



Well Details: PA 433-24

TVD Reference: GL 5733' & RKB 24' @ 5757.00usft
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.00 0.00 1618787.10 2312518.40 39.5070349 -107.9368204PA 433-24 (A4)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well PA 433-24 - Slot PA 433-24 (A4), True North
 Vertical (TVD) Reference: GL 5733' & RKB 24' @ 5757.00usft
 Section (VS) Reference: Slot - PA 433-24 (A4)(0.00N, 0.00E)
 Measured Depth Reference: GL 5733' & RKB 24' @ 5757.00usft
 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

12:33, October 09 2018
 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.	PA 433-24
County & State	Garfield County, CO
SDI Job No.	OP.013479
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 126 feet to a measured depth of 9,055 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

09-Oct-18

Date

Mel Mireles Jr.

Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well PA 433-24 - Slot PA 433-24 (A4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 5733' & RKB 24' @ 5757.00usft
Site:	RWF 13-19 Pad	MD Reference:	GL 5733' & RKB 24' @ 5757.00usft
Well:	PA 433-24	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		RWF 13-19 Pad			
Site Position:		Northing:	1,618,792.50 usft	Latitude:	39.5070510
From:	Map	Easting:	2,312,535.60 usft	Longitude:	-107.9367600
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.54 °

Well		PA 433-24 - Slot PA 433-24 (A4)				
Well Position	+N/-S	0.00 usft	Northing:	1,618,787.10 usft	Latitude:	39.5070349
	+E/-W	0.00 usft	Easting:	2,312,518.40 usft	Longitude:	-107.9368204
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	5,733.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/1/2018	9.35	65.75	51,568

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	276.98	

Survey Program	Date	10/9/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
126.00	494.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
566.00	1,069.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,209.00	9,055.00	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	
126.00	1.23	268.33	125.99	-0.04	-1.35	1.34	0.98	0.98	0.00	
First SDI Gyro MWD Survey										
218.00	3.70	279.76	217.90	0.44	-5.26	5.28	2.72	2.68	12.42	
311.00	5.81	279.84	310.57	1.75	-12.86	12.98	2.27	2.27	0.09	
402.00	8.36	278.61	400.87	3.53	-23.94	24.19	2.81	2.80	-1.35	
494.00	11.79	277.38	491.44	5.74	-39.88	40.28	3.74	3.73	-1.34	
Last SDI Gyro MWD Survey										

