



<b>Well Details: PA 332-24</b>					
TVD Reference: GL 5733' & RKB 24' @ 5757.00usft Grid Level: 5733.00					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	1618796.70	2312521.20	39.5070614	-107.9368114
Slot PA 332-24 (B4)					
<b>REFERENCE INFORMATION</b>					
Co-ordinate (N/E) Reference: Well PA 332-24 - Slot PA 332-24 (B4), True North					
Vertical (TVD) Reference: GL 5733' & RKB 24' @ 5757.00usft					
Section (VS) Reference: Slot - PA 332-24 (B4)(0.00N, 0.00E)					
Measured Depth Reference: GL 5733' & RKB 24' @ 5757.00usft					
Calculation Method: Minimum Curvature					
<b>PROJECT DETAILS: Garfield County, CO NAD83</b>					
Geodetic System: US State Plane 1983					
Datum: North American Datum 1983					
Ellipsoid: GRS 1980					
Zone: Colorado Central Zone					
System Datum: Mean Sea Level					
<b>Plan: OH</b>					
10:34, October 25 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 332-24
County & State	Garfield County, CO
SDI Job No.	OP.013630
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           155           feet to a measured depth of   9,201   feet is true and correct as determined from all available records.

Signature

                    25-Oct-18                    

Date

### **Mel Mireles Jr.**

Grand Junction Assistant Well Planner  
Scientific Drilling - Colorado District



## Scientific Drilling, Intl Survey Report

<b>Company:</b> TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b> Well PA 332-24 - Slot PA 332-24 (B4)
<b>Project:</b> Garfield County, CO NAD83	<b>TVD Reference:</b> GL 5733' & RKB 24' @ 5757.00usft
<b>Site:</b> RWF 13-19 Pad	<b>MD Reference:</b> GL 5733' & RKB 24' @ 5757.00usft
<b>Well:</b> PA 332-24	<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		

<b>Site</b> RWF 13-19 Pad					
<b>Site Position:</b>		<b>Northing:</b> 1,618,792.50 usft	<b>Latitude:</b> 39.5070510		
<b>From:</b> Map		<b>Easting:</b> 2,312,535.60 usft	<b>Longitude:</b> -107.9367600		
<b>Position Uncertainty:</b> 0.00 usft		<b>Slot Radius:</b> 13.20 in	<b>Grid Convergence:</b> -1.54 °		

<b>Well</b> PA 332-24 - Slot PA 332-24 (B4)					
<b>Well Position</b>	<b>+N/-S</b> 0.00 usft	<b>Northing:</b> 1,618,796.70 usft	<b>Latitude:</b> 39.5070615		
	<b>+E/-W</b> 0.00 usft	<b>Easting:</b> 2,312,521.20 usft	<b>Longitude:</b> -107.9368114		
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b> 0.00 usft	<b>Ground Level:</b> 5,733.00 usft		

<b>Wellbore</b> OH					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/6/2018	9.35	65.75	51,567

<b>Design</b> OH					
<b>Audit Notes:</b>					
<b>Version:</b> 1.0		<b>Phase:</b> ACTUAL		<b>Tie On Depth:</b> 0.00	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	297.58	

<b>Survey Program</b>		<b>Date</b> 10/25/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
155.00	958.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5
1,032.00	1,071.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM
1,178.00	9,201.00	Survey #3 - Production MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM

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	
155.00	0.35	306.12	155.00	0.28	-0.38	0.47	0.23	0.23	0.00	
<b>First SDI Gyro MWD Survey</b>										
218.00	1.06	267.98	217.99	0.37	-1.12	1.17	1.29	1.13	-60.54	
311.00	3.70	260.77	310.91	-0.14	-4.94	4.32	2.85	2.84	-7.75	
402.00	5.37	272.64	401.62	-0.41	-12.10	10.53	2.10	1.84	13.04	
494.00	7.21	288.11	493.07	1.58	-21.88	20.13	2.70	2.00	16.82	
586.00	10.21	294.08	584.00	6.70	-34.82	33.97	3.40	3.26	6.49	
678.00	13.20	290.65	674.08	13.73	-52.10	52.54	3.34	3.25	-3.73	



