



#### Well Details: PA 422-24

TVD Reference: GL 5371' & RKB 24' @ 5395.00usft (H&P 318) Level: 5371.00  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.00 0.00 1618406.45 2310453.00 39.5058379 -107.9441015PA 422-24 (B8)

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well PA 422-24 - Slot PA 422-24 (B8), True North  
 Vertical (TVD) Reference: GL 5371' & RKB 24' @ 5395.00usft (H&P 318)  
 Section (VS) Reference: Slot - PA 422-24 (B8)(0.00N, 0.00E)  
 Measured Depth Reference: GL 5371' & RKB 24' @ 5395.00usft (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

14:51, September 24 2019  
 Created By: Mel Mireles Jr.



## Directional Survey Certification

2948 I-70 Business Loop  
Grand Junction, CO 81504  
(970)-245-9447 Fax (970)-245-9454

<b>Operator</b>	TEP Rocky Mountain, LLC.
<b>Well Name &amp; No.</b>	PA 422-24
<b>County &amp; State</b>	Garfield County, CO
<b>SDI Job No.</b>	OP.021132
<b>Rig</b>	H&P 318

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 9,139 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

24-Sep-19

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 PA 422-24 - Slot PA 422-24 (B8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
<b>Site:</b>	PA 34-24 Pad	<b>MD Reference:</b>	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
<b>Well:</b>	PA 422-24	<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		PA 34-24 Pad			
Site Position:		Northing:	1,618,371.20 usft	Latitude:	39.5057421
From:	Map	Easting:	2,310,465.70 usft	Longitude:	-107.9440532
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.54 °

Well		PA 422-24 - Slot PA 422-24 (B8)				
Well Position	+N/-S	0.00 usft	Northing:	1,618,406.45 usft	Latitude:	39.5058379
	+E/-W	0.00 usft	Easting:	2,310,453.00 usft	Longitude:	-107.9441015
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	5,371.00 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	9/19/2019	9.25	65.72	51,476

<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	313.43	

<b>Survey Program</b>	<b>Date</b>	9/24/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
122.00	488.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
560.00	1,080.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,169.00	9,139.00	Survey #3 - Production MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	

<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	1.14	345.76	121.99	1.18	-0.30	1.03	0.93	0.93	0.00	
<b>First SDI Gyro MWD Survey</b>										
214.00	4.05	341.28	213.89	5.14	-1.57	4.67	3.17	3.16	-4.87	
306.00	5.45	344.36	305.57	12.43	-3.79	11.29	1.55	1.52	3.35	
397.00	6.95	328.36	396.04	21.28	-7.84	20.32	2.50	1.65	-17.58	
488.00	9.50	315.00	486.11	31.28	-16.04	33.15	3.48	2.80	-14.68	
<b>Last SDI Gyro MWD Survey</b>										

