



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 513-4
County & State	Garfield County, CO
SDI Job No.	OP.005242
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 7,066 feet is true and correct as determined from all available records.


Signature

29-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 513-4 - Slot A10 (GM 513-4)
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 513-4	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 513-4 - Slot A10 (GM 513-4)					
Well Position	+N/-S	0.00 usft	Northing:	1,603,489.32 usft	Latitude:	39.4609416
	+E/-W	0.00 usft	Easting:	2,258,780.30 usft	Longitude:	-108.1256294
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	10/22/2017	9.57	65.77	51,753

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	56.61	

Survey Program	Date	10/29/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
123.00	581.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
659.00	971.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,075.00	7,066.00	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	0.35	130.52	123.00	-0.24	0.29	0.10	0.28	0.28	0.00	
First SDI Gyro MWD Survey										
214.00	3.08	74.79	213.95	0.22	2.86	2.50	3.18	3.00	-61.24	
306.00	6.60	54.32	305.62	3.95	9.54	10.14	4.20	3.83	-22.25	
397.00	10.29	62.58	395.62	10.75	21.01	23.45	4.26	4.05	9.08	
489.00	14.69	56.60	485.42	20.96	38.05	43.30	4.98	4.78	-6.50	
581.00	20.41	53.35	573.10	36.97	60.68	71.01	6.31	6.22	-3.53	

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Site:	MV 34-5 Pad	MD Reference:	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
Well:	GM 513-4	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									
659.00	24.48	54.99	645.18	54.37	84.83	100.75	5.28	5.22	2.10
First SDI Surface MWD Survey									
751.00	29.90	53.16	726.99	79.07	118.82	142.73	5.96	5.89	-1.99
842.00	33.81	52.98	804.26	107.92	157.21	190.65	4.30	4.30	-0.20
937.00	34.91	53.69	882.69	139.94	200.22	244.18	1.23	1.16	0.75
971.00	35.53	54.13	910.46	151.49	216.06	263.77	1.97	1.82	1.29
Last SDI Surface MWD Survey									
1,075.00	34.94	55.35	995.41	186.12	265.05	323.73	0.88	-0.57	1.17
First SDI Production MWD Survey									
1,169.00	36.58	55.71	1,071.69	217.21	310.34	378.65	1.76	1.74	0.38
1,264.00	35.67	55.77	1,148.42	248.74	356.63	434.65	0.96	-0.96	0.06
1,358.00	37.23	57.15	1,224.03	279.58	403.18	490.49	1.87	1.66	1.47
1,453.00	36.36	57.70	1,300.10	310.22	451.12	547.39	0.98	-0.92	0.58
1,548.00	35.01	57.70	1,377.26	339.83	497.96	602.79	1.42	-1.42	0.00
1,642.00	35.12	59.22	1,454.21	368.08	543.99	656.77	0.94	0.12	1.62
1,737.00	35.55	57.26	1,531.71	397.00	590.70	711.68	1.28	0.45	-2.06
1,832.00	34.75	56.42	1,609.38	426.91	636.48	766.37	0.98	-0.84	-0.88
1,926.00	35.48	54.31	1,686.28	457.65	680.96	820.42	1.51	0.78	-2.24
2,021.00	34.65	53.52	1,764.04	489.79	725.07	874.94	1.00	-0.87	-0.83
2,116.00	35.27	54.88	1,841.89	521.62	769.22	929.32	1.05	0.65	1.43
2,210.00	36.43	55.89	1,918.08	552.89	814.53	984.36	1.39	1.23	1.07
2,305.00	37.44	56.90	1,994.02	584.48	862.08	1,041.44	1.24	1.06	1.06
2,399.00	35.70	57.12	2,069.51	614.97	909.05	1,097.45	1.86	-1.85	0.23
2,494.00	33.62	56.87	2,147.65	644.40	954.36	1,151.47	2.19	-2.19	-0.26
2,588.00	32.91	56.95	2,226.25	672.55	997.55	1,203.03	0.76	-0.76	0.09
2,683.00	31.77	56.70	2,306.51	700.36	1,040.09	1,253.85	1.21	-1.20	-0.26
2,777.00	29.01	56.78	2,387.59	726.43	1,079.85	1,301.39	2.94	-2.94	0.09
2,872.00	26.43	57.62	2,471.68	750.38	1,116.98	1,345.58	2.75	-2.72	0.88
2,966.00	23.19	57.62	2,556.99	771.50	1,150.29	1,385.01	3.45	-3.45	0.00
3,060.00	21.30	57.78	2,643.99	790.52	1,180.36	1,420.59	2.01	-2.01	0.17
3,155.00	19.60	57.86	2,733.00	808.19	1,208.45	1,453.77	1.79	-1.79	0.08
3,249.00	18.45	58.23	2,821.86	824.41	1,234.45	1,484.40	1.23	-1.22	0.39
3,344.00	17.62	58.59	2,912.19	839.82	1,259.50	1,513.80	0.88	-0.87	0.38
3,438.00	15.29	56.96	3,002.34	854.00	1,282.04	1,540.41	2.53	-2.48	-1.73
3,533.00	13.26	51.23	3,094.40	867.65	1,301.04	1,563.79	2.60	-2.14	-6.03
3,627.00	10.16	54.49	3,186.44	879.22	1,316.19	1,582.81	3.37	-3.30	3.47
3,722.00	7.58	50.03	3,280.29	888.11	1,327.82	1,597.41	2.81	-2.72	-4.69
3,816.00	7.13	48.05	3,373.52	896.00	1,336.91	1,609.34	0.55	-0.48	-2.11
3,911.00	6.38	47.84	3,467.86	903.48	1,345.21	1,620.39	0.79	-0.79	-0.22
4,005.00	5.45	51.49	3,561.36	909.77	1,352.57	1,630.00	1.07	-0.99	3.88
4,019.82	5.40	51.71	3,576.11	910.64	1,353.67	1,631.39	0.37	-0.34	1.50
GM 513-4 MVRD									
4,100.00	5.13	52.99	3,655.95	915.13	1,359.49	1,638.73	0.37	-0.34	1.59

