



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 432-10
County & State	Garfield County, CO
SDI Job No.	OP.002640
Rig	H&P 273

I, Mel Mireles Jr., having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 63 feet to a measured depth of 6,830 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

14-Jul-17

Date

Mel Mireles Jr.

Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 432-10 - Slot A8
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 432-10	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 5-10 Pad			
Site Position:		Northing:	1,600,344.70 usft	Latitude:	39.4529509
From:	Map	Easting:	2,266,881.70 usft	Longitude:	-108.0966291
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.64 °

Well		Federal GM 432-10 - Slot A8				
Well Position	+N/-S	0.00 usft	Northing:	1,600,342.30 usft	Latitude:	39.4529438
	+E/-W	0.00 usft	Easting:	2,266,874.50 usft	Longitude:	-108.0966544
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,148.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	7/10/2017	9.53	65.75	51,786

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	135.94	

Survey Program	Date	7/14/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
63.00	582.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
655.00	933.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,082.00	6,830.00	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	
63.00	0.00	0.00	63.00	0.00	0.00	0.00	0.00	0.00	0.00	
First SDI Gyro MWD Survey										
154.00	0.35	266.84	154.00	-0.02	-0.28	-0.18	0.38	0.38	0.00	
213.00	0.18	183.60	213.00	-0.12	-0.46	-0.24	0.63	-0.29	-141.08	
305.00	2.64	133.59	304.96	-1.72	1.06	1.98	2.75	2.67	-54.36	
397.00	4.05	126.74	396.81	-5.13	5.20	7.30	1.59	1.53	-7.45	
490.00	4.40	144.84	489.56	-10.01	9.89	14.07	1.48	0.38	19.46	
582.00	4.31	147.22	581.29	-15.80	13.79	20.95	0.22	-0.10	2.59	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 432-10 - Slot A8
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 432-10	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									
655.00	4.08	134.63	654.10	-19.93	17.12	26.23	1.30	-0.32	-17.25
First SDI Surface MWD Survey									
747.00	4.38	124.93	745.85	-24.24	22.33	32.95	0.84	0.33	-10.54
840.00	4.11	130.86	838.59	-28.46	27.77	39.76	0.55	-0.29	6.38
933.00	4.04	144.00	931.36	-33.29	32.21	46.32	1.00	-0.08	14.13
Last SDI Surface MWD Survey									
1,082.00	5.15	142.64	1,079.88	-42.85	39.36	58.16	0.75	0.74	-0.91
