





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.	PA 13-24
County & State	Garfield County, CO
SDI Job No.	OP.020833
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 122 feet to a measured depth of 9,040 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

11-Sep-19

Date

Mel Mireles Jr.

Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well PA 13-24 - Slot PA 13-24 (B5)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
Site:	PA 34-24 Pad	MD Reference:	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
Well:	PA 13-24	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		PA 34-24 Pad			
Site Position:		Northing:	1,618,371.20 usft	Latitude:	39.5057421
From:	Map	Easting:	2,310,465.70 usft	Longitude:	-107.9440532
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.54 °

Well		PA 13-24 - Slot PA 13-24 (B5)				
Well Position	+N/-S	0.00 usft	Northing:	1,618,385.27 usft	Latitude:	39.5057804
	+E/-W	0.00 usft	Easting:	2,310,460.59 usft	Longitude:	-107.9440726
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	5,371.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	9/3/2019	9.25	65.72	51,480

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	296.26	

Survey Program	Date	9/11/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
122.00	761.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
837.00	1,078.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,169.00	9,040.00	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	
122.00	0.53	246.97	122.00	-0.22	-0.52	0.37	0.43	0.43	0.00	
First SDI Gyro MWD Survey										
213.00	3.61	280.99	212.93	0.16	-3.72	3.41	3.50	3.38	37.38	
304.00	6.51	286.35	303.57	2.16	-11.48	11.25	3.23	3.19	5.89	
395.00	10.56	294.70	393.54	7.10	-24.02	24.68	4.64	4.45	9.18	
486.00	13.72	294.70	482.50	15.09	-41.40	43.81	3.47	3.47	0.00	
578.00	16.54	297.60	571.30	25.72	-62.92	67.81	3.17	3.07	3.15	
669.00	19.44	298.39	657.84	38.93	-87.73	95.90	3.20	3.19	0.87	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well PA 13-24 - Slot PA 13-24 (B5)
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Site:	PA 34-24 Pad	MD Reference:	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
Well:	PA 13-24	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)	
761.00	22.43	296.37	743.76	54.01	-116.93	128.76	3.34	3.25	-2.20	
Last SDI Gyro MWD Survey										
837.00	25.52	296.11	813.19	67.65	-144.63	159.63	4.07	4.07	-0.34	
First SDI Surface MWD Survey										
931.00	29.02	296.64	896.73	86.79	-183.20	202.70	3.73	3.72	0.56	
1,026.00	32.54	296.94	978.34	108.71	-226.59	251.30	3.71	3.71	0.32	
1,078.00	34.12	296.92	1,021.78	121.65	-252.06	279.87	3.04	3.04	-0.04	
Last SDI Surface MWD Survey										
1,169.00	35.57	296.25	1,096.47	144.91	-298.56	331.86	1.65	1.59	-0.74	
First SDI Production MWD Survey										
1,263.00	36.06	295.12	1,172.69	168.75	-348.13	386.86	0.88	0.52	-1.20	
1,357.00	35.88	293.84	1,248.77	191.63	-398.37	442.04	0.82	-0.19	-1.36	
1,452.00	35.53	293.22	1,325.91	213.76	-449.21	497.42	0.53	-0.37	-0.65	
1,546.00	35.85	295.51	1,402.26	236.39	-499.15	552.23	1.46	0.34	2.44	
1,640.00	35.46	294.57	1,478.64	259.58	-548.79	607.00	0.72	-0.41	-1.00	
1,735.00	35.96	297.36	1,555.79	283.86	-598.63	662.44	1.79	0.53	2.94	
1,829.00	34.62	296.29	1,632.51	308.37	-647.09	716.74	1.57	-1.43	-1.14	
1,924.00	35.70	298.50	1,710.18	333.55	-695.64	771.43	1.76	1.14	2.33	
2,018.00	36.84	298.85	1,785.96	360.24	-744.43	826.99	1.23	1.21	0.37	
2,113.00	35.61	296.04	1,862.61	386.12	-794.23	883.10	2.18	-1.29	-2.96	
2,207.00	36.50	297.40	1,938.60	411.00	-843.64	938.42	1.27	0.95	1.45	
2,301.00	35.79	296.04	2,014.51	435.94	-893.16	993.86	1.14	-0.76	-1.45	
2,396.00	37.55	298.32	2,090.71	461.87	-943.61	1,050.58	2.34	1.85	2.40	
2,491.00	36.67	297.71	2,166.47	488.79	-994.21	1,107.86	1.00	-0.93	-0.64	
2,585.00	35.79	296.65	2,242.29	514.17	-1,043.63	1,163.41	1.15	-0.94	-1.13	
2,679.00	37.29	296.17	2,317.81	539.06	-1,093.75	1,219.38	1.62	1.60	-0.51	
2,773.00	37.03	295.56	2,392.73	563.83	-1,144.84	1,276.15	0.48	-0.28	-0.65	
2,868.00	36.32	294.95	2,468.92	588.04	-1,196.16	1,332.89	0.84	-0.75	-0.64	
2,962.00	35.70	294.28	2,544.96	611.06	-1,246.40	1,388.13	0.78	-0.66	-0.71	
3,056.00	36.93	295.60	2,620.70	634.54	-1,296.87	1,443.78	1.55	1.31	1.40	
3,151.00	36.14	295.33	2,697.03	658.86	-1,347.93	1,500.33	0.85	-0.83	-0.28	
3,245.00	37.05	296.28	2,772.50	683.26	-1,398.37	1,556.36	1.14	0.97	1.01	
