



## 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 413-4
County & State	Garfield County, CO
SDI Job No.	OP.004608
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 122 feet to a measured depth of 7,167 feet is true and correct as determined from all available records.

  
Signature

10-Oct-17  
Date

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

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 413-4 - Slot A8 (GM 413-4)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Site:</b>	MV 34-5 Pad	<b>MD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Well:</b>	GM 413-4	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

<b>Project</b>	Garfield County, CO NAD83		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	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 413-4 - Slot A8 (GM 413-4)				
Well Position	+N/-S	0.00 usft	Northing:	1,603,501.56 usft	Latitude:	39.4609759
	+E/-W	0.00 usft	Easting:	2,258,788.27 usft	Longitude:	-108.1256024
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	5,977.00 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	9/25/2017	9.57	65.77	51,762

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	47.37	

<b>Survey Program</b>	<b>Date</b>	10/3/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
122.00	847.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
941.00	1,022.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,168.00	7,167.00	Survey #3 - Production MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
122.00	0.62	346.38	122.00	0.64	-0.16	0.32	0.51	0.51	0.00	
<b>First SDI Gyro MWD Survey</b>										
215.00	2.29	350.86	214.96	2.97	-0.57	1.59	1.80	1.80	4.82	
307.00	2.82	352.62	306.87	7.02	-1.15	3.91	0.58	0.58	1.91	
399.00	3.61	5.27	398.73	12.15	-1.18	7.36	1.15	0.86	13.75	
491.00	6.60	35.24	490.37	19.36	2.14	14.69	4.25	3.25	32.58	
584.00	11.96	48.96	582.13	30.06	12.50	29.56	6.20	5.76	14.75	
677.00	16.54	51.24	672.24	44.68	30.10	52.41	4.96	4.92	2.45	

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 413-4 - Slot A8 (GM 413-4)
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<b>Site:</b>	MV 34-5 Pad	<b>MD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Well:</b>	GM 413-4	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)
769.00	20.59	52.12	759.44	62.82	53.09	81.61	4.41	4.40	0.96
847.00	23.53	53.03	831.72	80.61	76.36	110.78	3.79	3.77	1.17
Last SDI Gyro MWD Survey									
941.00	26.99	53.04	916.72	104.73	108.41	150.69	3.68	3.68	0.01
First SDI Surface MWD Survey									
1,022.00	29.77	52.57	987.98	128.00	139.07	189.01	3.44	3.43	-0.58
