



Well Details: GM 322-8

TVD Reference: GL 6175' & RKB 24' @ 6199.00usft
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.00 0.00 1601113.98 2257363.43 39.4543104 -108.1304020 GM 322-8 (B2)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 322-8 - Slot GM 322-8 (B2), True North
 Vertical (TVD) Reference: GL 6175' & RKB 24' @ 6199.00usft
 Section (VS) Reference: Slot - GM 322-8 (B2)(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

15:20, January 29 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 322-8
County & State	Garfield County, CO
SDI Job No.	OP.015088
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 7,140 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 322-8 - Slot GM 322-8 (B2)
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 322-8	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 322-8 - Slot GM 322-8 (B2)				
Well Position	+N/-S	0.00 usft	Northing:	1,601,113.98 usft	Latitude:	39.4543104
	+E/-W	0.00 usft	Easting:	2,257,363.43 usft	Longitude:	-108.1304020
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	1/13/2019	9.47	65.67	51,612

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	256.37	

Survey Program	Date	1/29/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
130.00	401.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
473.00	966.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,078.00	7,140.00	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	0.79	244.16	130.00	-0.39	-0.81	0.88	0.61	0.61	0.00	
First SDI Gyro MWD Survey										
218.00	3.26	240.56	217.93	-1.89	-3.53	3.88	2.81	2.81	-4.09	
310.00	6.60	239.41	309.58	-5.86	-10.36	11.45	3.63	3.63	-1.25	
401.00	8.27	247.32	399.81	-11.05	-20.90	22.92	2.15	1.84	8.69	
Last SDI Gyro MWD Survey										
473.00	10.12	257.60	470.89	-14.40	-31.86	34.36	3.43	2.57	14.28	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 322-8 - Slot GM 322-8 (B2)
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 322-8	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)
First SDI Surface MWD Survey									
565.00	12.83	258.42	561.04	-18.19	-49.77	52.65	2.95	2.95	0.89
657.00	16.62	258.56	650.01	-22.85	-72.68	76.02	4.12	4.12	0.15
749.00	19.20	258.05	737.54	-28.59	-100.38	104.29	2.81	2.80	-0.55
840.00	22.51	257.69	822.57	-35.41	-132.04	136.67	3.64	3.64	-0.40
933.00	27.22	260.55	906.93	-42.70	-170.44	175.70	5.23	5.06	3.08
966.00	27.96	262.17	936.17	-44.99	-185.55	190.93	3.19	2.24	4.91
Last SDI Surface MWD Survey									
1,078.00	27.33	262.35	1,035.39	-51.99	-237.04	242.62	0.57	-0.56	0.16