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well PA 422-24 - Slot PA 422-24 (B8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
<b>Site:</b>	PA 34-24 Pad	<b>MD Reference:</b>	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
<b>Well:</b>	PA 422-24	<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)	
560.00	12.21	315.15	556.81	40.88	-25.61	46.70	3.76	3.76	0.21	
First SDI Surface MWD Survey										
652.00	15.69	313.33	646.08	56.32	-41.53	68.87	3.81	3.78	-1.98	
743.00	19.70	313.44	732.76	75.31	-61.62	96.53	4.41	4.41	0.12	
837.00	23.50	313.38	820.14	99.09	-86.76	131.13	4.04	4.04	-0.06	
932.00	27.88	314.76	905.73	127.75	-116.31	172.29	4.65	4.61	1.45	
1,026.00	32.89	316.96	986.80	161.90	-149.36	219.77	5.46	5.33	2.34	
1,080.00	35.53	317.39	1,031.45	184.17	-169.99	250.06	4.91	4.89	0.80	
Last SDI Surface MWD Survey										
1,169.00	37.66	319.57	1,102.91	223.91	-205.14	302.90	2.80	2.39	2.45	
First SDI Production MWD Survey										
1,263.00	39.02	318.24	1,176.63	267.84	-243.47	360.94	1.69	1.45	-1.41	
1,357.00	40.00	317.11	1,249.16	312.05	-283.74	420.58	1.29	1.04	-1.20	
1,452.00	40.88	315.47	1,321.46	356.58	-326.32	482.12	1.45	0.93	-1.73	
1,546.00	38.77	313.50	1,393.65	398.78	-369.25	542.30	2.62	-2.24	-2.10	
1,640.00	39.19	313.17	1,466.73	439.36	-412.26	601.43	0.50	0.45	-0.35	
1,735.00	36.59	311.33	1,541.69	478.60	-455.42	659.75	2.98	-2.74	-1.94	
1,829.00	36.43	311.75	1,617.25	515.68	-497.28	715.65	0.32	-0.17	0.45	
1,924.00	35.55	311.26	1,694.11	552.68	-539.09	771.44	0.97	-0.93	-0.52	
2,018.00	34.29	311.53	1,771.19	588.26	-579.45	825.22	1.35	-1.34	0.29	
2,112.00	33.15	311.77	1,849.37	622.94	-618.45	877.37	1.22	-1.21	0.26	
2,207.00	33.95	311.96	1,928.54	657.98	-657.55	929.86	0.85	0.84	0.20	
2,301.00	33.33	312.12	2,006.80	692.85	-696.22	981.91	0.67	-0.66	0.17	
2,396.00	34.91	312.74	2,085.45	728.80	-735.55	1,035.19	1.70	1.66	0.65	
2,490.00	34.57	312.68	2,162.69	765.14	-774.91	1,088.75	0.36	-0.36	-0.06	
2,585.00	34.12	312.56	2,241.13	801.43	-814.35	1,142.35	0.48	-0.47	-0.13	
2,679.00	36.11	313.13	2,318.02	838.20	-853.98	1,196.41	2.15	2.12	0.61	
2,773.00	35.67	313.15	2,394.17	875.88	-894.19	1,251.52	0.47	-0.47	0.02	
2,867.00	35.29	313.06	2,470.72	913.16	-934.03	1,306.07	0.41	-0.40	-0.10	
2,962.00	37.93	314.86	2,546.97	952.50	-974.78	1,362.72	3.00	2.78	1.89	
3,056.00	37.47	314.98	2,621.34	993.09	-1,015.49	1,420.18	0.50	-0.49	0.13	
3,151.00	37.46	314.59	2,696.75	1,033.80	-1,056.50	1,477.95	0.25	-0.01	-0.41	
3,246.00	37.05	314.63	2,772.36	1,074.19	-1,097.44	1,535.45	0.43	-0.43	0.04	
3,340.00	35.75	315.01	2,848.02	1,113.50	-1,137.01	1,591.21	1.40	-1.38	0.40	
3,434.00	37.10	313.59	2,923.66	1,152.47	-1,176.96	1,647.01	1.69	1.44	-1.51	
3,529.00	36.01	313.62	2,999.97	1,191.50	-1,217.93	1,703.59	1.15	-1.15	0.03	
3,623.00	37.58	312.72	3,075.24	1,230.01	-1,259.00	1,759.89	1.77	1.67	-0.96	
3,718.00	36.86	312.05	3,150.89	1,268.75	-1,301.44	1,817.34	0.87	-0.76	-0.71	
3,812.00	36.25	312.37	3,226.40	1,306.36	-1,342.91	1,873.32	0.68	-0.65	0.34	
3,907.00	34.96	311.83	3,303.64	1,343.44	-1,383.94	1,928.61	1.40	-1.36	-0.57	
4,001.00	37.00	312.82	3,379.70	1,380.63	-1,424.76	1,983.82	2.26	2.17	1.05	
4,096.00	35.21	312.34	3,456.45	1,418.51	-1,465.97	2,039.79	1.91	-1.88	-0.51	
4,190.00	36.92	313.32	3,532.43	1,456.14	-1,506.55	2,095.12	1.92	1.82	1.04	
4,285.00	37.34	313.38	3,608.17	1,495.50	-1,548.25	2,152.47	0.44	0.44	0.06	

