



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 34-5
County & State	Garfield County, CO
SDI Job No.	OP.005055
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 123 feet to a measured depth of 6,938 feet is true and correct as determined from all available records.


Signature

27-Oct-17
Date

Mel Mireles Jr.
Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 34-5 - Slot B14 (GM 34-5)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
Site:	MV 34-5 Pad	MD Reference:	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
Well:	GM 34-5	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 34-5 Pad			
Site Position:		Northing:	1,603,476.79 usft	Latitude:	39.4609066
From:	Map	Easting:	2,258,772.10 usft	Longitude:	-108.1256571
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.66 °

Well		GM 34-5 - Slot B14 (GM 34-5)				
Well Position	+N/-S	0.00 usft	Northing:	1,603,477.59 usft	Latitude:	39.4609098
	+E/-W	0.00 usft	Easting:	2,258,784.60 usft	Longitude:	-108.1256129
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	5,977.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/14/2017	9.57	65.77	51,755

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	282.62	

Survey Program	Date	10/27/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
123.00	674.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
751.00	971.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,074.00	6,938.00	Survey #3 - Production MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	

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	
123.00	0.70	314.91	123.00	0.53	-0.53	0.64	0.57	0.57	0.00	
First SDI Gyro MWD Survey										
214.00	3.17	295.31	213.94	2.00	-3.20	3.56	2.77	2.71	-21.54	
306.00	3.87	294.87	305.76	4.39	-8.32	9.08	0.76	0.76	-0.48	
397.00	2.29	290.21	396.63	6.31	-12.81	13.88	1.76	-1.74	-5.12	
489.00	5.98	295.22	488.38	8.99	-18.87	20.38	4.03	4.01	5.45	
581.00	11.88	293.38	579.22	14.79	-31.91	34.37	6.42	6.41	-2.00	
674.00	17.60	285.91	669.13	22.45	-54.24	57.84	6.47	6.15	-8.03	

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Site:	MV 34-5 Pad	MD Reference:	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
Well:	GM 34-5	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)
Last SDI Gyro MWD Survey									
751.00	23.08	280.98	741.31	28.53	-80.27	84.57	7.45	7.12	-6.40
First SDI Surface MWD Survey									
842.00	26.72	281.28	823.83	35.93	-117.86	122.86	4.00	4.00	0.33
936.00	30.18	282.90	906.47	45.34	-161.63	167.63	3.77	3.68	1.72
971.00	31.04	282.91	936.59	49.32	-179.00	185.45	2.46	2.46	0.03
Last SDI Surface MWD Survey									
1,074.00	31.55	282.49	1,024.61	61.08	-231.19	238.95	0.54	0.50	-0.41
First SDI Production MWD Survey									
1,169.00	32.89	282.38	1,104.98	71.99	-280.66	289.60	1.41	1.41	-0.12
1,264.00	34.02	283.44	1,184.24	83.69	-331.70	341.97	1.34	1.19	1.12
1,358.00	34.85	281.46	1,261.77	95.14	-383.60	395.12	1.48	0.88	-2.11
1,453.00	35.93	280.94	1,339.21	105.82	-437.57	450.12	1.18	1.14	-0.55
1,548.00	34.12	279.22	1,417.01	115.38	-491.24	504.58	2.17	-1.91	-1.81
1,642.00	34.48	280.63	1,494.66	124.52	-543.42	557.49	0.93	0.38	1.50
1,737.00	35.29	278.68	1,572.59	133.62	-596.98	611.75	1.45	0.85	-2.05
1,831.00	34.84	279.80	1,649.53	142.29	-650.28	665.65	0.84	-0.48	1.19
1,926.00	34.09	280.56	1,727.85	151.78	-703.19	719.36	0.91	-0.79	0.80
2,021.00	34.13	281.46	1,806.51	161.96	-755.48	772.62	0.53	0.04	0.95
2,115.00	35.07	284.06	1,883.89	173.76	-807.53	825.98	1.86	1.00	2.77
2,210.00	34.73	285.99	1,961.81	187.85	-860.02	880.28	1.22	-0.36	2.03
2,304.00	35.57	284.74	2,038.67	202.18	-912.20	934.34	1.18	0.89	-1.33
2,399.00	34.56	284.61	2,116.42	216.01	-965.00	988.88	1.07	-1.06	-0.14
2,493.00	33.24	284.19	2,194.44	229.05	-1,015.78	1,041.28	1.43	-1.40	-0.45
2,588.00	29.54	283.29	2,275.52	240.82	-1,063.83	1,090.74	3.93	-3.89	-0.95
2,682.00	26.61	282.20	2,358.45	250.59	-1,106.97	1,134.97	3.16	-3.12	-1.16
2,777.00	23.81	280.51	2,444.40	258.59	-1,146.62	1,175.42	3.04	-2.95	-1.78
2,871.00	19.93	278.28	2,531.62	264.36	-1,181.15	1,210.37	4.22	-4.13	-2.37
2,966.00	18.73	284.76	2,621.27	270.58	-1,211.92	1,241.76	2.59	-1.26	6.82
3,060.00	18.56	285.96	2,710.34	278.54	-1,240.90	1,271.78	0.45	-0.18	1.28
3,155.00	18.25	286.97	2,800.48	287.04	-1,269.67	1,301.70	0.47	-0.33	1.06
3,249.00	17.35	286.97	2,889.98	295.42	-1,297.15	1,330.36	0.96	-0.96	0.00
3,344.00	15.75	283.86	2,981.04	302.65	-1,323.22	1,357.37	1.92	-1.68	-3.27
3,438.00	13.67	281.67	3,071.96	307.95	-1,346.48	1,381.24	2.29	-2.21	-2.33
3,532.00	11.13	278.58	3,163.76	311.55	-1,366.34	1,401.40	2.79	-2.70	-3.29
3,627.00	7.98	280.72	3,257.43	314.15	-1,381.89	1,417.14	3.34	-3.32	2.25
3,721.00	5.09	285.04	3,350.81	316.44	-1,392.33	1,427.83	3.12	-3.07	4.60
3,816.00	2.88	310.24	3,445.58	319.08	-1,398.22	1,434.15	2.92	-2.33	26.53
3,841.99	2.79	309.39	3,471.54	319.90	-1,399.21	1,435.30	0.39	-0.35	-3.29
GM 334-5 MVRD									
3,872.26	2.68	308.32	3,501.77	320.81	-1,400.33	1,436.59	0.39	-0.35	-3.53
GM 34-5 MVRD									
3,910.00	2.55	306.86	3,539.47	321.86	-1,401.70	1,438.15	0.39	-0.35	-3.86
4,005.00	2.55	296.36	3,634.38	324.07	-1,405.28	1,442.13	0.49	0.00	-11.05