First SDI Production MWD Survey									
1,177.00	3.85	122.27	1,174.59	-47.94	44.64	65.49	2.15	-1.37	-21.44
1,271.00	4.11	131.05	1,268.36	-51.84	49.85	71.92	0.70	0.28	9.34
1,365.00	3.76	123.84	1,362.14	-55.77	54.95	78.29	0.64	-0.37	-7.67
1,460.00	3.65	124.38	1,456.94	-59.21	60.03	84.30	0.12	-0.12	0.57
1,554.00	3.43	122.56	1,550.77	-62.41	64.87	89.96	0.26	-0.23	-1.94
1,649.00	3.07	116.92	1,645.61	-65.09	69.54	95.13	0.51	-0.38	-5.94
1,744.00	3.74	131.98	1,740.45	-68.32	74.11	100.63	1.17	0.71	15.85
1,838.00	3.85	129.91	1,834.24	-72.39	78.81	106.83	0.19	0.12	-2.20
1,933.00	4.13	128.18	1,929.01	-76.55	83.94	113.39	0.32	0.29	-1.82
2,027.00	3.60	125.82	2,022.80	-80.37	89.00	119.65	0.59	-0.56	-2.51
2,122.00	3.28	123.35	2,117.62	-83.61	93.68	125.23	0.37	-0.34	-2.60
2,216.00	3.20	127.23	2,211.47	-86.68	98.02	130.45	0.25	-0.09	4.13
2,311.00	2.81	125.53	2,306.34	-89.64	102.03	135.36	0.42	-0.41	-1.79
2,405.00	3.22	137.08	2,400.21	-92.91	105.70	140.27	0.78	0.44	12.29
2,499.00	2.91	144.58	2,494.08	-96.79	108.88	145.27	0.54	-0.33	7.98
2,594.00	3.67	147.60	2,588.92	-101.32	111.91	150.63	0.82	0.80	3.18
2,688.00	4.05	142.80	2,682.71	-106.50	115.53	156.87	0.53	0.40	-5.11
2,783.00	3.52	140.21	2,777.50	-111.42	119.42	163.11	0.59	-0.56	-2.73
2,877.00	3.49	142.86	2,871.33	-115.91	122.99	168.83	0.18	-0.03	2.82
2,972.00	3.25	141.37	2,966.16	-120.32	126.42	174.38	0.27	-0.25	-1.57
3,066.00	4.18	132.68	3,059.96	-124.73	130.60	180.45	1.15	0.99	-9.24
3,161.00	3.77	132.52	3,154.74	-129.18	135.45	187.03	0.43	-0.43	-0.17
3,255.00	3.85	129.62	3,248.53	-133.29	140.16	193.25	0.22	0.09	-3.09
3,350.00	3.40	123.63	3,343.34	-136.88	144.96	199.17	0.62	-0.47	-6.31
3,444.00	2.97	132.28	3,437.19	-140.06	149.08	204.32	0.68	-0.46	9.20
3,539.00	3.12	130.02	3,532.06	-143.38	152.89	209.35	0.20	0.16	-2.38
3,633.00	3.30	115.80	3,625.91	-146.20	157.28	214.44	0.87	0.19	-15.13
3,728.00	2.86	109.11	3,720.78	-148.17	161.98	219.12	0.60	-0.46	-7.04
3,822.00	2.60	121.08	3,814.67	-150.04	166.02	223.27	0.66	-0.28	12.73
3,917.00	2.50	113.71	3,909.58	-151.98	169.77	227.27	0.36	-0.11	-7.76
4,012.00	2.81	122.82	4,004.47	-154.08	173.62	231.46	0.55	0.33	9.59
4,107.00	2.22	124.92	4,099.38	-156.39	177.09	235.53	0.63	-0.62	2.21
4,201.00	2.31	125.43	4,193.31	-158.53	180.12	239.18	0.10	0.10	0.54
4,296.00	2.58	115.96	4,288.22	-160.58	183.60	243.07	0.51	0.28	-9.97
4,390.00	2.01	135.14	4,382.15	-162.67	186.67	246.71	1.01	-0.61	20.40