Last SDI Surface MWD Survey									
1,168.00	30.46	52.85	1,114.27	172.38	197.35	261.95	0.48	0.47	0.19
First SDI Production MWD Survey									
1,263.00	30.49	53.58	1,196.14	201.23	235.94	309.88	0.39	0.03	0.77
1,357.00	30.42	53.93	1,277.18	229.40	274.36	357.23	0.20	-0.07	0.37
1,452.00	30.20	54.38	1,359.19	257.48	313.22	404.83	0.33	-0.23	0.47
1,547.00	29.23	55.08	1,441.70	284.67	351.67	451.54	1.08	-1.02	0.74
1,641.00	31.74	53.14	1,522.70	312.65	390.28	498.89	2.87	2.67	-2.06
1,736.00	31.06	53.56	1,603.78	342.19	429.98	548.11	0.75	-0.72	0.44
1,831.00	29.87	52.02	1,685.67	371.31	468.35	596.06	1.50	-1.25	-1.62
1,925.00	28.76	51.98	1,767.63	399.65	504.61	641.93	1.18	-1.18	-0.04
2,020.00	30.43	50.94	1,850.23	428.88	541.30	688.73	1.84	1.76	-1.09
2,114.00	29.85	50.81	1,931.52	458.67	577.92	735.84	0.62	-0.62	-0.14
2,209.00	28.97	50.78	2,014.28	488.15	614.07	782.40	0.93	-0.93	-0.03
2,303.00	30.41	53.93	2,095.94	516.56	650.94	828.77	2.26	1.53	3.35
2,398.00	28.58	53.88	2,178.63	544.11	688.73	875.24	1.93	-1.93	-0.05
2,492.00	31.04	55.13	2,260.18	571.23	726.78	921.60	2.70	2.62	1.33
2,587.00	30.26	55.06	2,341.91	598.94	766.50	969.59	0.82	-0.82	-0.07
2,681.00	28.73	55.20	2,423.73	625.40	804.47	1,015.44	1.63	-1.63	0.15
2,776.00	29.02	56.75	2,506.92	651.06	842.49	1,060.80	0.84	0.31	1.63
2,870.00	30.53	55.95	2,588.51	676.93	881.34	1,106.91	1.66	1.61	-0.85
2,965.00	29.74	56.49	2,670.66	703.45	920.98	1,154.03	0.88	-0.83	0.57
3,059.00	30.65	55.83	2,751.91	729.78	960.25	1,200.75	1.03	0.97	-0.70
3,154.00	30.95	51.65	2,833.52	758.54	999.44	1,249.07	2.27	0.32	-4.40
3,248.00	30.20	51.79	2,914.45	788.17	1,036.98	1,296.75	0.80	-0.80	0.15
3,343.00	29.26	52.07	2,996.95	817.22	1,074.06	1,343.71	1.00	-0.99	0.29
3,437.00	30.48	52.80	3,078.46	845.75	1,111.18	1,390.34	1.35	1.30	0.78
3,531.00	29.33	53.18	3,159.94	873.97	1,148.60	1,436.98	1.24	-1.22	0.40
3,626.00	27.87	53.60	3,243.35	901.09	1,185.10	1,482.20	1.55	-1.54	0.44
3,720.00	26.77	53.83	3,326.86	926.62	1,219.87	1,525.08	1.18	-1.17	0.24
3,815.00	26.07	54.23	3,411.94	951.45	1,254.08	1,567.07	0.76	-0.74	0.42
3,909.00	24.91	54.57	3,496.79	975.00	1,286.97	1,607.21	1.24	-1.23	0.36
4,004.00	23.55	54.84	3,583.41	997.53	1,318.79	1,645.88	1.44	-1.43	0.28
4,099.00	22.57	54.98	3,670.82	1,018.92	1,349.24	1,682.77	1.03	-1.03	0.15
4,141.25	21.89	54.87	3,709.93	1,028.10	1,362.32	1,698.62	1.61	-1.61	-0.26
GM 413-4 MVRD									
4,193.00	21.06	54.73	3,758.09	1,039.03	1,377.80	1,717.40	1.61	-1.61	-0.27
4,288.00	20.05	55.68	3,847.04	1,058.06	1,405.19	1,750.45	1.12	-1.06	1.00

