



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.	SR 414-12
County & State	Garfield County, CO
SDI Job No.	OP.007162
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 121 feet to a measured depth of 10,035 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

19-Jan-18

Date

Mel Mireles Jr.

Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well SR 414-12 - Slot SR 414-12 (B9)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Site:	SR 23-12 Pad	MD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Well:	SR 414-12	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		SR 23-12 Pad			
Site Position:		Northing:	1,597,713.40 usft	Latitude:	39.4511965
From:	Map	Easting:	2,340,229.70 usft	Longitude:	-107.8367194
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.47 °

Well		SR 414-12 - Slot SR 414-12 (B9)				
Well Position	+N/-S	0.00 usft	Northing:	1,597,661.10 usft	Latitude:	39.4510552
	+E/-W	0.00 usft	Easting:	2,340,260.70 usft	Longitude:	-107.8366049
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,478.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	1/8/2018	9.23	65.62	51,628

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	236.40	

Survey Program	Date	1/19/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
121.00	581.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
658.00	1,078.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,178.00	10,035.00	Survey #3 - Production MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	

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	
121.00	0.44	281.51	121.00	0.09	-0.46	0.33	0.36	0.36	0.00	
First SDI Gyro MWD Survey										
214.00	2.73	250.40	213.96	-0.58	-2.89	2.73	2.54	2.46	-33.45	
305.00	4.93	239.33	304.75	-3.30	-8.30	8.74	2.54	2.42	-12.16	
398.00	8.01	243.54	397.15	-8.23	-17.54	19.16	3.35	3.31	4.53	
489.00	11.17	236.43	486.87	-15.93	-30.56	34.27	3.70	3.47	-7.81	
581.00	13.20	227.46	576.80	-27.96	-45.73	53.56	3.01	2.21	-9.75	