**Scientific Drilling, Intl**  
Survey Report

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well PA 332-24 - Slot PA 332-24 (B4)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5733' & RKB 24' @ 5757.00usft
<b>Site:</b>	RWF 13-19 Pad	<b>MD Reference:</b>	GL 5733' & RKB 24' @ 5757.00usft
<b>Well:</b>	PA 332-24	<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)	
770.00	16.01	297.69	763.10	23.34	-73.17	75.66	3.61	3.05	7.65	
861.00	19.35	302.08	849.80	37.18	-97.06	103.24	3.95	3.67	4.82	
958.00	21.91	306.74	940.57	56.54	-125.19	137.14	3.13	2.64	4.80	
<b>Last SDI Gyro MWD Survey</b>										
1,032.00	24.89	307.48	1,008.48	74.28	-148.61	166.12	4.05	4.03	1.00	
<b>First SDI Surface MWD Survey</b>										
1,071.00	25.85	308.00	1,043.72	84.51	-161.83	182.56	2.53	2.46	1.33	
<b>Last SDI Surface MWD Survey</b>										
1,178.00	29.37	308.62	1,138.52	115.26	-200.72	231.27	3.30	3.29	0.58	
<b>First SDI Production MWD Survey</b>										
1,272.00	29.61	308.83	1,220.34	144.21	-236.82	276.67	0.28	0.26	0.22	
1,367.00	31.25	307.78	1,302.25	174.02	-274.58	323.95	1.81	1.73	-1.11	
1,462.00	31.58	307.52	1,383.33	204.27	-313.79	372.70	0.38	0.35	-0.27	
1,556.00	32.01	306.80	1,463.22	234.18	-353.26	421.54	0.61	0.46	-0.77	
1,650.00	30.93	306.89	1,543.39	263.61	-392.53	469.97	1.15	-1.15	0.10	
1,745.00	32.49	304.59	1,624.21	292.75	-433.06	519.39	2.08	1.64	-2.42	
1,838.00	31.23	304.35	1,703.20	320.54	-473.53	568.12	1.36	-1.35	-0.26	
1,933.00	30.46	302.82	1,784.76	347.48	-514.10	616.56	1.16	-0.81	-1.61	
2,027.00	33.00	302.87	1,864.71	374.30	-555.63	665.78	2.70	2.70	0.05	
2,122.00	32.72	302.32	1,944.51	402.06	-599.06	717.13	0.43	-0.29	-0.58	
2,216.00	32.80	302.81	2,023.56	429.44	-641.93	767.80	0.29	0.09	0.52	
2,310.00	31.57	302.71	2,103.11	456.54	-684.03	817.67	1.31	-1.31	-0.11	
2,405.00	30.22	301.95	2,184.63	482.63	-725.24	866.27	1.48	-1.42	-0.80	
2,499.00	31.92	303.43	2,265.14	508.84	-766.06	914.59	1.98	1.81	1.57	
2,594.00	30.98	304.01	2,346.18	536.35	-807.29	963.87	1.04	-0.99	0.61	
2,688.00	32.22	304.53	2,426.25	564.09	-847.99	1,012.78	1.35	1.32	0.55	
2,782.00	31.11	304.21	2,506.25	591.95	-888.72	1,061.78	1.19	-1.18	-0.34	
2,877.00	29.92	305.10	2,588.09	619.37	-928.40	1,109.65	1.34	-1.25	0.94	
2,971.00	32.08	305.14	2,668.66	647.22	-968.00	1,157.64	2.30	2.30	0.04	
3,065.00	31.19	305.50	2,748.69	675.72	-1,008.22	1,206.50	0.97	-0.95	0.38	
3,160.00	30.64	304.38	2,830.20	703.68	-1,048.23	1,254.90	0.84	-0.58	-1.18	
3,254.00	32.24	305.25	2,910.39	731.68	-1,088.48	1,303.53	1.77	1.70	0.93	
3,348.00	30.97	304.68	2,990.45	759.91	-1,128.84	1,352.39	1.39	-1.35	-0.61	
3,442.00	32.56	304.95	3,070.37	788.16	-1,169.47	1,401.47	1.70	1.69	0.29	
3,537.00	31.47	304.62	3,150.92	816.90	-1,210.83	1,451.44	1.16	-1.15	-0.35	
3,631.00	31.26	304.62	3,231.18	844.69	-1,251.09	1,499.99	0.22	-0.22	0.00	
3,725.00	30.22	304.10	3,311.97	871.81	-1,290.75	1,547.70	1.14	-1.11	-0.55	
3,820.00	31.55	304.74	3,393.50	899.38	-1,330.98	1,596.12	1.44	1.40	0.67	
3,914.00	30.31	304.56	3,474.13	926.85	-1,370.72	1,644.06	1.32	-1.32	-0.19	
4,008.00	30.38	303.77	3,555.25	953.52	-1,410.01	1,691.24	0.43	0.07	-0.84	
4,103.00	30.86	304.30	3,637.01	980.60	-1,450.11	1,739.32	0.58	0.51	0.56	
4,197.00	30.76	303.67	3,717.74	1,007.52	-1,490.03	1,787.16	0.36	-0.11	-0.67	
4,291.00	29.55	303.31	3,799.02	1,033.57	-1,529.41	1,834.13	1.30	-1.29	-0.38	
4,386.00	30.14	303.62	3,881.42	1,059.64	-1,568.85	1,881.16	0.64	0.62	0.33	



