



Well Details: GM 343-8

TVD Reference: GL 6175' & RKB 24' @ 6199.00usft
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.00 0.00 1601142.36 2257377.46 39.4543894 -108.1303552 GM 343-8 (A6)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 343-8 - Slot GM 343-8 (A6), True North
 Vertical (TVD) Reference: GL 6175' & RKB 24' @ 6199.00usft
 Section (VS) Reference: Slot - GM 343-8 (A6)(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

17:37, January 16 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 343-8
County & State	Garfield County, CO
SDI Job No.	OP.014974
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 7,230 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

16-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 343-8 - Slot GM 343-8 (A6)
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 343-8	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 343-8 - Slot GM 343-8 (A6)					
Well Position	+N/-S	0.00 usft	Northing:	1,601,142.36 usft	Latitude:	39.4543894
	+E/-W	0.00 usft	Easting:	2,257,377.46 usft	Longitude:	-108.1303553
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	12/29/2018	9.48	65.67	51,616

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	129.61	

Survey Program	Date	1/16/2019			
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	964.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,079.00	7,230.00	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	1.06	68.12	129.99	0.45	1.12	0.57	0.82	0.82	0.00	
First SDI Gyro MWD Survey										
218.00	2.90	117.86	217.94	-0.29	3.84	3.14	2.68	2.09	56.52	
310.00	7.04	130.52	309.58	-5.04	10.19	11.06	4.63	4.50	13.76	
401.00	11.26	133.07	399.40	-14.74	20.92	25.51	4.66	4.64	2.80	
Last SDI Gyro MWD Survey										
473.00	13.74	132.16	469.69	-25.28	32.40	41.07	3.46	3.44	-1.26	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 343-8 - Slot GM 343-8 (A6)
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Site:	MV 60-8D Pad	MD Reference:	GL 6175' & RKB 24' @ 6199.00usft
Well:	GM 343-8	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	16.58	130.45	558.48	-41.13	50.49	65.12	3.12	3.09	-1.86
657.00	20.08	132.26	645.80	-60.27	72.17	94.03	3.85	3.80	1.97
749.00	23.53	132.58	731.20	-83.33	97.39	128.16	3.75	3.75	0.35
840.00	26.38	131.33	813.70	-108.97	125.95	166.51	3.18	3.13	-1.37
933.00	30.06	129.64	895.63	-137.49	159.42	210.47	4.05	3.96	-1.82
964.00	30.85	129.33	922.35	-147.48	171.54	226.18	2.60	2.55	-1.00
Last SDI Surface MWD Survey									
