



#### Well Details: GM 344-8

TVD Reference: GL 6280' & RKB 24' @ 6304.00usft  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.00 0.00 1599831.5700 2256686.5600 39.4507372 -108.1326665 GM 344-8 (A5)

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 344-8 - Slot GM 344-8 (A5), True North  
 Vertical (TVD) Reference: GL 6280' & RKB 24' @ 6304.00usft  
 Section (VS) Reference: Slot - GM 344-8 (A5)(0.00N, 0.00E)  
 Measured Depth Reference: GL 6280' & RKB 24' @ 6304.00usft  
 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

13:08, October 30 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 344-8
<b>County &amp; State</b>	Garfield County, CO
<b>SDI Job No.</b>	OP.021786
<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 7,503 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

30-Oct-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 344-8 - Slot GM 344-8 (A5)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft
<b>Site:</b>	GV 1-8 Pad	<b>MD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft
<b>Well:</b>	GM 344-8	<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 344-8 - Slot GM 344-8 (A5)					
Well Position	+N/-S	0.00 usft	Northing:	1,599,831.5700 usft	Latitude:	39.4507372
	+E/-W	0.00 usft	Easting:	2,256,686.5600 usft	Longitude:	-108.1326665
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	10/21/2019	9.38	65.62	51,540

<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	124.16	

<b>Survey Program</b>	<b>Date</b>	10/30/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
120.00	978.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
1,077.00	7,503.00	Survey #2 - 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	0.79	359.47	120.00	0.83	-0.01	-0.47	0.66	0.66	0.00	
<b>First SDI Gyro MWD Survey</b>										
212.00	4.22	106.08	211.91	0.52	3.24	2.39	4.90	3.73	115.88	
303.00	6.51	126.12	302.52	-3.45	10.63	10.73	3.22	2.52	22.02	
395.00	10.73	135.62	393.46	-12.65	20.83	24.34	4.83	4.59	10.33	
486.00	15.04	129.29	482.15	-26.18	35.91	44.41	4.98	4.74	-6.96	
578.00	19.00	121.82	570.12	-41.65	57.88	71.28	4.91	4.30	-8.12	
669.00	22.52	120.23	655.20	-58.24	85.53	103.48	3.92	3.87	-1.75	
764.00	27.01	121.46	741.44	-78.67	119.67	143.20	4.76	4.73	1.29	