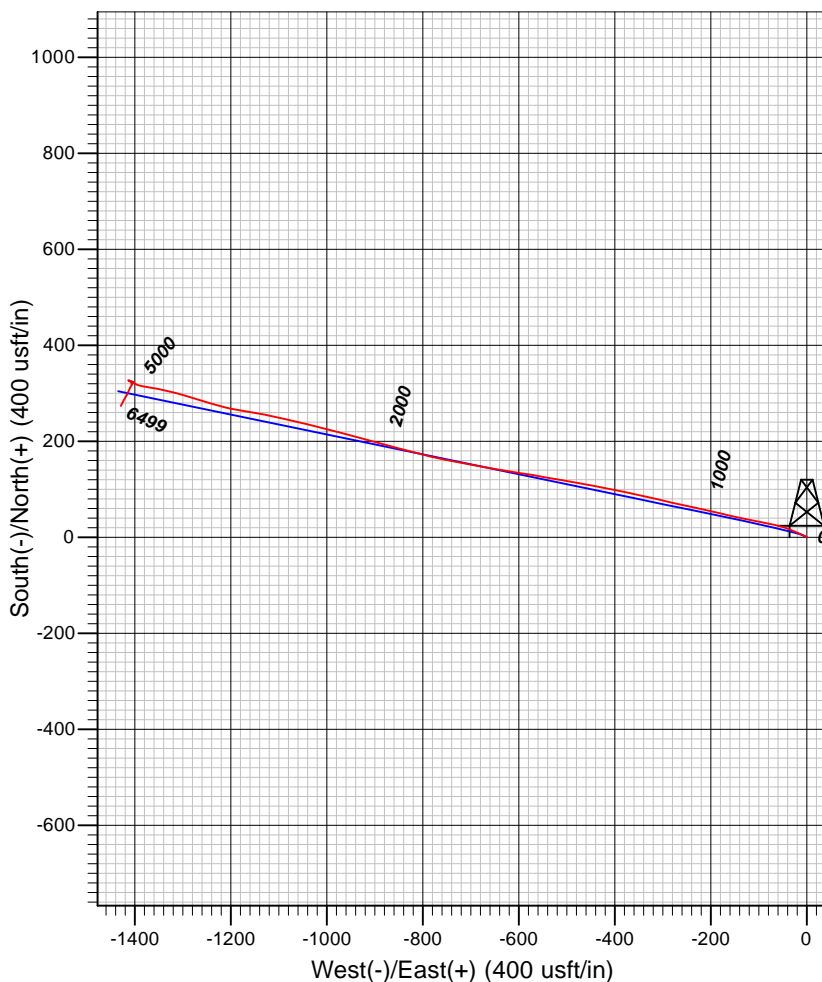
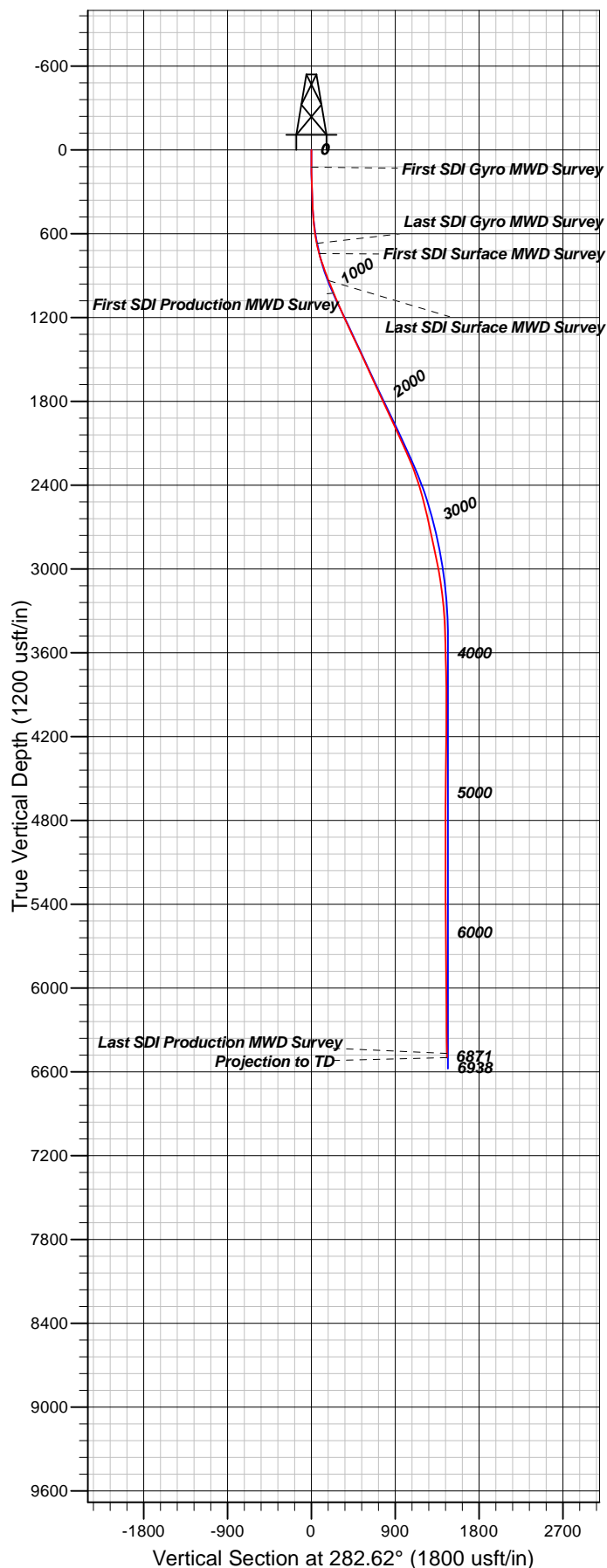
Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 34-5 - Slot B14 (GM 34-5)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
Site:	MV 34-5 Pad	MD Reference:	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
Well:	GM 34-5	North Reference:	True
Wellbore:	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)	
4,100.00	2.55	288.10	3,729.29	325.66	-1,409.18	1,446.29	0.39	0.00	-8.69	
4,194.00	0.59	287.26	3,823.25	326.45	-1,411.63	1,448.85	2.09	-2.09	-0.89	
4,289.00	0.62	286.25	3,918.24	326.74	-1,412.59	1,449.85	0.03	0.03	-1.06	
4,383.00	0.71	268.39	4,012.24	326.87	-1,413.66	1,450.93	0.24	0.10	-19.00	
4,478.00	1.52	115.02	4,107.23	326.32	-1,413.11	1,450.27	2.29	0.85	-161.44	
4,572.00	1.46	113.30	4,201.19	325.32	-1,410.88	1,447.87	0.08	-0.06	-1.83	
4,667.00	1.24	136.10	4,296.17	324.10	-1,409.06	1,445.82	0.61	-0.23	24.00	
4,761.00	1.06	146.68	4,390.15	322.64	-1,407.87	1,444.35	0.30	-0.19	11.26	
4,856.00	1.14	161.62	4,485.13	321.01	-1,407.09	1,443.23	0.31	0.08	15.73	
4,950.00	1.51	167.58	4,579.11	318.91	-1,406.53	1,442.23	0.42	0.39	6.34	
5,045.00	1.06	24.49	4,674.10	318.49	-1,405.90	1,441.52	2.57	-0.47	-150.62	
5,140.00	1.20	24.34	4,769.08	320.19	-1,405.12	1,441.13	0.15	0.15	-0.16	
5,234.00	0.93	29.52	4,863.06	321.75	-1,404.34	1,440.71	0.30	-0.29	5.51	