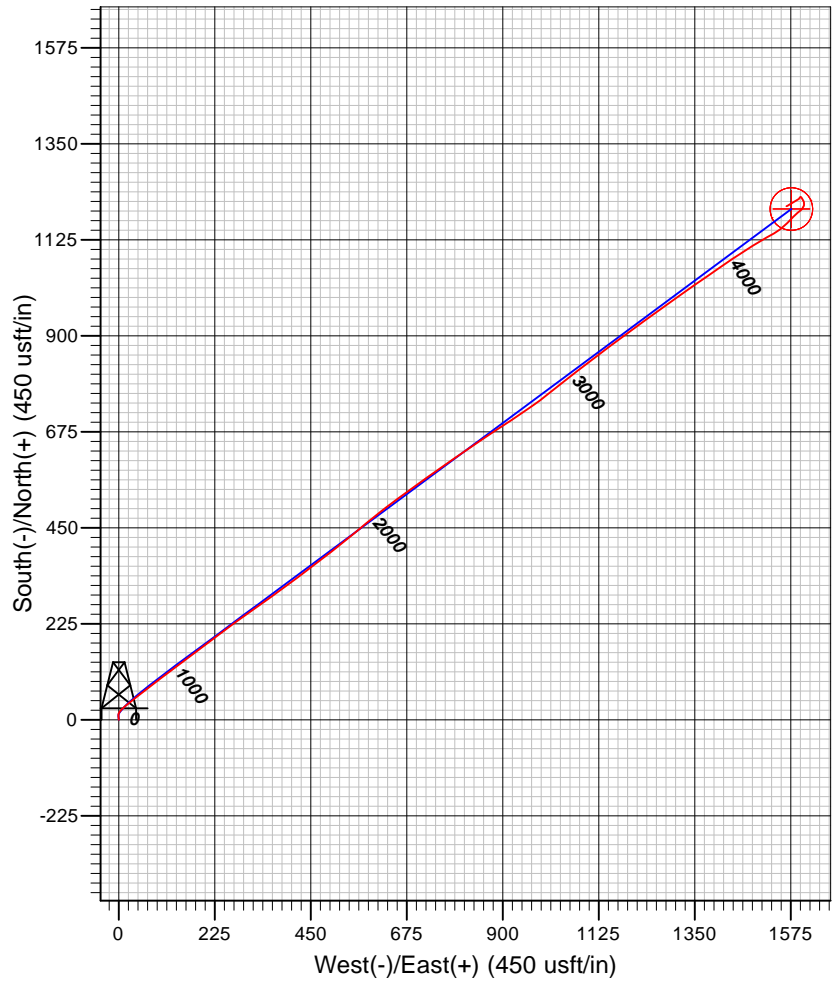
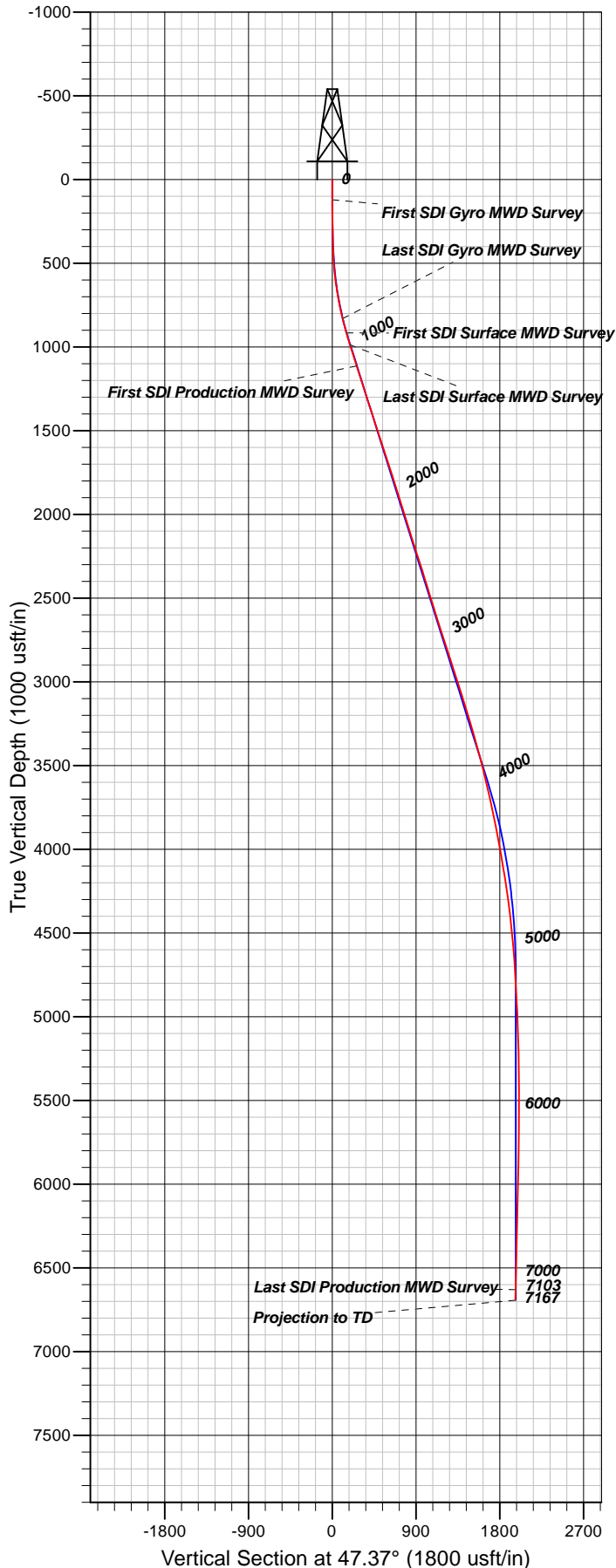
<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 413-4 - Slot A8 (GM 413-4)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Site:</b>	MV 34-5 Pad	<b>MD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Well:</b>	GM 413-4	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)
4,382.00	18.84	56.28	3,935.68	1,075.57	1,431.12	1,781.39	1.30	-1.29	0.64
4,477.00	18.04	56.43	4,025.80	1,092.22	1,456.14	1,811.07	0.84	-0.84	0.16
4,571.00	16.51	57.89	4,115.56	1,107.37	1,479.58	1,838.58	1.69	-1.63	1.55
4,666.00	15.45	59.23	4,206.88	1,121.02	1,501.88	1,864.23	1.18	-1.12	1.41
4,760.00	14.07	60.99	4,297.78	1,132.97	1,522.64	1,887.59	1.54	-1.47	1.87
4,855.00	12.18	57.18	4,390.30	1,144.00	1,541.16	1,908.69	2.19	-1.99	-4.01
4,949.00	10.54	50.76	4,482.45	1,154.82	1,556.15	1,927.05	2.20	-1.74	-6.83
5,044.00	8.95	42.02	4,576.09	1,165.80	1,567.83	1,943.08	2.28	-1.67	-9.20
5,139.00	6.51	47.98	4,670.22	1,174.90	1,576.78	1,955.83	2.70	-2.57	6.27
5,206.00	5.99	45.69	4,736.82	1,179.89	1,582.10	1,963.12	0.85	-0.77	-3.41
GM 413-4 KMV									
5,233.00	5.79	44.66	4,763.68	1,181.84	1,584.07	1,965.89	0.85	-0.76	-3.83
5,328.00	5.23	50.65	4,858.24	1,187.99	1,590.79	1,975.00	0.84	-0.59	6.31
5,423.00	4.82	47.80	4,952.87	1,193.42	1,597.09	1,983.31	0.51	-0.43	-3.00
5,517.00	5.01	36.29	5,046.53	1,199.38	1,602.45	1,991.29	1.07	0.20	-12.24
5,612.00	5.10	11.52	5,141.17	1,206.86	1,605.75	1,998.79	2.28	0.09	-26.07
5,706.00	3.77	338.73	5,234.90	1,213.84	1,605.46	2,003.30	2.99	-1.41	-34.88
5,801.00	3.32	327.30	5,329.72	1,219.06	1,602.84	2,004.91	0.88	-0.47	-12.03
5,895.00	2.81	326.50	5,423.59	1,223.28	1,600.10	2,005.75	0.54	-0.54	-0.85
5,990.00	0.73	308.39	5,518.54	1,225.59	1,598.34	2,006.02	2.24	-2.19	-19.06
6,084.00	0.72	241.76	5,612.53	1,225.69	1,597.35	2,005.35	0.85	-0.01	-70.88
6,179.00	1.13	212.36	5,707.52	1,224.61	1,596.32	2,003.87	0.65	0.43	-30.95
