



**Well Details: GM 14-8**

TVD Reference: GL 6280' & RKB 24' @ 6304.00usft		Current Level: 6280.00	
+N/-S	+E/-W	Northing	Easting
0.00	0.00	1599836.4100	2256677.8100
		Latitude	Longitude
		39.4507498	-108.1326980
		Slot GM 14-8 (B5)	

**REFERENCE INFORMATION**

Co-ordinate (N/E) Reference: Well GM 14-8 - Slot GM 14-8 (B5), True North  
 Vertical (TVD) Reference: GL 6280' & RKB 24' @ 6304.00usft  
 Section (VS) Reference: Slot - GM 14-8 (B5)(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

13:30, October 30 2019  
 Created By: Mel Mireles Jr.





## Scientific Drilling, Intl Survey Report

<b>Company:</b> TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b> Well GM 14-8 - Slot GM 14-8 (B5)
<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 14-8	<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		

<b>Site</b> GV 1-8 Pad		
<b>Site Position:</b>	<b>Northing:</b> 1,599,836.4100 usft	<b>Latitude:</b> 39.4507498
<b>From:</b> Map	<b>Easting:</b> 2,256,677.8100 usft	<b>Longitude:</b> -108.1326980
<b>Position Uncertainty:</b> 0.00 usft	<b>Slot Radius:</b> 13.20 in	<b>Grid Convergence:</b> -1.66 °

<b>Well</b> GM 14-8 - Slot GM 14-8 (B5)		
<b>Well Position</b> +N/-S 0.00 usft	<b>Northing:</b> 1,599,836.4100 usft	<b>Latitude:</b> 39.4507498
+E/-W 0.00 usft	<b>Easting:</b> 2,256,677.8100 usft	<b>Longitude:</b> -108.1326980
<b>Position Uncertainty</b> 0.00 usft	<b>Wellhead Elevation:</b> 0.00 usft	<b>Ground Level:</b> 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	10/24/2019	9.38	65.62	51,539

<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	219.95	

<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>
135.00	953.00	Survey #1 - Gyro MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM
744.00	953.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM
1,078.00	6,691.00	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	0.00
135.00	0.18	345.59	135.00	0.21	-0.05	-0.12	0.13	0.13	0.00	0.00
<b>First SDI Gyro MWD Survey</b>										
212.00	2.38	253.39	211.98	-0.13	-1.62	1.14	3.11	2.86	-119.74	
303.00	5.54	239.94	302.75	-2.88	-7.23	6.85	3.60	3.47	-14.78	
395.00	8.53	231.42	394.05	-9.36	-16.41	17.71	3.43	3.25	-9.26	
486.00	11.96	226.23	483.59	-20.09	-28.50	33.70	3.90	3.77	-5.70	
578.00	15.48	222.01	572.95	-35.81	-43.60	55.45	3.98	3.83	-4.59	
669.00	17.51	216.30	660.21	-55.87	-59.84	81.26	2.85	2.23	-6.27	