5,329.00	0.35	311.56	4,958.06	322.62	-1,404.18	1,440.74	0.97	-0.61	-82.06	
5,424.00	0.03	244.19	5,053.06	322.80	-1,404.42	1,441.02	0.36	-0.34	-70.92	
5,518.00	0.45	179.44	5,147.06	322.42	-1,404.44	1,440.95	0.47	0.45	-68.88	
5,613.00	0.47	209.13	5,242.05	321.71	-1,404.62	1,440.98	0.25	0.02	31.25	
5,707.00	1.43	202.34	5,336.04	320.28	-1,405.26	1,441.28	1.03	1.02	-7.22	
5,802.00	1.90	203.02	5,431.00	317.74	-1,406.32	1,441.77	0.50	0.49	0.72	
5,896.00	2.45	210.05	5,524.93	314.57	-1,407.94	1,442.65	0.65	0.59	7.48	
5,991.00	2.37	206.09	5,619.85	311.04	-1,409.82	1,443.72	0.19	-0.08	-4.17	
6,085.00	3.01	202.33	5,713.74	307.02	-1,411.61	1,444.59	0.71	0.68	-4.00	
6,179.00	3.52	209.17	5,807.59	302.21	-1,413.96	1,445.83	0.68	0.54	7.28	
6,273.00	3.98	207.71	5,901.39	296.81	-1,416.88	1,447.50	0.50	0.49	-1.55	
6,367.00	1.89	211.59	5,995.26	292.60	-1,419.21	1,448.85	2.23	-2.22	4.13	
6,462.00	2.38	208.98	6,090.19	289.54	-1,420.99	1,449.92	0.53	0.52	-2.75	
6,556.00	2.41	203.92	6,184.11	286.02	-1,422.73	1,450.85	0.23	0.03	-5.38	
6,651.00	2.49	211.14	6,279.02	282.43	-1,424.61	1,451.90	0.34	0.08	7.60	
6,745.00	2.81	208.91	6,372.92	278.67	-1,426.78	1,453.19	0.36	0.34	-2.37	
6,840.00	2.55	202.85	6,467.82	274.68	-1,428.73	1,454.22	0.40	-0.27	-6.38	
6,871.00	2.37	202.93	6,498.79	273.45	-1,429.24	1,454.46	0.58	-0.58	0.26	
Last SDI Production MWD Survey										
6,938.00	2.37	202.93	6,565.73	270.90	-1,430.32	1,454.96	0.00	0.00	0.00	
