



Directional Survey Certification

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

Operator	TEP Rocky Mountain, LLC.
Well Name & No.	RU 424-17
County & State	Garfield County, CO
SDI Job No.	OP.010328
Rig	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 124 feet to a measured depth of 10,491 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

05-Jun-18

Date

Mel Mireles Jr.

Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well RU 424-17 - Slot RU 424-17 (B13)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
Site:	RU 23-17 Pad	MD Reference:	GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
Well:	RU 424-17	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

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

Site		RU 23-17 Pad			
Site Position:		Northing:	1,594,634.40 usft	Latitude:	39.4435163
From:	Map	Easting:	2,351,232.80 usft	Longitude:	-107.7974906
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.45 °

Well	RU 424-17 - Slot RU 424-17 (B13)					
Well Position	+N/-S	0.00 usft	Northing:	1,594,587.60 usft	Latitude:	39.4433913
	+E/-W	0.00 usft	Easting:	2,351,282.40 usft	Longitude:	-107.7973108
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	8,368.60 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	5/20/2018	9.17	65.57	51,560

Design	OH				
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	195.80	

Survey Program	Date	6/5/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
124.00	676.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
750.00	1,051.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,182.00	10,491.00	Survey #3 - Production MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	

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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
124.00	0.35	312.36	124.00	0.26	-0.28	-0.17	0.28	0.28	0.00	
First SDI Gyro MWD Survey										
216.00	0.26	285.91	216.00	0.50	-0.69	-0.30	0.18	-0.10	-28.75	
308.00	0.44	212.87	308.00	0.26	-1.08	0.04	0.48	0.20	-79.39	
400.00	0.53	219.55	399.99	-0.36	-1.54	0.77	0.12	0.10	7.26	
492.00	0.79	229.48	491.99	-1.10	-2.30	1.69	0.31	0.28	10.79	
585.00	2.82	215.77	584.94	-3.38	-4.12	4.37	2.22	2.18	-14.74	
676.00	4.47	199.28	675.75	-8.54	-6.60	10.01	2.13	1.81	-18.12	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well RU 424-17 - Slot RU 424-17 (B13)
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Site:	RU 23-17 Pad	MD Reference:	GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
Well:	RU 424-17	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	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)
Last SDI Gyro MWD Survey									
750.00	6.97	190.26	749.38	-15.68	-8.35	17.36	3.58	3.38	-12.19
First SDI Surface MWD Survey									