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Project:	Garfield County, CO NAD83	TVD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Site:	SR 23-12 Pad	MD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Well:	SR 414-12	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										
658.00	15.65	229.82	651.37	-40.61	-60.14	72.57	3.27	3.18	3.06	
First SDI Surface MWD Survey										
753.00	18.44	232.19	742.18	-58.09	-81.81	100.29	3.03	2.94	2.49	
847.00	21.44	236.70	830.54	-76.64	-107.92	132.30	3.58	3.19	4.80	
941.00	24.89	240.33	916.96	-95.87	-139.48	169.23	3.97	3.67	3.86	
1,036.00	27.44	238.27	1,002.22	-117.28	-175.47	211.06	2.85	2.68	-2.17	
1,078.00	28.49	237.83	1,039.31	-127.71	-192.18	230.75	2.55	2.50	-1.05	
Last SDI Surface MWD Survey										
1,178.00	28.42	236.83	1,127.23	-153.42	-232.29	278.38	0.48	-0.07	-1.00	
First SDI Production MWD Survey										
1,272.00	27.50	238.10	1,210.26	-177.13	-269.44	322.45	1.17	-0.98	1.35	
1,366.00	28.38	240.36	1,293.30	-199.65	-307.28	366.43	1.46	0.94	2.40	
1,461.00	30.15	240.98	1,376.18	-222.39	-347.77	412.74	1.89	1.86	0.65	
1,555.00	29.55	240.15	1,457.71	-245.38	-388.52	459.40	0.77	-0.64	-0.88	
1,650.00	28.31	240.73	1,540.85	-268.05	-428.49	505.24	1.34	-1.31	0.61	
1,745.00	30.27	240.85	1,623.70	-290.73	-469.06	551.58	2.06	2.06	0.13	
1,839.00	30.37	240.38	1,704.84	-314.02	-510.40	598.90	0.27	0.11	-0.50	
1,934.00	30.44	240.88	1,786.78	-337.60	-552.30	646.85	0.28	0.07	0.53	
2,028.00	31.74	237.74	1,867.28	-362.39	-594.02	695.31	2.21	1.38	-3.34	
2,122.00	30.85	236.51	1,947.60	-388.88	-635.03	744.13	1.17	-0.95	-1.31	
2,217.00	30.03	237.14	2,029.51	-415.22	-675.31	792.26	0.93	-0.86	0.66	
2,311.00	28.05	237.64	2,111.69	-439.82	-713.74	837.88	2.12	-2.11	0.53	
2,405.00	29.27	237.27	2,194.17	-464.07	-751.74	882.96	1.31	1.30	-0.39	
2,500.00	30.60	236.25	2,276.49	-490.06	-791.39	930.36	1.50	1.40	-1.07	
2,594.00	30.10	236.48	2,357.61	-516.37	-830.93	977.85	0.55	-0.53	0.24	
2,689.00	28.73	237.42	2,440.36	-541.82	-870.03	1,024.51	1.52	-1.44	0.99	
2,783.00	29.89	235.98	2,522.33	-567.09	-908.49	1,070.52	1.44	1.23	-1.53	
2,878.00	29.04	235.90	2,605.04	-593.26	-947.20	1,117.25	0.90	-0.89	-0.08	
2,972.00	28.14	236.37	2,687.58	-618.33	-984.55	1,162.23	0.99	-0.96	0.50	
3,067.00	29.69	236.03	2,770.73	-643.89	-1,022.71	1,208.16	1.64	1.63	-0.36	
3,161.00	29.12	235.92	2,852.62	-669.71	-1,060.97	1,254.31	0.61	-0.61	-0.12	
3,255.00	28.01	236.49	2,935.18	-694.71	-1,098.31	1,299.26	1.22	-1.18	0.61	
3,350.00	29.27	236.65	3,018.55	-719.80	-1,136.31	1,344.79	1.33	1.33	0.17	
3,444.00	28.38	236.39	3,100.90	-744.80	-1,174.12	1,390.11	0.96	-0.95	-0.28	
3,539.00	29.81	236.16	3,183.92	-770.45	-1,212.53	1,436.30	1.51	1.51	-0.24	
3,633.00	28.69	236.68	3,265.93	-795.85	-1,250.80	1,482.23	1.22	-1.19	0.55	
3,728.00	28.40	238.87	3,349.38	-820.06	-1,289.19	1,527.61	1.14	-0.31	2.31	
3,822.00	30.32	240.22	3,431.31	-843.40	-1,328.92	1,573.62	2.16	2.04	1.44	
3,917.00	29.07	240.56	3,513.83	-866.66	-1,369.84	1,620.57	1.33	-1.32	0.36	
4,011.00	28.27	240.87	3,596.30	-888.72	-1,409.17	1,665.54	0.87	-0.85	0.33	
4,105.00	27.56	241.47	3,679.37	-909.94	-1,447.72	1,709.39	0.81	-0.76	0.64	
4,200.00	26.75	241.83	3,763.89	-930.53	-1,485.88	1,752.56	0.87	-0.85	0.38	
4,294.00	25.14	242.01	3,848.42	-949.89	-1,522.16	1,793.50	1.71	-1.71	0.19	