First SDI Production MWD Survey									
1,172.00	28.88	262.03	1,118.30	-58.01	-280.91	286.67	1.66	1.65	-0.34
1,267.00	32.04	263.08	1,200.18	-64.23	-328.66	334.54	3.37	3.33	1.11
1,361.00	34.69	262.00	1,278.68	-70.96	-379.91	385.94	2.89	2.82	-1.15
1,455.00	36.93	260.66	1,354.91	-79.27	-434.27	440.72	2.52	2.38	-1.43
1,549.00	37.66	260.53	1,429.69	-88.58	-490.46	497.52	0.78	0.78	-0.14
1,644.00	38.88	261.86	1,504.27	-97.57	-548.61	556.15	1.55	1.28	1.40
1,738.00	38.78	258.77	1,577.50	-107.48	-606.69	614.94	2.06	-0.11	-3.29
1,832.00	37.76	257.08	1,651.30	-119.65	-663.62	673.13	1.55	-1.09	-1.80
1,927.00	38.11	256.01	1,726.23	-133.24	-720.42	731.53	0.78	0.37	-1.13
2,021.00	37.93	255.36	1,800.29	-147.56	-776.52	789.42	0.47	-0.19	-0.69
2,116.00	37.38	254.86	1,875.50	-162.47	-832.61	847.44	0.66	-0.58	-0.53
2,210.00	37.84	255.31	1,949.96	-177.23	-888.04	904.80	0.57	0.49	0.48
2,304.00	38.18	254.33	2,024.03	-192.39	-943.90	962.66	0.74	0.36	-1.04
2,399.00	37.53	254.32	2,099.03	-208.14	-1,000.03	1,020.92	0.68	-0.68	-0.01
2,493.00	38.51	255.82	2,173.09	-223.05	-1,055.97	1,078.80	1.43	1.04	1.60
2,587.00	38.34	256.27	2,246.73	-237.14	-1,112.67	1,137.22	0.35	-0.18	0.48
2,681.00	38.59	255.63	2,320.33	-251.34	-1,169.39	1,195.69	0.50	0.27	-0.68
2,776.00	37.58	256.26	2,395.10	-265.57	-1,226.23	1,254.28	1.14	-1.06	0.66
2,869.00	37.37	256.00	2,468.91	-279.13	-1,281.17	1,310.86	0.28	-0.23	-0.28
2,964.00	36.04	257.29	2,545.07	-292.26	-1,336.41	1,367.64	1.62	-1.40	1.36
3,058.00	34.82	258.73	2,621.67	-303.59	-1,389.70	1,422.11	1.57	-1.30	1.53
3,152.00	33.95	259.38	2,699.24	-313.67	-1,441.82	1,475.13	1.00	-0.93	0.69
3,247.00	32.18	259.56	2,778.85	-323.14	-1,492.78	1,526.89	1.87	-1.86	0.19
3,341.00	30.44	260.06	2,859.16	-331.79	-1,540.85	1,575.64	1.87	-1.85	0.53
3,435.00	28.74	258.01	2,940.90	-340.60	-1,586.42	1,622.00	2.10	-1.81	-2.18
3,530.00	26.86	256.53	3,024.93	-350.34	-1,629.63	1,666.30	2.11	-1.98	-1.56
3,624.00	25.93	259.14	3,109.14	-359.16	-1,670.47	1,708.06	1.58	-0.99	2.78
3,718.00	24.21	260.14	3,194.28	-366.33	-1,709.65	1,747.83	1.88	-1.83	1.06
3,813.00	21.74	260.56	3,281.73	-372.56	-1,746.20	1,784.82	2.61	-2.60	0.44
3,907.00	21.38	261.80	3,369.16	-377.85	-1,780.33	1,819.23	0.62	-0.38	1.32
4,001.00	19.85	260.09	3,457.14	-383.04	-1,813.01	1,852.22	1.75	-1.63	-1.82
4,095.00	18.07	258.35	3,546.03	-388.74	-1,843.02	1,882.72	1.99	-1.89	-1.85
4,190.00	16.62	254.25	3,636.72	-395.40	-1,870.52	1,911.02	2.00	-1.53	-4.32
4,296.00	15.33	257.31	3,738.62	-402.59	-1,898.79	1,940.18	1.45	-1.22	2.89