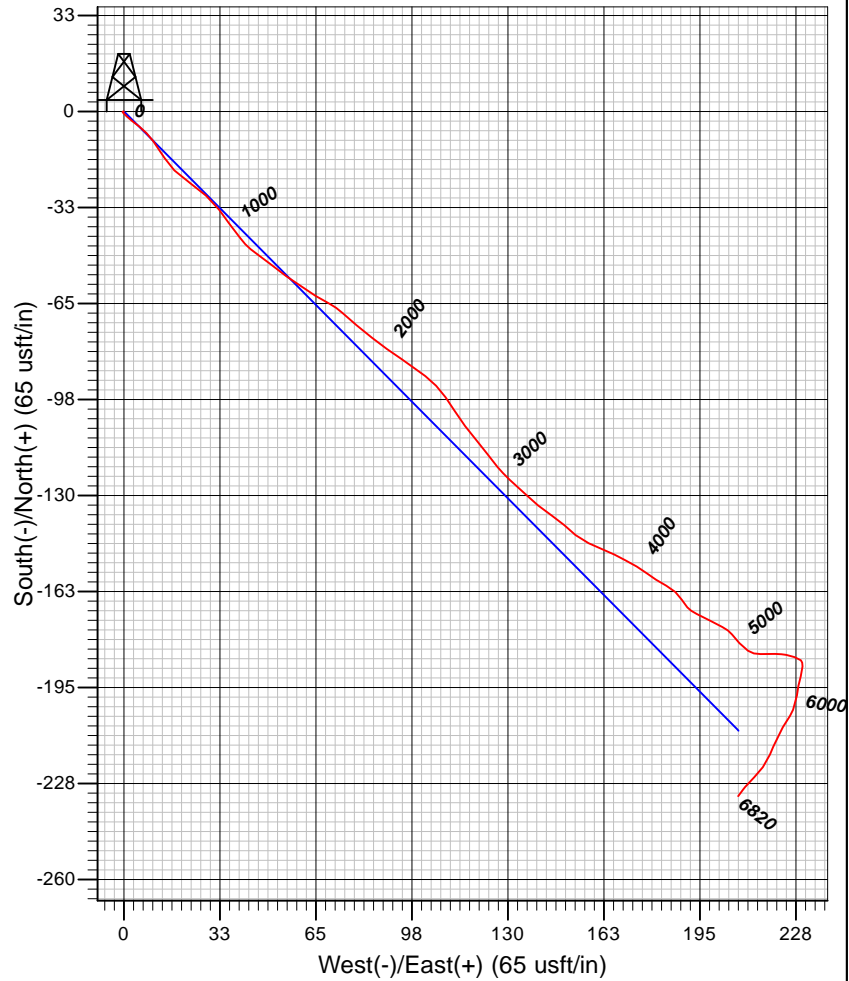
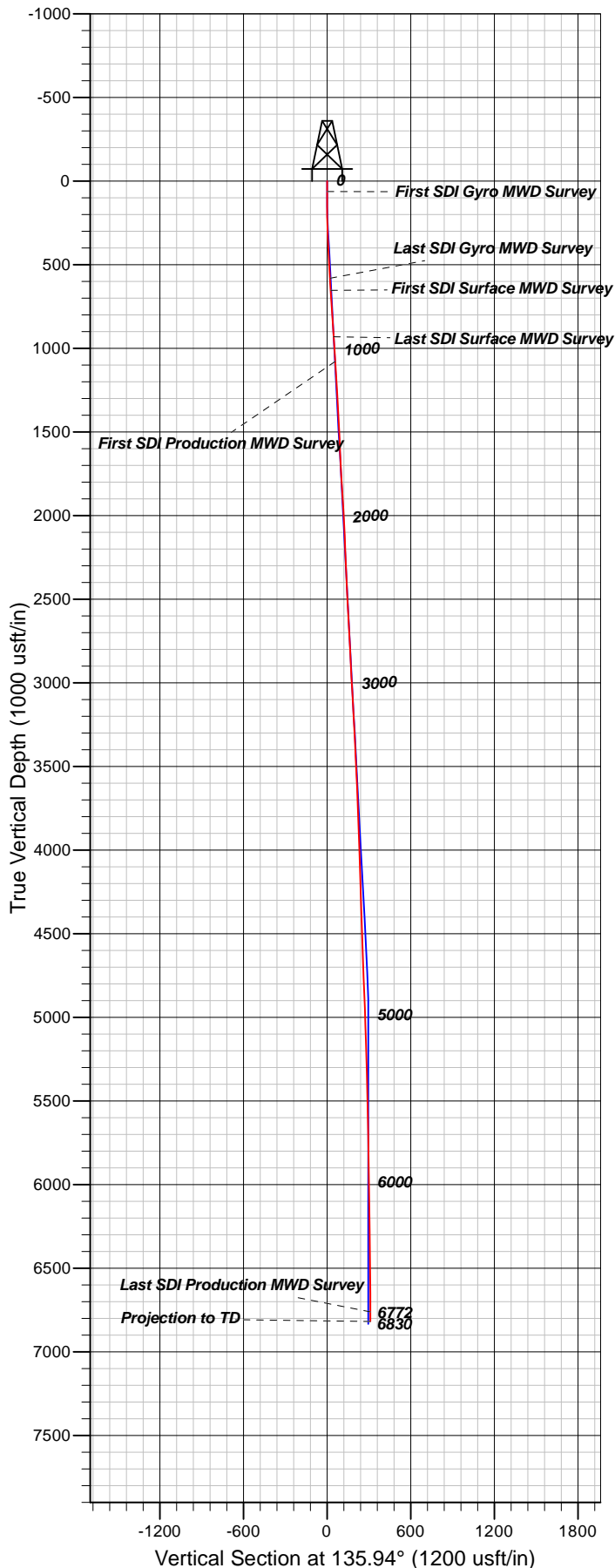
Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 432-10 - Slot A8
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 432-10	North Reference:	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)
4,485.00	2.13	145.97	4,477.09	-165.32	188.83	250.12	0.43	0.13	11.40
4,579.00	1.76	140.50	4,571.03	-167.88	190.73	253.27	0.44	-0.39	-5.82
4,674.00	3.13	115.90	4,665.95	-170.14	193.99	257.17	1.79	1.44	-25.89
4,768.00	2.92	117.51	4,759.82	-172.36	198.42	261.85	0.24	-0.22	1.71
4,863.00	2.75	117.60	4,854.70	-174.54	202.59	266.31	0.18	-0.18	0.09
4,958.00	2.37	139.64	4,949.61	-177.09	205.88	270.43	1.10	-0.40	23.20
4,968.44	2.35	139.74	4,960.03	-177.42	206.16	270.86	0.19	-0.19	0.94
GM 432-10 KMV									
5,053.00	2.19	140.60	5,044.53	-179.99	208.30	274.20	0.19	-0.19	1.02
5,147.00	2.67	124.23	5,138.45	-182.61	211.25	278.13	0.89	0.51	-17.41
5,242.00	3.00	86.28	5,233.34	-183.69	215.56	281.91	1.97	0.35	-39.95
5,338.00	2.85	92.23	5,329.21	-183.62	220.46	285.26	0.35	-0.16	6.20
5,431.00	1.76	100.06	5,422.14	-183.96	224.17	288.09	1.22	-1.17	8.42
5,525.00	1.89	109.99	5,516.09	-184.74	227.05	290.65	0.36	0.14	10.56
5,620.00	1.05	131.04	5,611.06	-185.85	229.18	292.93	1.04	-0.88	22.16
5,715.00	1.76	184.34	5,706.03	-187.88	229.73	294.77	1.49	0.75	56.11
5,809.00	2.37	194.19	5,799.97	-191.20	229.14	296.75	0.75	0.65	10.48
5,904.00	1.74	192.36	5,894.91	-194.52	228.35	298.58	0.67	-0.66	-1.93
5,999.00	2.21	186.65	5,989.85	-197.74	227.83	300.54	0.54	0.49	-6.01
6,130.00	2.19	203.00	6,120.76	-202.56	226.56	303.11	0.48	-0.02	12.48
6,188.00	2.43	211.55	6,178.71	-204.62	225.48	303.85	0.72	0.41	14.74
6,283.00	2.97	212.25	6,273.61	-208.42	223.11	304.93	0.57	0.57	0.74
6,422.00	3.17	200.96	6,412.41	-215.06	219.82	307.41	0.46	0.14	-8.12