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well PA 422-24 - Slot PA 422-24 (B8)
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<b>Site:</b>	PA 34-24 Pad	<b>MD Reference:</b>	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
<b>Well:</b>	PA 422-24	<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)
4,380.00	37.29	314.16	3,683.73	1,535.34	-1,589.83	2,210.05	0.50	-0.05	0.82
4,474.00	36.33	314.17	3,758.99	1,574.58	-1,630.23	2,266.37	1.02	-1.02	0.01
4,569.00	34.57	313.21	3,836.37	1,612.64	-1,670.06	2,321.46	1.94	-1.85	-1.01
4,663.00	37.81	313.61	3,912.23	1,650.78	-1,710.37	2,376.96	3.46	3.45	0.43
4,758.00	37.50	313.70	3,987.44	1,690.85	-1,752.36	2,435.00	0.33	-0.33	0.09
4,852.00	37.31	313.93	4,062.11	1,730.38	-1,793.57	2,492.09	0.25	-0.20	0.24
4,947.00	35.18	313.59	4,138.72	1,769.23	-1,834.13	2,548.26	2.25	-2.24	-0.36
5,041.00	35.02	312.28	4,215.63	1,806.04	-1,873.70	2,602.30	0.82	-0.17	-1.39
5,136.00	32.27	313.97	4,294.71	1,842.00	-1,912.12	2,654.93	3.06	-2.89	1.78
5,230.00	30.80	314.30	4,374.83	1,876.23	-1,947.41	2,704.09	1.57	-1.56	0.35
5,324.00	28.58	314.05	4,456.48	1,908.67	-1,980.80	2,750.64	2.37	-2.36	-0.27
5,419.00	26.96	311.74	4,540.54	1,938.81	-2,013.20	2,794.89	2.05	-1.71	-2.43
5,513.00	24.26	313.44	4,625.30	1,966.28	-2,043.13	2,835.51	2.98	-2.87	1.81
5,608.00	25.42	313.92	4,711.51	1,993.85	-2,071.99	2,875.42	1.24	1.22	0.51
5,702.00	24.71	313.64	4,796.65	2,021.40	-2,100.74	2,915.24	0.77	-0.76	-0.30
5,797.00	23.92	313.77	4,883.23	2,048.43	-2,129.02	2,954.35	0.83	-0.83	0.14
5,891.00	21.35	313.76	4,969.98	2,073.45	-2,155.14	2,990.53	2.73	-2.73	-0.01
5,986.00	19.29	312.64	5,059.06	2,096.04	-2,179.18	3,023.51	2.21	-2.17	-1.18
6,080.00	16.85	311.40	5,148.42	2,115.57	-2,200.82	3,052.66	2.63	-2.60	-1.32
6,175.00	16.44	311.10	5,239.44	2,133.51	-2,221.28	3,079.85	0.44	-0.43	-0.32
6,269.00	13.90	310.11	5,330.16	2,149.54	-2,239.94	3,104.42	2.72	-2.70	-1.05
6,364.00	14.28	312.58	5,422.30	2,164.81	-2,257.30	3,127.52	0.75	0.40	2.60
6,458.00	12.49	312.05	5,513.74	2,179.47	-2,273.38	3,149.28	1.91	-1.90	-0.56
6,552.00	11.47	312.13	5,605.69	2,192.55	-2,287.86	3,168.78	1.09	-1.09	0.09
6,634.19	11.30	311.77	5,686.26	2,203.39	-2,299.93	3,185.00	0.23	-0.21	-0.44
PA 422-24 BTV									
6,647.00	11.27	311.71	5,698.83	2,205.06	-2,301.80	3,187.51	0.23	-0.21	-0.45
6,742.00	9.64	317.52	5,792.25	2,217.10	-2,314.10	3,204.72	2.04	-1.72	6.12
6,836.00	7.66	320.64	5,885.18	2,227.75	-2,323.39	3,218.79	2.16	-2.11	3.32
6,930.00	4.78	321.31	5,978.61	2,235.65	-2,329.81	3,228.88	3.06	-3.06	0.71
7,025.00	2.19	321.70	6,073.43	2,240.17	-2,333.41	3,234.60	2.73	-2.73	0.41
7,119.00	1.26	298.94	6,167.39	2,242.08	-2,335.43	3,237.38	1.21	-0.99	-24.21
7,213.00	1.12	300.41	6,261.37	2,243.04	-2,337.13	3,239.28	0.15	-0.15	1.56
7,308.00	1.22	284.41	6,356.35	2,243.77	-2,338.91	3,241.06	0.36	0.11	-16.84
7,403.00	1.14	266.75	6,451.33	2,243.96	-2,340.83	3,242.60	0.39	-0.08	-18.59
7,497.00	1.45	252.67	6,545.30	2,243.56	-2,342.90	3,243.82	0.47	0.33	-14.98
7,592.00	1.79	248.09	6,640.27	2,242.65	-2,345.42	3,245.03	0.38	0.36	-4.82
7,686.00	1.14	230.73	6,734.23	2,241.51	-2,347.51	3,245.76	0.83	-0.69	-18.47
7,780.00	1.01	219.23	6,828.22	2,240.27	-2,348.76	3,245.82	0.27	-0.14	-12.23
7,875.00	0.78	191.05	6,923.21	2,238.99	-2,349.41	3,245.41	0.52	-0.24	-29.66
7,970.00	0.62	183.86	7,018.20	2,237.84	-2,349.57	3,244.73	0.19	-0.17	-7.57
8,064.00	0.55	208.64	7,112.20	2,236.94	-2,349.82	3,244.30	0.28	-0.07	26.36
8,158.00	0.86	171.28	7,206.19	2,235.84	-2,349.93	3,243.62	0.57	0.33	-39.74
8,253.00	1.02	176.02	7,301.18	2,234.30	-2,349.76	3,242.44	0.19	0.17	4.99

