



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 321-23-597
County & State	Garfield County, CO
SDI Job No.	OP.001605 & OP.002466
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 143 feet to a measured depth of 10,686 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

13-Jul-17

Date

Mel Mireles Jr.

Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well TR 321-23-597 - Slot B12 (TR 321-23-597)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
Site:	TR 32-23-597 Pad	MD Reference:	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
Well:	TR 321-23-597	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 32-23-597 Pad			
Site Position:		Northing:	1,654,899.00 usft	Latitude:	39.5994964
From:	Map	Easting:	2,227,644.00 usft	Longitude:	-108.2413519
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.73 °

Well	TR 321-23-597 - Slot B12 (TR 321-23-597)					
Well Position	+N/-S	0.00 usft	Northing:	1,654,905.20 usft	Latitude:	39.5995128
	+E/-W	0.00 usft	Easting:	2,227,636.20 usft	Longitude:	-108.2413803
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	8,545.20 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	5/29/2017	9.75	65.93	51,605

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	338.65	

Survey Program	Date	7/13/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
143.00	532.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
601.00	2,949.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
3,063.00	10,686.00	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	
143.00	0.97	336.88	142.99	1.11	-0.48	1.21	0.68	0.68	0.00	
First SDI Gyro MWD Survey										
173.00	1.41	345.67	172.99	1.70	-0.67	1.83	1.58	1.47	29.30	
263.00	3.52	352.18	262.90	5.51	-1.32	5.62	2.36	2.34	7.23	
352.00	5.81	350.07	351.60	12.66	-2.47	12.69	2.58	2.57	-2.37	
442.00	8.62	345.67	440.88	23.68	-4.92	23.85	3.18	3.12	-4.89	

