



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 313-17
County & State	Garfield County, CO
SDI Job No.	OP.009123
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 10,727 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-Apr-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 313-17 - Slot RU 313-17 (A6)
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 313-17	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 313-17 - Slot RU 313-17 (A6)				
Well Position	+N/-S	0.00 usft	Northing:	1,594,622.60 usft	Latitude:	39.4434846
	+E/-W	0.00 usft	Easting:	2,351,242.10 usft	Longitude:	-107.7974566
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	3/29/2018	9.18	65.57	51,576

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	277.58	

Survey Program	Date	4/11/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
123.00	1,068.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
1,068.00	1,068.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,182.00	10,727.00	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	0.44	121.55	123.00	-0.25	0.40	-0.43	0.36	0.36	0.00	
First SDI Gyro MWD Survey										
214.00	0.53	94.04	214.00	-0.46	1.12	-1.17	0.27	0.10	-30.23	
307.00	1.76	304.80	306.98	0.33	0.38	-0.33	2.40	1.32	-160.47	
399.00	4.49	279.32	398.84	1.72	-4.34	4.53	3.26	2.97	-27.70	
492.00	7.65	281.95	491.31	3.59	-13.99	14.34	3.41	3.40	2.83	
584.00	10.91	282.48	582.09	6.74	-28.48	29.12	3.54	3.54	0.58	
676.00	14.34	280.63	671.85	10.72	-48.19	49.18	3.75	3.73	-2.01	

