



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.	GM 11-10
County & State	Garfield County, CO
SDI Job No.	OP.002985
Rig	H&P 273

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 7,541 feet is true and correct as determined from all available records.


Signature

02-Aug-17
Date

Mel Mireles Jr.
Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 11-10 - Slot B10
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 11-10	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		MV 5-10 Pad			
Site Position:		Northing:	1,600,344.70 usft	Latitude:	39.4529509
From:	Map	Easting:	2,266,881.70 usft	Longitude:	-108.0966291
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.64 °

Well		Federal GM 11-10 - Slot B10				
Well Position	+N/-S	0.00 usft	Northing:	1,600,356.50 usft	Latitude:	39.4529836
	+E/-W	0.00 usft	Easting:	2,266,885.70 usft	Longitude:	-108.0966162
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,148.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	7/22/2017	9.53	65.75	51,782

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		323.01

Survey Program	Date	8/2/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
123.00	490.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
562.00	959.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,110.00	7,541.00	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	1.32	334.78	122.99	1.28	-0.60	1.39	1.07	1.07	0.00	
First SDI Gyro MWD Survey										
213.00	4.49	332.67	212.86	5.35	-2.66	5.88	3.52	3.52	-2.34	
305.00	7.65	338.64	304.34	14.25	-6.55	15.33	3.50	3.43	6.49	
397.00	11.70	335.21	395.01	28.43	-12.69	30.35	4.44	4.40	-3.73	
490.00	15.31	329.94	485.43	47.63	-22.80	51.76	4.10	3.88	-5.67	
Last SDI Gyro MWD Survey										

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 11-10 - Slot B10
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 11-10	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)	
562.00	18.50	324.89	554.31	65.20	-34.13	72.62	4.87	4.43	-7.01	
First SDI Surface MWD Survey										
655.00	23.50	320.41	641.11	91.58	-54.45	105.91	5.64	5.38	-4.82	
747.00	28.56	318.33	723.75	122.16	-80.78	146.18	5.59	5.50	-2.26	
840.00	32.59	318.87	803.81	157.65	-112.05	193.34	4.34	4.33	0.58	
937.00	36.68	318.29	883.60	198.97	-148.52	248.29	4.23	4.22	-0.60	
959.00	37.46	318.29	901.15	208.87	-157.35	261.51	3.55	3.55	0.00	
Last SDI Surface MWD Survey										
1,110.00	37.02	318.47	1,021.37	277.18	-218.04	352.59	0.30	-0.29	0.12	
First SDI Production MWD Survey										
1,203.00	36.93	318.29	1,095.66	319.00	-255.19	408.34	0.15	-0.10	-0.19	
1,298.00	37.11	318.99	1,171.51	361.93	-292.99	465.37	0.48	0.19	0.74	
1,394.00	37.02	318.90	1,248.12	405.56	-330.99	523.09	0.11	-0.09	-0.09	
1,487.00	37.11	319.26	1,322.33	447.92	-367.70	579.01	0.25	0.10	0.39	
1,581.00	36.93	319.26	1,397.38	490.80	-404.64	635.48	0.19	-0.19	0.00	
1,675.00	37.02	319.52	1,472.48	533.72	-441.44	691.91	0.19	0.10	0.28	
1,770.00	36.93	319.17	1,548.37	577.07	-478.67	748.93	0.24	-0.09	-0.37	
1,864.00	35.88	319.70	1,624.03	619.45	-514.95	804.61	1.17	-1.12	0.56	
1,959.00	33.65	319.34	1,702.06	660.65	-550.11	858.68	2.36	-2.35	-0.38	
2,054.00	33.94	320.40	1,781.01	701.05	-584.16	911.44	0.69	0.31	1.12	
2,148.00	34.03	322.24	1,858.96	742.07	-617.00	963.95	1.10	0.10	1.96	
2,243.00	34.12	323.83	1,937.65	784.59	-649.00	1,017.17	0.94	0.09	1.67	
2,337.00	34.21	324.44	2,015.43	827.37	-679.93	1,069.95	0.38	0.10	0.65	
2,432.00	33.68	324.88	2,094.23	870.64	-710.61	1,122.98	0.61	-0.56	0.46	
2,526.00	33.77	326.82	2,172.42	913.83	-739.90	1,175.10	1.15	0.10	2.06	
2,621.00	33.41	327.17	2,251.55	957.90	-768.53	1,227.53	0.43	-0.38	0.37	
2,715.00	33.85	328.66	2,329.82	1,002.01	-796.18	1,279.39	0.99	0.47	1.59	
2,809.00	33.77	329.45	2,407.93	1,046.87	-823.08	1,331.40	0.48	-0.09	0.84	
2,904.00	33.94	329.10	2,486.82	1,092.37	-850.12	1,384.01	0.27	0.18	-0.37	
2,998.00	33.33	328.22	2,565.08	1,136.84	-877.20	1,435.82	0.83	-0.65	-0.94	
3,093.00	30.69	324.18	2,645.64	1,178.69	-905.14	1,486.07	3.58	-2.78	-4.25	
3,187.00	31.39	321.81	2,726.18	1,217.39	-934.31	1,534.53	1.50	0.74	-2.52	
3,282.00	33.15	322.33	2,806.51	1,257.40	-965.49	1,585.24	1.88	1.85	0.55	
3,376.00	33.24	320.57	2,885.17	1,297.64	-997.56	1,636.68	1.03	0.10	-1.87	
3,471.00	33.24	317.67	2,964.63	1,337.00	-1,031.63	1,688.62	1.67	0.00	-3.05	
3,565.00	33.59	315.37	3,043.10	1,374.55	-1,067.25	1,740.05	1.40	0.37	-2.45	
3,660.00	32.62	313.64	3,122.68	1,410.93	-1,104.24	1,791.36	1.43	-1.02	-1.82	
3,754.00	32.80	314.25	3,201.77	1,446.18	-1,140.81	1,841.52	0.40	0.19	0.65	
3,849.00	32.62	314.69	3,281.70	1,482.14	-1,177.45	1,892.29	0.31	-0.19	0.46	
3,944.00	32.80	316.71	3,361.64	1,518.88	-1,213.30	1,943.20	1.16	0.19	2.13	
4,038.00	32.71	316.36	3,440.69	1,555.79	-1,248.28	1,993.74	0.22	-0.10	-0.37	
4,133.00	32.71	317.06	3,520.63	1,593.16	-1,283.48	2,044.76	0.40	0.00	0.74	
4,228.00	31.74	315.92	3,600.99	1,629.90	-1,318.35	2,095.09	1.20	-1.02	-1.20	
4,322.00	29.37	314.25	3,681.94	1,663.76	-1,352.07	2,142.42	2.68	-2.52	-1.78	

