



Well Details: GM 314-8

TVD Reference: GL 6280' & RKB 24' @ 6304.00usft (H&P 318)		Datum Level: 6280.00	
+N/-S	+E/-W	North	East
0.00	0.00	1599823.2900	2256670.5500
		Latitude	Longitude
		39.4507132	-108.1327223

Slot GM 314-8 (B3)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 314-8 - Slot GM 314-8 (B3), True North
Vertical (TVD) Reference: GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
Section (VS) Reference: Slot - GM 314-8 (B3)(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

11:02, October 28 2019
Created By: Janie Collins



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 314-8
County & State	Garfield, CO
SDI Job No.	OP.021601
Rig	H&P 318

I, Janie Collins, 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 6,860 feet is true and correct as determined from all available records.



Signature

28-Oct-19

Date

Janie Collins
Colorado District Well Planner
Scientific Drilling International

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 314-8 - Slot GM 314-8 (B3)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
Site:	GV 1-8 Pad	MD Reference:	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
Well:	GM 314-8	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		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 314-8 - Slot GM 314-8 (B3)				
Well Position	+N/-S	0.00 usft	Northing:	1,599,823.2900 usft	Latitude:	39.4507132
	+E/-W	0.00 usft	Easting:	2,256,670.5500 usft	Longitude:	-108.1327224
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,280.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/12/2019	9.40	65.62	51,542

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	205.38	

Survey Program	Date	10/28/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
120.00	953.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
1,084.00	6,860.00	Survey #2 - Production MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	

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	
120.00	0.53	194.24	120.00	-0.54	-0.14	0.54	0.44	0.44	0.00	
212.00	2.46	180.88	211.96	-2.92	-0.27	2.76	2.12	2.10	-14.52	
303.00	3.08	178.95	302.86	-7.32	-0.26	6.73	0.69	0.68	-2.12	
395.00	6.77	190.11	394.50	-15.13	-1.16	14.17	4.13	4.01	12.13	
486.00	10.38	192.39	484.47	-28.43	-3.87	27.34	3.98	3.97	2.51	
578.00	13.99	196.00	574.38	-47.22	-8.71	46.39	4.01	3.92	3.92	
669.00	16.36	202.68	662.21	-69.62	-16.69	70.05	3.23	2.60	7.34	
764.00	19.53	203.38	752.58	-96.55	-28.15	99.30	3.34	3.34	0.74	
858.00	22.52	204.79	840.31	-127.32	-41.93	133.01	3.23	3.18	1.50	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 314-8 - Slot GM 314-8 (B3)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
Site:	GV 1-8 Pad	MD Reference:	GL 6280' & RKB 24' @ 6304.00usft (H&P 318)
Well:	GM 314-8	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)
953.00	24.81	207.16	927.32	-161.58	-58.66	171.13	2.61	2.41	2.49
1,084.00	26.11	210.35	1,045.60	-210.91	-85.78	227.32	1.44	0.99	2.44
1,179.00	24.92	209.09	1,131.33	-246.44	-106.07	268.12	1.38	-1.25	-1.33
1,273.00	25.87	205.39	1,216.25	-282.28	-124.49	308.39	1.97	1.01	-3.94
1,367.00	27.28	203.39	1,300.32	-320.58	-141.84	350.43	1.78	1.50	-2.13
1,462.00	25.91	202.90	1,385.27	-359.68	-158.56	392.93	1.46	-1.44	-0.52
1,556.00	27.54	205.70	1,469.23	-398.18	-175.98	435.18	2.19	1.73	2.98
1,650.00	25.63	204.63	1,553.28	-436.25	-193.88	477.24	2.09	-2.03	-1.14
1,745.00	26.35	205.80	1,638.68	-473.91	-211.62	518.87	0.93	0.76	1.23
1,839.00	27.57	205.02	1,722.46	-512.40	-229.90	561.49	1.35	1.30	-0.83
1,934.00	26.09	203.02	1,807.23	-551.55	-247.36	604.35	1.82	-1.56	-2.11
2,028.00	27.13	204.38	1,891.27	-590.10	-264.30	646.43	1.28	1.11	1.45
2,123.00	25.75	202.10	1,976.34	-628.95	-281.00	688.69	1.80	-1.45	-2.40
2,217.00	28.48	204.58	2,060.00	-668.26	-298.01	731.50	3.14	2.90	2.64
2,312.00	27.79	203.65	2,143.78	-709.15	-316.32	776.28	0.86	-0.73	-0.98
2,406.00	27.22	207.70	2,227.16	-748.26	-335.10	819.67	2.08	-0.61	4.31
2,500.00	24.78	204.81	2,311.64	-785.18	-353.36	860.86	2.92	-2.60	-3.07
2,595.00	25.13	208.31	2,397.78	-821.01	-371.29	900.91	1.60	0.37	3.68
2,689.00	23.58	207.66	2,483.41	-855.24	-389.48	939.64	1.67	-1.65	-0.69
2,783.00	24.19	209.74	2,569.36	-888.62	-407.76	977.63	1.11	0.65	2.21
2,878.00	24.76	206.31	2,655.83	-923.35	-426.24	1,016.93	1.61	0.60	-3.61
2,972.00	27.09	205.68	2,740.37	-960.29	-444.24	1,058.02	2.50	2.48	-0.67
3,067.00	26.49	205.44	2,825.17	-998.92	-462.71	1,100.84	0.64	-0.63	-0.25
3,161.00	27.76	204.67	2,908.83	-1,037.75	-480.86	1,143.69	1.40	1.35	-0.82
3,255.00	26.70	204.15	2,992.41	-1,076.91	-498.64	1,186.70	1.16	-1.13	-0.55
3,349.00	26.01	200.95	3,076.64	-1,115.43	-514.65	1,228.36	1.68	-0.73	-3.40
3,443.00	24.15	205.05	3,161.78	-1,152.10	-530.16	1,268.15	2.71	-1.98	4.36
3,538.00	22.33	204.10	3,249.07	-1,186.19	-545.76	1,305.62	1.96	-1.92	-1.00
3,632.00	20.69	201.37	3,336.53	-1,217.95	-559.10	1,340.05	2.04	-1.74	-2.90
3,726.00	19.59	201.05	3,424.78	-1,248.13	-570.81	1,372.33	1.18	-1.17	-0.34
3,820.00	19.56	207.50	3,513.35	-1,276.79	-583.74	1,403.77	2.30	-0.03	6.86
3,914.00	17.10	212.65	3,602.58	-1,302.39	-598.47	1,433.21	3.13	-2.62	5.48
4,009.00	15.50	208.99	3,693.76	-1,325.26	-612.15	1,459.73	2.00	-1.68	-3.85
4,103.00	14.68	220.84	3,784.54	-1,345.26	-626.03	1,483.75	3.39	-0.87	12.61
4,197.00	13.99	221.78	3,875.62	-1,362.75	-641.39	1,506.13	0.77	-0.73	1.00
4,292.00	10.76	219.32	3,968.40	-1,378.17	-654.67	1,525.76	3.44	-3.40	-2.59
4,386.00	8.82	213.33	4,061.03	-1,390.98	-664.19	1,541.42	2.33	-2.06	-6.37
4,481.00	8.12	208.48	4,154.99	-1,402.97	-671.39	1,555.33	1.05	-0.74	-5.11
4,575.00	8.14	209.70	4,248.05	-1,414.58	-677.85	1,568.60	0.18	0.02	1.30
4,669.00	5.93	205.06	4,341.33	-1,424.76	-683.21	1,580.09	2.43	-2.35	-4.94
4,763.00	5.80	207.92	4,434.84	-1,433.36	-687.49	1,589.69	0.34	-0.14	3.04
4,858.00	4.70	196.64	4,529.45	-1,441.33	-690.85	1,598.33	1.58	-1.16	-11.87
4,953.00	4.35	193.93	4,624.15	-1,448.56	-692.83	1,605.71	0.43	-0.37	-2.85

