

#### Well Details: GM 11-8

+N/-S	+E/-W	TVD Reference: GL 6175 & RKB 24' @ 6199.00usft	North Level: 6175.00	Slot
0.00	0.00	North 1601172.03	East 2257381.57	Latitude 39.4544711
				Longitude -108.1303437

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 11-8, True North  
 Vertical (TVD) Reference: GL 6175 & RKB 24' @ 6199.00usft  
 Section (VS) Reference: Slot - (0.00N, 0.00E)  
 Measured Depth Reference: GL 6175 & RKB 24' @ 6199.00usft  
 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

16:17, January 02 2019  
 Created By: Mel Mireles Jr.




## Directional Survey Certification

2948 I-70 Business Loop  
Grand Junction, CO 81504  
(970)-245-9447 Fax (970)-245-9454

<b>Operator</b>	TEP Rocky Mountain, LLC.
<b>Well Name &amp; No.</b>	GM 11-8
<b>County &amp; State</b>	Garfield County, CO
<b>SDI Job No.</b>	OP.014942
<b>Rig</b>	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 129 feet to a measured depth of 7,412 feet is true and correct as determined from all available records.

  
Signature

02-Jan-19

Date

### Mel Mireles Jr.

Grand Junction Assistant Well Planner  
Scientific Drilling - Colorado District

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 11-8
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6175 & RKB 24' @ 6199.00usft
<b>Site:</b>	MV 60-8D Pad	<b>MD Reference:</b>	GL 6175 & RKB 24' @ 6199.00usft
<b>Well:</b>	GM 11-8	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

<b>Project</b>	Garfield County, CO NAD83		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Central Zone		

Site		MV 60-8D Pad			
Site Position:		Northing:	1,601,172.03 usft	Latitude:	39.4544712
From:	Map	Easting:	2,257,381.57 usft	Longitude:	-108.1303437
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.66 °

Well	GM 11-8					
Well Position	+N/-S	0.00 usft	Northing:	1,601,172.03 usft	Latitude:	39.4544712
	+E/-W	0.00 usft	Easting:	2,257,381.57 usft	Longitude:	-108.1303437
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,175.00 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	12/26/2018	9.48	65.67	51,617

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	303.82	

<b>Survey Program</b>	<b>Date</b>	1/2/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
129.00	401.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
473.00	965.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,079.00	7,412.00	Survey #3 - Production MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
129.00	0.62	356.84	129.00	0.70	-0.04	0.42	0.48	0.48	0.00	
<b>First SDI Gyro MWD Survey</b>										
217.00	2.73	333.72	216.96	3.05	-0.99	2.52	2.47	2.40	-26.27	
309.00	5.28	321.15	308.72	8.31	-4.62	8.46	2.92	2.77	-13.66	
401.00	9.68	311.75	399.92	16.77	-13.05	20.17	4.95	4.78	-10.22	
<b>Last SDI Gyro MWD Survey</b>										
473.00	12.70	308.90	470.55	25.77	-23.73	34.05	4.26	4.19	-3.96	