844.00	9.78	184.92	842.37	-29.25	-10.05	30.88	3.10	2.99	-5.68
938.00	11.45	191.67	934.76	-46.34	-12.63	48.03	2.21	1.78	7.18
1,032.00	12.78	197.98	1,026.67	-65.37	-17.72	67.73	1.99	1.41	6.71
1,051.00	12.84	196.90	1,045.20	-69.39	-18.99	71.94	1.30	0.32	-5.68
Last SDI Surface MWD Survey									
1,182.00	13.88	196.52	1,172.65	-98.38	-27.69	102.20	0.80	0.79	-0.29
First SDI Production MWD Survey									
1,276.00	13.49	195.12	1,263.98	-119.78	-33.75	124.44	0.54	-0.41	-1.49
1,370.00	12.73	194.31	1,355.53	-140.40	-39.17	145.76	0.83	-0.81	-0.86
1,465.00	11.99	190.73	1,448.33	-160.24	-43.60	166.05	1.12	-0.78	-3.77
1,559.00	12.46	198.17	1,540.20	-179.46	-48.58	185.91	1.75	0.50	7.91
1,654.00	12.72	196.60	1,632.92	-199.22	-54.76	206.61	0.45	0.27	-1.65
1,748.00	11.52	191.63	1,724.82	-218.34	-59.61	226.32	1.69	-1.28	-5.29
1,843.00	11.34	196.64	1,817.94	-236.58	-64.20	245.12	1.06	-0.19	5.27
1,937.00	11.52	197.34	1,910.08	-254.39	-69.64	263.74	0.24	0.19	0.74
2,032.00	11.52	195.58	2,003.16	-272.59	-75.01	282.71	0.37	0.00	-1.85
2,126.00	11.43	193.21	2,095.29	-290.69	-79.66	301.40	0.51	-0.10	-2.52
2,221.00	11.08	200.51	2,188.46	-308.41	-85.01	319.90	1.54	-0.37	7.68
2,315.00	10.29	200.16	2,280.83	-324.75	-91.07	337.28	0.84	-0.84	-0.37
2,410.00	10.45	198.03	2,374.28	-340.91	-96.66	354.35	0.44	0.17	-2.24
2,504.00	9.94	196.11	2,466.80	-356.81	-101.55	370.98	0.65	-0.54	-2.04
2,598.00	9.85	191.54	2,559.40	-372.48	-105.41	387.11	0.84	-0.10	-4.86
2,693.00	10.90	196.55	2,652.85	-389.05	-109.60	404.20	1.46	1.11	5.27
2,788.00	9.94	196.90	2,746.28	-405.51	-114.54	421.37	1.01	-1.01	0.37
2,882.00	11.08	196.11	2,838.70	-421.95	-119.40	438.52	1.22	1.21	-0.84
2,977.00	10.58	192.62	2,932.01	-439.23	-123.84	456.36	0.87	-0.53	-3.67
3,071.00	12.02	195.16	3,024.19	-457.10	-128.29	474.76	1.62	1.53	2.70
3,164.00	11.78	194.89	3,115.19	-475.62	-133.26	493.94	0.26	-0.26	-0.29
3,259.00	11.22	192.77	3,208.28	-494.01	-137.80	512.86	0.74	-0.59	-2.23
3,353.00	11.91	197.82	3,300.37	-512.16	-142.78	531.69	1.30	0.73	5.37
3,448.00	11.42	197.54	3,393.41	-530.46	-148.62	550.89	0.52	-0.52	-0.29
3,542.00	10.73	196.99	3,485.66	-547.70	-153.98	568.94	0.74	-0.73	-0.59
3,637.00	12.93	198.93	3,578.64	-566.22	-160.01	588.39	2.35	2.32	2.04
3,732.00	12.66	199.37	3,671.28	-586.09	-166.91	609.40	0.30	-0.28	0.46
3,826.00	12.40	198.93	3,763.04	-605.36	-173.61	629.75	0.29	-0.28	-0.47
3,921.00	11.78	198.40	3,855.93	-624.21	-179.98	649.63	0.66	-0.65	-0.56
4,015.00	11.46	198.45	3,948.01	-642.17	-185.96	668.54	0.34	-0.34	0.05
4,110.00	10.64	198.57	4,041.24	-659.44	-191.74	686.73	0.86	-0.86	0.13
4,204.00	12.13	196.46	4,133.39	-677.13	-197.30	705.27	1.65	1.59	-2.24
4,299.00	12.31	194.36	4,226.24	-696.52	-202.64	725.38	0.50	0.19	-2.21
4,393.00	11.74	196.15	4,318.18	-715.41	-207.79	744.96	0.72	-0.61	1.90