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Well:	TR 321-23-597	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)
532.00	10.73	339.43	529.59	38.06	-9.53	38.92	2.61	2.34	-6.93
Last SDI Gyro MWD Survey									
601.00	12.84	332.92	597.14	50.91	-15.28	52.98	3.61	3.06	-9.43
First SDI Surface MWD Survey									
690.00	16.44	330.49	683.24	70.68	-25.99	75.29	4.10	4.04	-2.73
779.00	20.56	331.07	767.62	95.33	-39.76	103.26	4.63	4.63	0.65
868.00	23.13	329.85	850.22	124.13	-56.10	136.03	2.93	2.89	-1.37
958.00	25.71	326.18	932.17	155.64	-75.85	172.57	3.32	2.87	-4.08
1,053.00	28.75	324.59	1,016.63	191.39	-100.56	214.87	3.29	3.20	-1.67
1,148.00	30.89	325.50	1,099.05	230.11	-127.62	260.78	2.30	2.25	0.96
1,243.00	30.87	326.18	1,180.58	270.45	-155.00	308.33	0.37	-0.02	0.72
1,337.00	31.30	330.64	1,261.09	311.78	-180.39	356.06	2.49	0.46	4.74
1,432.00	32.10	331.96	1,341.92	355.56	-204.36	405.57	1.11	0.84	1.39
1,527.00	34.65	331.61	1,421.25	401.61	-229.07	457.45	2.69	2.68	-0.37
1,621.00	35.44	330.46	1,498.21	448.83	-255.21	510.95	1.10	0.84	-1.22
1,716.00	33.85	331.52	1,576.36	496.05	-281.41	564.47	1.79	-1.67	1.12
1,811.00	32.15	329.59	1,656.03	541.11	-306.82	615.69	2.10	-1.79	-2.03
1,906.00	32.27	328.53	1,736.41	584.54	-332.86	665.61	0.61	0.13	-1.12
2,000.00	33.41	330.29	1,815.39	628.42	-358.79	715.93	1.58	1.21	1.87
2,095.00	33.85	330.99	1,894.49	674.28	-384.58	768.03	0.62	0.46	0.74
2,190.00	34.21	333.19	1,973.23	721.26	-409.46	820.84	1.35	0.38	2.32
2,285.00	33.24	333.28	2,052.24	768.35	-433.21	873.34	1.02	-1.02	0.09
2,380.00	32.36	330.64	2,132.09	813.77	-457.39	924.45	1.77	-0.93	-2.78
2,475.00	31.74	328.09	2,212.62	857.14	-483.06	974.19	1.57	-0.65	-2.68
2,569.00	31.30	326.77	2,292.75	898.55	-509.51	1,022.39	0.87	-0.47	-1.40
2,664.00	31.57	328.09	2,373.81	940.31	-536.18	1,070.99	0.78	0.28	1.39
2,759.00	29.61	329.49	2,455.58	981.64	-561.24	1,118.61	2.20	-2.06	1.47
2,854.00	30.61	328.09	2,537.76	1,022.39	-585.94	1,165.56	1.29	1.05	-1.47
2,949.00	29.18	326.05	2,620.12	1,062.14	-611.66	1,211.94	1.85	-1.51	-2.15
Last SDI Surface MWD Survey									
3,063.00	27.37	323.91	2,720.52	1,106.37	-642.62	1,264.42	1.82	-1.59	-1.88
First SDI Production MWD Survey									
3,157.00	29.46	324.93	2,803.19	1,142.76	-668.64	1,307.77	2.28	2.22	1.09
3,252.00	30.13	327.45	2,885.64	1,181.98	-694.89	1,353.86	1.49	0.71	2.65
3,346.00	29.73	325.87	2,967.10	1,221.16	-720.66	1,399.74	0.94	-0.43	-1.68
3,440.00	30.78	329.06	3,048.30	1,261.08	-746.11	1,446.19	2.04	1.12	3.39
3,534.00	30.19	328.55	3,129.31	1,301.88	-770.80	1,493.17	0.69	-0.63	-0.54
3,629.00	29.77	329.98	3,211.60	1,342.68	-795.07	1,540.00	0.87	-0.44	1.51
3,723.00	29.81	328.53	3,293.18	1,382.81	-818.94	1,586.08	0.77	0.04	-1.54
3,818.00	29.28	329.23	3,375.82	1,422.91	-843.15	1,632.24	0.67	-0.56	0.74
3,913.00	29.99	332.40	3,458.40	1,463.92	-866.04	1,678.77	1.81	0.75	3.34
4,007.00	29.72	334.07	3,539.93	1,505.69	-887.11	1,725.35	0.93	-0.29	1.78
4,102.00	31.07	333.09	3,621.87	1,548.73	-908.51	1,773.22	1.51	1.42	-1.03