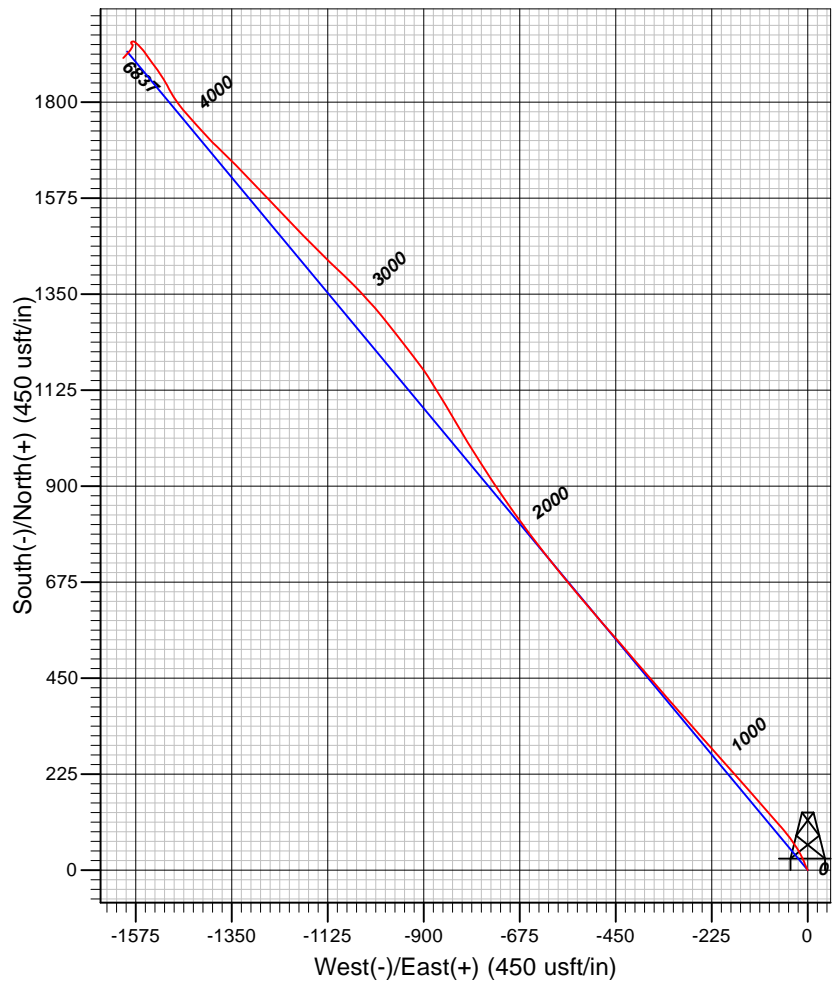
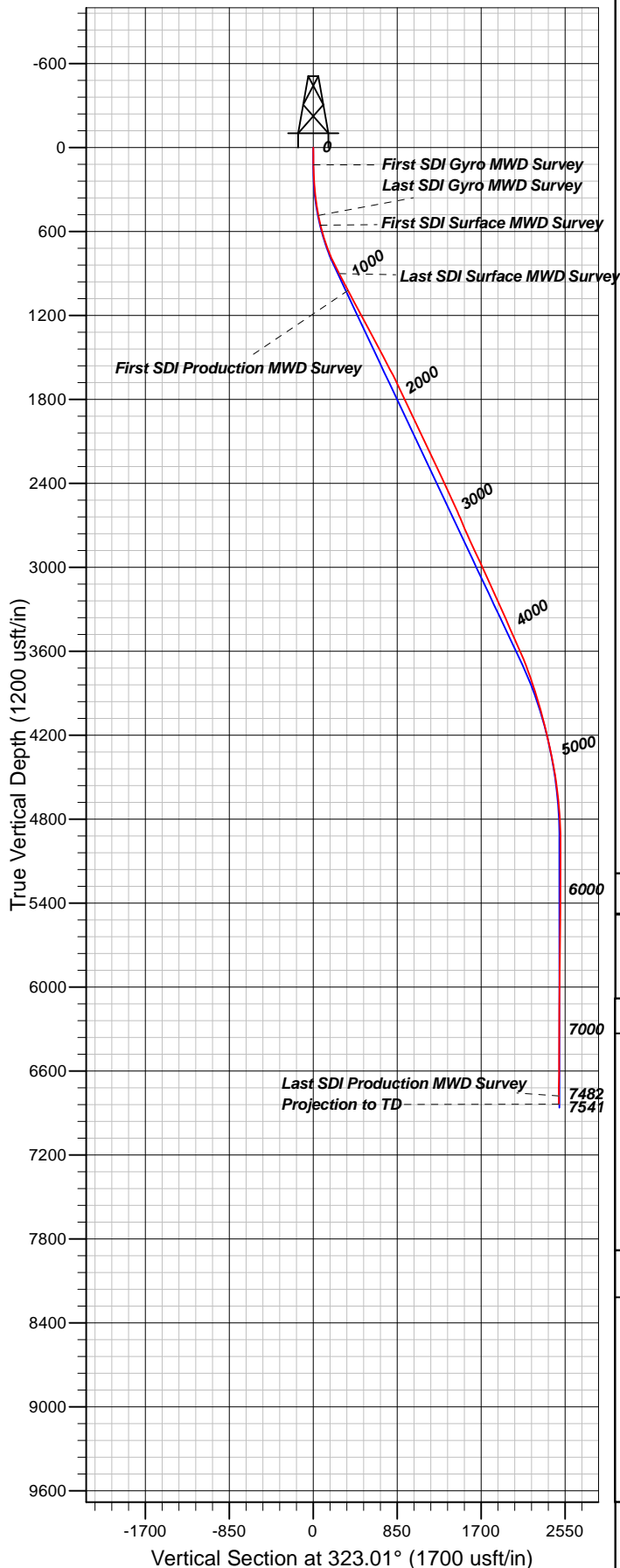
Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 11-10 - Slot B10
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 11-10	North Reference:	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)
4,417.00	27.26	314.51	3,765.57	1,695.27	-1,384.28	2,186.97	2.22	-2.22	0.27
4,512.00	25.32	317.59	3,850.74	1,725.52	-1,413.50	2,228.71	2.50	-2.04	3.24
4,606.00	22.60	317.59	3,936.63	1,753.70	-1,439.24	2,266.71	2.89	-2.89	0.00
4,701.00	21.02	319.87	4,024.83	1,780.21	-1,462.53	2,301.90	1.89	-1.66	2.40
4,795.00	20.58	326.73	4,112.72	1,806.92	-1,482.47	2,335.22	2.63	-0.47	7.30
4,890.00	19.52	332.35	4,201.97	1,834.94	-1,498.99	2,367.55	2.31	-1.12	5.92
4,958.00	16.44	328.05	4,266.64	1,853.17	-1,509.36	2,388.35	4.93	-4.53	-6.32
5,053.00	16.06	324.14	4,357.85	1,875.23	-1,524.17	2,414.88	1.22	-0.40	-4.12
5,148.00	13.72	324.79	4,449.65	1,895.09	-1,538.37	2,439.28	2.47	-2.46	0.68
5,243.00	11.43	324.13	4,542.37	1,911.92	-1,550.38	2,459.96	2.42	-2.41	-0.69
5,337.00	8.54	319.90	4,634.93	1,924.81	-1,560.34	2,476.24	3.17	-3.07	-4.50
5,432.00	6.95	310.91	4,729.07	1,933.97	-1,569.22	2,488.91	2.10	-1.67	-9.46
5,526.00	4.91	310.70	4,822.56	1,940.32	-1,576.57	2,498.40	2.17	-2.17	-0.22
5,621.00	2.56	256.80	4,917.38	1,942.49	-1,581.72	2,503.23	4.19	-2.47	-56.74
5,658.16	1.81	254.34	4,954.51	1,942.14	-1,583.10	2,503.78	2.02	-2.01	-6.63
GM 11-10 KMV									
