



#### Well Details: GM 444-8

TVD Reference: GL 6280' & RKB 24' @ 6304.00usft (H&P 318) Level: 6280.00  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.00 0.00 1599851.2600 2256697.4400 39.4507921 -108.1326300 GM 444-8 (A8)

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 444-8 - Slot GM 444-8 (A8), True North  
 Vertical (TVD) Reference: GL 6280' & RKB 24' @ 6304.00usft (H&P 318)  
 Section (VS) Reference: Slot - GM 444-8 (A8)(0.00N, 0.00E)  
 Measured Depth Reference: GL 6280' & RKB 24' @ 6304.00usft (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

16:29, November 06 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 444-8
<b>County &amp; State</b>	Garfield County, CO
<b>SDI Job No.</b>	OP.022012
<b>Rig</b>	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 120 feet to a measured depth of 7,315 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

06-Nov-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 444-8 - Slot GM 444-8 (A8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
<b>Site:</b>	GV 1-8 Pad	<b>MD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
<b>Well:</b>	GM 444-8	<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		GV 1-8 Pad			
Site Position:		Northing:	1,599,836.4100 usft	Latitude:	39.4507498
From:	Map	Easting:	2,256,677.8100 usft	Longitude:	-108.1326980
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.66 °

Well	GM 444-8 - Slot GM 444-8 (A8)					
Well Position	+N/-S	0.00 usft	Northing:	1,599,851.2600 usft	Latitude:	39.4507921
	+E/-W	0.00 usft	Easting:	2,256,697.4400 usft	Longitude:	-108.1326300
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,280.00 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	11/3/2019	9.38	65.62	51,536

<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	107.29	

<b>Survey Program</b>	<b>Date</b>	11/6/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
120.00	578.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
650.00	963.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,080.00	7,315.00	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	
120.00	0.62	104.41	120.00	-0.16	0.63	0.65	0.52	0.52	0.00	
<b>First SDI Gyro MWD Survey</b>										
212.00	4.40	109.25	211.89	-1.45	4.44	4.67	4.11	4.11	5.26	
304.00	8.27	103.89	303.31	-4.20	14.20	14.81	4.25	4.21	-5.83	
395.00	11.79	101.16	392.91	-7.57	29.68	30.59	3.90	3.87	-3.00	
487.00	15.66	95.89	482.27	-10.67	51.26	52.12	4.42	4.21	-5.73	
578.00	19.35	100.99	569.05	-14.80	78.29	79.15	4.39	4.05	5.60	

