71	-4.16
7,605.00	3.17	175.86	7,073.23	-2,584.98	-458.54	2,625.32	1.37	-1.26	-8.19
7,700.00	1.70	141.50	7,168.15	-2,588.70	-457.47	2,628.79	2.12	-1.55	-36.17
7,725.87	1.33	132.76	7,194.01	-2,589.21	-457.01	2,629.21	1.69	-1.44	-33.79
<b>RWF 421-10 BTV</b>									
7,794.00	0.79	73.30	7,262.13	-2,589.61	-455.98	2,629.42	1.69	-0.79	-87.27
7,888.00	1.08	34.76	7,356.12	-2,588.69	-454.86	2,628.32	0.72	0.31	-41.00
7,982.00	0.57	51.86	7,450.11	-2,587.68	-453.99	2,627.16	0.60	-0.54	18.19
8,076.00	0.09	151.08	7,544.10	-2,587.45	-453.58	2,626.87	0.63	-0.51	105.55
8,170.00	0.35	197.93	7,638.10	-2,587.79	-453.64	2,627.21	0.31	0.28	49.84
8,265.00	0.32	163.50	7,733.10	-2,588.32	-453.65	2,627.74	0.21	-0.03	-36.24

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<b>Site:</b>	NR 23-3 Pad	<b>MD Reference:</b>	GL 6720' & RKB 24' @ 6744.00usft
<b>Well:</b>	RWF 421-10	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,359.00	0.66	176.44	7,827.10	-2,589.11	-453.54	2,628.50	0.38	0.36	13.77
8,454.00	0.18	54.40	7,922.10	-2,589.57	-453.39	2,628.92	0.81	-0.51	-128.46
8,548.00	0.18	356.83	8,016.10	-2,589.34	-453.27	2,628.67	0.18	0.00	-61.24
8,643.00	0.18	306.65	8,111.10	-2,589.10	-453.40	2,628.46	0.16	0.00	-52.82
8,738.00	0.26	234.75	8,206.10	-2,589.14	-453.70	2,628.55	0.28	0.08	-75.68
8,832.00	1.58	18.36	8,300.08	-2,588.03	-453.46	2,627.42	1.91	1.40	152.78
8,927.00	2.11	30.32	8,395.04	-2,585.28	-452.17	2,624.48	0.69	0.56	12.59
9,021.00	1.67	41.74	8,488.98	-2,582.76	-450.38	2,621.68	0.61	-0.47	12.15
9,116.00	1.04	65.44	8,583.96	-2,581.37	-448.68	2,620.01	0.87	-0.66	24.95
9,210.00	1.14	91.84	8,677.94	-2,581.05	-446.97	2,619.39	0.54	0.11	28.09
9,305.00	1.14	130.60	8,772.92	-2,581.69	-445.30	2,619.73	0.80	0.00	40.80
9,399.00	1.14	163.38	8,866.91	-2,583.20	-444.33	2,621.03	0.68	0.00	34.87
9,494.00	1.23	185.04	8,961.89	-2,585.12	-444.15	2,622.89	0.48	0.09	22.80
9,588.00	1.23	202.85	9,055.87	-2,587.05	-444.63	2,624.88	0.41	0.00	18.95
9,683.00	1.32	203.73	9,150.84	-2,588.99	-445.46	2,626.94	0.10	0.09	0.93
9,777.00	1.80	208.76	9,244.81	-2,591.28	-446.61	2,629.39	0.53	0.51	5.35
9,872.00	2.11	212.16	9,339.75	-2,594.07	-448.26	2,632.43	0.35	0.33	3.58
9,966.00	2.55	208.56	9,433.67	-2,597.37	-450.18	2,636.02	0.49	0.47	-3.83
10,060.00	2.55	198.28	9,527.58	-2,601.19	-451.83	2,640.08	0.49	0.00	-10.94
10,155.00	2.46	190.54	9,622.49	-2,605.20	-452.87	2,644.21	0.37	-0.09	-8.15
10,249.00	2.90	186.68	9,716.39	-2,609.55	-453.52	2,648.60	0.51	0.47	-4.11
10,258.00	2.73	188.17	9,725.38	-2,609.98	-453.57	2,649.04	2.06	-1.89	16.56
Last SDI Production MWD Survey									
10,318.00	2.73	188.17	9,785.31	-2,612.81	-453.98	2,651.90	0.00	0.00	0.00
Projection to TD - RWF 421-10 PBHL									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
121.00	121.00	-0.91	-0.19	First SDI Gyro MWD Survey
560.00	556.45	-51.18	6.22	Last SDI Gyro MWD Survey
652.00	646.53	-69.85	6.02	First SDI Surface MWD Survey
1,060.00	1,032.00	-200.28	-7.75	Last SDI Surface MWD Survey
1,181.00	1,141.65	-250.65	-16.72	First SDI Production MWD Survey
10,258.00	9,725.38	-2,609.98	-453.57	Last SDI Production MWD Survey
10,318.00	9,785.31	-2,612.81	-453.98	Projection to TD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_