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well PA 433-24 - Slot PA 433-24 (A4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 5733' & RKB 24' @ 5757.00usft
Site:	RWF 13-19 Pad	MD Reference:	GL 5733' & RKB 24' @ 5757.00usft
Well:	PA 433-24	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)	
566.00	15.23	277.68	561.44	7.94	-56.55	57.10	4.78	4.78	0.42	
First SDI Surface MWD Survey										
678.00	19.70	277.15	668.25	12.26	-89.88	90.70	3.99	3.99	-0.47	
750.00	22.51	274.34	735.41	14.82	-115.67	116.61	4.15	3.90	-3.90	
841.00	26.29	272.76	818.27	17.11	-153.18	154.12	4.21	4.15	-1.74	
938.00	28.15	277.77	904.53	21.23	-197.32	198.44	3.04	1.92	5.16	
1,033.00	29.30	278.93	987.84	27.87	-242.49	244.08	1.35	1.21	1.22	
1,069.00	29.99	279.00	1,019.13	30.65	-260.08	261.87	1.92	1.92	0.19	
Last SDI Surface MWD Survey										
1,209.00	31.94	279.05	1,139.17	41.95	-331.21	333.86	1.39	1.39	0.04	
First SDI Production MWD Survey										
1,272.00	32.06	279.62	1,192.60	47.36	-364.16	367.21	0.52	0.19	0.90	
1,366.00	32.23	281.22	1,272.19	56.41	-413.34	417.13	0.92	0.18	1.70	
1,461.00	31.53	281.17	1,352.86	66.15	-462.56	467.17	0.74	-0.74	-0.05	
1,555.00	31.51	281.36	1,432.99	75.75	-510.76	516.17	0.11	-0.02	0.20	
1,649.00	30.79	281.03	1,513.44	85.19	-558.45	564.67	0.79	-0.77	-0.35	
1,743.00	30.59	281.31	1,594.27	94.49	-605.52	612.52	0.26	-0.21	0.30	
1,838.00	29.59	281.00	1,676.47	103.70	-652.25	660.02	1.07	-1.05	-0.33	
1,932.00	31.25	279.70	1,757.53	112.24	-699.07	707.53	1.90	1.77	-1.38	
2,027.00	30.03	280.35	1,839.26	120.66	-746.75	755.87	1.33	-1.28	0.68	
2,121.00	29.13	280.01	1,921.01	128.87	-792.42	802.20	0.97	-0.96	-0.36	
2,215.00	31.26	283.02	2,002.26	138.34	-838.72	849.31	2.78	2.27	3.20	
2,310.00	31.09	282.69	2,083.54	149.28	-886.66	898.23	0.25	-0.18	-0.35	
2,404.00	29.67	282.53	2,164.63	159.66	-933.05	945.54	1.51	-1.51	-0.17	
2,499.00	28.80	283.43	2,247.53	170.08	-978.26	991.68	1.03	-0.92	0.95	
2,593.00	27.50	284.26	2,330.41	180.68	-1,021.32	1,035.71	1.44	-1.38	0.88	
2,687.00	28.67	283.32	2,413.34	191.22	-1,064.30	1,079.65	1.33	1.24	-1.00	
2,781.00	27.57	282.99	2,496.24	201.31	-1,107.44	1,123.69	1.18	-1.17	-0.35	
2,876.00	28.96	280.81	2,579.91	210.56	-1,151.46	1,168.51	1.82	1.46	-2.29	
2,970.00	28.62	281.77	2,662.29	219.42	-1,195.85	1,213.65	0.61	-0.36	1.02	
3,065.00	27.84	281.79	2,745.99	228.60	-1,239.84	1,258.43	0.82	-0.82	0.02	
3,159.00	29.14	278.39	2,828.61	236.42	-1,283.97	1,303.18	2.21	1.38	-3.62	
3,253.00	28.17	279.02	2,911.10	243.24	-1,328.53	1,348.24	1.08	-1.03	0.67	
3,347.00	29.18	275.82	2,993.58	249.04	-1,373.24	1,393.32	1.95	1.07	-3.40	
3,442.00	27.80	275.87	3,077.07	253.66	-1,418.32	1,438.63	1.45	-1.45	0.05	
3,536.00	30.03	278.70	3,159.35	259.46	-1,463.39	1,484.06	2.78	2.37	3.01	
3,630.00	28.79	278.75	3,241.23	266.46	-1,509.01	1,530.20	1.32	-1.32	0.05	
3,725.00	29.32	281.21	3,324.28	274.46	-1,554.44	1,576.27	1.38	0.56	2.59	
3,819.00	28.17	282.50	3,406.70	283.74	-1,598.68	1,621.30	1.39	-1.22	1.37	
3,913.00	28.73	279.71	3,489.35	292.35	-1,642.61	1,665.96	1.53	0.60	-2.97	
4,007.00	27.54	279.07	3,572.24	299.59	-1,686.34	1,710.24	1.31	-1.27	-0.68	
4,102.00	27.76	278.55	3,656.39	306.34	-1,729.91	1,754.31	0.34	0.23	-0.55	
4,196.00	26.18	278.43	3,740.17	312.64	-1,772.07	1,796.92	1.68	-1.68	-0.13	
4,290.00	24.96	278.73	3,824.96	318.69	-1,812.19	1,837.48	1.31	-1.30	0.32	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well PA 433-24 - Slot PA 433-24 (A4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 5733' & RKB 24' @ 5757.00usft
Site:	RWF 13-19 Pad	MD Reference:	GL 5733' & RKB 24' @ 5757.00usft
Well:	PA 433-24	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)
4,384.00	23.91	278.99	3,910.54	324.67	-1,850.61	1,876.34	1.12	-1.12	0.28
4,479.00	22.75	279.51	3,997.77	330.72	-1,887.74	1,913.93	1.24	-1.22	0.55
4,573.00	21.42	281.01	4,084.87	337.00	-1,922.52	1,949.21	1.54	-1.41	1.60
4,667.00	20.23	280.37	4,172.73	343.20	-1,955.35	1,982.56	1.29	-1.27	-0.68
4,762.00	19.08	279.37	4,262.19	348.69	-1,986.83	2,014.47	1.26	-1.21	-1.05
4,856.00	18.43	280.95	4,351.20	354.01	-2,016.58	2,044.64	0.88	-0.69	1.68
4,950.00	17.61	280.12	4,440.59	359.33	-2,045.16	2,073.67	0.91	-0.87	-0.88
5,045.00	16.65	279.00	4,531.37	363.99	-2,072.75	2,101.62	1.07	-1.01	-1.18
5,139.00	15.96	280.87	4,621.59	368.53	-2,098.75	2,127.97	0.92	-0.73	1.99
5,232.00	14.90	280.56	4,711.24	373.13	-2,123.06	2,152.66	1.14	-1.14	-0.33
5,326.00	13.51	279.84	4,802.36	377.22	-2,145.76	2,175.69	1.49	-1.48	-0.77
5,420.00	12.58	280.93	4,893.94	381.04	-2,166.63	2,196.87	1.02	-0.99	1.16
5,514.00	11.74	281.21	4,985.83	384.84	-2,186.06	2,216.62	0.90	-0.89	0.30
5,609.00	10.74	282.37	5,079.00	388.62	-2,204.19	2,235.07	1.08	-1.05	1.22
5,704.00	8.93	275.40	5,172.61	391.21	-2,220.18	2,251.25	2.28	-1.91	-7.34
5,798.00	8.01	275.87	5,265.58	392.56	-2,233.96	2,265.10	0.98	-0.98	0.50
5,893.00	6.56	275.09	5,359.81	393.72	-2,245.95	2,277.14	1.53	-1.53	-0.82
5,987.00	5.67	272.93	5,453.28	394.44	-2,255.93	2,287.14	0.98	-0.95	-2.30
6,081.00	4.62	274.05	5,546.90	394.94	-2,264.35	2,295.55	1.12	-1.12	1.19
6,176.00	3.77	271.06	5,641.64	395.27	-2,271.28	2,302.48	0.92	-0.89	-3.15
6,262.47	3.31	270.83	5,727.94	395.36	-2,276.62	2,307.79	0.53	-0.53	-0.26
PA 433-24 KMV									
6,270.00	3.27	270.81	5,735.46	395.36	-2,277.05	2,308.22	0.53	-0.53	-0.30
6,364.00	3.08	269.93	5,829.32	395.40	-2,282.26	2,313.39	0.21	-0.20	-0.94
6,459.00	2.59	267.04	5,924.20	395.28	-2,286.96	2,318.03	0.54	-0.52	-3.04
6,553.00	2.02	265.54	6,018.13	395.05	-2,290.73	2,321.75	0.61	-0.61	-1.60
6,647.00	1.78	266.86	6,112.07	394.84	-2,293.84	2,324.81	0.26	-0.26	1.40
6,742.00	1.20	251.88	6,207.04	394.45	-2,296.26	2,327.17	0.73	-0.61	-15.77
6,836.00	1.11	234.75	6,301.02	393.61	-2,297.94	2,328.73	0.38	-0.10	-18.22
6,931.00	0.97	224.23	6,396.01	392.51	-2,299.25	2,329.90	0.25	-0.15	-11.07
7,025.00	1.09	225.88	6,489.99	391.32	-2,300.45	2,330.94	0.13	0.13	1.76
7,119.00	0.58	72.29	6,583.99	390.84	-2,300.63	2,331.07	1.73	-0.54	-163.39
7,214.00	0.57	88.01	6,678.98	391.00	-2,299.70	2,330.17	0.17	-0.01	16.55
7,308.00	0.63	129.09	6,772.98	390.69	-2,298.84	2,329.27	0.45	0.06	43.70
7,402.00	0.81	111.66	6,866.97	390.12	-2,297.82	2,328.19	0.30	0.19	-18.54
7,496.00	0.88	113.72	6,960.96	389.58	-2,296.54	2,326.85	0.08	0.07	2.19
7,591.00	1.12	103.60	7,055.95	389.07	-2,294.97	2,325.23	0.31	0.25	-10.65
7,685.00	1.46	104.82	7,149.92	388.55	-2,292.92	2,323.13	0.36	0.36	1.30
7,780.00	1.24	108.59	7,244.90	387.91	-2,290.77	2,320.93	0.25	-0.23	3.97
7,874.00	1.26	105.42	7,338.87	387.31	-2,288.81	2,318.91	0.08	0.02	-3.37
7,969.00	1.33	100.00	7,433.85	386.84	-2,286.72	2,316.78	0.15	0.07	-5.71
8,063.00	1.12	112.60	7,527.83	386.30	-2,284.80	2,314.80	0.36	-0.22	13.40
8,158.00	1.05	138.31	7,622.81	385.29	-2,283.36	2,313.25	0.51	-0.07	27.06
8,252.00	0.85	151.04	7,716.80	384.04	-2,282.45	2,312.20	0.31	-0.21	13.54