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Site:	RU 23-17 Pad	MD Reference:	GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
Well:	RU 313-17	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)
771.00	16.54	275.89	763.42	14.28	-73.21	74.45	2.67	2.32	-4.99
865.00	17.77	274.22	853.24	16.71	-100.82	102.15	1.41	1.31	-1.78
959.00	19.62	273.87	942.28	18.83	-130.88	132.22	1.97	1.97	-0.37
1,054.00	20.67	276.59	1,031.47	21.83	-163.45	164.90	1.48	1.11	2.86
Last SDI Gyro MWD Survey									
1,068.00	20.84	276.98	1,044.56	22.42	-168.37	169.86	1.56	1.21	2.79
SDI Surface MWD Survey									
1,182.00	21.17	276.23	1,150.98	27.11	-208.96	210.72	0.37	0.29	-0.66
First SDI Production MWD Survey									
1,276.00	20.54	276.46	1,238.82	30.81	-242.22	244.17	0.68	-0.67	0.24
1,371.00	19.44	274.59	1,328.10	33.95	-274.54	276.62	1.34	-1.16	-1.97
1,465.00	18.12	273.79	1,417.09	36.17	-304.72	306.83	1.43	-1.40	-0.85
1,560.00	17.59	272.99	1,507.52	37.90	-333.80	335.88	0.61	-0.56	-0.84
1,654.00	18.21	279.77	1,596.98	41.13	-362.46	364.72	2.31	0.66	7.21
1,748.00	17.01	281.60	1,686.57	46.39	-390.41	393.11	1.41	-1.28	1.95
1,843.00	16.49	281.09	1,777.54	51.77	-417.25	420.43	0.57	-0.55	-0.54
1,937.00	18.77	283.61	1,867.12	57.90	-445.04	448.79	2.56	2.43	2.68
2,032.00	18.38	283.40	1,957.17	64.97	-474.47	478.89	0.42	-0.41	-0.22
2,126.00	17.50	283.84	2,046.60	71.78	-502.61	507.68	0.95	-0.94	0.47
2,221.00	16.47	285.26	2,137.46	78.74	-529.47	535.23	1.17	-1.08	1.49
2,315.00	18.38	284.89	2,227.14	86.06	-556.65	563.14	2.04	2.03	-0.39
2,409.00	17.39	285.26	2,316.59	93.57	-584.52	591.76	1.06	-1.05	0.39
2,504.00	16.71	285.24	2,407.42	100.89	-611.40	619.37	0.72	-0.72	-0.02
2,598.00	19.05	284.94	2,496.87	108.40	-639.26	647.98	2.49	2.49	-0.32
2,693.00	19.28	285.56	2,586.61	116.60	-669.35	678.88	0.32	0.24	0.65
2,787.00	18.82	284.89	2,675.46	124.66	-698.95	709.29	0.54	-0.49	-0.71
2,881.00	19.74	281.78	2,764.19	131.80	-729.15	740.16	1.47	0.98	-3.31
2,975.00	19.28	281.28	2,852.79	138.08	-759.91	771.48	0.52	-0.49	-0.53
3,069.00	18.50	281.58	2,941.73	144.11	-789.74	801.85	0.84	-0.83	0.32
3,164.00	20.22	276.63	3,031.36	149.03	-820.81	833.30	2.50	1.81	-5.21
3,258.00	19.62	276.88	3,119.73	152.79	-852.62	865.32	0.64	-0.64	0.27
3,352.00	19.01	276.23	3,208.44	156.35	-883.50	896.41	0.69	-0.65	-0.69
3,447.00	18.38	277.01	3,298.43	159.85	-913.75	926.86	0.71	-0.66	0.82
3,541.00	17.57	277.34	3,387.84	163.47	-942.53	955.86	0.87	-0.86	0.35
3,636.00	16.51	276.96	3,478.67	166.94	-970.15	983.70	1.12	-1.12	-0.40
3,730.00	19.08	277.42	3,568.17	170.55	-998.65	1,012.43	2.74	2.73	0.49
3,825.00	18.91	278.04	3,657.99	174.70	-1,029.29	1,043.35	0.28	-0.18	0.65
3,919.00	18.34	278.74	3,747.07	179.08	-1,058.99	1,073.36	0.65	-0.61	0.74
4,014.00	17.70	279.22	3,837.41	183.67	-1,088.02	1,102.74	0.69	-0.67	0.51
4,108.00	17.56	280.18	3,926.99	188.46	-1,116.08	1,131.19	0.34	-0.15	1.02
4,203.00	16.67	280.28	4,017.79	193.43	-1,143.59	1,159.12	0.94	-0.94	0.11
4,297.00	18.47	276.81	4,107.40	197.60	-1,171.65	1,187.48	2.21	1.91	-3.69
4,391.00	18.20	276.81	4,196.63	201.11	-1,201.01	1,217.05	0.29	-0.29	0.00
4,486.00	17.27	277.45	4,287.11	204.69	-1,229.72	1,245.98	1.00	-0.98	0.67