Projection to TD - GM 334-5 PBHL - GM 34-5 PBHL										

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Site:	MV 34-5 Pad	MD Reference:	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
Well:	GM 34-5	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)	
123.00	123.00	0.53	-0.53	First SDI Gyro MWD Survey
674.00	669.13	22.45	-54.24	Last SDI Gyro MWD Survey
751.00	741.31	28.53	-80.27	First SDI Surface MWD Survey
971.00	936.59	49.32	-179.00	Last SDI Surface MWD Survey
1,074.00	1,024.61	61.08	-231.19	First SDI Production MWD Survey
6,871.00	6,498.79	273.45	-1,429.24	Last SDI Production MWD Survey
6,938.00	6,565.73	270.90	-1,430.32	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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Well Details: GM 34-5

TVD Reference: GL 5977' & RKB 24' @ 6001.00usft (H&P 271) and Level: 5977.00
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.00 0.00 1603477.59 2258784.60 39.4609098 -108.1256129 B14 (GM 34-5)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 34-5 - Slot B14 (GM 34-5), True North
 Vertical (TVD) Reference: GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
 Section (VS) Reference: Slot - B14 (GM 34-5)(0.00N, 0.00E)
 Measured Depth Reference: GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
 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

12:45, October 27 2017
 Created By: Mel Mireles Jr.