## Scientific Drilling, Intl Survey Report

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 14-8 - Slot GM 14-8 (B5)
<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 14-8	<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>										
744.00	18.48	212.04	731.54	-75.04	-72.82	104.29	2.18	1.29	-5.68	
<b>First SDI Surface MWD Survey</b>										
838.00	18.98	210.61	820.56	-100.83	-88.51	134.13	0.72	0.53	-1.52	
933.00	18.24	212.49	910.60	-126.67	-104.36	164.12	1.00	-0.78	1.98	
953.00	18.35	213.50	929.58	-131.93	-107.78	170.35	1.68	0.55	5.05	
<b>Last SDI Surface MWD Survey</b>										
1,078.00	18.28	217.41	1,048.26	-163.91	-130.55	209.49	0.98	-0.06	3.13	
<b>First SDI Production MWD Survey</b>										
1,173.00	17.56	217.96	1,138.65	-187.05	-148.42	238.69	0.78	-0.76	0.58	
1,267.00	16.34	217.26	1,228.56	-208.75	-165.15	266.07	1.32	-1.30	-0.74	
1,361.00	17.58	219.94	1,318.47	-230.16	-182.27	293.48	1.56	1.32	2.85	
1,456.00	16.92	220.76	1,409.20	-251.63	-200.51	321.65	0.74	-0.69	0.86	
1,550.00	16.15	221.25	1,499.31	-271.82	-218.06	348.40	0.83	-0.82	0.52	
1,644.00	17.11	220.20	1,589.38	-292.21	-235.60	375.30	1.07	1.02	-1.12	
1,739.00	16.51	218.64	1,680.32	-313.43	-253.05	402.77	0.79	-0.63	-1.64	
1,833.00	16.00	216.27	1,770.56	-334.31	-269.06	429.05	0.89	-0.54	-2.52	
1,928.00	17.24	222.84	1,861.60	-355.19	-286.38	456.18	2.37	1.31	6.92	
2,022.00	16.44	222.87	1,951.57	-375.15	-304.90	483.37	0.85	-0.85	0.03	
2,117.00	15.30	221.64	2,042.95	-394.37	-322.37	509.33	1.25	-1.20	-1.29	
2,211.00	16.68	222.97	2,133.31	-413.51	-339.81	535.20	1.52	1.47	1.41	
2,306.00	15.60	222.72	2,224.56	-432.87	-357.77	561.57	1.14	-1.14	-0.26	
2,400.00	16.62	221.46	2,314.87	-452.23	-375.24	587.64	1.15	1.09	-1.34	
2,494.00	15.65	221.55	2,405.17	-471.80	-392.55	613.75	1.03	-1.03	0.10	
2,589.00	16.36	218.56	2,496.49	-491.85	-409.39	639.93	1.15	0.75	-3.15	
2,683.00	14.98	216.01	2,586.99	-512.03	-424.79	665.29	1.64	-1.47	-2.71	
2,777.00	15.01	210.95	2,677.79	-532.30	-438.19	689.43	1.39	0.03	-5.38	
2,872.00	15.31	218.68	2,769.50	-552.64	-452.36	714.13	2.15	0.32	8.14	
2,966.00	16.13	220.66	2,859.98	-572.23	-468.62	739.59	1.04	0.87	2.11	
3,061.00	18.95	225.52	2,950.56	-593.06	-488.23	768.14	3.34	2.97	5.12	
3,155.00	18.15	223.83	3,039.68	-614.31	-509.26	797.94	1.03	-0.85	-1.80	
3,249.00	18.98	224.11	3,128.78	-635.85	-530.04	827.80	0.89	0.88	0.30	
3,343.00	18.15	222.84	3,217.89	-657.56	-550.64	857.67	0.98	-0.88	-1.35	
3,437.00	17.54	222.57	3,307.37	-678.73	-570.17	886.44	0.65	-0.65	-0.29	
3,531.00	18.45	219.94	3,396.77	-700.57	-589.30	915.46	1.30	0.97	-2.80	
3,626.00	17.80	218.78	3,487.06	-723.41	-608.05	945.01	0.78	-0.68	-1.22	
3,720.00	15.65	220.44	3,577.08	-744.27	-625.28	972.06	2.34	-2.29	1.77	
3,814.00	14.68	219.09	3,667.80	-763.16	-641.01	996.65	1.10	-1.03	-1.44	
3,908.00	13.33	219.20	3,759.01	-780.80	-655.37	1,019.39	1.44	-1.44	0.12	
4,003.00	13.15	218.40	3,851.48	-797.76	-669.00	1,041.15	0.27	-0.19	-0.84	
4,097.00	11.87	218.12	3,943.25	-813.75	-681.61	1,061.50	1.36	-1.36	-0.30	
4,191.00	10.03	219.18	4,035.53	-827.70	-692.75	1,079.35	1.97	-1.96	1.13	
4,286.00	9.06	217.08	4,129.22	-840.08	-702.49	1,095.09	1.08	-1.02	-2.21	
4,380.00	7.78	216.45	4,222.20	-851.10	-710.73	1,108.83	1.37	-1.36	-0.67	