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Site:	RU 23-17 Pad	MD Reference:	GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
Well:	RU 313-17	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)
4,581.00	14.97	276.64	4,378.37	207.94	-1,255.90	1,272.36	2.43	-2.42	-0.85
4,675.00	16.97	275.05	4,468.74	210.55	-1,281.62	1,298.20	2.18	2.13	-1.69
4,770.00	16.71	275.75	4,559.67	213.14	-1,309.02	1,325.70	0.35	-0.27	0.74
4,864.00	18.38	276.63	4,649.29	216.21	-1,337.19	1,354.03	1.80	1.78	0.94
4,959.00	17.67	276.02	4,739.63	219.45	-1,366.41	1,383.42	0.77	-0.75	-0.64
5,053.00	16.97	275.49	4,829.36	222.26	-1,394.25	1,411.39	0.76	-0.74	-0.56
5,148.00	18.73	276.89	4,919.79	225.41	-1,423.20	1,440.50	1.91	1.85	1.47
5,242.00	17.50	277.51	5,009.13	229.07	-1,452.19	1,469.72	1.32	-1.31	0.66
5,336.00	16.97	277.16	5,098.91	232.63	-1,479.82	1,497.57	0.57	-0.56	-0.37
5,431.00	19.08	280.32	5,189.24	237.14	-1,508.85	1,526.95	2.45	2.22	3.33
5,525.00	18.55	279.97	5,278.22	242.48	-1,538.69	1,557.24	0.58	-0.56	-0.37
5,620.00	17.84	281.14	5,368.47	247.91	-1,567.85	1,586.86	0.84	-0.75	1.23
5,715.00	16.95	281.65	5,459.12	253.51	-1,595.70	1,615.20	0.95	-0.94	0.54
5,809.00	18.82	281.38	5,548.57	259.27	-1,623.98	1,643.99	1.99	1.99	-0.29
5,904.00	18.20	281.90	5,638.66	265.36	-1,653.52	1,674.08	0.68	-0.65	0.55
5,998.00	17.94	282.34	5,728.02	271.48	-1,682.03	1,703.14	0.31	-0.28	0.47
6,093.00	17.62	283.87	5,818.49	278.05	-1,710.28	1,732.02	0.60	-0.34	1.61
6,187.00	16.80	285.07	5,908.28	284.99	-1,737.21	1,759.63	0.95	-0.87	1.28
6,282.00	18.64	279.71	5,998.77	291.13	-1,765.44	1,788.42	2.59	1.94	-5.64
6,376.00	17.94	281.29	6,088.02	296.49	-1,794.44	1,817.87	0.91	-0.74	1.68
6,471.00	17.87	280.66	6,178.42	302.05	-1,823.11	1,847.03	0.22	-0.07	-0.66
6,566.00	16.36	280.59	6,269.21	307.21	-1,850.59	1,874.95	1.59	-1.59	-0.07
6,660.00	14.79	282.59	6,359.76	312.26	-1,875.31	1,900.12	1.76	-1.67	2.13
6,755.00	16.71	279.44	6,451.19	317.14	-1,900.62	1,925.85	2.21	2.02	-3.32
6,849.00	15.92	279.88	6,541.40	321.57	-1,926.66	1,952.24	0.85	-0.84	0.47
6,943.00	15.45	277.97	6,631.90	325.52	-1,951.76	1,977.65	0.74	-0.50	-2.03
7,038.00	14.68	278.30	6,723.64	329.01	-1,976.20	2,002.34	0.82	-0.81	0.35
7,132.00	14.60	279.97	6,814.59	332.78	-1,999.65	2,026.08	0.46	-0.09	1.78
7,227.00	12.75	280.32	6,906.89	336.73	-2,021.76	2,048.52	1.95	-1.95	0.37
7,321.00	12.22	280.76	6,998.67	340.45	-2,041.74	2,068.81	0.57	-0.56	0.47
7,416.00	12.05	281.73	7,091.54	344.34	-2,061.33	2,088.74	0.28	-0.18	1.02
7,510.00	10.29	279.00	7,183.76	347.65	-2,079.23	2,106.92	1.95	-1.87	-2.90
7,605.00	10.19	278.42	7,277.25	350.21	-2,095.92	2,123.81	0.15	-0.11	-0.61
7,699.00	9.06	277.69	7,369.92	352.41	-2,111.48	2,139.52	1.21	-1.20	-0.78
7,793.00	8.09	269.34	7,462.87	353.33	-2,125.43	2,153.47	1.68	-1.03	-8.88
7,887.00	6.33	270.92	7,556.13	353.34	-2,137.23	2,165.16	1.88	-1.87	1.68
7,982.00	5.85	273.39	7,650.59	353.71	-2,147.30	2,175.19	0.58	-0.51	2.60
8,076.00	5.54	272.94	7,744.13	354.22	-2,156.61	2,184.49	0.33	-0.33	-0.48
8,171.00	3.78	269.45	7,838.81	354.43	-2,164.32	2,192.17	1.88	-1.85	-3.67
8,265.00	3.52	273.56	7,932.62	354.58	-2,170.30	2,198.11	0.39	-0.28	4.37
8,360.00	3.52	271.71	8,027.44	354.85	-2,176.13	2,203.92	0.12	0.00	-1.95
8,455.00	1.67	276.02	8,122.34	355.08	-2,180.42	2,208.21	1.96	-1.95	4.54
8,549.00	1.67	272.32	8,216.30	355.28	-2,183.15	2,210.94	0.11	0.00	-3.94