5,716.00	0.68	239.75	5,012.33	1,941.72	-1,584.27	2,504.15	2.02	-1.96	-25.22
5,810.00	0.35	217.30	5,106.33	1,941.21	-1,584.93	2,504.14	0.41	-0.35	-23.88
5,905.00	0.66	198.76	5,201.33	1,940.46	-1,585.28	2,503.75	0.36	0.33	-19.52
6,000.00	1.07	207.86	5,296.32	1,939.16	-1,585.87	2,503.07	0.45	0.43	9.58
6,094.00	1.22	122.55	5,390.30	1,937.85	-1,585.44	2,501.76	1.65	0.16	-90.76
6,189.00	0.88	170.54	5,485.29	1,936.58	-1,584.47	2,500.16	0.96	-0.36	50.52
6,283.00	0.61	113.32	5,579.28	1,935.67	-1,583.89	2,499.09	0.80	-0.29	-60.87
6,387.00	0.59	127.02	5,683.28	1,935.13	-1,582.95	2,498.09	0.14	-0.02	13.17
6,473.00	0.78	148.77	5,769.27	1,934.36	-1,582.30	2,497.09	0.37	0.22	25.29
6,587.00	1.31	184.43	5,883.25	1,932.40	-1,581.99	2,495.34	0.71	0.46	31.28
6,662.00	1.75	202.96	5,958.23	1,930.49	-1,582.51	2,494.12	0.88	0.59	24.71
6,756.00	2.03	206.95	6,052.17	1,927.69	-1,583.82	2,492.67	0.33	0.30	4.24
6,851.00	1.76	217.14	6,147.12	1,925.02	-1,585.47	2,491.53	0.45	-0.28	10.73
6,947.00	2.16	215.55	6,243.07	1,922.38	-1,587.41	2,490.59	0.42	0.42	-1.66
7,040.00	1.95	210.94	6,336.01	1,919.59	-1,589.24	2,489.47	0.29	-0.23	-4.96
7,135.00	2.37	218.80	6,430.94	1,916.67	-1,591.30	2,488.38	0.54	0.44	8.27
7,230.00	2.37	233.90	6,525.86	1,913.99	-1,594.12	2,487.92	0.66	0.00	15.89
7,324.00	2.39	222.10	6,619.78	1,911.39	-1,597.00	2,487.58	0.52	0.02	-12.55
7,418.00	2.80	223.96	6,713.68	1,908.28	-1,599.91	2,486.85	0.45	0.44	1.98
7,482.00	2.87	221.20	6,777.60	1,905.95	-1,602.05	2,486.28	0.24	0.11	-4.31