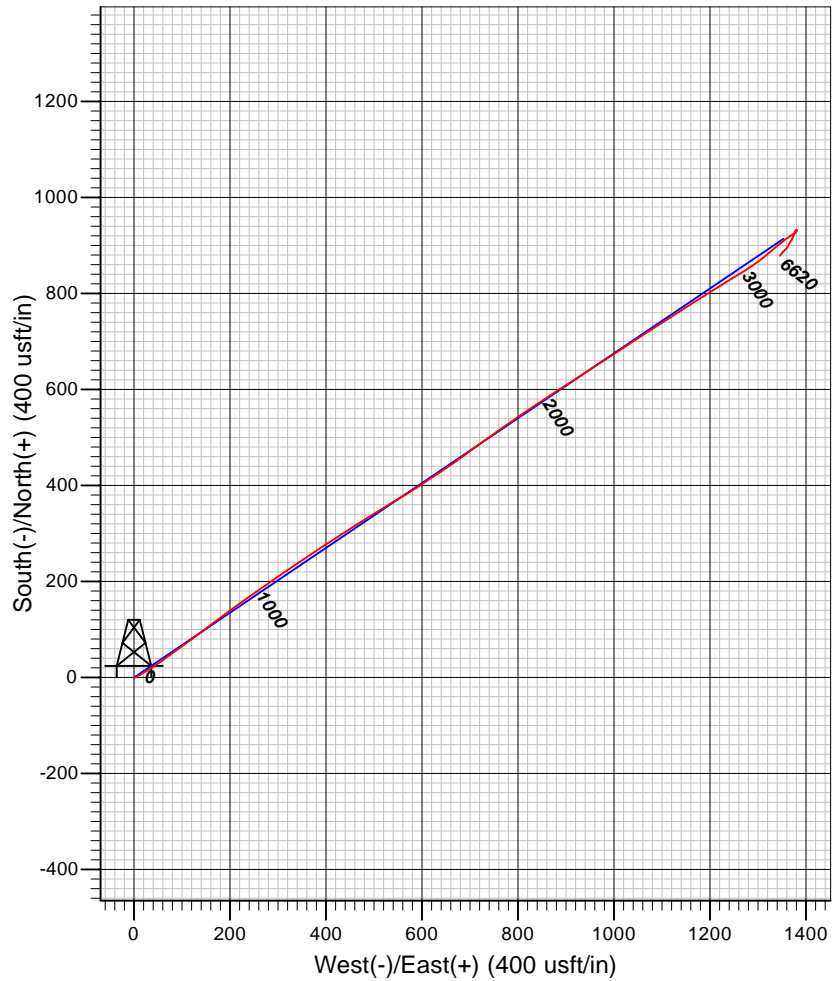
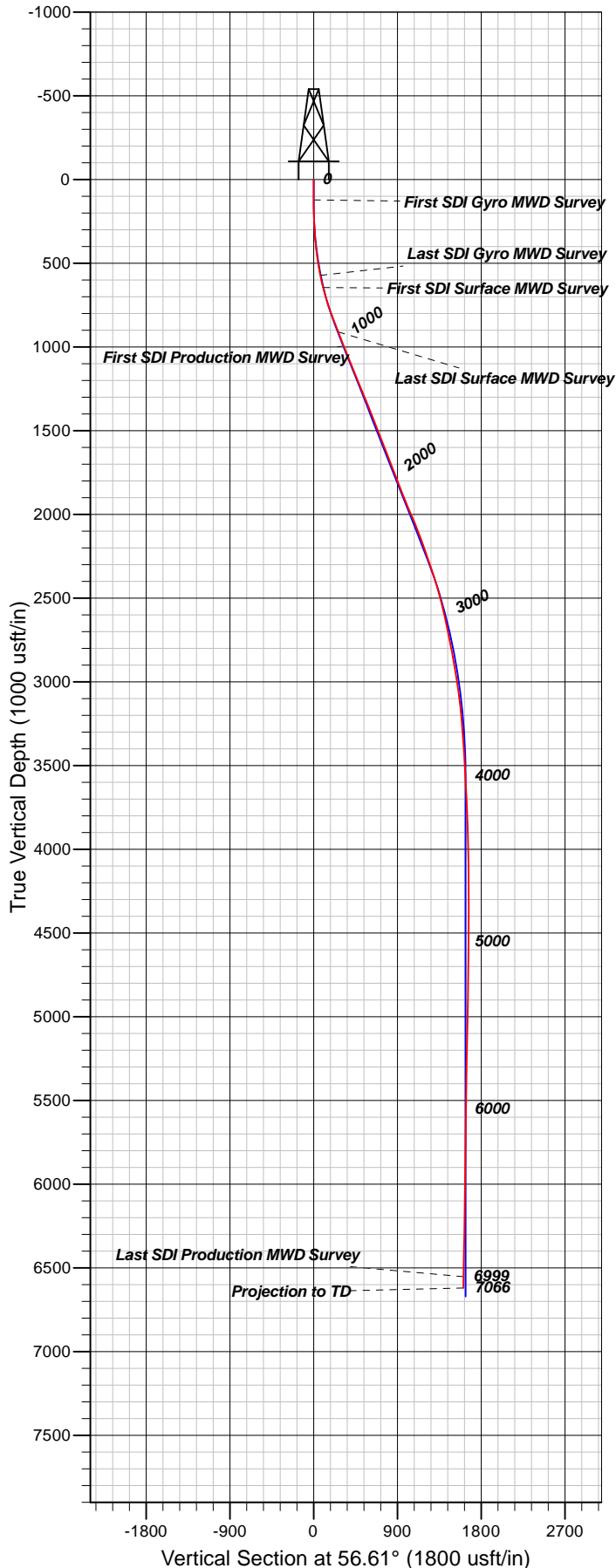
Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 513-4 - Slot A10 (GM 513-4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
Site:	MV 34-5 Pad	MD Reference:	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
Well:	GM 513-4	North Reference:	True
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)	
4,194.00	3.93	54.12	3,749.66	919.55	1,365.46	1,646.14	1.28	-1.28	1.20	
4,289.00	3.52	59.05	3,844.46	922.96	1,370.60	1,652.31	0.55	-0.43	5.19	
4,384.00	2.90	68.81	3,939.31	925.33	1,375.34	1,657.57	0.87	-0.65	10.27	
4,478.00	2.14	34.93	4,033.22	927.62	1,378.56	1,661.53	1.74	-0.81	-36.04	
4,572.00	1.85	39.80	4,127.17	930.23	1,380.54	1,664.61	0.36	-0.31	5.18	
4,667.00	0.88	319.91	4,222.14	931.96	1,381.05	1,665.99	2.00	-1.02	-84.09	
4,761.00	0.72	279.17	4,316.14	932.61	1,380.00	1,665.47	0.61	-0.17	-43.34	
4,856.00	0.44	231.14	4,411.13	932.48	1,379.13	1,664.67	0.57	-0.29	-50.56	
4,951.00	0.64	220.07	4,506.13	931.84	1,378.50	1,663.80	0.24	0.21	-11.65	
5,045.00	0.91	213.49	4,600.12	930.82	1,377.75	1,662.61	0.30	0.29	-7.00	
5,140.00	1.07	209.01	4,695.10	929.41	1,376.91	1,661.13	0.19	0.17	-4.72	
5,235.00	1.38	196.75	4,790.08	927.54	1,376.15	1,659.46	0.43	0.33	-12.91	
5,329.00	1.78	193.55	4,884.05	925.04	1,375.48	1,657.53	0.44	0.43	-3.40	