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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)
8,347.00	0.42	156.72	7,811.79	383.11	-2,281.97	2,311.61	0.46	-0.45	5.98
8,441.00	0.51	245.47	7,905.79	382.62	-2,282.22	2,311.79	0.70	0.10	94.41
8,536.00	0.57	209.42	8,000.79	382.03	-2,282.83	2,312.33	0.36	0.06	-37.95
8,630.00	0.67	221.69	8,094.78	381.21	-2,283.43	2,312.82	0.18	0.11	13.05
8,724.00	0.39	240.80	8,188.78	380.64	-2,284.07	2,313.40	0.35	-0.30	20.33
8,819.00	0.31	297.20	8,283.78	380.60	-2,284.58	2,313.90	0.36	-0.08	59.37
8,913.00	0.24	52.22	8,377.77	380.84	-2,284.66	2,314.00	0.50	-0.07	122.36
8,997.00	0.17	93.39	8,461.77	380.94	-2,284.39	2,313.75	0.19	-0.08	49.01
Last SDI Production MWD Survey									
9,044.16	0.17	93.39	8,508.93	380.93	-2,284.25	2,313.61	0.00	0.00	0.00
PA 433-24 PBHL									
9,055.00	0.17	93.39	8,519.77	380.93	-2,284.22	2,313.58	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)	
126.00	125.99	-0.04	-1.35	First SDI Gyro MWD Survey
494.00	491.44	5.74	-39.88	Last SDI Gyro MWD Survey
566.00	561.44	7.94	-56.55	First SDI Surface MWD Survey
1,069.00	1,019.13	30.65	-260.08	Last SDI Surface MWD Survey
1,209.00	1,139.17	41.95	-331.21	First SDI Production MWD Survey
8,997.00	8,461.77	380.94	-2,284.39	Last SDI Production MWD Survey
9,055.00	8,519.77	380.93	-2,284.22	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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