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Project:	Garfield County, CO NAD83	TVD Reference:	GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
Site:	RU 23-17 Pad	MD Reference:	GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
Well:	RU 424-17	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	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)
4,488.00	10.96	196.32	4,411.32	-733.36	-213.01	763.65	0.82	-0.82	0.18
4,582.00	10.24	195.95	4,503.71	-749.97	-217.82	780.94	0.77	-0.77	-0.39
4,676.00	11.53	190.58	4,596.02	-767.24	-221.84	798.66	1.74	1.37	-5.71
4,771.00	11.12	190.84	4,689.17	-785.57	-225.31	817.24	0.43	-0.43	0.27
4,865.00	10.29	190.14	4,781.54	-802.74	-228.49	834.62	0.89	-0.88	-0.74
4,959.00	11.98	192.00	4,873.76	-820.55	-232.00	852.71	1.84	1.80	1.98
5,053.00	11.28	193.58	4,965.83	-839.03	-236.18	871.63	0.82	-0.74	1.68
5,148.00	10.72	191.92	5,059.09	-856.70	-240.19	889.73	0.68	-0.59	-1.75
5,242.00	12.28	194.78	5,151.20	-874.92	-244.55	908.45	1.77	1.66	3.04
5,337.00	11.70	194.71	5,244.13	-894.01	-249.57	928.18	0.61	-0.61	-0.07
5,432.00	11.53	192.10	5,337.18	-912.61	-254.01	947.29	0.58	-0.18	-2.75
5,527.00	10.94	191.59	5,430.36	-930.72	-257.81	965.76	0.63	-0.62	-0.54
5,621.00	11.61	195.24	5,522.55	-948.59	-262.09	984.11	1.04	0.71	3.88
5,715.00	11.78	198.05	5,614.60	-966.84	-267.55	1,003.16	0.63	0.18	2.99
5,810.00	10.91	195.95	5,707.74	-984.70	-273.02	1,021.84	1.01	-0.92	-2.21
5,905.00	10.11	196.38	5,801.14	-1,001.35	-277.84	1,039.16	0.85	-0.84	0.45
5,999.00	12.05	191.72	5,893.39	-1,018.87	-282.16	1,057.20	2.27	2.06	-4.96
6,096.00	11.70	190.49	5,988.31	-1,038.46	-286.01	1,077.10	0.45	-0.36	-1.27
6,189.00	11.87	196.82	6,079.36	-1,056.88	-290.49	1,096.05	1.40	0.18	6.81
6,284.00	11.52	197.34	6,172.38	-1,075.29	-296.15	1,115.30	0.38	-0.37	0.55
6,378.00	10.99	197.61	6,264.58	-1,092.79	-301.66	1,133.64	0.57	-0.56	0.29
6,473.00	10.82	197.52	6,357.86	-1,109.93	-307.08	1,151.60	0.18	-0.18	-0.09
6,568.00	10.90	197.61	6,451.16	-1,126.99	-312.48	1,169.49	0.09	0.08	0.09
6,662.00	10.20	198.22	6,543.57	-1,143.37	-317.77	1,186.69	0.75	-0.74	0.65
6,757.00	8.79	199.63	6,637.27	-1,158.19	-322.84	1,202.34	1.50	-1.48	1.48
6,852.00	9.23	195.48	6,731.10	-1,172.37	-327.32	1,217.20	0.83	0.46	-4.37
6,947.00	8.90	194.54	6,824.91	-1,186.83	-331.19	1,232.17	0.38	-0.35	-0.99
7,041.00	8.71	192.33	6,917.80	-1,200.82	-334.54	1,246.54	0.41	-0.20	-2.35
7,136.00	7.65	195.41	7,011.83	-1,213.95	-337.76	1,260.04	1.21	-1.12	3.24
7,230.00	5.98	201.58	7,105.17	-1,224.53	-341.22	1,271.17	1.94	-1.78	6.56
7,325.00	3.96	204.73	7,199.81	-1,232.11	-344.41	1,279.34	2.14	-2.13	3.32
7,420.00	3.52	216.06	7,294.60	-1,237.45	-347.50	1,285.31	0.90	-0.46	11.93
7,515.00	2.29	204.20	7,389.48	-1,241.54	-350.00	1,289.93	1.43	-1.29	-12.48
7,609.00	0.18	144.35	7,483.46	-1,243.37	-350.68	1,291.88	2.35	-2.24	-63.67
7,704.00	0.26	7.85	7,578.45	-1,243.28	-350.56	1,291.76	0.43	0.08	-143.68
7,799.00	0.35	350.63	7,673.45	-1,242.78	-350.58	1,291.28	0.13	0.09	-18.13
7,893.00	0.57	352.00	7,767.45	-1,242.03	-350.69	1,290.59	0.23	0.23	1.46
7,989.00	0.44	11.02	7,863.45	-1,241.20	-350.69	1,289.79	0.22	-0.14	19.81
8,082.00	0.44	7.24	7,956.44	-1,240.50	-350.58	1,289.08	0.03	0.00	-4.06
8,177.00	0.62	300.97	8,051.44	-1,239.87	-350.97	1,288.59	0.63	0.19	-69.76
8,272.00	0.88	273.34	8,146.43	-1,239.56	-352.14	1,288.61	0.46	0.27	-29.08
8,367.00	0.53	309.23	8,241.43	-1,239.24	-353.21	1,288.59	0.58	-0.37	37.78
8,461.00	0.35	309.76	8,335.42	-1,238.78	-353.77	1,288.30	0.19	-0.19	0.56

