



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 23-17
County & State	Garfield County, CO
SDI Job No.	OP.008726
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 123 feet to a measured depth of 10,425 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

22-Mar-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 23-17 - Slot RU 23-17 (B2)
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 23-17	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 23-17 - Slot RU 23-17 (B2)				
Well Position	+N/-S	0.00 usft	Northing:	1,594,652.40 usft	Latitude:	39.4435657
	+E/-W	0.00 usft	Easting:	2,351,231.40 usft	Longitude:	-107.7974971
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	3/10/2018	9.18	65.57	51,583

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	328.10	

Survey Program	Date	3/21/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
123.00	492.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
568.00	1,049.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,182.00	10,425.00	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	
123.00	0.26	317.46	123.00	0.21	-0.19	0.27	0.21	0.21	0.00	
First SDI Gyro MWD Survey										
215.00	1.94	322.56	214.98	1.60	-1.28	2.03	1.83	1.83	5.54	
307.00	2.02	324.58	306.92	4.15	-3.16	5.20	0.12	0.09	2.20	
399.00	4.57	331.26	398.77	8.69	-5.87	10.48	2.80	2.77	7.26	
492.00	5.10	331.70	491.43	15.58	-9.61	18.30	0.57	0.57	0.47	
Last SDI Gyro MWD Survey										

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Site:	RU 23-17 Pad	MD Reference:	GL 8368.6 & RKB 24' @ 8392.60usft (H&P 318)
Well:	RU 23-17	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)	
568.00	5.40	328.65	567.12	21.61	-13.07	25.25	0.54	0.39	-4.01	
First SDI Surface MWD Survey										
660.00	6.12	325.02	658.65	29.32	-18.13	34.47	0.88	0.78	-3.95	
755.00	7.40	327.99	752.99	38.66	-24.28	45.65	1.40	1.35	3.13	
849.00	6.41	331.15	846.31	48.39	-30.02	56.94	1.13	-1.05	3.36	
943.00	3.99	330.55	939.91	55.83	-34.16	65.45	2.58	-2.57	-0.64	
1,038.00	3.50	317.72	1,034.71	60.86	-37.74	71.61	1.02	-0.52	-13.51	
1,049.00	3.43	316.27	1,045.69	61.34	-38.19	72.26	1.02	-0.64	-13.18	
Last SDI Surface MWD Survey										
1,182.00	3.44	315.28	1,178.45	67.05	-43.75	80.04	0.05	0.01	-0.74	
First SDI Production MWD Survey										
1,277.00	4.70	330.22	1,273.21	72.46	-47.69	86.71	1.72	1.33	15.73	
1,371.00	4.33	334.20	1,366.92	78.99	-51.14	94.09	0.52	-0.39	4.23	
1,466.00	6.03	332.25	1,461.53	86.64	-55.03	102.63	1.80	1.79	-2.05	
1,560.00	6.34	329.62	1,554.98	95.49	-59.95	112.75	0.45	0.33	-2.80	
1,655.00	5.89	329.81	1,649.44	104.22	-65.06	122.86	0.47	-0.47	0.20	
1,749.00	5.70	328.38	1,742.96	112.37	-69.93	132.35	0.25	-0.20	-1.52	
1,843.00	5.74	327.73	1,836.49	120.32	-74.89	141.72	0.08	0.04	-0.69	
1,938.00	5.93	327.68	1,931.00	128.48	-80.05	151.38	0.20	0.20	-0.05	
2,032.00	5.71	331.53	2,024.52	136.70	-84.87	160.90	0.48	-0.23	4.10	
2,127.00	5.36	330.24	2,119.07	144.70	-89.33	170.05	0.39	-0.37	-1.36	
2,221.00	5.92	327.03	2,212.62	152.58	-94.14	179.29	0.68	0.60	-3.41	
2,316.00	5.89	328.03	2,307.11	160.83	-99.39	189.06	0.11	-0.03	1.05	
2,410.00	5.95	325.52	2,400.61	168.93	-104.70	198.75	0.28	0.06	-2.67	
2,505.00	5.76	328.96	2,495.12	177.08	-109.95	208.43	0.42	-0.20	3.62	
2,599.00	5.63	330.24	2,588.65	185.12	-114.67	217.76	0.19	-0.14	1.36	
2,693.00	5.36	331.47	2,682.22	192.98	-119.05	226.75	0.31	-0.29	1.31	
2,788.00	5.10	331.18	2,776.83	200.58	-123.21	235.39	0.28	-0.27	-0.31	
2,882.00	4.66	331.65	2,870.49	207.60	-127.04	243.38	0.47	-0.47	0.50	
2,976.00	6.40	326.67	2,964.04	215.34	-131.73	252.43	1.92	1.85	-5.30	
3,070.00	6.42	326.73	3,057.46	224.11	-137.49	262.92	0.02	0.02	0.06	
3,164.00	5.98	327.08	3,150.91	232.61	-143.03	273.07	0.47	-0.47	0.37	
3,259.00	6.04	326.82	3,245.38	240.95	-148.46	283.01	0.07	0.06	-0.27	
3,353.00	6.05	328.50	3,338.86	249.31	-153.75	292.91	0.19	0.01	1.79	
3,448.00	6.29	328.12	3,433.31	258.00	-159.12	303.12	0.26	0.25	-0.40	
3,542.00	6.07	329.01	3,526.77	266.64	-164.40	313.24	0.26	-0.23	0.95	
3,637.00	5.98	331.39	3,621.24	275.29	-169.35	323.20	0.28	-0.09	2.51	
3,731.00	5.46	330.62	3,714.77	283.48	-173.89	332.56	0.56	-0.55	-0.82	
3,826.00	5.05	330.26	3,809.37	291.05	-178.18	341.25	0.43	-0.43	-0.38	
3,920.00	6.60	322.07	3,902.89	298.90	-183.56	350.76	1.87	1.65	-8.71	
4,015.00	6.42	322.42	3,997.27	307.42	-190.15	361.47	0.19	-0.19	0.37	
4,109.00	6.46	322.06	4,090.68	315.75	-196.61	371.96	0.06	0.04	-0.38	
4,203.00	6.09	324.18	4,184.12	323.97	-202.78	382.19	0.46	-0.39	2.26	
4,298.00	5.54	324.09	4,278.63	331.77	-208.42	391.80	0.58	-0.58	-0.09	