6,472.00	3.34	203.50	6,462.33	-217.68	218.74	308.55	0.45	0.34	5.08
6,566.00	2.66	216.47	6,556.20	-221.95	216.35	309.95	1.02	-0.72	13.80
6,661.00	2.85	224.48	6,651.09	-225.41	213.39	310.37	0.45	0.20	8.43
6,754.00	2.78	221.89	6,743.98	-228.73	210.26	310.59	0.16	-0.08	-2.78
6,772.00	2.90	216.42	6,761.95	-229.43	209.70	310.70	1.65	0.67	-30.39
Last SDI Production MWD Survey									
6,830.00	2.90	216.42	6,819.88	-231.79	207.96	311.18	0.00	0.00	0.00
Projection to TD - GM 432-10 PBHL									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
63.00	63.00	0.00	0.00	First SDI Gyro MWD Survey
582.00	581.29	-15.80	13.79	Last SDI Gyro MWD Survey
655.00	654.10	-19.93	17.12	First SDI Surface MWD Survey
933.00	931.36	-33.29	32.21	Last SDI Surface MWD Survey
1,082.00	1,079.88	-42.85	39.36	First SDI Production MWD Survey
6,772.00	6,761.95	-229.43	209.70	Last SDI Production MWD Survey
6,830.00	6,819.88	-231.79	207.96	Projection to TD

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 432-10 - Slot A8
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 432-10	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------



Well Details: Federal GM 432-10

TVD Reference: GL 6148' & RKB 24' @ 6172.00usft (H&P 318) Level: 6148.00							Slot
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude		A8
0.00	0.00	1600342.30	2266874.50	39.4529437	-108.0966543		

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Federal GM 432-10 - Slot A8, True North
 Vertical (TVD) Reference: GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
 Section (VS) Reference: Slot - A8(0.00N, 0.00E)
 Measured Depth Reference: GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
 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

11:02, July 14 2017
 Created By: Mel Mireles Jr.