



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 411-25
County & State	Garfield County, CO
SDI Job No.	OP.006920
Rig	H&P 271

I, Mel Mireles Jr., having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 138 feet to a measured depth of 8,245 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

9-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 PA 411-25 - Slot PA 411-25 (A9)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 5224' & RKB 24' @ 5248.00usft
Site:	PA 22-25 Pad	MD Reference:	GL 5224' & RKB 24' @ 5248.00usft
Well:	PA 411-25	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 22-25 Pad			
Site Position:		Northing:	1,615,186.77 usft	Latitude:	39.4968742
From:	Map	Easting:	2,308,728.18 usft	Longitude:	-107.9499045
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.55 °

Well		PA 411-25 - Slot PA 411-25 (A9), A9				
Well Position	+N/-S	0.00 usft	Northing:	1,615,188.57 usft	Latitude:	39.4968839
	+E/-W	0.00 usft	Easting:	2,308,792.77 usft	Longitude:	-107.9496759
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	5,224.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/27/2017	9.40	65.78	51,672

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	109.32	

Survey Program	Date	1/9/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
138.00	673.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
746.00	1,071.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,177.00	8,245.00	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	
SHL (PA 411-25)										
138.00	0.44	146.16	138.00	-0.44	0.30	0.42	0.32	0.32	0.00	
First SDI Gyro MWD Survey										
214.00	0.79	115.05	213.99	-0.90	0.93	1.18	0.62	0.46	-40.93	
306.00	2.20	116.10	305.96	-1.95	3.09	3.56	1.53	1.53	1.14	
399.00	2.90	111.27	398.87	-3.59	6.89	7.69	0.79	0.75	-5.19	
490.00	2.29	68.64	489.78	-3.76	10.73	11.37	2.16	-0.67	-46.85	

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Site:	PA 22-25 Pad	MD Reference:	GL 5224' & RKB 24' @ 5248.00usft
Well:	PA 411-25	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)
581.00	2.29	347.08	580.73	-1.33	12.01	11.78	3.29	0.00	-89.63
673.00	2.73	311.57	672.65	1.92	9.96	8.77	1.72	0.48	-38.60
Last SDI Gyro MWD Survey									
746.00	2.29	312.36	745.58	4.06	7.59	5.82	0.60	-0.60	1.08
First SDI Surface MWD Survey									
838.00	1.46	358.83	837.53	6.47	6.20	3.71	1.81	-0.90	50.51
932.00	1.41	12.83	931.50	8.79	6.44	3.16	0.38	-0.05	14.89
1,027.00	2.39	347.11	1,026.45	11.86	6.25	1.98	1.34	1.03	-27.07
1,071.00	3.34	334.77	1,070.40	13.91	5.50	0.59	2.56	2.16	-28.05
Last SDI Surface MWD Survey									
1,177.00	4.29	331.14	1,176.16	20.18	2.27	-4.53	0.92	0.90	-3.42
First SDI Production MWD Survey									
1,271.00	6.50	330.79	1,269.74	27.90	-2.02	-11.14	2.35	2.35	-0.37
1,365.00	8.20	328.21	1,362.96	38.25	-8.15	-20.35	1.84	1.81	-2.74
1,460.00	10.29	333.17	1,456.72	51.58	-15.55	-31.74	2.35	2.20	5.22
1,555.00	12.73	332.30	1,549.81	68.42	-24.25	-45.52	2.57	2.57	-0.92
1,649.00	14.57	333.10	1,641.15	88.14	-34.41	-61.64	1.97	1.96	0.85
1,744.00	16.09	335.83	1,732.77	110.80	-45.21	-79.33	1.77	1.60	2.87
1,838.00	18.19	333.80	1,822.59	135.86	-57.02	-98.76	2.32	2.23	-2.16
1,933.00	20.82	335.15	1,912.13	164.49	-70.66	-121.11	2.81	2.77	1.42
2,027.00	22.47	336.10	1,999.50	196.07	-84.96	-145.06	1.79	1.76	1.01
2,122.00	21.80	335.22	2,087.50	228.68	-99.71	-169.77	0.79	-0.71	-0.93
2,215.00	23.96	334.01	2,173.17	261.34	-115.23	-195.21	2.38	2.32	-1.30
2,309.00	23.13	332.57	2,259.35	294.88	-132.10	-222.23	1.07	-0.88	-1.53
2,404.00	24.27	333.72	2,346.33	328.95	-149.34	-249.78	1.29	1.20	1.21
2,499.00	23.59	332.53	2,433.17	363.33	-166.75	-277.58	0.88	-0.72	-1.25
2,593.00	23.39	331.17	2,519.38	396.36	-184.42	-305.19	0.61	-0.21	-1.45
2,688.00	23.57	333.89	2,606.52	429.94	-201.88	-332.77	1.16	0.19	2.86
2,783.00	22.86	332.93	2,693.82	463.42	-218.63	-359.67	0.85	-0.75	-1.01
2,877.00	24.27	334.97	2,779.98	497.19	-235.12	-386.39	1.73	1.50	2.17
2,971.00	23.60	334.26	2,865.90	531.64	-251.46	-413.22	0.78	-0.71	-0.76
3,066.00	23.17	333.62	2,953.10	565.52	-268.03	-440.06	0.53	-0.45	-0.67
3,160.00	22.44	333.45	3,039.75	598.13	-284.26	-466.17	0.78	-0.78	-0.18
3,254.00	23.95	333.40	3,126.15	631.24	-300.83	-492.76	1.61	1.61	-0.05
3,348.00	24.14	333.58	3,211.99	665.52	-317.92	-520.23	0.22	0.20	0.19
3,441.00	23.90	332.87	3,296.94	699.31	-334.97	-547.51	0.40	-0.26	-0.76
3,535.00	23.95	332.38	3,382.86	733.16	-352.50	-575.25	0.22	0.05	-0.52
3,629.00	23.57	332.66	3,468.89	766.76	-369.98	-602.86	0.42	-0.40	0.30
3,722.00	24.09	332.31	3,553.97	800.09	-387.34	-630.27	0.58	0.56	-0.38
3,816.00	23.72	331.49	3,639.90	833.69	-405.28	-658.32	0.53	-0.39	-0.87
3,911.00	23.97	330.31	3,726.79	867.24	-423.96	-687.05	0.57	0.26	-1.24
4,005.00	24.61	333.25	3,812.47	901.31	-442.22	-715.56	1.46	0.68	3.13
4,099.00	24.59	332.90	3,897.94	936.20	-459.94	-743.82	0.16	-0.02	-0.37
4,208.00	24.71	332.31	3,997.01	976.56	-480.86	-776.92	0.25	0.11	-0.54