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

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8,644.00	2.11	283.40	8,311.25	355.74	-2,186.23	2,214.06	0.60	0.46	11.66	
8,738.00	2.58	279.22	8,405.17	356.48	-2,190.01	2,217.90	0.53	0.50	-4.45	
8,833.00	2.73	272.06	8,500.07	356.90	-2,194.38	2,222.28	0.38	0.16	-7.54	
8,928.00	1.41	250.07	8,595.00	356.58	-2,197.74	2,225.57	1.60	-1.39	-23.15	
9,023.00	0.97	245.87	8,689.98	355.86	-2,199.57	2,227.29	0.47	-0.46	-4.42	
9,117.00	1.14	264.68	8,783.97	355.45	-2,201.23	2,228.88	0.41	0.18	20.01	
9,212.00	1.58	279.09	8,878.94	355.56	-2,203.46	2,231.11	0.58	0.46	15.17	
9,307.00	1.06	302.73	8,973.91	356.25	-2,205.49	2,233.22	0.78	-0.55	24.88	
9,402.00	0.88	176.96	9,068.91	355.99	-2,206.19	2,233.88	1.82	-0.19	-132.39	
9,496.00	1.02	193.59	9,162.90	354.46	-2,206.35	2,233.83	0.33	0.15	17.69	
9,591.00	0.35	262.66	9,257.89	353.60	-2,206.84	2,234.20	1.00	-0.71	72.71	
9,686.00	0.35	310.03	9,352.89	353.75	-2,207.35	2,234.73	0.30	0.00	49.86	
9,780.00	0.97	314.78	9,446.88	354.50	-2,208.13	2,235.60	0.66	0.66	5.05	
9,875.00	1.39	299.99	9,541.86	355.64	-2,209.70	2,237.31	0.54	0.44	-15.57	
9,970.00	1.41	306.95	9,636.83	356.92	-2,211.63	2,239.39	0.18	0.02	7.33	
10,064.00	2.55	272.94	9,730.78	357.72	-2,214.65	2,242.49	1.69	1.21	-36.18	
10,159.00	3.34	261.43	9,825.65	357.41	-2,219.49	2,247.25	1.03	0.83	-12.12	
10,254.00	3.69	256.06	9,920.47	356.27	-2,225.20	2,252.75	0.51	0.37	-5.65	
10,348.00	2.73	261.07	10,014.33	355.19	-2,230.34	2,257.71	1.06	-1.02	5.33	
10,443.00	2.02	289.64	10,109.25	355.40	-2,234.16	2,261.52	1.43	-0.75	30.07	
10,538.00	2.18	292.41	10,204.18	356.65	-2,237.40	2,264.90	0.20	0.17	2.92	
10,632.00	2.29	294.30	10,298.11	358.11	-2,240.77	2,268.43	0.14	0.12	2.01	
10,667.00	2.29	290.78	10,333.08	358.64	-2,242.06	2,269.78	0.40	0.00	-10.06	
Last SDI Production MWD Survey										
10,727.00	2.29	290.78	10,393.04	359.49	-2,244.30	2,272.11	0.00	0.00	0.00	
Projection to TD - PBHL(RU_313-17)										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
123.00	123.00	-0.25	0.40	First SDI Gyro MWD Survey	
1,054.00	1,031.47	21.83	-163.45	Last SDI Gyro MWD Survey	
1,068.00	1,044.56	22.42	-168.37	SDI Surface MWD Survey	
1,182.00	1,150.98	27.11	-208.96	First SDI Production MWD Survey	
10,667.00	10,333.08	358.64	-2,242.06	Last SDI Production MWD Survey	
10,727.00	10,393.04	359.49	-2,244.30	Projection to TD	

Checked By: _____ Approved By: _____ Date: _____