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 444-8 - Slot GM 444-8 (A8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
<b>Site:</b>	GV 1-8 Pad	<b>MD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
<b>Well:</b>	GM 444-8	<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>Last SDI Gyro MWD Survey</b>									
650.00	22.01	106.32	636.41	-20.87	102.95	104.51	4.52	3.69	7.40
<b>First SDI Surface MWD Survey</b>									
744.00	26.08	106.22	722.23	-31.60	139.71	142.79	4.33	4.33	-0.11
839.00	30.73	106.20	805.77	-44.21	183.10	187.96	4.89	4.89	-0.02
933.00	33.77	105.95	885.26	-58.09	231.29	238.11	3.24	3.23	-0.27
963.00	34.56	106.41	910.08	-62.79	247.47	254.95	2.77	2.63	1.53
<b>Last SDI Surface MWD Survey</b>									
1,080.00	35.03	105.48	1,006.16	-81.12	311.67	321.69	0.61	0.40	-0.79
<b>First SDI Production MWD Survey</b>									
1,174.00	34.38	104.39	1,083.44	-94.92	363.37	375.17	0.96	-0.69	-1.16
1,269.00	33.06	106.50	1,162.46	-108.95	414.20	427.87	1.86	-1.39	2.22
1,363.00	33.51	108.04	1,241.04	-124.27	463.46	479.45	1.02	0.48	1.64
1,457.00	34.19	108.80	1,319.11	-140.81	513.14	531.80	0.85	0.72	0.81
1,552.00	33.23	106.91	1,398.13	-156.99	563.31	584.51	1.50	-1.01	-1.99
1,646.00	34.75	109.96	1,476.08	-173.63	613.14	637.04	2.43	1.62	3.24
1,740.00	33.60	108.80	1,553.84	-191.15	662.95	689.80	1.41	-1.22	-1.23
1,835.00	36.49	110.19	1,631.61	-209.38	714.35	744.30	3.16	3.04	1.46
1,929.00	35.04	109.00	1,707.89	-227.81	766.10	799.19	1.71	-1.54	-1.27
2,024.00	36.26	110.21	1,785.08	-246.40	818.26	854.51	1.48	1.28	1.27
2,118.00	35.26	109.22	1,861.36	-264.93	869.97	909.39	1.23	-1.06	-1.05
2,213.00	33.75	108.77	1,939.65	-282.45	920.85	963.18	1.61	-1.59	-0.47
2,307.00	35.57	109.30	2,016.96	-299.89	971.38	1,016.61	1.96	1.94	0.56
2,402.00	34.00	109.01	2,094.98	-317.68	1,022.57	1,070.78	1.66	-1.65	-0.31
2,496.00	35.37	108.84	2,172.28	-335.02	1,073.17	1,124.25	1.46	1.46	-0.18
2,590.00	34.34	108.38	2,249.41	-352.17	1,124.08	1,177.96	1.13	-1.10	-0.49
2,684.00	32.01	107.82	2,328.08	-368.16	1,172.97	1,229.38	2.50	-2.48	-0.60
2,779.00	33.77	108.60	2,407.85	-384.28	1,221.97	1,280.96	1.91	1.85	0.82
2,873.00	32.45	108.17	2,486.59	-400.48	1,270.69	1,332.30	1.43	-1.40	-0.46
2,968.00	32.45	106.94	2,566.76	-415.86	1,319.29	1,383.27	0.69	0.00	-1.29
3,062.00	32.09	105.49	2,646.24	-429.87	1,367.47	1,433.44	0.91	-0.38	-1.54
3,156.00	33.27	103.92	2,725.36	-442.74	1,416.57	1,484.14	1.55	1.26	-1.67
3,250.00	34.06	103.02	2,803.59	-454.88	1,467.24	1,536.13	0.99	0.84	-0.96
3,345.00	32.83	103.24	2,882.86	-466.77	1,518.23	1,588.35	1.30	-1.29	0.23
3,439.00	34.24	105.48	2,961.22	-479.66	1,568.52	1,640.20	2.00	1.50	2.38
3,533.00	33.18	104.91	3,039.41	-493.34	1,618.86	1,692.34	1.18	-1.13	-0.61
3,627.00	34.42	109.11	3,117.53	-508.66	1,668.83	1,744.60	2.81	1.32	4.47
3,721.00	33.54	108.37	3,195.48	-525.54	1,718.58	1,797.12	1.03	-0.94	-0.79
3,816.00	32.35	107.86	3,275.20	-541.61	1,767.68	1,848.78	1.29	-1.25	-0.54
3,910.00	31.66	108.98	3,354.91	-557.35	1,814.95	1,898.58	0.97	-0.73	1.19
4,004.00	31.36	109.04	3,435.05	-573.35	1,861.40	1,947.69	0.32	-0.32	0.06
4,098.00	29.27	106.35	3,516.20	-587.80	1,906.58	1,995.12	2.65	-2.22	-2.86
4,193.00	27.68	106.21	3,599.70	-600.50	1,950.05	2,040.41	1.68	-1.67	-0.15
4,287.00	26.29	106.67	3,683.47	-612.56	1,990.96	2,083.05	1.50	-1.48	0.49