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Well:	TR 321-23-597	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)
4,196.00	31.92	333.01	3,702.02	1,592.51	-930.76	1,822.09	0.91	0.90	-0.09
4,290.00	31.30	332.66	3,782.07	1,636.34	-953.25	1,871.11	0.69	-0.66	-0.37
4,385.00	29.37	331.52	3,864.06	1,678.74	-975.70	1,918.77	2.12	-2.03	-1.20
4,480.00	29.06	332.38	3,946.98	1,719.66	-997.50	1,964.82	0.55	-0.33	0.91
4,575.00	27.15	331.58	4,030.77	1,759.17	-1,018.52	2,009.27	2.05	-2.01	-0.84
4,670.00	27.70	333.98	4,115.10	1,798.08	-1,038.52	2,052.79	1.30	0.58	2.53
4,765.00	26.38	333.19	4,199.71	1,836.76	-1,057.73	2,095.81	1.44	-1.39	-0.83
4,860.00	25.21	333.03	4,285.25	1,873.63	-1,076.42	2,136.96	1.23	-1.23	-0.17
4,955.00	23.83	332.66	4,371.68	1,908.71	-1,094.41	2,176.18	1.46	-1.45	-0.39
5,049.00	22.86	332.75	4,457.98	1,941.81	-1,111.50	2,213.23	1.03	-1.03	0.10
5,143.00	21.54	332.13	4,545.01	1,973.30	-1,127.92	2,248.54	1.43	-1.40	-0.66
5,238.00	21.46	333.71	4,633.40	2,004.30	-1,143.77	2,283.18	0.62	-0.08	1.66
5,333.00	20.49	333.54	4,722.11	2,034.76	-1,158.88	2,317.05	1.02	-1.02	-0.18
5,427.00	18.55	333.45	4,810.70	2,062.87	-1,172.89	2,348.33	2.06	-2.06	-0.10
5,522.00	19.52	331.69	4,900.50	2,090.36	-1,187.18	2,379.14	1.19	1.02	-1.85
5,616.00	18.03	331.52	4,989.50	2,116.98	-1,201.56	2,409.16	1.59	-1.59	-0.18
5,711.00	17.06	328.53	5,080.08	2,141.78	-1,215.85	2,437.47	1.39	-1.02	-3.15
5,805.00	16.27	325.45	5,170.13	2,164.39	-1,230.51	2,463.87	1.26	-0.84	-3.28
5,900.00	15.48	323.17	5,261.51	2,185.50	-1,245.66	2,489.04	1.06	-0.83	-2.40
5,994.00	15.74	324.31	5,352.04	2,205.90	-1,260.62	2,513.48	0.43	0.28	1.21
6,089.00	14.51	330.20	5,443.76	2,226.69	-1,274.05	2,537.74	2.07	-1.29	6.20
6,183.00	12.66	333.28	5,535.12	2,246.11	-1,284.54	2,559.65	2.11	-1.97	3.28
6,277.00	11.78	332.66	5,626.99	2,263.84	-1,293.58	2,579.45	0.95	-0.94	-0.66
6,372.00	9.94	336.26	5,720.29	2,279.96	-1,301.33	2,597.29	2.06	-1.94	3.79
6,466.00	9.02	337.47	5,813.00	2,294.19	-1,307.42	2,612.76	1.00	-0.98	1.29
6,561.00	8.09	335.12	5,906.95	2,307.13	-1,313.09	2,626.88	1.05	-0.98	-2.47
6,655.00	6.60	335.30	6,000.17	2,318.04	-1,318.13	2,638.87	1.59	-1.59	0.19
6,750.00	5.08	338.60	6,094.68	2,326.92	-1,321.94	2,648.53	1.64	-1.60	3.47
6,844.00	4.48	333.19	6,188.35	2,334.07	-1,325.12	2,656.35	0.80	-0.64	-5.76
6,939.00	3.96	337.23	6,283.09	2,340.41	-1,328.06	2,663.32	0.63	-0.55	4.25
7,033.00	2.55	328.18	6,376.94	2,345.18	-1,330.42	2,668.62	1.59	-1.50	-9.63
7,123.82	2.30	327.59	6,467.68	2,348.43	-1,332.46	2,672.40	0.28	-0.27	-0.65
TR 321-23-597 MVRD									
7,128.00	2.29	327.56	6,471.85	2,348.57	-1,332.55	2,672.56	0.28	-0.27	-0.72
7,222.00	2.40	319.89	6,565.78	2,351.66	-1,334.83	2,676.27	0.35	0.12	-8.16
7,317.00	2.29	310.95	6,660.70	2,354.43	-1,337.54	2,679.83	0.40	-0.12	-9.41
7,411.00	1.14	277.29	6,754.65	2,355.78	-1,339.89	2,681.94	1.58	-1.22	-35.81
7,506.00	0.97	263.14	6,849.64	2,355.80	-1,341.62	2,682.60	0.33	-0.18	-14.89
7,600.00	0.62	286.52	6,943.63	2,355.85	-1,342.90	2,683.11	0.50	-0.37	24.87
7,695.00	0.70	293.99	7,038.62	2,356.24	-1,343.92	2,683.84	0.12	0.08	7.86
7,789.00	0.88	316.75	7,132.61	2,356.99	-1,344.94	2,684.91	0.38	0.19	24.21
7,884.00	0.97	298.73	7,227.60	2,357.91	-1,346.15	2,686.21	0.32	0.09	-18.97