## Scientific Drilling, Intl Survey Report

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well PA 332-24 - Slot PA 332-24 (B4)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5733' & RKB 24' @ 5757.00usft
<b>Site:</b>	RWF 13-19 Pad	<b>MD Reference:</b>	GL 5733' & RKB 24' @ 5757.00usft
<b>Well:</b>	PA 332-24	<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)	
4,480.00	31.30	302.64	3,962.23	1,085.88	-1,609.06	1,928.95	1.34	1.23	-1.04	
4,574.00	30.83	303.36	4,042.75	1,112.30	-1,649.74	1,977.24	0.64	-0.50	0.77	
4,668.00	30.88	302.96	4,123.44	1,138.67	-1,690.10	2,025.22	0.22	0.05	-0.43	
4,762.00	30.50	303.00	4,204.28	1,164.78	-1,730.35	2,072.98	0.40	-0.40	0.04	
4,857.00	31.00	304.49	4,285.92	1,191.77	-1,770.73	2,121.27	0.96	0.53	1.57	
4,951.00	29.45	304.39	4,367.14	1,218.53	-1,809.76	2,168.25	1.65	-1.65	-0.11	
5,140.00	29.90	305.97	4,531.35	1,272.44	-1,886.22	2,260.99	0.48	0.24	0.84	
5,234.00	30.75	306.24	4,612.49	1,300.41	-1,924.57	2,307.92	0.92	0.90	0.29	
5,328.00	29.44	307.18	4,693.82	1,328.58	-1,962.36	2,354.46	1.48	-1.39	1.00	
5,516.00	25.09	308.11	4,860.89	1,381.12	-2,030.56	2,439.24	2.32	-2.31	0.49	
5,610.00	25.33	309.23	4,945.94	1,406.14	-2,061.82	2,478.53	0.57	0.26	1.19	
5,704.00	25.80	310.24	5,030.74	1,432.07	-2,093.01	2,518.18	0.68	0.50	1.07	
5,798.00	23.30	311.17	5,116.23	1,457.53	-2,122.63	2,556.21	2.69	-2.66	0.99	
5,893.00	22.19	310.43	5,203.84	1,481.53	-2,150.43	2,591.97	1.21	-1.17	-0.78	
5,987.00	19.36	309.59	5,291.72	1,502.98	-2,175.95	2,624.52	3.03	-3.01	-0.89	
6,082.00	15.81	310.01	5,382.27	1,521.34	-2,198.01	2,652.57	3.74	-3.74	0.44	
6,176.00	13.98	307.57	5,473.11	1,536.50	-2,216.81	2,676.26	2.06	-1.95	-2.60	
6,270.00	13.74	304.59	5,564.37	1,549.76	-2,235.00	2,698.52	0.80	-0.26	-3.17	
6,365.00	12.87	301.87	5,656.82	1,561.75	-2,253.28	2,720.27	1.13	-0.92	-2.86	
6,455.01	11.37	299.80	5,744.83	1,571.45	-2,269.49	2,739.13	1.74	-1.67	-2.30	
<b>PA 332-24 KMV</b>										
6,459.00	11.30	299.70	5,748.74	1,571.84	-2,270.17	2,739.91	1.74	-1.66	-2.61	
6,554.00	9.40	300.03	5,842.19	1,580.33	-2,284.97	2,756.97	2.00	-2.00	0.35	
6,648.00	7.08	298.64	5,935.21	1,586.95	-2,296.70	2,770.43	2.48	-2.47	-1.48	
6,743.00	5.24	306.36	6,029.66	1,592.33	-2,305.34	2,780.57	2.12	-1.94	8.13	
6,837.00	4.30	298.28	6,123.33	1,596.55	-2,311.90	2,788.34	1.23	-1.00	-8.60	
6,931.00	2.10	289.81	6,217.18	1,598.80	-2,316.62	2,793.57	2.39	-2.34	-9.01	
7,025.00	1.33	277.63	6,311.14	1,599.53	-2,319.32	2,796.30	0.90	-0.82	-12.96	
7,120.00	0.74	257.15	6,406.12	1,599.54	-2,321.01	2,797.80	0.72	-0.62	-21.56	
7,214.00	0.62	246.03	6,500.12	1,599.20	-2,322.07	2,798.58	0.19	-0.13	-11.83	
7,309.00	0.76	235.76	6,595.11	1,598.63	-2,323.06	2,799.20	0.20	0.15	-10.81	
7,403.00	0.62	193.81	6,689.10	1,597.79	-2,323.70	2,799.37	0.54	-0.15	-44.63	
7,497.00	0.41	144.76	6,783.10	1,597.02	-2,323.62	2,798.95	0.50	-0.22	-52.18	
7,591.00	0.85	126.19	6,877.09	1,596.33	-2,322.87	2,797.96	0.51	0.47	-19.76	
7,686.00	1.59	100.94	6,972.07	1,595.67	-2,321.00	2,796.00	0.94	0.78	-26.58	
7,780.00	0.64	190.78	7,066.06	1,594.90	-2,319.82	2,794.60	1.82	-1.01	95.57	
7,875.00	0.80	171.73	7,161.05	1,593.73	-2,319.83	2,794.06	0.30	0.17	-20.05	
7,969.00	1.42	151.42	7,255.03	1,592.05	-2,319.17	2,792.71	0.77	0.66	-21.61	
8,064.00	1.87	149.41	7,349.99	1,589.69	-2,317.82	2,790.41	0.48	0.47	-2.12	
8,158.00	0.60	183.73	7,443.97	1,587.88	-2,317.07	2,788.91	1.51	-1.35	36.51	
8,252.00	1.19	175.20	7,537.96	1,586.41	-2,317.02	2,788.19	0.64	0.63	-9.07	
8,347.00	1.69	157.99	7,632.93	1,584.13	-2,316.42	2,786.60	0.69	0.53	-18.12	
8,441.00	2.16	153.89	7,726.88	1,581.25	-2,315.12	2,784.11	0.52	0.50	-4.36	