## Scientific Drilling, Intl Survey Report

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<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 14-8	<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)	
4,475.00	5.59	221.80	4,316.55	-859.72	-717.64	1,119.88	2.39	-2.31	5.63	
4,569.00	5.40	223.24	4,410.12	-866.36	-723.72	1,128.87	0.25	-0.20	1.53	
4,663.00	3.51	221.73	4,503.83	-871.73	-728.67	1,136.16	2.01	-2.01	-1.61	
4,757.00	1.64	203.44	4,597.73	-875.11	-731.12	1,140.33	2.15	-1.99	-19.46	
4,852.00	1.49	213.99	4,692.70	-877.38	-732.35	1,142.86	0.34	-0.16	11.11	
4,947.00	1.98	202.38	4,787.65	-879.92	-733.66	1,145.65	0.63	0.52	-12.22	
5,041.00	1.97	207.46	4,881.60	-882.86	-735.03	1,148.78	0.19	-0.01	5.40	
5,067.73	1.89	205.88	4,908.31	-883.66	-735.43	1,149.65	0.37	-0.32	-5.90	
<b>GM 14-8 BTV</b>										
5,135.00	1.68	201.22	4,975.55	-885.58	-736.27	1,151.66	0.37	-0.31	-6.93	
5,230.00	1.23	197.92	5,070.52	-887.84	-737.09	1,153.92	0.48	-0.47	-3.47	
5,324.00	1.54	210.33	5,164.49	-889.90	-738.04	1,156.11	0.46	0.33	13.20	
5,418.00	1.55	209.11	5,258.46	-892.10	-739.29	1,158.60	0.04	0.01	-1.30	
5,513.00	1.43	208.01	5,353.43	-894.27	-740.47	1,161.02	0.13	-0.13	-1.16	
5,607.00	1.76	207.20	5,447.39	-896.58	-741.68	1,163.58	0.35	0.35	-0.86	
5,701.00	1.90	208.04	5,541.34	-899.24	-743.08	1,166.51	0.15	0.15	0.89	
5,795.00	1.80	196.37	5,635.29	-902.04	-744.23	1,169.39	0.41	-0.11	-12.41	
5,890.00	2.01	199.59	5,730.24	-905.04	-745.21	1,172.32	0.25	0.22	3.39	
5,984.00	0.44	179.01	5,824.22	-906.95	-745.75	1,174.13	1.71	-1.67	-21.89	
6,079.00	0.62	248.52	5,919.21	-907.50	-746.22	1,174.86	0.65	0.19	73.17	
6,173.00	1.27	226.59	6,013.20	-908.41	-747.45	1,176.34	0.78	0.69	-23.33	
6,268.00	1.31	190.73	6,108.18	-910.20	-748.42	1,178.34	0.84	0.04	-37.75	
6,362.00	1.43	171.33	6,202.15	-912.41	-748.44	1,180.05	0.51	0.13	-20.64	
6,456.00	1.92	187.87	6,296.11	-915.13	-748.48	1,182.16	0.73	0.52	17.60	
6,551.00	1.70	200.78	6,391.06	-918.02	-749.20	1,184.84	0.49	-0.23	13.59	
6,632.00	2.37	184.90	6,472.01	-920.82	-749.77	1,187.35	1.07	0.83	-19.60	
<b>Last SDI Production MWD Survey</b>										
6,691.00	2.37	184.90	6,530.96	-923.25	-749.98	1,189.34	0.00	0.00	0.00	
<b>Projection to TD - GM 14-8 PBHL</b>										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
135.00	135.00	0.21	-0.05	First SDI Gyro MWD Survey	
669.00	660.21	-55.87	-59.84	Last SDI Gyro MWD Survey	
744.00	731.54	-75.04	-72.82	First SDI Surface MWD Survey	
953.00	929.58	-131.93	-107.78	Last SDI Surface MWD Survey	
1,078.00	1,048.26	-163.91	-130.55	First SDI Production MWD Survey	
6,632.00	6,472.01	-920.82	-749.77	Last SDI Production MWD Survey	
6,691.00	6,530.96	-923.25	-749.98	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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