5,424.00	1.95	200.22	4,979.00	922.09	1,374.57	1,655.15	0.29	0.18	7.02	
5,519.00	2.01	203.26	5,073.94	919.04	1,373.36	1,652.46	0.13	0.06	3.20	
5,613.00	2.29	207.01	5,167.87	915.85	1,371.85	1,649.45	0.33	0.30	3.99	
5,707.00	2.33	206.76	5,261.80	912.47	1,370.14	1,646.16	0.04	0.04	-0.27	
5,802.00	2.45	216.29	5,356.72	909.11	1,368.07	1,642.58	0.44	0.13	10.03	
5,896.00	2.69	208.90	5,450.62	905.56	1,365.81	1,638.74	0.43	0.26	-7.86	
5,991.00	2.56	204.35	5,545.52	901.68	1,363.86	1,634.97	0.26	-0.14	-4.79	
6,086.00	0.75	232.02	5,640.48	899.36	1,362.50	1,632.56	2.03	-1.91	29.13	
6,180.00	0.86	202.76	5,734.47	898.33	1,361.74	1,631.36	0.45	0.12	-31.13	
6,273.00	0.81	204.42	5,827.46	897.09	1,361.20	1,630.22	0.06	-0.05	1.78	
6,368.00	1.03	214.66	5,922.45	895.78	1,360.43	1,628.86	0.29	0.23	10.78	
6,462.00	1.41	209.52	6,016.43	894.08	1,359.38	1,627.05	0.42	0.40	-5.47	
6,557.00	1.58	225.17	6,111.39	892.14	1,357.88	1,624.73	0.46	0.18	16.47	
6,651.00	2.11	236.71	6,205.35	890.27	1,355.51	1,621.73	0.69	0.56	12.28	
6,746.00	2.20	224.90	6,300.28	888.02	1,352.77	1,618.19	0.48	0.09	-12.43	
6,840.00	2.02	214.18	6,394.22	885.37	1,350.56	1,614.89	0.46	-0.19	-11.40	
6,935.00	2.37	217.78	6,489.15	882.43	1,348.42	1,611.49	0.40	0.37	3.79	
6,999.00	2.02	217.78	6,553.10	880.50	1,346.92	1,609.17	0.55	-0.55	0.00	
Last SDI Production MWD Survey										
7,066.00	2.02	217.78	6,620.06	878.63	1,345.47	1,606.93	0.00	0.00	0.00	
Projection to TD - GM 513-4 PBHL										

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well GM 513-4 - Slot A10 (GM 513-4)
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Site:	MV 34-5 Pad	MD Reference:	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
Well:	GM 513-4	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			
		+N/-S (usft)	+E/-W (usft)	Comment	
123.00	123.00	-0.24	0.29	First SDI Gyro MWD Survey	
581.00	573.10	36.97	60.68	Last SDI Gyro MWD Survey	
659.00	645.18	54.37	84.83	First SDI Surface MWD Survey	
971.00	910.46	151.49	216.06	Last SDI Surface MWD Survey	
1,075.00	995.41	186.12	265.05	First SDI Production MWD Survey	
6,999.00	6,553.10	880.50	1,346.92	Last SDI Production MWD Survey	
7,066.00	6,620.06	878.63	1,345.47	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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Well Details: GM 513-4

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 1603489.32 2258780.30 39.4609416 -108.1256293 A10 (GM 513-4)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 513-4 - Slot A10 (GM 513-4), True North
 Vertical (TVD) Reference: GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
 Section (VS) Reference: Slot - A10 (GM 513-4)(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

16:12, October 29 2017
 Created By: Mel Mireles Jr.