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Site:	SR 23-12 Pad	MD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Well:	SR 414-12	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)
4,389.00	24.76	242.66	3,934.55	-968.50	-1,557.65	1,833.36	0.49	-0.40	0.68
4,483.00	23.68	239.50	4,020.28	-987.12	-1,591.40	1,871.77	1.79	-1.15	-3.36
4,578.00	22.67	235.26	4,107.62	-1,007.24	-1,622.89	1,909.13	2.05	-1.06	-4.46
4,672.00	20.49	232.91	4,195.03	-1,027.48	-1,650.90	1,943.67	2.49	-2.32	-2.50
4,767.00	19.61	233.53	4,284.27	-1,046.99	-1,676.99	1,976.19	0.95	-0.93	0.65
4,861.00	18.80	233.67	4,373.04	-1,065.34	-1,701.87	2,007.07	0.86	-0.86	0.15
4,955.00	17.94	234.41	4,462.24	-1,082.74	-1,725.85	2,036.67	0.95	-0.91	0.79
5,050.00	17.01	234.90	4,552.86	-1,099.24	-1,749.12	2,065.18	0.99	-0.98	0.52
5,145.00	15.85	235.88	4,643.98	-1,114.51	-1,771.23	2,092.05	1.26	-1.22	1.03
5,239.00	15.12	238.19	4,734.57	-1,128.17	-1,792.27	2,117.14	1.02	-0.78	2.46
5,334.00	14.42	237.66	4,826.43	-1,141.03	-1,812.80	2,141.35	0.75	-0.74	-0.56
5,430.00	13.53	239.02	4,919.59	-1,153.21	-1,832.52	2,164.52	0.99	-0.93	1.42
5,525.00	13.08	239.39	5,012.03	-1,164.40	-1,851.30	2,186.35	0.48	-0.47	0.39
5,620.00	12.15	230.91	5,104.75	-1,176.18	-1,868.32	2,207.04	2.18	-0.98	-8.93
5,715.00	11.62	229.27	5,197.71	-1,188.73	-1,883.33	2,226.49	0.66	-0.56	-1.73
5,809.00	11.11	231.49	5,289.87	-1,200.54	-1,897.59	2,244.91	0.71	-0.54	2.36
5,903.00	11.34	221.84	5,382.08	-1,213.07	-1,910.84	2,262.88	2.01	0.24	-10.27
5,998.00	11.43	209.01	5,475.22	-1,228.26	-1,921.64	2,280.28	2.66	0.09	-13.51
6,092.00	9.41	205.31	5,567.67	-1,243.35	-1,929.44	2,295.13	2.26	-2.15	-3.94
6,186.00	7.65	201.89	5,660.63	-1,256.11	-1,935.06	2,306.87	1.95	-1.87	-3.64
6,281.00	6.33	191.52	5,754.92	-1,267.11	-1,938.46	2,315.79	1.92	-1.39	-10.92
6,375.00	4.57	177.80	5,848.50	-1,275.93	-1,939.35	2,321.41	2.32	-1.87	-14.60
6,417.11	4.70	171.86	5,890.47	-1,279.31	-1,939.04	2,323.03	1.18	0.30	-14.10
SR 414-12 BTV									
6,469.00	4.92	165.06	5,942.18	-1,283.57	-1,938.17	2,324.66	1.18	0.43	-13.11
6,564.00	3.07	155.26	6,036.95	-1,289.81	-1,936.05	2,326.35	2.07	-1.95	-10.32
6,658.00	0.53	100.99	6,130.89	-1,292.18	-1,934.57	2,326.43	2.97	-2.70	-57.73
6,753.00	0.62	57.48	6,225.89	-1,291.99	-1,933.71	2,325.60	0.46	0.09	-45.80
6,847.00	0.53	57.57	6,319.89	-1,291.48	-1,932.91	2,324.66	0.10	-0.10	0.10
6,942.00	0.50	49.28	6,414.88	-1,290.98	-1,932.23	2,323.81	0.08	-0.03	-8.73
7,036.00	0.53	49.48	6,508.88	-1,290.43	-1,931.59	2,322.97	0.03	0.03	0.21
7,131.00	1.08	27.31	6,603.87	-1,289.35	-1,930.84	2,321.75	0.65	0.58	-23.34
7,225.00	1.57	29.62	6,697.84	-1,287.44	-1,929.80	2,319.83	0.52	0.52	2.46
7,319.00	1.58	28.65	6,791.81	-1,285.18	-1,928.54	2,317.53	0.03	0.01	-1.03
7,414.00	1.42	353.70	6,886.78	-1,282.86	-1,928.04	2,315.83	0.96	-0.17	-36.79
7,508.00	1.58	355.49	6,980.74	-1,280.41	-1,928.27	2,314.67	0.18	0.17	1.90
7,602.00	1.58	349.45	7,074.71	-1,277.85	-1,928.61	2,313.53	0.18	0.00	-6.43
7,697.00	1.94	357.57	7,169.66	-1,274.95	-1,928.92	2,312.19	0.46	0.38	8.55
7,791.00	1.14	329.86	7,263.63	-1,272.56	-1,929.46	2,311.31	1.14	-0.85	-29.48
7,885.00	0.97	325.64	7,357.61	-1,271.09	-1,930.37	2,311.26	0.20	-0.18	-4.49
7,979.00	1.14	330.73	7,451.60	-1,269.62	-1,931.28	2,311.20	0.21	0.18	5.41
8,074.00	0.62	331.14	7,546.59	-1,268.34	-1,931.99	2,311.09	0.55	-0.55	0.43
8,168.00	0.62	335.83	7,640.58	-1,267.43	-1,932.44	2,310.96	0.05	0.00	4.99
8,263.00	0.79	326.87	7,735.57	-1,266.42	-1,933.01	2,310.87	0.21	0.18	-9.43