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well PA 422-24 - Slot PA 422-24 (B8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
<b>Site:</b>	PA 34-24 Pad	<b>MD Reference:</b>	GL 5371' & RKB 24' @ 5395.00usft (H&P 318)
<b>Well:</b>	PA 422-24	<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)
8,347.00	1.14	153.54	7,395.16	2,232.62	-2,349.29	3,240.94	0.47	0.13	-23.91
8,442.00	0.97	146.45	7,490.14	2,231.11	-2,348.42	3,239.27	0.23	-0.18	-7.46
8,536.00	0.74	123.14	7,584.13	2,230.11	-2,347.47	3,237.90	0.44	-0.24	-24.80
8,631.00	0.93	89.38	7,679.12	2,229.79	-2,346.19	3,236.74	0.55	0.20	-35.54
8,725.00	0.27	19.83	7,773.12	2,230.00	-2,345.35	3,236.28	0.93	-0.70	-73.99
8,820.00	0.28	136.77	7,868.12	2,230.04	-2,345.11	3,236.14	0.49	0.01	123.09
8,914.00	0.88	225.99	7,962.11	2,229.38	-2,345.48	3,235.94	0.98	0.64	94.91
9,008.00	0.48	249.55	8,056.11	2,228.74	-2,346.36	3,236.15	0.51	-0.43	25.06
9,080.00	0.97	212.37	8,128.10	2,228.12	-2,346.97	3,236.17	0.91	0.68	-51.64
Last SDI Production MWD Survey									
9,139.00	0.97	212.37	8,187.09	2,227.27	-2,347.51	3,235.97	0.00	0.00	0.00
Projection to TD - PA 422-24 PBHL									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
122.00	121.99	1.18	-0.30	First SDI Gyro MWD Survey
488.00	486.11	31.28	-16.04	Last SDI Gyro MWD Survey
560.00	556.81	40.88	-25.61	First SDI Surface MWD Survey
1,080.00	1,031.45	184.17	-169.99	Last SDI Surface MWD Survey
1,169.00	1,102.91	223.91	-205.14	First SDI Production MWD Survey
9,080.00	8,128.10	2,228.12	-2,346.97	Last SDI Production MWD Survey
9,139.00	8,187.09	2,227.27	-2,347.51	Projection to TD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_