



Well Details: GM 312-8

TVD Reference: GL 6175' & RKB 24' @ 6199.00usft
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.00 0.00 1601143.69 2257367.55 39.4543922 -108.1303904 GM 312-8 (B6)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 312-8 - Slot GM 312-8 (B6), True North
 Vertical (TVD) Reference: GL 6175' & RKB 24' @ 6199.00usft
 Section (VS) Reference: Slot - GM 312-8 (B6)(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

14:48, March 26 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

Operator	TEP Rocky Mountain, LLC.
Well Name & No.	GM 312-8
County & State	Garfield County, CO
SDI Job No.	OP.015101
Rig	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 130 feet to a measured depth of 7,125 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

29-Jan-19

Date

Mel Mireles Jr.

Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 312-8 - Slot GM 312-8 (B6)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6175' & RKB 24' @ 6199.00usft
Site:	MV 60-8D Pad	MD Reference:	GL 6175' & RKB 24' @ 6199.00usft
Well:	GM 312-8	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		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 312-8 - Slot GM 312-8 (B6)					
Well Position	+N/-S	0.00 usft	Northing:	1,601,143.69 usft	Latitude:	39.4543923
	+E/-W	0.00 usft	Easting:	2,257,367.55 usft	Longitude:	-108.1303905
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,175.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	1/23/2019	9.47	65.65	51,617

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	277.27	

Survey Program	Date	3/26/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
130.00	310.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
381.00	968.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,074.00	7,125.00	Survey #3 - 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	
130.00	0.97	285.56	129.99	0.30	-1.06	1.09	0.75	0.75	0.00	
First SDI Gyro MWD Survey										
218.00	3.43	290.13	217.92	1.40	-4.25	4.39	2.80	2.80	5.19	
310.00	7.39	274.39	309.50	2.80	-12.74	12.99	4.56	4.30	-17.11	
Last SDI Gyro MWD Survey										
381.00	11.87	276.88	379.48	4.03	-24.55	24.86	6.34	6.31	3.51	
First SDI Surface MWD Survey										