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	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)	
8,556.00	0.44	253.07	8,430.42	-1,238.70	-354.34	1,288.38	0.40	0.09	-59.67	
8,650.00	0.53	240.32	8,524.42	-1,239.02	-355.06	1,288.89	0.15	0.10	-13.56	
8,745.00	0.70	203.85	8,619.41	-1,239.77	-355.68	1,289.77	0.44	0.18	-38.39	
8,840.00	0.44	176.60	8,714.41	-1,240.67	-355.89	1,290.69	0.39	-0.27	-28.68	
8,934.00	0.53	205.34	8,808.40	-1,241.42	-356.05	1,291.46	0.27	0.10	30.57	
9,029.00	0.97	191.19	8,903.40	-1,242.61	-356.40	1,292.70	0.50	0.46	-14.89	
9,124.00	2.11	214.22	8,998.36	-1,244.84	-357.54	1,295.16	1.34	1.20	24.24	
9,219.00	2.11	222.57	9,093.30	-1,247.58	-359.70	1,298.38	0.32	0.00	8.79	
9,313.00	0.88	248.06	9,187.26	-1,249.12	-361.54	1,300.37	1.46	-1.31	27.12	
9,408.00	0.53	235.22	9,282.26	-1,249.64	-362.58	1,301.15	0.40	-0.37	-13.52	
9,501.00	0.79	258.87	9,375.25	-1,250.01	-363.56	1,301.78	0.40	0.28	25.43	
9,597.00	0.62	247.97	9,471.24	-1,250.33	-364.70	1,302.39	0.22	-0.18	-11.35	
9,691.00	0.62	274.07	9,565.24	-1,250.49	-365.67	1,302.81	0.30	0.00	27.77	
9,785.00	0.44	271.96	9,659.23	-1,250.44	-366.54	1,303.00	0.19	-0.19	-2.24	
9,879.00	0.26	315.38	9,753.23	-1,250.28	-367.05	1,302.98	0.33	-0.19	46.19	
9,974.00	0.44	185.57	9,848.23	-1,250.49	-367.24	1,303.23	0.67	0.19	-136.64	
10,068.00	0.44	216.24	9,942.23	-1,251.14	-367.49	1,303.93	0.25	0.00	32.63	
10,162.00	1.49	231.97	10,036.21	-1,252.18	-368.66	1,305.25	1.14	1.12	16.73	
10,257.00	1.32	250.43	10,131.19	-1,253.31	-370.67	1,306.88	0.51	-0.18	19.43	
10,351.00	0.79	353.88	10,225.18	-1,253.03	-371.76	1,306.91	1.80	-0.56	110.05	
10,434.00	0.79	0.56	10,308.17	-1,251.89	-371.81	1,305.82	0.11	0.00	8.05	
Last SDI Production MWD Survey										
10,491.00	0.79	0.56	10,365.16	-1,251.10	-371.81	1,305.07	0.00	0.00	0.00	
Projection to TD - PBHL(RU_424-17)										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
124.00	124.00	0.26	-0.28	First SDI Gyro MWD Survey	
676.00	675.75	-8.54	-6.60	Last SDI Gyro MWD Survey	
750.00	749.38	-15.68	-8.35	First SDI Surface MWD Survey	
1,051.00	1,045.20	-69.39	-18.99	Last SDI Surface MWD Survey	
1,182.00	1,172.65	-98.38	-27.69	First SDI Production MWD Survey	
10,434.00	10,308.17	-1,251.89	-371.81	Last SDI Production MWD Survey	
10,491.00	10,365.16	-1,251.10	-371.81	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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