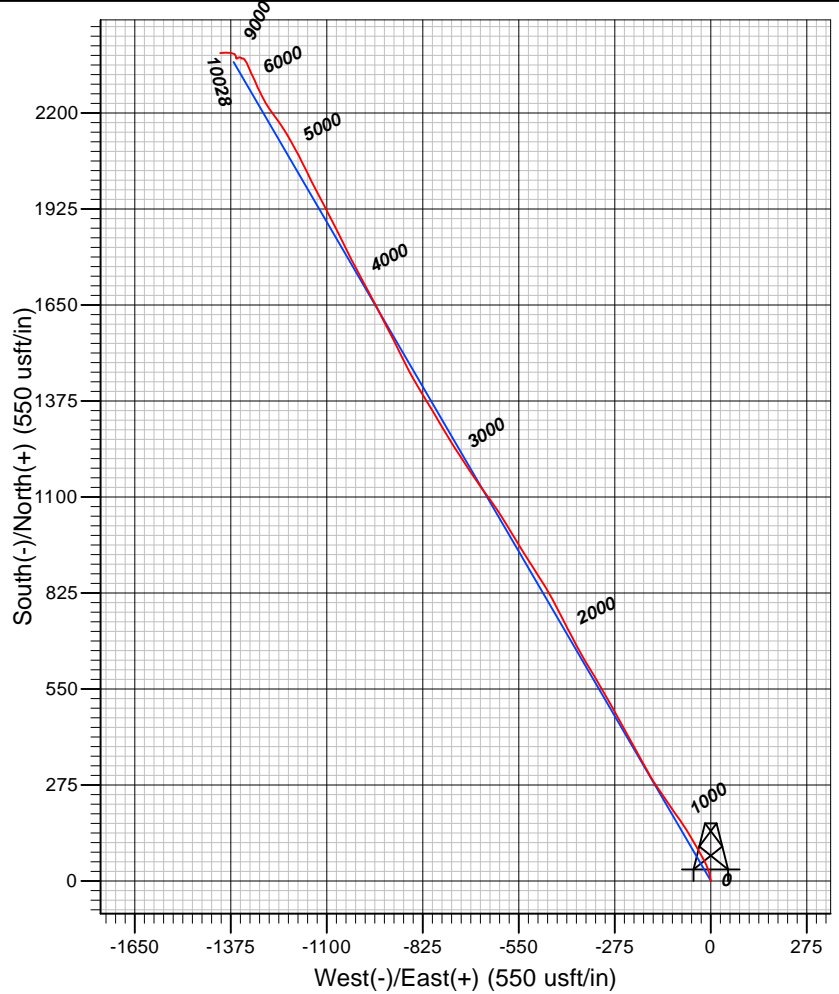
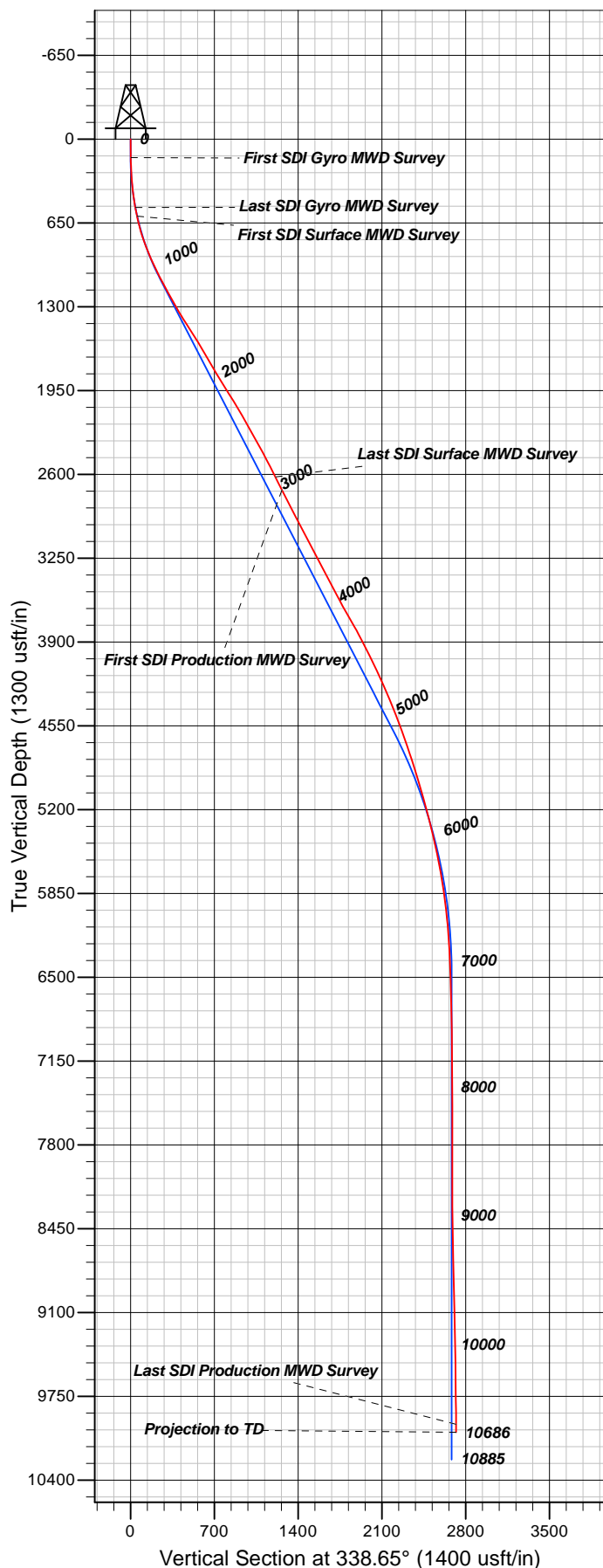
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Design:	OH	Database:	Grand Junction District