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Well:	PA 411-25	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)	
4,287.00	23.83	333.01	4,069.03	1,005.40	-495.78	-800.54	1.17	-1.11	0.89	
4,381.00	23.21	333.54	4,155.22	1,038.91	-512.65	-827.55	0.70	-0.66	0.56	
4,475.00	22.05	334.24	4,241.98	1,071.38	-528.57	-853.32	1.27	-1.23	0.74	
4,570.00	20.49	334.51	4,330.51	1,102.45	-543.48	-877.67	1.65	-1.64	0.28	
4,665.00	20.20	335.56	4,419.58	1,132.39	-557.42	-900.73	0.49	-0.31	1.11	
4,754.42	19.40	334.66	4,503.71	1,159.87	-570.16	-921.85	0.96	-0.89	-1.01	
PA 411-25 MVRD										
4,759.00	19.36	334.61	4,508.03	1,161.24	-570.81	-922.92	0.96	-0.89	-1.05	
4,854.00	18.73	335.58	4,597.83	1,189.36	-583.87	-944.54	0.74	-0.66	1.02	
4,948.00	18.14	336.91	4,687.01	1,216.56	-595.85	-964.85	0.77	-0.63	1.41	
5,042.00	16.01	336.72	4,776.86	1,241.93	-606.71	-983.49	2.27	-2.27	-0.20	
5,137.00	14.15	338.09	4,868.58	1,264.74	-616.22	-1,000.02	1.99	-1.96	1.44	
5,232.00	14.04	333.74	4,960.73	1,285.85	-625.66	-1,015.90	1.12	-0.12	-4.58	
5,327.00	13.98	333.72	5,052.90	1,306.47	-635.84	-1,032.33	0.06	-0.06	-0.02	
5,422.00	13.08	334.33	5,145.26	1,326.45	-645.57	-1,048.13	0.96	-0.95	0.64	
5,516.00	12.67	335.71	5,236.90	1,345.44	-654.42	-1,062.76	0.55	-0.44	1.47	
5,611.00	11.55	336.34	5,329.78	1,363.64	-662.52	-1,076.44	1.19	-1.18	0.66	
5,706.00	10.80	337.46	5,422.98	1,380.58	-669.75	-1,088.86	0.82	-0.79	1.18	
5,801.00	9.67	340.40	5,516.47	1,396.31	-675.84	-1,099.81	1.31	-1.19	3.09	
5,896.00	8.51	342.11	5,610.28	1,410.52	-680.68	-1,109.08	1.25	-1.22	1.80	
5,990.00	7.92	333.96	5,703.31	1,422.96	-685.66	-1,117.89	1.39	-0.63	-8.67	
6,085.00	7.08	332.72	5,797.50	1,434.04	-691.21	-1,126.80	0.90	-0.88	-1.31	
6,180.00	6.66	336.20	5,891.82	1,444.29	-696.12	-1,134.82	0.62	-0.44	3.66	
6,275.00	6.80	341.38	5,986.17	1,454.66	-700.14	-1,142.05	0.66	0.15	5.45	
6,370.00	6.54	342.88	6,080.52	1,465.16	-703.53	-1,148.72	0.33	-0.27	1.58	
6,464.00	5.57	343.63	6,174.00	1,474.65	-706.39	-1,154.56	1.04	-1.03	0.80	
6,559.00	4.84	345.58	6,268.60	1,482.95	-708.69	-1,159.48	0.79	-0.77	2.05	
6,654.00	3.53	336.97	6,363.35	1,489.53	-710.83	-1,163.68	1.53	-1.38	-9.06	