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Site:	RU 23-17 Pad	MD Reference:	GL 8368.6 & RKB 24' @ 8392.60usft (H&P 318)
Well:	RU 23-17	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)	
4,392.00	5.01	325.85	4,372.23	338.84	-213.38	400.42	0.59	-0.56	1.87	
4,487.00	6.44	325.39	4,466.75	346.66	-218.74	409.89	1.51	1.51	-0.48	
4,581.00	6.52	322.41	4,560.15	355.23	-224.99	420.47	0.37	0.09	-3.17	
4,676.00	6.34	323.12	4,654.56	363.70	-231.42	431.06	0.21	-0.19	0.75	
4,770.00	5.97	325.44	4,748.01	371.87	-237.31	441.11	0.47	-0.39	2.47	
4,865.00	5.99	323.26	4,842.50	379.91	-243.08	450.99	0.24	0.02	-2.29	
4,959.00	6.18	323.37	4,935.97	387.90	-249.03	460.92	0.20	0.20	0.12	
5,054.00	5.98	320.66	5,030.43	395.84	-255.22	470.92	0.37	-0.21	-2.85	
5,148.00	5.95	319.72	5,123.92	403.34	-261.47	480.60	0.11	-0.03	-1.00	
5,243.00	6.14	323.44	5,218.40	411.18	-267.68	490.53	0.46	0.20	3.92	
5,337.00	6.20	327.86	5,311.85	419.51	-273.38	500.62	0.51	0.06	4.70	
5,431.00	6.27	328.04	5,405.30	428.17	-278.80	510.83	0.08	0.07	0.19	
5,526.00	6.16	329.01	5,499.74	436.94	-284.17	521.11	0.16	-0.12	1.02	
5,621.00	6.60	328.22	5,594.15	445.95	-289.67	531.67	0.47	0.46	-0.83	
5,715.00	6.77	327.70	5,687.51	455.22	-295.47	542.61	0.19	0.18	-0.55	
5,810.00	7.15	324.95	5,781.81	464.80	-301.86	554.11	0.53	0.40	-2.89	
5,904.00	7.03	325.50	5,875.09	474.33	-308.48	565.70	0.15	-0.13	0.59	
5,999.00	6.86	324.62	5,969.39	483.74	-315.05	577.17	0.21	-0.18	-0.93	
6,094.00	6.39	323.66	6,063.76	492.63	-321.47	588.10	0.51	-0.49	-1.01	
6,188.00	6.60	321.10	6,157.16	501.04	-327.96	598.68	0.38	0.22	-2.72	
6,282.00	5.89	320.31	6,250.60	508.96	-334.44	608.82	0.76	-0.76	-0.84	
6,377.00	5.61	316.35	6,345.12	516.07	-340.76	618.20	0.51	-0.29	-4.17	
6,472.00	5.71	320.13	6,439.66	523.06	-346.99	627.42	0.41	0.11	3.98	
6,566.00	5.72	320.14	6,533.19	530.24	-352.99	636.69	0.01	0.01	0.01	
6,661.00	5.54	316.18	6,627.73	537.18	-359.20	645.87	0.45	-0.19	-4.17	
6,755.00	5.10	315.48	6,721.33	543.44	-365.27	654.39	0.47	-0.47	-0.74	
6,850.00	4.90	317.51	6,815.97	549.44	-370.97	662.49	0.28	-0.21	2.14	
6,944.00	5.01	326.11	6,909.62	555.81	-375.97	670.54	0.80	0.12	9.15	
7,039.00	4.40	346.77	7,004.30	562.80	-379.12	678.14	1.88	-0.64	21.75	
7,133.00	3.87	347.82	7,098.06	569.41	-380.61	684.54	0.57	-0.56	1.12	
7,227.00	3.43	344.39	7,191.87	575.22	-382.04	690.23	0.52	-0.47	-3.65	
7,322.00	2.90	345.54	7,286.72	580.28	-383.40	695.25	0.56	-0.56	1.21	
7,416.00	2.46	335.87	7,380.62	584.43	-384.82	699.52	0.67	-0.47	-10.29	
7,511.00	2.29	323.39	7,475.54	587.81	-386.79	703.43	0.57	-0.18	-13.14	
7,605.00	3.08	354.77	7,569.44	591.83	-388.14	707.56	1.74	0.84	33.38	
7,699.00	2.99	356.17	7,663.31	596.79	-388.53	711.98	0.12	-0.10	1.49	
7,794.00	2.39	2.79	7,758.20	601.25	-388.60	715.79	0.71	-0.63	6.97	
7,888.00	2.05	345.13	7,852.13	604.83	-388.94	719.01	0.81	-0.36	-18.79	
7,982.00	2.20	8.13	7,946.07	608.24	-389.11	722.00	0.91	0.16	24.47	
8,077.00	1.78	13.77	8,041.01	611.48	-388.51	724.43	0.49	-0.44	5.94	
8,171.00	1.49	4.70	8,134.97	614.11	-388.06	726.43	0.41	-0.31	-9.65	
8,266.00	1.31	352.43	8,229.95	616.42	-388.10	728.41	0.37	-0.19	-12.92	
8,361.00	1.06	13.75	8,324.93	618.35	-388.03	730.01	0.53	-0.26	22.44	