3,340.00	35.70	295.77	2,848.99	707.98	-1,449.00	1,612.70	1.46	-1.42	-0.54	
3,435.00	36.23	297.36	2,925.88	732.94	-1,498.90	1,668.49	1.13	0.56	1.67	
3,529.00	35.09	296.65	3,002.26	757.82	-1,547.72	1,723.28	1.29	-1.21	-0.76	
3,623.00	36.93	296.65	3,078.29	782.61	-1,597.11	1,778.54	1.96	1.96	0.00	
3,718.00	35.61	295.42	3,154.88	807.28	-1,647.60	1,834.74	1.59	-1.39	-1.29	
3,813.00	37.02	297.62	3,231.43	832.42	-1,697.92	1,890.99	2.02	1.48	2.32	
3,907.00	35.96	296.74	3,307.00	857.96	-1,747.65	1,946.88	1.26	-1.13	-0.94	
4,002.00	35.17	296.56	3,384.28	882.74	-1,797.03	2,002.13	0.84	-0.83	-0.19	
4,096.00	36.49	297.88	3,460.49	907.92	-1,845.96	2,057.15	1.63	1.40	1.40	
4,191.00	35.53	296.56	3,537.34	933.47	-1,895.62	2,112.99	1.30	-1.01	-1.39	
4,285.00	36.23	298.94	3,613.51	959.13	-1,944.36	2,168.05	1.66	0.74	2.53	
4,380.00	35.44	298.76	3,690.52	985.96	-1,993.07	2,223.61	0.84	-0.83	-0.19	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well PA 13-24 - Slot PA 13-24 (B5)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
Site:	PA 34-24 Pad	MD Reference:	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
Well:	PA 13-24	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)
4,474.00	37.37	297.79	3,766.17	1,012.38	-2,042.21	2,279.36	2.14	2.05	-1.03
4,569.00	37.37	297.00	3,841.67	1,038.91	-2,093.40	2,337.01	0.50	0.00	-0.83
4,663.00	37.02	296.48	3,916.55	1,064.48	-2,144.15	2,393.84	0.50	-0.37	-0.55
4,758.00	36.14	296.30	3,992.84	1,089.64	-2,194.86	2,450.45	0.93	-0.93	-0.19
4,852.00	34.91	297.18	4,069.34	1,114.21	-2,243.64	2,505.07	1.42	-1.31	0.94
4,947.00	33.15	297.09	4,148.07	1,138.46	-2,290.95	2,558.22	1.85	-1.85	-0.09
5,041.00	31.22	297.00	4,227.62	1,161.23	-2,335.54	2,608.28	2.05	-2.05	-0.10
5,136.00	29.37	295.77	4,309.65	1,182.53	-2,378.46	2,656.20	2.05	-1.95	-1.29
5,230.00	28.40	295.86	4,391.95	1,202.31	-2,419.34	2,701.61	1.03	-1.03	0.10
5,325.00	26.63	295.45	4,476.20	1,221.31	-2,458.90	2,745.49	1.87	-1.86	-0.43
5,419.00	24.38	293.29	4,561.04	1,238.04	-2,495.75	2,785.94	2.59	-2.39	-2.30
5,514.00	23.52	294.78	4,647.86	1,253.73	-2,530.97	2,824.47	1.11	-0.91	1.57
5,608.00	23.48	294.63	4,734.06	1,269.40	-2,565.02	2,861.94	0.08	-0.04	-0.16
5,703.00	22.51	293.58	4,821.51	1,284.56	-2,598.89	2,899.02	1.11	-1.02	-1.11
5,797.00	22.30	293.36	4,908.42	1,298.83	-2,631.75	2,934.81	0.24	-0.22	-0.23
5,891.00	21.41	292.17	4,995.66	1,312.38	-2,664.02	2,969.73	1.06	-0.95	-1.27
5,986.00	19.70	290.59	5,084.61	1,324.55	-2,695.06	3,002.96	1.89	-1.80	-1.66
6,080.00	18.58	295.39	5,173.42	1,336.55	-2,723.43	3,033.71	2.05	-1.19	5.11
6,175.00	17.85	294.37	5,263.66	1,349.04	-2,750.36	3,063.39	0.84	-0.77	-1.07
6,269.00	15.83	293.49	5,353.62	1,360.10	-2,775.25	3,090.60	2.17	-2.15	-0.94
6,364.00	13.89	291.55	5,445.44	1,369.45	-2,797.74	3,114.91	2.11	-2.04	-2.04
6,458.00	13.89	298.23	5,536.70	1,378.94	-2,818.18	3,137.43	1.71	0.00	7.11
6,553.00	12.66	297.44	5,629.16	1,389.13	-2,837.46	3,159.24	1.31	-1.29	-0.83
6,586.63	11.86	297.83	5,662.02	1,392.44	-2,843.79	3,166.38	2.40	-2.38	1.17
PA 13-24 BTV									
6,647.00	10.42	298.69	5,721.25	1,397.96	-2,854.06	3,178.03	2.40	-2.38	1.42
6,742.00	9.07	306.63	5,814.88	1,406.55	-2,867.61	3,193.98	2.00	-1.42	8.36
6,836.00	6.62	306.66	5,908.00	1,414.21	-2,877.90	3,206.60	2.61	-2.61	0.03
6,930.00	6.07	316.99	6,001.42	1,421.08	-2,885.64	3,216.58	1.35	-0.59	10.99
7,025.00	4.96	317.84	6,095.98	1,427.79	-2,891.82	3,225.09	1.17	-1.17	0.89
7,119.00	2.79	332.69	6,189.76	1,432.84	-2,895.60	3,230.71	2.52	-2.31	15.80
7,214.00	2.55	346.46	6,284.66	1,436.95	-2,897.16	3,233.93	0.72	-0.25	14.49
7,308.00	2.25	342.86	6,378.58	1,440.74	-2,898.19	3,236.53	0.36	-0.32	-3.83
7,403.00	2.37	348.81	6,473.50	1,444.45	-2,899.12	3,239.01	0.28	0.13	6.26
7,497.00	2.02	7.49	6,567.43	1,448.00	-2,899.28	3,240.72	0.84	-0.37	19.87
7,592.00	1.74	16.10	6,662.38	1,451.05	-2,898.66	3,241.52	0.42	-0.29	9.06
7,686.00	1.78	13.00	6,756.34	1,453.84	-2,897.94	3,242.10	0.11	0.04	-3.30
7,781.00	0.98	104.35	6,851.32	1,455.08	-2,896.82	3,241.65	2.16	-0.84	96.16
7,875.00	1.42	133.60	6,945.30	1,454.08	-2,895.20	3,239.75	0.79	0.47	31.12
7,970.00	1.39	132.65	7,040.27	1,452.48	-2,893.50	3,237.52	0.04	-0.03	-1.00
8,064.00	2.11	142.22	7,134.22	1,450.34	-2,891.60	3,234.87	0.82	0.77	10.18
8,159.00	2.73	151.19	7,229.14	1,446.98	-2,889.44	3,231.44	0.76	0.65	9.44
8,253.00	2.81	150.31	7,323.03	1,443.02	-2,887.22	3,227.70	0.10	0.09	-0.94