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 312-8 - Slot GM 312-8 (B6)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6175' & RKB 24' @ 6199.00usft
Site:	MV 60-8D Pad	MD Reference:	GL 6175' & RKB 24' @ 6199.00usft
Well:	GM 312-8	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)
473.00	15.37	278.61	468.88	6.99	-46.00	46.51	3.83	3.80	1.88
565.00	18.83	276.83	556.80	10.58	-72.81	73.56	3.80	3.76	-1.93
657.00	21.26	276.51	643.22	14.24	-104.12	105.09	2.64	2.64	-0.35
749.00	23.44	276.70	728.30	18.26	-138.87	140.07	2.37	2.37	0.21
840.00	25.42	275.16	811.15	22.13	-176.30	177.69	2.29	2.18	-1.69
933.00	27.33	278.63	894.47	27.13	-217.30	218.98	2.64	2.05	3.73
968.00	28.29	280.03	925.43	29.78	-233.41	235.30	3.32	2.74	4.00
Last SDI Surface MWD Survey									
1,074.00	29.55	282.07	1,018.21	39.62	-283.71	286.44	1.51	1.19	1.92
First SDI Production MWD Survey									
1,168.00	30.15	281.88	1,099.74	49.33	-329.48	333.07	0.65	0.64	-0.20
1,262.00	31.16	282.14	1,180.60	59.30	-376.35	380.83	1.08	1.07	0.28
1,357.00	31.85	281.15	1,261.60	69.32	-424.98	430.33	0.91	0.73	-1.04
1,451.00	31.97	280.17	1,341.40	78.51	-473.80	479.93	0.57	0.13	-1.04
1,545.00	31.77	277.19	1,421.23	86.00	-522.85	529.53	1.69	-0.21	-3.17
1,639.00	32.55	276.40	1,500.81	91.92	-572.54	579.56	0.94	0.83	-0.84
1,734.00	33.71	275.17	1,580.36	97.14	-624.19	631.47	1.41	1.22	-1.29
1,827.00	32.22	275.60	1,658.39	101.89	-674.57	682.04	1.62	-1.60	0.46
1,921.00	32.66	276.66	1,737.72	107.27	-724.70	732.45	0.76	0.47	1.13
2,016.00	31.51	278.08	1,818.21	113.74	-774.74	782.91	1.45	-1.21	1.49
2,110.00	32.84	277.67	1,897.77	120.59	-824.33	832.96	1.43	1.41	-0.44
2,205.00	33.41	276.79	1,977.33	127.12	-875.83	884.87	0.78	0.60	-0.93
2,299.00	31.44	277.15	2,056.67	133.23	-925.85	935.27	2.11	-2.10	0.38
2,393.00	31.66	278.97	2,136.78	140.13	-974.55	984.45	1.04	0.23	1.94
2,488.00	31.17	279.99	2,217.86	148.28	-1,023.39	1,033.93	0.76	-0.52	1.07
2,582.00	31.77	281.32	2,298.03	157.36	-1,071.61	1,082.91	0.98	0.64	1.41
2,676.00	31.88	281.30	2,377.90	167.08	-1,120.22	1,132.36	0.12	0.12	-0.02
2,770.00	32.03	280.01	2,457.66	176.28	-1,169.11	1,182.02	0.74	0.16	-1.37
2,865.00	31.40	278.97	2,538.47	184.52	-1,218.36	1,231.92	0.88	-0.66	-1.09
2,959.00	29.72	279.62	2,619.41	192.23	-1,265.53	1,279.68	1.82	-1.79	0.69
3,053.00	30.30	279.82	2,700.81	200.17	-1,311.87	1,326.65	0.63	0.62	0.21
3,148.00	31.54	278.87	2,782.31	208.09	-1,360.03	1,375.43	1.40	1.31	-1.00
3,242.00	32.84	279.26	2,861.86	215.98	-1,409.48	1,425.48	1.40	1.38	0.41
3,337.00	33.29	278.38	2,941.47	223.92	-1,460.70	1,477.29	0.69	0.47	-0.93
3,431.00	33.05	281.52	3,020.16	232.80	-1,511.34	1,528.65	1.85	-0.26	3.34
3,525.00	33.55	281.50	3,098.72	243.10	-1,561.91	1,580.12	0.53	0.53	-0.02
3,620.00	33.31	280.76	3,178.01	253.20	-1,613.26	1,632.33	0.50	-0.25	-0.78
3,714.00	31.92	281.97	3,257.18	263.18	-1,662.93	1,682.87	1.63	-1.48	1.29
3,808.00	30.72	283.51	3,337.49	273.94	-1,710.59	1,731.50	1.53	-1.28	1.64
3,902.00	29.45	280.36	3,418.83	283.71	-1,756.67	1,778.45	2.16	-1.35	-3.35
3,996.00	27.41	280.32	3,501.49	291.74	-1,800.69	1,823.14	2.17	-2.17	-0.04
4,091.00	27.23	279.39	3,585.89	299.20	-1,843.65	1,866.69	0.49	-0.19	-0.98
4,185.00	25.81	279.27	3,670.00	306.01	-1,885.07	1,908.64	1.51	-1.51	-0.13
4,279.00	24.56	279.52	3,755.06	312.54	-1,924.53	1,948.61	1.33	-1.33	0.27