1,079.00	31.59	128.21	1,020.70	-184.80	218.02	285.78	0.82	0.64	-0.97
First SDI Production MWD Survey									
1,173.00	29.30	127.77	1,101.73	-214.12	255.55	333.39	2.45	-2.44	-0.47
1,267.00	29.92	131.57	1,183.46	-243.77	291.27	379.81	2.10	0.66	4.04
1,361.00	29.88	130.32	1,264.95	-274.47	326.67	426.66	0.66	-0.04	-1.33
1,456.00	29.75	130.72	1,347.38	-305.16	362.57	473.88	0.25	-0.14	0.42
1,550.00	32.04	129.35	1,428.04	-336.19	399.54	522.14	2.55	2.44	-1.46
1,644.00	30.41	126.74	1,508.42	-366.23	437.89	570.84	2.25	-1.73	-2.78
1,738.00	30.98	126.41	1,589.25	-394.82	476.42	618.76	0.63	0.61	-0.35
1,833.00	32.01	129.26	1,670.26	-425.27	515.60	668.35	1.91	1.08	3.00
1,927.00	30.50	128.97	1,750.61	-456.04	553.43	717.12	1.61	-1.61	-0.31
2,022.00	29.44	131.64	1,832.91	-486.72	589.63	764.56	1.79	-1.12	2.81
2,116.00	31.54	131.02	1,913.91	-518.21	625.45	812.23	2.26	2.23	-0.66
2,210.00	30.34	131.12	1,994.53	-549.96	661.88	860.55	1.28	-1.28	0.11
2,304.00	31.80	131.07	2,075.05	-581.85	698.44	909.04	1.55	1.55	-0.05
2,399.00	30.58	131.67	2,156.31	-614.36	735.36	958.21	1.33	-1.28	0.63
2,493.00	31.42	126.63	2,236.90	-644.88	772.89	1,006.59	2.90	0.89	-5.36
2,588.00	30.37	126.05	2,318.42	-673.79	812.18	1,055.29	1.15	-1.11	-0.61
2,682.00	31.42	128.87	2,399.09	-703.15	850.48	1,103.51	1.90	1.12	3.00
2,776.00	28.16	126.67	2,480.66	-731.78	887.35	1,150.17	3.66	-3.47	-2.34
2,870.00	27.33	127.64	2,563.85	-758.21	922.23	1,193.89	1.01	-0.88	1.03
2,965.00	30.22	129.19	2,647.11	-786.64	958.04	1,239.60	3.14	3.04	1.63
3,059.00	30.04	131.75	2,728.41	-817.25	993.93	1,286.77	1.38	-0.19	2.72
3,153.00	30.86	130.36	2,809.45	-848.53	1,029.85	1,334.39	1.15	0.87	-1.48
3,247.00	30.74	131.38	2,890.19	-880.03	1,066.25	1,382.51	0.57	-0.13	1.09
3,342.00	31.16	127.84	2,971.67	-911.16	1,103.88	1,431.35	1.97	0.44	-3.73
3,436.00	32.99	130.03	3,051.32	-942.54	1,142.69	1,481.25	2.31	1.95	2.33
3,530.00	33.48	129.23	3,129.95	-975.40	1,182.37	1,532.77	0.70	0.52	-0.85
3,625.00	34.14	129.78	3,208.88	-1,009.03	1,223.15	1,585.63	0.77	0.69	0.58
3,719.00	33.06	129.33	3,287.17	-1,042.15	1,263.26	1,637.65	1.18	-1.15	-0.48
3,813.00	32.18	129.73	3,366.34	-1,074.40	1,302.34	1,688.32	0.96	-0.94	0.43
3,907.00	30.99	130.24	3,446.42	-1,106.04	1,340.06	1,737.55	1.30	-1.27	0.54
4,002.00	29.27	131.94	3,528.58	-1,137.36	1,376.01	1,785.22	2.02	-1.81	1.79
4,096.00	28.56	130.63	3,610.86	-1,167.35	1,410.16	1,830.64	1.01	-0.76	-1.39
4,191.00	26.99	129.62	3,694.92	-1,195.89	1,444.00	1,874.91	1.73	-1.65	-1.06
4,285.00	26.85	131.76	3,778.73	-1,223.63	1,476.27	1,917.45	1.04	-0.15	2.28