6,273.00	1.32	215.43	5,801.50	1,222.95	1,595.20	2,001.92	0.21	0.20	3.27
6,368.00	1.47	229.13	5,896.47	1,221.26	1,593.64	1,999.63	0.38	0.16	14.42
7,031.00	3.26	242.35	6,558.88	1,206.94	1,570.51	1,972.92	0.28	0.27	1.99
7,103.00	2.73	238.17	6,630.78	1,205.09	1,567.24	1,969.25	0.80	-0.74	-5.81
Last SDI Production MWD Survey									
7,162.99	2.73	238.17	6,690.70	1,203.58	1,564.81	1,966.45	0.00	0.00	0.00
GM 413-4 PBHL									
7,167.00	2.73	238.17	6,694.71	1,203.48	1,564.65	1,966.26	0.00	0.00	0.00
Projection to TD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
122.00	122.00	0.64	-0.16	First SDI Gyro MWD Survey
847.00	831.72	80.61	76.36	Last SDI Gyro MWD Survey
941.00	916.72	104.73	108.41	First SDI Surface MWD Survey
1,022.00	987.98	128.00	139.07	Last SDI Surface MWD Survey
1,168.00	1,114.27	172.38	197.35	First SDI Production MWD Survey
7,103.00	6,630.78	1,205.09	1,567.24	Last SDI Production MWD Survey
7,167.00	6,694.71	1,203.48	1,564.65	Projection to TD

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 413-4 - Slot A8 (GM 413-4)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Site:</b>	MV 34-5 Pad	<b>MD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Well:</b>	GM 413-4	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

Checked By: _____	Approved By: _____	Date: _____
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#### Well Details: GM 413-4

TVD Reference: GL 5977' & RKB 24' @ 6001.00usft (H&P 271) Level: 5977.00  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.00 0.00 1603501.57 2258788.27 39.4609758 -108.1256024 A8 (GM 413-4)

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 413-4 - Slot A8 (GM 413-4), True North  
 Vertical (TVD) Reference: GL 5977' & RKB 24' @ 6001.00usft (H&P 271)  
 Section (VS) Reference: Slot - A8 (GM 413-4)(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

13:14, October 10 2017  
 Created By: Mel Mireles Jr.