Survey									
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7,979.00	0.97	289.95	7,322.59	2,358.57	-1,347.61	2,687.36	0.16	0.00	-9.24
8,073.00	1.23	278.52	7,416.57	2,358.99	-1,349.36	2,688.38	0.36	0.28	-12.16
8,168.00	0.26	299.09	7,511.56	2,359.25	-1,350.55	2,689.06	1.04	-1.02	21.65
8,262.00	0.70	249.52	7,605.56	2,359.15	-1,351.28	2,689.23	0.60	0.47	-52.73
8,357.00	0.88	238.88	7,700.55	2,358.57	-1,352.44	2,689.12	0.24	0.19	-11.20
8,452.00	1.23	244.95	7,795.53	2,357.76	-1,353.99	2,688.93	0.39	0.37	6.39
8,546.00	0.18	246.62	7,889.53	2,357.28	-1,355.04	2,688.86	1.12	-1.12	1.78
8,640.00	0.09	255.93	7,983.53	2,357.20	-1,355.25	2,688.86	0.10	-0.10	9.90
8,735.00	0.35	210.49	8,078.52	2,356.93	-1,355.47	2,688.69	0.31	0.27	-47.83
8,829.00	0.62	240.29	8,172.52	2,356.43	-1,356.06	2,688.44	0.38	0.29	31.70
8,924.00	0.70	260.41	8,267.52	2,356.08	-1,357.08	2,688.48	0.26	0.08	21.18
9,019.00	1.06	240.20	8,362.50	2,355.55	-1,358.41	2,688.47	0.49	0.38	-21.27
9,113.00	1.41	341.63	8,456.49	2,356.21	-1,359.53	2,689.50	2.05	0.37	107.90
9,208.00	1.93	359.55	8,551.45	2,358.92	-1,359.91	2,692.16	0.77	0.55	18.86
9,302.00	1.67	345.67	8,645.40	2,361.83	-1,360.26	2,695.00	0.54	-0.28	-14.77
9,397.00	1.85	334.24	8,740.36	2,364.56	-1,361.27	2,697.90	0.41	0.19	-12.03
9,492.00	1.14	317.63	8,835.33	2,366.64	-1,362.57	2,700.31	0.87	-0.75	-17.48
9,586.00	1.23	307.70	8,929.31	2,367.94	-1,364.00	2,702.05	0.24	0.10	-10.56
9,681.00	1.93	293.20	9,024.27	2,369.20	-1,366.28	2,704.05	0.84	0.74	-15.26
9,775.00	2.55	288.89	9,118.20	2,370.50	-1,369.71	2,706.51	0.68	0.66	-4.59
9,870.00	2.73	282.47	9,213.10	2,371.67	-1,373.92	2,709.13	0.36	0.19	-6.76
9,964.00	1.41	272.46	9,307.04	2,372.20	-1,377.26	2,710.85	1.45	-1.40	-10.65
10,059.00	1.76	267.09	9,402.00	2,372.18	-1,379.89	2,711.78	0.40	0.37	-5.65
10,154.00	2.11	272.98	9,496.94	2,372.20	-1,383.09	2,712.96	0.42	0.37	6.20
10,248.00	2.64	272.81	9,590.86	2,372.39	-1,386.98	2,714.56	0.56	0.56	-0.18
10,342.00	2.11	266.57	9,684.78	2,372.39	-1,390.87	2,715.98	0.63	-0.56	-6.64
10,437.00	2.29	268.06	9,779.71	2,372.23	-1,394.51	2,717.15	0.20	0.19	1.57
10,532.00	2.29	270.85	9,874.64	2,372.19	-1,398.31	2,718.50	0.12	0.00	2.94
10,623.00	2.64	254.44	9,965.55	2,371.65	-1,402.15	2,719.40	0.86	0.38	-18.03
Last SDI Production MWD Survey									
10,686.00	2.64	254.44	10,028.49	2,370.88	-1,404.94	2,719.69	0.00	0.00	0.00
Projection to TD - TR 321-23-597 PBHL									