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 444-8 - Slot GM 444-8 (A8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
<b>Site:</b>	GV 1-8 Pad	<b>MD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
<b>Well:</b>	GM 444-8	<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)
4,382.00	24.45	107.11	3,769.30	-624.38	2,029.91	2,123.76	1.95	-1.94	0.46
4,476.00	24.18	104.39	3,854.97	-634.89	2,067.15	2,162.44	1.23	-0.29	-2.89
4,570.00	23.13	104.46	3,941.07	-644.29	2,103.68	2,200.10	1.12	-1.12	0.07
4,665.00	21.28	105.44	4,029.02	-653.54	2,138.36	2,235.97	1.99	-1.95	1.03
4,759.00	20.75	104.57	4,116.77	-662.27	2,170.92	2,269.66	0.65	-0.56	-0.93
4,853.00	18.47	104.57	4,205.31	-670.20	2,201.45	2,301.17	2.43	-2.43	0.00
4,948.00	18.82	104.13	4,295.32	-677.73	2,230.88	2,331.50	0.40	0.37	-0.46
5,042.00	18.30	105.37	4,384.43	-685.34	2,259.81	2,361.39	0.69	-0.55	1.32
5,137.00	16.42	106.65	4,475.10	-693.14	2,287.06	2,389.72	2.02	-1.98	1.35
5,231.00	15.77	107.39	4,565.42	-700.77	2,311.98	2,415.78	0.73	-0.69	0.79
5,325.00	13.19	109.83	4,656.43	-708.23	2,334.26	2,439.27	2.82	-2.74	2.60
5,420.00	10.19	110.72	4,749.44	-714.88	2,352.32	2,458.49	3.16	-3.16	0.94
5,458.66	9.82	110.47	4,787.52	-717.24	2,358.61	2,465.20	0.95	-0.95	-0.63
GM 444-8 BTV									
5,514.00	9.30	110.09	4,842.09	-720.43	2,367.23	2,474.38	0.95	-0.95	-0.69
5,608.00	6.74	117.26	4,935.16	-725.56	2,379.27	2,487.40	2.92	-2.72	7.63
5,703.00	4.53	115.79	5,029.70	-729.75	2,387.60	2,496.60	2.33	-2.33	-1.55
5,797.00	2.14	100.78	5,123.53	-731.69	2,392.67	2,502.02	2.69	-2.54	-15.97
5,891.00	0.94	92.88	5,217.50	-732.06	2,395.17	2,504.51	1.29	-1.28	-8.40
5,985.00	0.77	152.38	5,311.49	-732.66	2,396.23	2,505.70	0.92	-0.18	63.30
6,080.00	1.04	163.73	5,406.48	-734.05	2,396.77	2,506.63	0.34	0.28	11.95
6,174.00	1.44	176.59	5,500.46	-736.05	2,397.08	2,507.52	0.52	0.43	13.68
6,269.00	1.43	186.08	5,595.43	-738.42	2,397.02	2,508.17	0.25	-0.01	9.99
6,363.00	1.70	193.74	5,689.39	-740.94	2,396.57	2,508.48	0.36	0.29	8.15
6,457.00	1.72	196.61	5,783.35	-743.65	2,395.83	2,508.59	0.09	0.02	3.05
6,552.00	2.24	210.56	5,878.29	-746.61	2,394.48	2,508.18	0.74	0.55	14.68
6,647.00	2.52	208.08	5,973.21	-750.05	2,392.55	2,507.36	0.31	0.29	-2.61
6,741.00	2.89	208.94	6,067.11	-753.95	2,390.43	2,506.50	0.40	0.39	0.91
6,836.00	2.77	213.13	6,161.99	-757.97	2,388.02	2,505.39	0.25	-0.13	4.41
6,930.00	2.56	219.22	6,255.89	-761.50	2,385.45	2,503.98	0.37	-0.22	6.48
7,025.00	2.78	223.34	6,350.78	-764.82	2,382.53	2,502.18	0.31	0.23	4.34
7,120.00	2.86	218.54	6,445.67	-768.35	2,379.47	2,500.31	0.26	0.08	-5.05
7,214.00	2.99	216.54	6,539.55	-772.15	2,376.55	2,498.65	0.18	0.14	-2.13
7,262.00	2.90	217.07	6,587.48	-774.12	2,375.07	2,497.83	0.20	-0.19	1.10
Last SDI Production MWD Survey									
7,315.00	2.90	217.07	6,640.42	-776.26	2,373.46	2,496.92	0.00	0.00	0.00
Projection to TD - GM 444-8 PBHL									



Scientific Drilling, Intl  
Survey Report

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 444-8 - Slot GM 444-8 (A8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
<b>Site:</b>	GV 1-8 Pad	<b>MD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
<b>Well:</b>	GM 444-8	<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)	
120.00	120.00	-0.16	0.63	First SDI Gyro MWD Survey
578.00	569.05	-14.80	78.29	Last SDI Gyro MWD Survey
650.00	636.41	-20.87	102.95	First SDI Surface MWD Survey
963.00	910.08	-62.79	247.47	Last SDI Surface MWD Survey
1,080.00	1,006.16	-81.12	311.67	First SDI Production MWD Survey
7,262.00	6,587.48	-774.12	2,375.07	Last SDI Production MWD Survey
7,315.00	6,640.42	-776.26	2,373.46	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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