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 312-8 - Slot GM 312-8 (B6)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6175' & RKB 24' @ 6199.00usft
Site:	MV 60-8D Pad	MD Reference:	GL 6175' & RKB 24' @ 6199.00usft
Well:	GM 312-8	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)	
4,374.00	22.79	280.18	3,842.06	319.05	-1,962.11	1,986.72	1.88	-1.86	0.69	
4,468.00	20.50	280.49	3,929.43	325.27	-1,996.22	2,021.34	2.44	-2.44	0.33	
4,562.00	20.29	279.93	4,017.53	331.08	-2,028.46	2,054.05	0.30	-0.22	-0.60	
4,656.00	18.46	280.34	4,106.21	336.56	-2,059.16	2,085.20	1.95	-1.95	0.44	
4,751.00	16.18	279.23	4,196.89	341.38	-2,087.02	2,113.45	2.42	-2.40	-1.17	
4,845.00	15.00	278.86	4,287.43	345.36	-2,111.97	2,138.70	1.26	-1.26	-0.39	
4,940.00	13.18	276.64	4,379.57	348.50	-2,134.88	2,161.82	2.00	-1.92	-2.34	
5,034.00	13.39	275.22	4,471.06	350.73	-2,156.36	2,183.41	0.41	0.22	-1.51	
5,128.00	12.15	274.27	4,562.73	352.46	-2,177.07	2,204.17	1.34	-1.32	-1.01	
5,223.00	10.38	275.34	4,655.90	354.00	-2,195.56	2,222.71	1.88	-1.86	1.13	
5,317.00	9.36	276.51	4,748.50	355.65	-2,211.58	2,238.81	1.11	-1.09	1.24	
5,411.00	7.06	281.31	4,841.53	357.65	-2,224.85	2,252.22	2.55	-2.45	5.11	
5,415.15	6.95	281.31	4,845.66	357.75	-2,225.34	2,252.73	2.67	-2.67	-0.01	
GM 312-8 BTV										
5,506.00	4.52	281.30	4,936.04	359.53	-2,234.24	2,261.78	2.67	-2.67	-0.01	
5,600.00	2.10	296.85	5,029.88	361.04	-2,239.41	2,267.10	2.72	-2.57	16.54	
5,694.00	0.20	321.33	5,123.86	361.94	-2,241.05	2,268.84	2.04	-2.02	26.04	
5,789.00	0.34	189.37	5,218.86	361.79	-2,241.20	2,268.97	0.52	0.15	-138.91	
5,883.00	0.79	209.10	5,312.85	360.95	-2,241.56	2,269.22	0.51	0.48	20.99	
5,977.00	1.59	215.34	5,406.83	359.32	-2,242.63	2,270.07	0.86	0.85	6.64	
6,071.00	0.18	178.22	5,500.82	358.11	-2,243.38	2,270.66	1.54	-1.50	-39.49	
6,165.00	0.68	199.66	5,594.81	357.44	-2,243.56	2,270.76	0.55	0.53	22.81	
6,260.00	0.86	187.92	5,689.81	356.20	-2,243.85	2,270.89	0.25	0.19	-12.36	
6,354.00	1.01	197.38	5,783.79	354.71	-2,244.20	2,271.04	0.23	0.16	10.06	
6,449.00	1.32	193.60	5,878.77	352.85	-2,244.70	2,271.31	0.34	0.33	-3.98	
6,543.00	1.39	184.51	5,972.75	350.66	-2,245.05	2,271.38	0.24	0.07	-9.67	
6,637.00	1.77	194.12	6,066.71	348.12	-2,245.49	2,271.49	0.49	0.40	10.22	
6,731.00	2.23	198.49	6,160.65	344.97	-2,246.43	2,272.02	0.52	0.49	4.65	
6,825.00	2.21	208.38	6,254.58	341.64	-2,247.87	2,273.03	0.41	-0.02	10.52	
6,920.00	2.26	226.83	6,349.51	338.75	-2,250.10	2,274.88	0.76	0.05	19.42	
7,014.00	2.99	228.85	6,443.41	335.87	-2,253.30	2,277.69	0.78	0.78	2.15	
7,065.00	2.64	232.89	6,494.35	334.29	-2,255.24	2,279.41	0.79	-0.69	7.92	
Last SDI Production MWD Survey										
7,125.00	2.64	232.89	6,554.29	332.62	-2,257.44	2,281.39	0.00	0.00	0.00	
Projection to TD - GM 312-8 PBHL										



Scientific Drilling, Intl
Survey Report

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 312-8 - Slot GM 312-8 (B6)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6175' & RKB 24' @ 6199.00usft
Site:	MV 60-8D Pad	MD Reference:	GL 6175' & RKB 24' @ 6199.00usft
Well:	GM 312-8	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
130.00	129.99	0.30	-1.06	First SDI Gyro MWD Survey
310.00	309.50	2.80	-12.74	Last SDI Gyro MWD Survey
381.00	379.48	4.03	-24.55	First SDI Surface MWD Survey
968.00	925.43	29.78	-233.41	Last SDI Surface MWD Survey
1,074.00	1,018.21	39.62	-283.71	First SDI Production MWD Survey
7,065.00	6,494.35	334.29	-2,255.24	Last SDI Production MWD Survey
7,125.00	6,554.29	332.62	-2,257.44	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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