



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.	TR 323-21-597
County & State	Garfield, CO
SDI Job No.	420117DEFK406652 & 420217DEF419390
Rig	H&P 271

I, Janie Collins, having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 180 feet to a measured depth of 9,597 feet is true and correct as determined from all available records.

A handwritten signature in blue ink, appearing to read 'Janie Collins', written over a horizontal line.

Signature

27-Feb-17

Date

Janie Collins

Colorado District Well Planner
Scientific Drilling International

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Chevron TR 323-21-597 - Slot B1 (TR 323-21-597)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 8292' & RKB 24' @ 8316.00usft (H&P 318)
Site:	TR 24-21-597 Pad	MD Reference:	GL 8292' & RKB 24' @ 8316.00usft (H&P 318)
Well:	Chevron TR 323-21-597	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		TR 24-21-597 Pad			
Site Position:		Northing:	1,653,248.80 usft	Latitude:	39.5939185
From:	Map	Easting:	2,215,073.70 usft	Longitude:	-108.2857609
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.76 °

Well		Chevron TR 323-21-597 - Slot B1 (TR 323-21-597)				
Well Position	+N/-S	0.00 usft	Northing:	1,653,244.60 usft	Latitude:	39.5939077
	+E/-W	0.00 usft	Easting:	2,215,082.80 usft	Longitude:	-108.2857281
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	8,292.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	2/23/2017	9.82	65.92	51,651

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	20.66	

Survey Program	Date	2/27/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
180.00	725.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
796.00	2,583.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
2,694.00	9,597.00	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	
180.00	1.41	36.39	179.98	1.78	1.31	2.13	0.78	0.78	0.00	
First SDI Gyro MWD Survey										
270.00	2.46	41.92	269.93	4.11	3.26	5.00	1.18	1.17	6.14	
361.00	3.70	21.09	360.80	8.30	5.62	9.75	1.81	1.36	-22.89	
452.00	4.40	29.79	451.57	14.07	8.41	16.14	1.02	0.77	9.56	
541.00	5.28	38.85	540.25	20.23	12.68	23.40	1.31	0.99	10.18	
632.00	6.95	28.21	630.74	28.34	17.91	32.84	2.21	1.84	-11.69	

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Site:	TR 24-21-597 Pad	MD Reference:	GL 8292' & RKB 24' @ 8316.00usft (H&P 318)
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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)
725.00	8.97	23.82	722.84	39.93	23.50	45.65	2.27	2.17	-4.72
Last SDI Gyro MWD Survey									
796.00	10.64	21.96	792.80	51.07	28.18	57.73	2.39	2.35	-2.62
First SDI Surface MWD Survey									
890.00	12.10	19.45	884.95	68.41	34.71	76.26	1.64	1.55	-2.67
983.00	13.61	24.54	975.62	87.56	42.50	96.92	2.03	1.62	5.47
1,076.00	16.07	25.85	1,065.51	109.10	52.66	120.66	2.67	2.65	1.41
1,169.00	17.00	19.68	1,154.67	133.49	62.85	147.08	2.14	1.00	-6.63
1,261.00	16.40	15.61	1,242.79	158.66	70.88	173.46	1.43	-0.65	-4.42
1,354.00	16.18	12.12	1,332.06	183.98	77.13	199.36	1.08	-0.24	-3.75
1,449.00	16.29	17.18	1,423.28	209.65	83.84	225.75	1.49	0.12	5.33
1,543.00	17.20	24.09	1,513.30	234.93	93.41	252.78	2.33	0.97	7.35
1,637.00	17.77	23.62	1,602.96	260.76	104.83	280.98	0.62	0.61	-0.50
1,732.00	16.97	18.36	1,693.63	287.21	115.01	309.31	1.85	-0.84	-5.54
1,827.00	17.17	19.47	1,784.45	313.59	124.05	337.19	0.40	0.21	1.17
1,921.00	16.80	20.20	1,874.34	339.42	133.36	364.64	0.45	-0.39	0.78
2,016.00	17.42	22.97	1,965.14	365.39	143.65	392.58	1.08	0.65	2.92
2,110.00	18.97	23.46	2,054.44	392.37	155.23	421.90	1.66	1.65	0.52
2,205.00	18.64	19.46	2,144.37	420.85	166.43	452.50	1.40	-0.35	-4.21
2,299.00	17.83	16.69	2,233.65	448.80	175.57	481.88	1.26	-0.86	-2.95
2,394.00	19.29	17.51	2,323.71	477.69	184.47	512.06	1.56	1.54	0.86
2,489.00	19.80	16.96	2,413.23	508.05	193.89	543.78	0.57	0.54	-0.58
2,583.00	19.15	16.45	2,501.86	538.06	202.90	575.05	0.71	-0.69	-0.54
Last SDI Surface MWD Survey									
2,694.00	18.78	18.37	2,606.83	572.48	213.68	611.06	0.65	-0.33	1.73
First SDI Production MWD Survey									
2,789.00	18.86	18.16	2,696.75	601.59	223.29	641.68	0.11	0.08	-0.22
2,883.00	18.55	18.52	2,785.79	630.20	232.77	671.80	0.35	-0.33	0.38
2,978.00	18.64	19.22	2,875.83	658.86	242.57	702.08	0.25	0.09	0.74
3,072.00	19.35	20.63	2,964.71	687.62	253.00	732.67	0.90	0.76	1.50
3,167.00	19.96	19.84	3,054.17	717.61	264.05	764.62	0.70	0.64	-0.83
3,261.00	20.75	20.01	3,142.30	748.34	275.19	797.31	0.84	0.84	0.18
3,356.00	20.49	19.92	3,231.22	779.79	286.62	830.77	0.28	-0.27	-0.09
3,450.00	19.79	19.22	3,319.47	810.28	297.46	863.13	0.79	-0.74	-0.74
3,545.00	18.55	18.43	3,409.20	839.81	307.53	894.30	1.33	-1.31	-0.83
3,639.00	18.73	20.98	3,498.27	868.08	317.66	924.34	0.89	0.19	2.71
3,734.00	19.35	20.98	3,588.07	897.02	328.76	955.33	0.65	0.65	0.00
3,828.00	18.08	20.06	3,677.10	925.26	339.34	985.49	1.39	-1.35	-0.98
3,923.00	19.26	21.58	3,767.10	953.68	350.16	1,015.90	1.34	1.24	1.60
4,017.00	17.98	22.07	3,856.18	981.55	361.31	1,045.90	1.37	-1.36	0.52
4,112.00	19.21	20.26	3,946.22	1,009.80	372.24	1,076.19	1.43	1.29	-1.91
4,206.00	19.89	20.20	4,034.80	1,039.31	383.11	1,107.64	0.72	0.72	-0.06
4,301.00	18.73	19.75	4,124.45	1,068.83	393.85	1,139.06	1.23	-1.22	-0.47