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 344-8 - Slot GM 344-8 (A5)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft
<b>Site:</b>	GV 1-8 Pad	<b>MD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft
<b>Well:</b>	GM 344-8	<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)
858.00	29.56	122.26	824.21	-102.19	157.49	187.70	2.74	2.71	0.85
953.00	32.86	121.55	905.45	-128.19	199.28	236.88	3.50	3.47	-0.75
978.00	33.61	120.32	926.36	-135.23	211.04	250.56	4.03	3.00	-4.92
<b>Last SDI Gyro MWD Survey</b>									
1,077.00	35.36	123.73	1,007.97	-164.97	258.52	306.55	2.63	1.77	3.44
<b>First SDI Production MWD Survey</b>									
1,172.00	37.42	126.70	1,084.44	-197.49	304.53	362.88	2.85	2.17	3.13
1,266.00	39.62	126.53	1,157.98	-232.40	351.52	421.37	2.34	2.34	-0.18
1,360.00	41.05	127.69	1,229.64	-269.12	400.03	482.13	1.72	1.52	1.23
1,455.00	40.03	126.73	1,301.83	-306.46	449.20	543.78	1.26	-1.07	-1.01
1,549.00	38.33	125.29	1,374.70	-341.38	497.23	603.13	2.05	-1.81	-1.53
1,643.00	39.29	125.63	1,447.94	-375.56	545.21	662.03	1.05	1.02	0.36
1,738.00	36.07	124.50	1,523.12	-408.94	592.72	720.08	3.47	-3.39	-1.19
1,832.00	39.25	125.52	1,597.53	-441.89	639.74	777.50	3.45	3.38	1.09
1,927.00	37.37	126.00	1,672.07	-476.30	687.53	836.36	2.00	-1.98	0.51
2,021.00	40.30	125.24	1,745.28	-510.62	735.45	895.28	3.16	3.12	-0.81
2,116.00	40.32	124.51	1,817.72	-545.76	785.87	956.74	0.50	0.02	-0.77
2,210.00	40.12	122.97	1,889.50	-579.47	836.34	1,017.43	1.08	-0.21	-1.64
2,305.00	40.46	122.71	1,961.97	-612.79	887.96	1,078.84	0.40	0.36	-0.27
2,399.00	40.54	124.17	2,033.45	-646.43	938.90	1,139.88	1.01	0.09	1.55
2,493.00	39.08	124.02	2,105.65	-680.16	988.73	1,200.06	1.56	-1.55	-0.16
2,588.00	39.03	123.54	2,179.42	-713.44	1,038.48	1,259.92	0.32	-0.05	-0.51
2,682.00	39.46	124.58	2,252.22	-746.75	1,087.75	1,319.39	0.84	0.46	1.11
2,776.00	39.90	124.85	2,324.57	-780.93	1,137.08	1,379.40	0.50	0.47	0.29
2,871.00	38.25	124.21	2,398.32	-814.88	1,186.41	1,439.28	1.79	-1.74	-0.67
2,965.00	38.78	123.75	2,471.87	-847.59	1,234.95	1,497.81	0.64	0.56	-0.49
3,060.00	38.77	123.13	2,545.93	-880.38	1,284.59	1,557.30	0.41	-0.01	-0.65
3,154.00	37.61	122.98	2,619.81	-912.08	1,333.30	1,615.41	1.24	-1.23	-0.16
3,248.00	37.81	121.54	2,694.17	-942.76	1,381.92	1,672.87	0.96	0.21	-1.53
3,342.00	39.92	124.10	2,767.37	-974.75	1,431.46	1,731.82	2.82	2.24	2.72
3,436.00	41.56	124.30	2,838.59	-1,009.23	1,482.20	1,793.17	1.75	1.74	0.21
3,531.00	40.35	123.71	2,910.33	-1,044.06	1,533.82	1,855.44	1.34	-1.27	-0.62
3,625.00	41.16	124.11	2,981.54	-1,078.30	1,584.74	1,916.80	0.91	0.86	0.43
3,719.00	40.14	123.50	3,052.85	-1,112.37	1,635.62	1,978.03	1.16	-1.09	-0.65
3,813.00	41.31	124.73	3,124.09	-1,146.77	1,686.39	2,039.36	1.51	1.24	1.31
3,907.00	40.24	124.38	3,195.27	-1,181.59	1,736.95	2,100.75	1.16	-1.14	-0.37
4,002.00	39.96	124.53	3,267.94	-1,216.21	1,787.40	2,161.94	0.31	-0.29	0.16
4,096.00	38.08	124.08	3,340.97	-1,249.57	1,836.29	2,221.12	2.02	-2.00	-0.48
4,190.00	34.91	124.52	3,416.53	-1,281.06	1,882.47	2,277.01	3.38	-3.37	0.47
4,285.00	31.30	123.54	3,496.09	-1,310.11	1,925.45	2,328.89	3.84	-3.80	-1.03
4,379.00	30.60	124.48	3,576.71	-1,337.15	1,965.52	2,377.23	0.90	-0.74	1.00
4,474.00	29.36	123.54	3,659.00	-1,363.70	2,004.87	2,424.70	1.40	-1.31	-0.99
4,568.00	28.32	123.72	3,741.34	-1,388.81	2,042.62	2,470.04	1.11	-1.11	0.19