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Well:	GM 314-8	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)	
5,047.00	2.24	221.04	4,717.99	-1,453.40	-694.90	1,610.97	2.73	-2.24	28.84	
5,141.00	2.45	225.08	4,811.92	-1,456.21	-697.53	1,614.63	0.28	0.22	4.30	
5,236.00	2.08	212.86	4,906.84	-1,459.09	-699.90	1,618.26	0.64	-0.39	-12.86	
5,330.00	2.61	219.30	5,000.76	-1,462.18	-702.18	1,622.02	0.63	0.56	6.85	
5,424.00	0.69	295.54	5,094.73	-1,463.59	-704.05	1,624.10	2.70	-2.04	81.11	
5,519.00	0.88	281.42	5,189.72	-1,463.20	-705.28	1,624.27	0.28	0.20	-14.86	
5,613.00	0.57	292.22	5,283.71	-1,462.88	-706.42	1,624.47	0.36	-0.33	11.49	
5,707.00	0.57	221.27	5,377.71	-1,463.05	-707.16	1,624.95	0.70	0.00	-75.48	
5,801.00	0.51	199.08	5,471.70	-1,463.80	-707.61	1,625.82	0.23	-0.06	-23.61	
5,896.00	0.62	180.86	5,566.70	-1,464.71	-707.75	1,626.70	0.22	0.12	-19.18	
5,990.00	0.95	131.79	5,660.69	-1,465.74	-707.18	1,627.39	0.76	0.35	-52.20	
6,085.00	0.85	135.39	5,755.68	-1,466.77	-706.10	1,627.85	0.12	-0.11	3.79	
6,179.00	0.48	181.92	5,849.67	-1,467.66	-705.62	1,628.45	0.67	-0.39	49.50	
6,274.00	0.64	178.76	5,944.67	-1,468.59	-705.62	1,629.29	0.17	0.17	-3.33	
6,368.00	0.98	193.91	6,038.66	-1,469.89	-705.80	1,630.55	0.42	0.36	16.12	
6,462.00	1.28	38.66	6,132.65	-1,469.85	-705.34	1,630.31	2.35	0.32	-165.16	
6,557.00	1.36	30.91	6,227.63	-1,468.06	-704.10	1,628.16	0.21	0.08	-8.16	
6,651.00	1.26	61.44	6,321.60	-1,466.61	-702.62	1,626.21	0.74	-0.11	32.48	
6,746.00	0.44	79.45	6,416.59	-1,466.04	-701.34	1,625.15	0.90	-0.86	18.96	
6,797.00	0.44	36.47	6,467.59	-1,465.85	-701.03	1,624.85	0.63	0.00	-84.27	
6,860.00	0.44	36.47	6,530.59	-1,465.46	-700.75	1,624.37	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
120.00	120.00	-0.54	-0.14	First SDI Gyro MWD Survey	
953.00	927.32	-161.58	-58.66	Last SDI Gyro MWD Survey	
1,084.00	1,045.60	-210.91	-85.78	First SDI Production MWD Survey	
6,797.00	6,467.59	-1,465.85	-701.03	Last SDI Production MWD Survey	
6,860.00	6,530.59	-1,465.46	-700.75	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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