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 11-8
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6175 & RKB 24' @ 6199.00usft
<b>Site:</b>	MV 60-8D Pad	<b>MD Reference:</b>	GL 6175 & RKB 24' @ 6199.00usft
<b>Well:</b>	GM 11-8	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)
<b>First SDI Surface MWD Survey</b>									
566.00	15.57	304.98	560.72	39.35	-41.91	56.72	3.25	3.09	-4.22
657.00	19.11	302.20	647.58	54.29	-64.53	83.83	3.99	3.89	-3.05
749.00	24.00	299.87	733.12	71.64	-93.52	117.57	5.40	5.32	-2.53
840.00	26.86	300.57	815.29	91.32	-127.27	156.57	3.16	3.14	0.77
933.00	30.77	303.58	896.76	115.17	-165.20	201.35	4.48	4.20	3.24
965.00	32.46	304.60	924.01	124.58	-179.09	218.12	5.54	5.28	3.19
<b>Last SDI Surface MWD Survey</b>									
1,079.00	34.94	304.24	1,018.85	160.32	-231.27	281.37	2.18	2.18	-0.32
<b>First SDI Production MWD Survey</b>									
1,173.00	36.06	303.55	1,095.38	190.76	-276.58	335.95	1.27	1.19	-0.73
1,267.00	37.05	304.69	1,170.89	222.17	-322.92	391.93	1.28	1.05	1.21
1,362.00	37.36	304.31	1,246.55	254.70	-370.26	449.37	0.41	0.33	-0.40
1,456.00	37.88	305.10	1,321.01	287.37	-417.43	506.74	0.75	0.55	0.84
1,551.00	39.01	303.30	1,395.41	320.56	-466.28	565.80	1.67	1.19	-1.89
1,645.00	39.10	302.28	1,468.41	352.64	-516.07	625.02	0.69	0.10	-1.09
1,739.00	39.10	301.24	1,541.36	383.84	-566.48	684.26	0.70	0.00	-1.11
1,833.00	38.24	302.24	1,614.75	414.73	-616.43	742.96	1.13	-0.91	1.06
1,927.00	37.74	304.75	1,688.84	446.65	-664.67	800.80	1.73	-0.53	2.67
2,022.00	38.22	304.13	1,763.72	479.71	-712.89	859.26	0.65	0.51	-0.65
2,116.00	37.40	303.64	1,837.98	511.84	-760.73	916.89	0.93	-0.87	-0.52
2,210.00	37.35	303.94	1,912.68	543.58	-808.15	973.95	0.20	-0.05	0.32
2,305.00	37.58	304.52	1,988.08	576.08	-855.92	1,031.73	0.44	0.24	0.61
2,399.00	37.32	304.46	2,062.71	608.45	-903.03	1,088.89	0.28	-0.28	-0.06
2,494.00	36.97	304.59	2,138.43	640.96	-950.30	1,146.25	0.38	-0.37	0.14
2,588.00	36.81	304.79	2,213.62	673.07	-996.69	1,202.67	0.21	-0.17	0.21
2,682.00	36.45	304.09	2,289.05	704.79	-1,042.94	1,258.75	0.59	-0.38	-0.74
2,777.00	37.02	302.74	2,365.19	736.08	-1,090.37	1,315.56	1.04	0.60	-1.42
2,871.00	36.68	302.41	2,440.41	766.43	-1,137.88	1,371.92	0.42	-0.36	-0.35
2,965.00	35.85	302.91	2,516.20	796.43	-1,184.69	1,427.51	0.94	-0.88	0.53
3,060.00	33.45	304.06	2,594.34	826.22	-1,229.74	1,481.52	2.62	-2.53	1.21
3,153.00	32.90	303.46	2,672.18	854.50	-1,272.05	1,532.41	0.69	-0.59	-0.65
3,248.00	34.32	304.71	2,751.30	883.98	-1,315.59	1,584.99	1.66	1.49	1.32
3,342.00	36.88	304.39	2,827.73	915.00	-1,360.66	1,639.70	2.73	2.72	-0.34
3,436.00	37.07	304.06	2,902.82	946.80	-1,407.41	1,696.24	0.29	0.20	-0.35
3,530.00	38.51	304.98	2,977.11	979.45	-1,454.86	1,753.83	1.65	1.53	0.98
3,625.00	38.80	305.05	3,051.29	1,013.50	-1,503.46	1,813.16	0.31	0.31	0.07
3,719.00	38.79	304.72	3,124.56	1,047.18	-1,551.77	1,872.04	0.22	-0.01	-0.35
3,814.00	39.66	304.62	3,198.15	1,081.35	-1,601.18	1,932.11	0.92	0.92	-0.11
3,908.00	39.11	303.96	3,270.80	1,114.96	-1,650.45	1,991.75	0.74	-0.59	-0.70
4,002.00	37.04	304.73	3,344.79	1,147.65	-1,698.32	2,049.71	2.26	-2.20	0.82
4,096.00	36.17	304.89	3,420.25	1,179.65	-1,744.34	2,105.76	0.93	-0.93	0.17
4,191.00	34.05	304.66	3,497.96	1,210.81	-1,789.22	2,160.38	2.24	-2.23	-0.24
4,285.00	31.22	303.35	3,577.12	1,239.18	-1,831.22	2,211.07	3.10	-3.01	-1.39