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 344-8 - Slot GM 344-8 (A5)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft
<b>Site:</b>	GV 1-8 Pad	<b>MD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft
<b>Well:</b>	GM 344-8	<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)
4,662.00	27.62	122.87	3,824.36	-1,413.02	2,079.47	2,514.12	0.86	-0.74	-0.90
4,756.00	24.89	123.55	3,908.65	-1,435.78	2,114.26	2,555.69	2.92	-2.90	0.72
4,851.00	22.39	124.44	3,995.67	-1,457.07	2,145.85	2,593.78	2.66	-2.63	0.94
4,946.00	20.70	124.67	4,084.03	-1,476.85	2,174.58	2,628.67	1.78	-1.78	0.24
5,040.00	21.06	123.38	4,171.86	-1,495.59	2,202.35	2,662.17	0.62	0.38	-1.37
5,134.00	19.96	125.40	4,259.90	-1,514.18	2,229.53	2,695.10	1.39	-1.17	2.15
5,229.00	19.28	126.24	4,349.39	-1,532.85	2,255.40	2,726.98	0.77	-0.72	0.88
5,323.00	18.16	125.96	4,438.41	-1,550.62	2,279.77	2,757.13	1.20	-1.19	-0.30
5,417.00	17.58	127.05	4,527.88	-1,567.78	2,302.96	2,785.95	0.71	-0.62	1.16
5,512.00	15.71	120.44	4,618.90	-1,582.94	2,325.50	2,813.12	2.80	-1.97	-6.96
5,606.00	15.39	121.88	4,709.46	-1,595.98	2,347.07	2,838.28	0.53	-0.34	1.53
5,672.01	14.01	121.02	4,773.31	-1,604.72	2,361.35	2,855.01	2.12	-2.10	-1.31
<b>GM 344-8 BTV</b>									
5,700.00	13.42	120.60	4,800.50	-1,608.12	2,367.05	2,861.64	2.12	-2.09	-1.49
5,794.00	10.81	118.29	4,892.40	-1,617.85	2,384.20	2,881.30	2.82	-2.78	-2.46
5,889.00	8.89	107.84	4,986.00	-1,624.32	2,399.04	2,897.21	2.75	-2.02	-11.00
5,983.00	6.43	107.90	5,079.16	-1,628.16	2,410.96	2,909.23	2.62	-2.62	0.06
6,078.00	3.56	106.98	5,173.78	-1,630.66	2,418.85	2,917.16	3.02	-3.02	-0.97
6,172.00	1.74	36.07	5,267.70	-1,630.36	2,422.48	2,919.99	3.63	-1.94	-75.44
6,267.00	2.23	339.57	5,362.65	-1,627.46	2,422.69	2,918.54	2.03	0.52	-59.47
6,361.00	2.26	340.25	5,456.58	-1,624.00	2,421.42	2,915.55	0.04	0.03	0.72
6,455.00	1.94	335.95	5,550.52	-1,620.81	2,420.15	2,912.70	0.38	-0.34	-4.57
6,550.00	1.44	328.17	5,645.47	-1,618.32	2,418.86	2,910.24	0.58	-0.53	-8.19
6,644.00	1.28	315.02	5,739.45	-1,616.58	2,417.50	2,908.13	0.37	-0.17	-13.99
6,739.00	0.51	322.30	5,834.44	-1,615.49	2,416.49	2,906.69	0.82	-0.81	7.66
6,833.00	0.50	290.66	5,928.43	-1,615.02	2,415.85	2,905.89	0.29	-0.01	-33.66
6,928.00	0.46	292.49	6,023.43	-1,614.72	2,415.11	2,905.11	0.05	-0.04	1.93
7,023.00	0.74	245.43	6,118.42	-1,614.83	2,414.20	2,904.42	0.57	0.29	-49.54
7,117.00	0.57	214.57	6,212.42	-1,615.47	2,413.38	2,904.10	0.41	-0.18	-32.83
7,212.00	0.69	237.30	6,307.41	-1,616.17	2,412.63	2,903.87	0.29	0.13	23.93
7,306.00	0.77	243.15	6,401.41	-1,616.76	2,411.59	2,903.35	0.12	0.09	6.22
7,401.00	1.01	249.04	6,496.39	-1,617.35	2,410.24	2,902.56	0.27	0.25	6.20
7,443.00	1.14	237.46	6,538.39	-1,617.71	2,409.54	2,902.18	0.60	0.31	-27.57
<b>Last SDI Production MWD Survey</b>									
7,503.00	1.14	237.46	6,598.37	-1,618.35	2,408.54	2,901.71	0.00	0.00	0.00
<b>Projection to TD - GM 344-8 PBHL</b>									



Scientific Drilling, Intl  
Survey Report

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 344-8 - Slot GM 344-8 (A5)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft
<b>Site:</b>	GV 1-8 Pad	<b>MD Reference:</b>	GL 6280' & RKB 24' @ 6304.00usft
<b>Well:</b>	GM 344-8	<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	0.83	-0.01	First SDI Gyro MWD Survey
978.00	926.36	-135.23	211.04	Last SDI Gyro MWD Survey
1,077.00	1,007.97	-164.97	258.52	First SDI Production MWD Survey
7,443.00	6,538.39	-1,617.71	2,409.54	Last SDI Production MWD Survey
7,503.00	6,598.37	-1,618.35	2,408.54	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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