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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)
4,395.00	17.67	19.48	4,213.75	1,096.49	403.70	1,168.41	1.13	-1.13	-0.29
4,490.00	17.51	20.34	4,304.31	1,123.48	413.48	1,197.12	0.32	-0.17	0.91
4,584.00	15.12	18.78	4,394.52	1,148.35	422.34	1,223.51	2.58	-2.54	-1.66
4,679.00	13.89	17.46	4,486.49	1,170.96	429.75	1,247.28	1.34	-1.29	-1.39
4,773.00	13.28	16.15	4,577.86	1,192.09	436.14	1,269.31	0.73	-0.65	-1.39
4,868.00	12.78	16.53	4,670.41	1,212.65	442.17	1,290.67	0.53	-0.53	0.40
4,962.00	11.70	16.02	4,762.27	1,231.78	447.76	1,310.54	1.15	-1.15	-0.54
5,057.00	10.35	16.60	4,855.52	1,249.21	452.85	1,328.65	1.43	-1.42	0.61
5,151.00	9.18	15.41	4,948.15	1,264.54	457.26	1,344.54	1.26	-1.24	-1.27
5,246.00	8.54	18.01	5,042.02	1,278.55	461.45	1,359.14	0.79	-0.67	2.74
5,340.00	7.94	16.81	5,135.05	1,291.40	465.49	1,372.59	0.66	-0.64	-1.28
5,435.00	7.47	18.34	5,229.19	1,303.54	469.33	1,385.30	0.54	-0.49	1.61
5,529.00	7.00	17.30	5,322.44	1,314.81	472.95	1,397.13	0.52	-0.50	-1.11
5,624.00	6.51	18.78	5,416.78	1,325.44	476.41	1,408.29	0.55	-0.52	1.56
5,719.00	5.63	16.85	5,511.25	1,335.00	479.49	1,418.32	0.95	-0.93	-2.03
5,813.00	5.10	15.97	5,604.84	1,343.43	481.98	1,427.09	0.57	-0.56	-0.94
5,908.00	4.75	16.15	5,699.49	1,351.27	484.24	1,435.21	0.37	-0.37	0.19
6,002.00	3.87	15.53	5,793.22	1,358.06	486.17	1,442.25	0.94	-0.94	-0.66
6,097.00	3.52	13.24	5,888.02	1,363.99	487.69	1,448.34	0.40	-0.37	-2.41
6,191.00	2.73	6.39	5,981.88	1,369.02	488.60	1,453.37	0.93	-0.84	-7.29
6,285.00	2.64	2.96	6,075.78	1,373.41	488.96	1,457.60	0.20	-0.10	-3.65
6,380.00	2.00	357.04	6,170.70	1,377.25	488.99	1,461.21	0.72	-0.67	-6.23
6,475.00	1.41	349.16	6,265.66	1,380.05	488.69	1,463.72	0.67	-0.62	-8.29
6,569.00	1.14	340.73	6,359.63	1,382.07	488.16	1,465.42	0.35	-0.29	-8.97
6,664.00	1.06	312.07	6,454.62	1,383.55	487.20	1,466.47	0.58	-0.08	-30.17
6,758.00	1.32	286.23	6,548.60	1,384.44	485.51	1,466.70	0.63	0.28	-27.49
6,853.00	0.26	144.55	6,643.59	1,384.57	484.59	1,466.50	1.61	-1.12	-149.14
6,947.00	0.44	191.84	6,737.59	1,384.04	484.64	1,466.02	0.35	0.19	50.31
7,042.00	0.79	183.84	6,832.58	1,383.03	484.52	1,465.04	0.38	0.37	-8.42
7,137.00	1.14	200.19	6,927.57	1,381.49	484.15	1,463.46	0.47	0.37	17.21
7,231.00	1.49	135.41	7,021.55	1,379.74	484.68	1,462.02	1.53	0.37	-68.91
7,326.00	1.76	136.73	7,116.51	1,377.80	486.55	1,460.86	0.29	0.28	1.39
7,420.00	0.88	223.83	7,210.49	1,376.23	487.04	1,459.56	2.05	-0.94	92.66
7,515.00	1.41	226.47	7,305.47	1,374.90	485.69	1,457.84	0.56	0.56	2.78
7,609.00	0.53	274.02	7,399.46	1,374.13	484.41	1,456.67	1.19	-0.94	50.59
7,704.00	0.88	245.72	7,494.45	1,373.86	483.31	1,456.03	0.51	0.37	-29.79
7,798.00	0.18	281.49	7,588.45	1,373.59	482.51	1,455.50	0.79	-0.74	38.05
7,893.00	0.62	241.06	7,683.45	1,373.37	481.91	1,455.08	0.52	0.46	-42.56
7,988.00	1.14	253.71	7,778.43	1,372.86	480.55	1,454.12	0.58	0.55	13.32
8,082.00	0.26	213.90	7,872.43	1,372.42	479.54	1,453.35	1.02	-0.94	-42.35
8,177.00	1.14	225.76	7,967.42	1,371.58	478.74	1,452.29	0.93	0.93	12.48
8,271.00	0.26	66.33	8,061.41	1,371.02	478.27	1,451.59	1.47	-0.94	-169.61
8,366.00	1.67	78.20	8,156.40	1,371.39	479.82	1,452.48	1.49	1.48	12.49