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well TR 321-23-597 - Slot B12 (TR 321-23-597)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
Site:	TR 32-23-597 Pad	MD Reference:	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
Well:	TR 321-23-597	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
143.00	142.99	1.11	-0.48	First SDI Gyro MWD Survey
532.00	529.59	38.06	-9.53	Last SDI Gyro MWD Survey
601.00	597.14	50.91	-15.28	First SDI Surface MWD Survey
2,949.00	2,620.12	1,062.14	-611.66	Last SDI Surface MWD Survey
3,063.00	2,720.52	1,106.37	-642.62	First SDI Production MWD Survey
10,623.00	9,965.55	2,371.65	-1,402.15	Last SDI Production MWD Survey
10,686.00	10,028.49	2,370.88	-1,404.94	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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Well Details: TR 321-23-597

TVD Reference: GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318) Level: 8545.20
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.00 0.00 1654905.20 2227636.20 39.5995127 -108.2413802 TR 321-23-597

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well TR 321-23-597 - Slot B12 (TR 321-23-597), True North
 Vertical (TVD) Reference: GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
 Section (VS) Reference: Slot - B12 (TR 321-23-597)(0.00N, 0.00E)
 Measured Depth Reference: GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
 Calculation Method: Minimum Curvature

PROJECT DETAILS: Garfield County, CO NAD83

Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Colorado Central Zone

System Datum: Mean Sea Level

Plan: OH

10:54, July 13 2017
 Created By: Mel Mireles Jr.