6,749.00	3.19	336.21	6,458.19	1,494.64	-713.04	-1,167.45	0.36	-0.36	-0.80	
6,843.00	1.58	341.36	6,552.10	1,498.26	-714.51	-1,170.04	1.73	-1.71	5.48	
6,938.00	1.34	340.22	6,647.07	1,500.55	-715.30	-1,171.54	0.25	-0.25	-1.20	
7,033.00	1.25	327.14	6,742.05	1,502.46	-716.24	-1,173.06	0.32	-0.09	-13.77	
7,127.00	1.14	331.44	6,836.03	1,504.14	-717.24	-1,174.57	0.15	-0.12	4.57	
7,222.00	0.77	316.41	6,931.01	1,505.44	-718.14	-1,175.84	0.47	-0.39	-15.82	
7,317.00	0.80	287.55	7,026.00	1,506.10	-719.21	-1,177.07	0.41	0.03	-30.38	
7,411.00	1.06	267.71	7,119.99	1,506.26	-720.70	-1,178.53	0.44	0.28	-21.11	
7,506.00	1.34	267.37	7,214.97	1,506.18	-722.69	-1,180.38	0.29	0.29	-0.36	
7,600.00	1.69	265.92	7,308.94	1,506.03	-725.17	-1,182.67	0.37	0.37	-1.54	
7,695.00	1.56	262.96	7,403.90	1,505.77	-727.85	-1,185.11	0.16	-0.14	-3.12	
7,789.00	1.65	243.38	7,497.86	1,505.01	-730.33	-1,187.20	0.59	0.10	-20.83	
7,884.00	1.65	239.93	7,592.82	1,503.71	-732.74	-1,189.04	0.10	0.00	-3.63	
7,978.00	1.18	249.76	7,686.80	1,502.69	-734.82	-1,190.67	0.56	-0.50	10.46	
8,072.00	1.23	230.53	7,780.78	1,501.72	-736.50	-1,191.94	0.43	0.05	-20.46	
8,167.00	1.28	219.01	7,875.75	1,500.25	-737.96	-1,192.82	0.27	0.05	-12.13	

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Site:	PA 22-25 Pad	MD Reference:	GL 5224' & RKB 24' @ 5248.00usft
Well:	PA 411-25	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)
8,185.00	1.32	216.38	7,893.75	1,499.92	-738.21	-1,192.95	0.40	0.22	-14.61
Last SDI Production MWD Survey									
8,245.00	1.32	216.38	7,953.73	1,498.81	-739.03	-1,193.36	0.00	0.00	0.00
Projection to TD - PA 411-25 PBHL - PBHL (PA 411-25)									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
138.00	138.00	-0.44	0.30	First SDI Gyro MWD Survey
673.00	672.65	1.92	9.96	Last SDI Gyro MWD Survey
746.00	745.58	4.06	7.59	First SDI Surface MWD Survey
1,071.00	1,070.40	13.91	5.50	Last SDI Surface MWD Survey
1,177.00	1,176.16	20.18	2.27	First SDI Production MWD Survey
8,185.00	7,893.75	1,499.92	-738.21	Last SDI Production MWD Survey
8,245.00	7,953.73	1,498.81	-739.03	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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