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Well:	RU 23-17	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)	
8,455.00	0.53	0.74	8,418.92	619.63	-387.82	730.99	0.59	-0.56	-13.84	
8,550.00	0.88	6.63	8,513.91	620.79	-387.73	731.93	0.38	0.37	6.20	
8,645.00	0.81	8.40	8,608.90	622.18	-387.55	733.01	0.08	-0.07	1.86	
8,739.00	0.88	3.29	8,702.89	623.56	-387.41	734.11	0.11	0.07	-5.44	
8,834.00	0.97	329.28	8,797.88	624.98	-387.78	735.51	0.58	0.09	-35.80	
8,929.00	0.97	276.89	8,892.86	625.77	-388.99	736.82	0.90	0.00	-55.15	
9,024.00	0.97	267.23	8,987.85	625.83	-390.59	737.71	0.17	0.00	-10.17	
9,118.00	0.88	273.91	9,081.84	625.84	-392.10	738.52	0.15	-0.10	7.11	
9,213.00	0.97	265.21	9,176.83	625.82	-393.63	739.31	0.18	0.09	-9.16	
9,308.00	0.88	266.79	9,271.81	625.71	-395.16	740.03	0.10	-0.09	1.66	
9,402.00	1.41	238.49	9,365.80	625.07	-396.87	740.38	0.81	0.56	-30.11	
9,497.00	1.32	232.48	9,460.77	623.79	-398.73	740.29	0.18	-0.09	-6.33	
9,592.00	2.20	226.09	9,555.72	621.86	-400.92	739.80	0.95	0.93	-6.73	
9,686.00	2.46	216.78	9,649.65	618.99	-403.42	738.69	0.49	0.28	-9.90	
9,781.00	2.37	199.46	9,744.56	615.51	-405.30	736.72	0.77	-0.09	-18.23	
9,876.00	2.90	173.89	9,839.47	611.26	-405.70	733.33	1.34	0.56	-26.92	
9,970.00	3.52	168.53	9,933.32	606.07	-404.87	728.49	0.73	0.66	-5.70	
10,065.00	3.08	166.47	10,028.16	600.73	-403.69	723.33	0.48	-0.46	-2.17	
10,160.00	3.78	180.74	10,122.99	595.12	-403.14	718.27	1.16	0.74	15.02	
10,254.00	2.73	178.72	10,216.84	589.78	-403.13	713.74	1.12	-1.12	-2.15	
10,349.00	2.11	182.06	10,311.75	585.77	-403.14	710.34	0.67	-0.65	3.52	
Last SDI Production MWD Survey										
10,425.00	2.11	182.06	10,387.70	582.98	-403.24	708.02	0.00	0.00	0.00	
Projection to TD - PBHL(RU_23-17)										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
123.00	123.00	0.21	-0.19	First SDI Gyro MWD Survey	
492.00	491.43	15.58	-9.61	Last SDI Gyro MWD Survey	
568.00	567.12	21.61	-13.07	First SDI Surface MWD Survey	
1,049.00	1,045.69	61.34	-38.19	Last SDI Surface MWD Survey	
1,182.00	1,178.45	67.05	-43.75	First SDI Production MWD Survey	
10,349.00	10,311.75	585.77	-403.14	Last SDI Production MWD Survey	
10,425.00	10,387.70	582.98	-403.24	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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