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 322-8 - Slot GM 322-8 (B2)
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 322-8	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)	
4,390.00	14.35	262.30	3,829.49	-406.88	-1,922.45	1,964.19	1.71	-1.04	5.31	
4,484.00	12.94	264.89	3,920.83	-409.38	-1,944.48	1,986.19	1.63	-1.50	2.76	
4,579.00	11.32	267.55	4,013.71	-410.73	-1,964.39	2,005.86	1.80	-1.71	2.80	
4,673.00	9.77	265.07	4,106.12	-411.81	-1,981.56	2,022.79	1.72	-1.65	-2.64	
4,767.00	8.05	266.13	4,198.98	-412.94	-1,996.07	2,037.17	1.84	-1.83	1.13	
4,861.00	7.20	264.81	4,292.15	-413.91	-2,008.50	2,049.48	0.92	-0.90	-1.40	
4,956.00	5.91	265.75	4,386.53	-414.82	-2,019.31	2,060.19	1.36	-1.36	0.99	
5,050.00	4.77	268.58	4,480.12	-415.27	-2,028.04	2,068.79	1.24	-1.21	3.01	
5,145.00	4.19	270.42	4,574.83	-415.34	-2,035.46	2,076.02	0.63	-0.61	1.94	
5,239.00	3.40	270.94	4,668.62	-415.27	-2,041.68	2,082.04	0.84	-0.84	0.55	
5,333.00	2.23	276.92	4,762.51	-415.01	-2,046.29	2,086.46	1.28	-1.24	6.36	
5,395.48	1.18	298.64	4,824.96	-414.55	-2,048.06	2,088.07	1.94	-1.68	34.77	
GM 322-8 BTV										
5,427.00	0.84	328.35	4,856.47	-414.20	-2,048.46	2,088.38	1.94	-1.08	94.26	
5,521.00	0.62	341.72	4,950.47	-413.13	-2,048.99	2,088.64	0.29	-0.23	14.22	
5,616.00	0.51	321.72	5,045.46	-412.31	-2,049.41	2,088.85	0.24	-0.12	-21.05	
5,710.00	0.35	336.19	5,139.46	-411.72	-2,049.78	2,089.08	0.20	-0.17	15.39	
5,805.00	0.42	252.14	5,234.46	-411.56	-2,050.23	2,089.48	0.55	0.07	-88.47	
5,899.00	0.31	250.92	5,328.46	-411.75	-2,050.80	2,090.07	0.12	-0.12	-1.30	
5,993.00	0.84	252.97	5,422.45	-412.03	-2,051.70	2,091.01	0.56	0.56	2.18	
6,087.00	0.64	259.02	5,516.44	-412.34	-2,052.87	2,092.23	0.23	-0.21	6.44	
6,182.00	0.98	249.40	5,611.43	-412.72	-2,054.16	2,093.56	0.38	0.36	-10.13	
6,276.00	1.02	227.41	5,705.42	-413.57	-2,055.52	2,095.09	0.41	0.04	-23.39	
6,370.00	1.19	225.04	5,799.40	-414.83	-2,056.83	2,096.66	0.19	0.18	-2.52	
6,464.00	1.04	219.78	5,893.38	-416.17	-2,058.07	2,098.18	0.19	-0.16	-5.60	
6,559.00	1.42	210.46	5,988.36	-417.85	-2,059.22	2,099.69	0.45	0.40	-9.81	
6,653.00	2.09	210.58	6,082.32	-420.33	-2,060.68	2,101.69	0.71	0.71	0.13	
6,747.00	1.92	209.42	6,176.26	-423.18	-2,062.32	2,103.96	0.19	-0.18	-1.23	
6,841.00	1.70	212.85	6,270.21	-425.72	-2,063.85	2,106.05	0.26	-0.23	3.65	
6,936.00	1.99	222.44	6,365.16	-428.12	-2,065.73	2,108.44	0.44	0.31	10.09	
7,030.00	1.94	216.78	6,459.11	-430.60	-2,067.78	2,111.02	0.21	-0.05	-6.02	
Last SDI Production MWD Survey										
7,140.00	1.94	216.78	6,569.05	-433.58	-2,070.01	2,113.89	0.00	0.00	0.00	
Projection to TD - GM 322-8 PBHL										



Scientific Drilling, Intl
Survey Report

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 322-8 - Slot GM 322-8 (B2)
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 322-8	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	130.00	-0.39	-0.81	First SDI Gyro MWD Survey
401.00	399.81	-11.05	-20.90	Last SDI Gyro MWD Survey
473.00	470.89	-14.40	-31.86	First SDI Surface MWD Survey
966.00	936.17	-44.99	-185.55	Last SDI Surface MWD Survey
1,078.00	1,035.39	-51.99	-237.04	First SDI Production MWD Survey
7,030.00	6,459.11	-430.60	-2,067.78	Last SDI Production MWD Survey
7,140.00	6,569.05	-433.58	-2,070.01	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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