## Scientific Drilling, Intl Survey Report

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well PA 332-24 - Slot PA 332-24 (B4)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5733' & RKB 24' @ 5757.00usft
<b>Site:</b>	RWF 13-19 Pad	<b>MD Reference:</b>	GL 5733' & RKB 24' @ 5757.00usft
<b>Well:</b>	PA 332-24	<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)	
8,536.00	2.11	161.63	7,821.81	1,577.99	-2,313.78	2,781.41	0.31	-0.05		8.15
8,630.00	2.75	166.95	7,915.73	1,574.15	-2,312.72	2,778.70	0.72	0.68		5.66
8,725.00	3.20	168.96	8,010.60	1,569.32	-2,311.70	2,775.56	0.49	0.47		2.12
8,819.00	3.94	183.58	8,104.42	1,563.53	-2,311.40	2,772.61	1.24	0.79		15.55
8,914.00	4.10	187.75	8,199.18	1,556.90	-2,312.06	2,770.13	0.35	0.17		4.39
9,008.00	4.58	191.92	8,292.91	1,549.90	-2,313.29	2,767.98	0.61	0.51		4.44
9,102.00	3.87	191.20	8,386.66	1,543.12	-2,314.68	2,766.07	0.76	-0.76		-0.77
9,141.00	3.52	184.25	8,425.58	1,540.63	-2,315.03	2,765.23	1.46	-0.90		-17.82
<b>Last SDI Production MWD Survey</b>										
9,201.00	3.52	184.25	8,485.46	1,536.96	-2,315.30	2,763.77	0.00	0.00		0.00
<b>Projection to TD - PA 332-24 PBHL</b>										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
155.00	155.00	0.28	-0.38	First SDI Gyro MWD Survey	
958.00	940.57	56.54	-125.19	Last SDI Gyro MWD Survey	
1,032.00	1,008.48	74.28	-148.61	First SDI Surface MWD Survey	
1,071.00	1,043.72	84.51	-161.83	Last SDI Surface MWD Survey	
1,178.00	1,138.52	115.26	-200.72	First SDI Production MWD Survey	
9,141.00	8,425.58	1,540.63	-2,315.03	Last SDI Production MWD Survey	
9,201.00	8,485.46	1,536.96	-2,315.30	Projection to TD	

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