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Design:	OH	Database:	Grand Junction District

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8,460.00	0.97	77.49	8,250.37	1,371.84	481.94	1,453.65	0.74	-0.74	-0.76	
8,555.00	1.76	73.89	8,345.35	1,372.42	484.12	1,454.97	0.84	0.83	-3.79	
8,649.00	1.14	79.43	8,439.31	1,372.99	486.43	1,456.32	0.68	-0.66	5.89	
8,744.00	0.88	124.69	8,534.30	1,372.75	487.96	1,456.63	0.86	-0.27	47.64	
8,838.00	0.70	110.63	8,628.29	1,372.13	489.09	1,456.45	0.28	-0.19	-14.96	
8,933.00	0.88	162.13	8,723.28	1,371.24	489.86	1,455.88	0.74	0.19	54.21	
9,027.00	0.88	192.45	8,817.27	1,369.84	489.92	1,454.60	0.49	0.00	32.26	
9,122.00	1.01	202.42	8,912.26	1,368.36	489.45	1,453.05	0.22	0.14	10.49	
9,217.00	1.76	220.14	9,007.23	1,366.47	488.19	1,450.83	0.90	0.79	18.65	
9,311.00	2.20	237.72	9,101.18	1,364.40	485.73	1,448.03	0.79	0.47	18.70	
9,406.00	2.37	241.32	9,196.10	1,362.48	482.46	1,445.09	0.23	0.18	3.79	
9,500.00	2.55	236.40	9,290.02	1,360.39	479.02	1,441.92	0.30	0.19	-5.23	
9,548.00	2.73	234.82	9,337.96	1,359.15	477.19	1,440.10	0.40	0.38	-3.29	
Last SDI Production MWD Survey										
9,597.00	2.73	234.82	9,386.91	1,357.80	475.29	1,438.17	0.00	0.00	0.00	
Projection to TD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
180.00	179.98	1.78	1.31	First SDI Gyro MWD Survey	
725.00	722.84	39.93	23.50	Last SDI Gyro MWD Survey	
796.00	792.80	51.07	28.18	First SDI Surface MWD Survey	
2,583.00	2,501.86	538.06	202.90	Last SDI Surface MWD Survey	
2,694.00	2,606.83	572.48	213.68	First SDI Production MWD Survey	
9,548.00	9,337.96	1,359.15	477.19	Last SDI Production MWD Survey	
9,597.00	9,386.91	1,357.80	475.29	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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