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Well:	PA 13-24	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

Survey										
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8,347.00	2.90	155.15	7,416.91	1,438.86	-2,885.08	3,223.94	0.27	0.10	5.15	
8,442.00	2.99	165.87	7,511.79	1,434.27	-2,883.46	3,220.46	0.59	0.09	11.28	
8,536.00	3.17	179.85	7,605.65	1,429.30	-2,882.86	3,217.72	0.82	0.19	14.87	
8,631.00	3.87	186.96	7,700.48	1,423.49	-2,883.24	3,215.49	0.87	0.74	7.48	
8,725.00	6.21	205.27	7,794.11	1,415.74	-2,885.79	3,214.35	2.99	2.49	19.48	
8,820.00	8.79	201.47	7,888.29	1,404.34	-2,890.65	3,213.66	2.76	2.72	-4.00	
8,914.00	10.82	206.87	7,980.91	1,389.78	-2,897.26	3,213.15	2.37	2.16	5.74	
8,980.00	11.43	208.94	8,045.67	1,378.53	-2,903.23	3,213.52	1.10	0.92	3.14	
Last SDI Production MWD Survey										
9,040.00	11.43	208.94	8,104.48	1,368.12	-2,908.98	3,214.08	0.00	0.00	0.00	
Proejction to TD - PA 13-24 PBHL										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
122.00	122.00	-0.22	-0.52	First SDI Gyro MWD Survey	
761.00	743.76	54.01	-116.93	Last SDI Gyro MWD Survey	
837.00	813.19	67.65	-144.63	First SDI Surface MWD Survey	
1,078.00	1,021.78	121.65	-252.06	Last SDI Surface MWD Survey	
1,169.00	1,096.47	144.91	-298.56	First SDI Production MWD Survey	
8,980.00	8,045.67	1,378.53	-2,903.23	Last SDI Production MWD Survey	
9,040.00	8,104.48	1,368.12	-2,908.98	Proejction to TD	

Checked By: _____ Approved By: _____ Date: _____