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 11-8
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6175 & RKB 24' @ 6199.00usft
<b>Site:</b>	MV 60-8D Pad	<b>MD Reference:</b>	GL 6175 & RKB 24' @ 6199.00usft
<b>Well:</b>	GM 11-8	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)
4,379.00	30.72	302.92	3,657.72	1,265.62	-1,871.72	2,259.44	0.58	-0.53	-0.46
4,474.00	27.90	304.09	3,740.55	1,291.27	-1,910.51	2,305.93	3.03	-2.97	1.23
4,568.00	26.41	303.46	3,824.18	1,315.12	-1,946.17	2,348.83	1.61	-1.59	-0.67
4,663.00	24.59	302.20	3,909.93	1,337.31	-1,980.52	2,389.72	2.00	-1.92	-1.33
4,757.00	23.18	300.98	3,995.87	1,357.25	-2,012.93	2,427.75	1.59	-1.50	-1.30
4,851.00	21.82	299.86	4,082.72	1,375.47	-2,043.95	2,463.66	1.52	-1.45	-1.19
4,945.00	19.25	298.74	4,170.74	1,391.63	-2,072.69	2,496.53	2.77	-2.73	-1.19
5,039.00	15.99	296.38	4,260.32	1,404.83	-2,097.88	2,524.81	3.55	-3.47	-2.51
5,134.00	16.32	298.37	4,351.57	1,416.99	-2,121.35	2,551.07	0.68	0.35	2.09
5,228.00	17.07	301.85	4,441.60	1,430.55	-2,144.69	2,578.01	1.33	0.80	3.70
5,323.00	16.28	303.54	4,532.61	1,445.26	-2,167.63	2,605.26	0.98	-0.83	1.78
5,417.00	15.41	306.00	4,623.04	1,459.88	-2,188.72	2,630.91	1.17	-0.93	2.62
5,511.00	12.96	306.34	4,714.17	1,473.47	-2,207.31	2,653.93	2.61	-2.61	0.36
5,605.00	10.46	308.27	4,806.20	1,485.00	-2,222.51	2,672.97	2.69	-2.66	2.05
5,645.84	9.85	308.67	4,846.40	1,489.48	-2,228.14	2,680.15	1.50	-1.49	0.98
<b>GM 11-8 BTV</b>									
5,699.00	9.06	309.27	4,898.84	1,494.97	-2,234.94	2,688.84	1.50	-1.49	1.13
5,794.00	7.11	310.55	4,992.89	1,503.53	-2,245.20	2,702.13	2.06	-2.05	1.35
5,888.00	4.73	311.92	5,086.38	1,509.90	-2,252.50	2,711.75	2.54	-2.53	1.46
5,983.00	3.36	323.97	5,181.15	1,514.77	-2,257.05	2,718.24	1.69	-1.44	12.68
6,077.00	2.97	340.99	5,275.00	1,519.30	-2,259.47	2,722.76	1.08	-0.41	18.11
6,171.00	2.39	338.09	5,368.90	1,523.42	-2,260.99	2,726.32	0.63	-0.62	-3.09
6,265.00	1.05	358.87	5,462.86	1,526.10	-2,261.74	2,728.44	1.55	-1.43	22.11
6,359.00	0.69	303.16	5,556.85	1,527.27	-2,262.23	2,729.50	0.93	-0.38	-59.27
6,454.00	0.83	253.10	5,651.84	1,527.39	-2,263.37	2,730.51	0.69	0.15	-52.69
6,548.00	1.36	230.03	5,745.82	1,526.47	-2,264.87	2,731.25	0.72	0.56	-24.54
6,643.00	1.97	216.38	5,840.78	1,524.43	-2,266.71	2,731.64	0.76	0.64	-14.37
6,737.00	2.63	210.19	5,934.71	1,521.27	-2,268.75	2,731.57	0.75	0.70	-6.59
6,831.00	3.22	206.16	6,028.58	1,517.03	-2,271.00	2,731.08	0.66	0.63	-4.29
6,925.00	3.25	208.71	6,122.43	1,512.33	-2,273.44	2,730.49	0.16	0.03	2.71
7,020.00	3.40	209.81	6,217.27	1,507.52	-2,276.14	2,730.06	0.17	0.16	1.16
7,114.00	3.56	208.14	6,311.10	1,502.53	-2,278.90	2,729.57	0.20	0.17	-1.78
7,208.00	4.06	213.93	6,404.89	1,497.20	-2,282.13	2,729.29	0.67	0.53	6.16
7,303.00	4.13	212.77	6,499.65	1,491.53	-2,285.86	2,729.23	0.11	0.07	-1.22
<b>Last SDI Production MWD Survey</b>									
7,412.00	4.13	212.77	6,608.37	1,484.93	-2,290.11	2,729.09	0.00	0.00	0.00
<b>Projection to TD - GM 11-8 PBHL</b>									



Scientific Drilling, Intl  
Survey Report

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 11-8
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6175 & RKB 24' @ 6199.00usft
<b>Site:</b>	MV 60-8D Pad	<b>MD Reference:</b>	GL 6175 & RKB 24' @ 6199.00usft
<b>Well:</b>	GM 11-8	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
129.00	129.00	0.70	-0.04	First SDI Gyro MWD Survey
401.00	399.92	16.77	-13.05	Last SDI Gyro MWD Survey
473.00	470.55	25.77	-23.73	First SDI Surface MWD Survey
965.00	924.01	124.58	-179.09	Last SDI Surface MWD Survey
1,079.00	1,018.85	160.32	-231.27	First SDI Production MWD Survey
7,303.00	6,499.65	1,491.53	-2,285.86	Last SDI Production MWD Survey
7,412.00	6,608.37	1,484.93	-2,290.11	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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