Last SDI Production MWD Survey									
7,541.00	2.87	221.20	6,836.53	1,903.73	-1,604.00	2,485.67	0.00	0.00	0.00
Projection to TD - GM 11-10 PBHL									

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 11-10 - Slot B10
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 11-10	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)	
123.00	122.99	1.28	-0.60	First SDI Gyro MWD Survey
490.00	485.43	47.63	-22.80	Last SDI Gyro MWD Survey
562.00	554.31	65.20	-34.13	First SDI Surface MWD Survey
959.00	901.15	208.87	-157.35	Last SDI Surface MWD Survey
1,110.00	1,021.37	277.18	-218.04	First SDI Production MWD Survey
7,482.00	6,777.60	1,905.95	-1,602.05	Last SDI Production MWD Survey
7,541.00	6,836.53	1,903.73	-1,604.00	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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Well Details: Federal GM 11-10

TVD Reference: GL 6148' & RKB 24' @ 6172.00usft (H&P 318)		H&P 318 Level: 6148.00		Slot B10	
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	1600356.50	2266885.70	39.4529836	-108.0966161

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Federal GM 11-10 - Slot B10, True North
 Vertical (TVD) Reference: GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
 Section (VS) Reference: Slot - B10(0.00N, 0.00E)
 Measured Depth Reference: GL 6148' & RKB 24' @ 6172.00usft (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

17:58, August 02 2017
 Created By: Mel Mireles Jr.