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Well:	SR 414-12	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)
8,357.00	0.88	319.04	7,829.56	-1,265.33	-1,933.84	2,310.96	0.15	0.10	-8.33
8,452.00	1.03	347.73	7,924.55	-1,263.94	-1,934.50	2,310.74	0.52	0.16	30.20
8,546.00	0.97	320.45	8,018.54	-1,262.50	-1,935.19	2,310.52	0.51	-0.06	-29.02
8,640.00	1.17	302.37	8,112.52	-1,261.38	-1,936.50	2,310.99	0.41	0.21	-19.23
8,735.00	0.98	303.34	8,207.50	-1,260.41	-1,938.00	2,311.70	0.20	-0.20	1.02
8,829.00	1.21	275.03	8,301.49	-1,259.88	-1,939.66	2,312.79	0.62	0.24	-30.12
8,924.00	1.49	265.52	8,396.46	-1,259.89	-1,941.89	2,314.65	0.38	0.29	-10.01
9,018.00	1.93	250.93	8,490.42	-1,260.50	-1,944.61	2,317.25	0.65	0.47	-15.52
9,113.00	1.85	240.38	8,585.37	-1,261.78	-1,947.45	2,320.33	0.38	-0.08	-11.11
9,207.00	1.80	244.80	8,679.32	-1,263.16	-1,950.11	2,323.31	0.16	-0.05	4.70
9,301.00	1.49	242.14	8,773.28	-1,264.36	-1,952.52	2,325.98	0.34	-0.33	-2.83
9,396.00	1.46	246.22	8,868.25	-1,265.43	-1,954.72	2,328.40	0.11	-0.03	4.29
9,490.00	0.99	246.18	8,962.23	-1,266.24	-1,956.56	2,330.38	0.50	-0.50	-0.04
9,585.00	0.77	290.96	9,057.22	-1,266.34	-1,957.91	2,331.56	0.74	-0.23	47.14
9,679.00	1.17	341.14	9,151.21	-1,265.21	-1,958.81	2,331.69	0.96	0.43	53.38
9,774.00	1.50	1.29	9,246.18	-1,263.05	-1,959.09	2,330.73	0.60	0.35	21.21
9,868.00	1.75	16.58	9,340.14	-1,260.44	-1,958.66	2,328.92	0.53	0.27	16.27
9,963.00	1.93	24.44	9,435.10	-1,257.59	-1,957.58	2,326.45	0.33	0.19	8.27
10,024.00	1.93	24.44	9,496.06	-1,255.72	-1,956.73	2,324.71	0.00	0.00	0.00
Last SDI Production MWD Survey									
10,035.00	1.93	24.44	9,507.05	-1,255.39	-1,956.58	2,324.39	0.00	0.00	0.00
Projection to TD - SR 414-12 PBHL									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
121.00	121.00	0.09	-0.46	First SDI Gyro MWD Survey
581.00	576.80	-27.96	-45.73	Last SDI Gyro MWD Survey
658.00	651.37	-40.61	-60.14	First SDI Surface MWD Survey
1,078.00	1,039.31	-127.71	-192.18	Last SDI Surface MWD Survey
1,178.00	1,127.23	-153.42	-232.29	First SDI Production MWD Survey
10,024.00	9,496.06	-1,255.72	-1,956.73	Last SDI Production MWD Survey
10,035.00	9,507.05	-1,255.39	-1,956.58	Projection to TD

Checked By: _____ Approved By: _____ Date: _____