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 343-8 - Slot GM 343-8 (A6)
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 343-8	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)
4,379.00	24.17	132.33	3,863.56	-1,250.73	1,506.33	1,957.90	2.86	-2.85	0.61
4,474.00	23.79	131.95	3,950.36	-1,276.64	1,534.96	1,996.47	0.43	-0.40	-0.40
4,568.00	23.56	133.05	4,036.45	-1,302.13	1,562.79	2,034.16	0.53	-0.24	1.17
4,662.00	21.10	133.80	4,123.39	-1,326.67	1,588.74	2,069.80	2.63	-2.62	0.80
4,756.00	18.72	131.16	4,211.77	-1,348.32	1,612.31	2,101.76	2.71	-2.53	-2.81
4,851.00	17.50	126.53	4,302.07	-1,366.85	1,635.26	2,131.26	1.99	-1.28	-4.87
4,945.00	15.18	127.47	4,392.27	-1,382.76	1,656.39	2,157.68	2.48	-2.47	1.00
5,039.00	13.31	127.92	4,483.37	-1,396.89	1,674.70	2,180.79	1.99	-1.99	0.48
5,134.00	11.85	124.89	4,576.09	-1,409.19	1,691.33	2,201.44	1.69	-1.54	-3.19
5,228.00	9.57	123.17	4,668.45	-1,418.99	1,705.79	2,218.83	2.45	-2.43	-1.83
5,322.00	9.12	123.80	4,761.20	-1,427.41	1,718.52	2,234.01	0.49	-0.48	0.67
5,364.10	8.36	118.20	4,802.81	-1,430.71	1,723.98	2,240.32	2.72	-1.82	-13.31
GM 343-8 BTV									
5,417.00	7.53	109.66	4,855.20	-1,433.69	1,730.64	2,247.35	2.72	-1.56	-16.14
5,511.00	6.26	104.20	4,948.52	-1,437.02	1,741.41	2,257.77	1.52	-1.35	-5.81
5,605.00	5.72	98.32	5,042.01	-1,438.96	1,751.01	2,266.40	0.87	-0.57	-6.26
5,699.00	5.22	101.82	5,135.58	-1,440.51	1,759.83	2,274.19	0.64	-0.53	3.72
5,793.00	2.67	81.85	5,229.36	-1,441.08	1,766.18	2,279.44	3.04	-2.71	-21.24
5,888.00	3.07	36.41	5,324.25	-1,438.72	1,769.88	2,280.79	2.36	0.42	-47.83
5,982.00	1.85	1.15	5,418.16	-1,435.17	1,771.41	2,279.70	2.01	-1.30	-37.51
6,077.00	1.15	307.66	5,513.14	-1,433.06	1,770.69	2,277.80	1.57	-0.74	-56.31
6,171.00	0.78	306.69	5,607.12	-1,432.10	1,769.43	2,276.22	0.39	-0.39	-1.03
6,265.00	1.21	299.88	5,701.11	-1,431.22	1,768.05	2,274.60	0.47	0.46	-7.24
6,359.00	1.30	251.48	5,795.09	-1,431.07	1,766.18	2,273.06	1.10	0.10	-51.49
6,454.00	1.36	245.69	5,890.06	-1,431.87	1,764.13	2,271.99	0.15	0.06	-6.09
6,548.00	1.27	233.56	5,984.04	-1,432.95	1,762.28	2,271.25	0.31	-0.10	-12.90
6,642.00	1.60	226.82	6,078.01	-1,434.47	1,760.48	2,270.84	0.39	0.35	-7.17
6,736.00	1.64	238.95	6,171.97	-1,436.06	1,758.37	2,270.23	0.37	0.04	12.90
6,831.00	2.55	228.98	6,266.91	-1,438.15	1,755.61	2,269.43	1.03	0.96	-10.49
6,925.00	1.71	228.70	6,360.84	-1,440.45	1,752.98	2,268.87	0.89	-0.89	-0.30
7,019.00	1.88	225.81	6,454.79	-1,442.45	1,750.82	2,268.48	0.20	0.18	-3.07
7,114.00	2.55	217.34	6,549.72	-1,445.21	1,748.42	2,268.40	0.78	0.71	-8.92
7,170.00	2.29	207.23	6,605.67	-1,447.20	1,747.16	2,268.69	0.89	-0.46	-18.05
Last SDI Production MWD Surve									
7,230.00	2.29	207.23	6,665.63	-1,449.33	1,746.06	2,269.20	0.00	0.00	0.00
Projection to TD - GM 343-8 PBHL									



Scientific Drilling, Intl
Survey Report

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 343-8 - Slot GM 343-8 (A6)
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 343-8	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	0.45	1.12	First SDI Gyro MWD Survey
401.00	399.40	-14.74	20.92	Last SDI Gyro MWD Survey
473.00	469.69	-25.28	32.40	First SDI Surface MWD Survey
964.00	922.35	-147.48	171.54	Last SDI Surface MWD Survey
1,079.00	1,020.70	-184.80	218.02	First SDI Production MWD Survey
7,170.00	6,605.67	-1,447.20	1,747.16	Last SDI Production MWD Surve
7,230.00	6,665.63	-1,449.33	1,746.06	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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