



Well Details: NR 311-3

TVD Reference: GL 6720' & RKB 24' @ 6744.00usft
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.00 0.00 1634946.62 2329738.79 39.5526365 -107.8773084 NR 311-3 (B4)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well NR 311-3 - Slot NR 311-3 (B4), True North
 Vertical (TVD) Reference: GL 6720' & RKB 24' @ 6744.00usft
 Section (VS) Reference: Slot - NR 311-3 (B4)(0.00N, 0.00E)
 Measured Depth Reference: GL 6720' & RKB 24' @ 6744.00usft
 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

10:56, August 23 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.	NR 311-3
County & State	Garfield County, CO
SDI Job No.	OP.012125
Rig	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 11,028 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

23-Aug-18

Date

Mel Mireles Jr.

Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well NR 311-3 - Slot NR 311-3 (B4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6720' & RKB 24' @ 6744.00usft
Site:	NR 23-3 Pad	MD Reference:	GL 6720' & RKB 24' @ 6744.00usft
Well:	NR 311-3	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		NR 23-3 Pad			
Site Position:		Northing:	1,634,904.55 usft	Latitude:	39.5525224
From:	Map	Easting:	2,329,757.66 usft	Longitude:	-107.8772377
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.50 °

Well		NR 311-3 - Slot NR 311-3 (B4)				
Well Position	+N/-S	0.00 usft	Northing:	1,634,946.62 usft	Latitude:	39.5526365
	+E/-W	0.00 usft	Easting:	2,329,738.79 usft	Longitude:	-107.8773085
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,720.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/4/2018	9.45	65.80	51,551

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	336.16	

Survey Program	Date	8/23/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
122.00	673.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
746.00	1,069.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,178.00	11,028.00	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	
122.00	0.53	331.44	122.00	0.50	-0.27	0.56	0.43	0.43	0.00	
First SDI Gyro MWD Survey										
213.00	2.38	344.62	212.97	2.69	-0.97	2.85	2.05	2.03	14.48	
305.00	3.96	343.65	304.82	7.58	-2.37	7.89	1.72	1.72	-1.05	
397.00	3.52	330.47	396.63	13.08	-4.66	13.85	1.05	-0.48	-14.33	
489.00	3.52	329.06	488.45	17.96	-7.50	19.46	0.09	0.00	-1.53	
581.00	6.07	332.40	580.12	24.70	-11.21	27.12	2.79	2.77	3.63	
673.00	10.38	336.45	671.16	36.61	-16.78	40.27	4.72	4.68	4.40	

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Site:	NR 23-3 Pad	MD Reference:	GL 6720' & RKB 24' @ 6744.00usft
Well:	NR 311-3	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									
746.00	13.77	338.40	742.53	50.72	-22.61	55.53	4.68	4.64	2.67
First SDI Surface MWD Survey									
840.00	16.88	335.07	833.18	73.51	-32.48	80.36	3.44	3.31	-3.54
935.00	20.25	334.15	923.22	100.82	-45.46	110.59	3.56	3.55	-0.97
1,029.00	23.49	334.69	1,010.45	132.40	-60.57	145.58	3.45	3.45	0.57
1,069.00	24.45	335.52	1,047.00	147.14	-67.41	161.83	2.54	2.40	2.08
Last SDI Surface MWD Survey									
1,178.00	25.74	334.34	1,145.71	189.01	-87.01	208.05	1.27	1.18	-1.08
First SDI Production MWD Survey									
1,273.00	26.86	335.47	1,230.87	227.13	-104.85	250.13	1.29	1.18	1.19
1,368.00	28.12	335.86	1,315.14	267.08	-122.92	293.97	1.34	1.33	0.41
1,462.00	31.33	337.17	1,396.77	309.83	-141.46	340.57	3.48	3.41	1.39
1,557.00	32.80	336.84	1,477.27	356.26	-161.17	391.00	1.56	1.55	-0.35
1,651.00	34.56	335.49	1,555.49	403.93	-182.24	443.12	2.03	1.87	-1.44
1,745.00	34.85	334.94	1,632.77	452.52	-204.68	496.63	0.45	0.31	-0.59
1,840.00	34.09	333.35	1,711.09	500.90	-228.12	550.37	1.24	-0.80	-1.67
1,935.00	35.09	333.85	1,789.30	549.21	-252.10	604.24	1.09	1.05	0.53
2,029.00	33.87	336.88	1,866.79	597.56	-274.29	657.44	2.24	-1.30	3.22
2,124.00	33.15	335.52	1,946.00	645.54	-295.45	709.88	1.09	-0.76	-1.43
2,218.00	33.38	334.38	2,024.59	692.25	-317.28	761.43	0.71	0.24	-1.21
2,312.00	33.62	336.38	2,102.98	739.41	-338.89	813.30	1.20	0.26	2.13
2,407.00	32.60	335.74	2,182.56	786.84	-359.94	865.19	1.13	-1.07	-0.67
2,501.00	33.24	337.55	2,261.46	833.74	-380.19	916.27	1.25	0.68	1.93
2,596.00	33.33	336.67	2,340.88	881.77	-400.47	968.40	0.52	0.09	-0.93
2,691.00	33.94	336.56	2,419.97	930.07	-421.35	1,021.02	0.65	0.64	-0.12
2,785.00	35.83	335.35	2,497.08	979.15	-443.27	1,074.77	2.14	2.01	-1.29
2,880.00	36.25	333.33	2,573.90	1,029.53	-467.47	1,130.63	1.33	0.44	-2.13
2,974.00	34.56	335.35	2,650.52	1,078.60	-491.07	1,185.05	2.19	-1.80	2.15
3,069.00	34.18	335.52	2,728.93	1,127.38	-513.36	1,238.68	0.41	-0.40	0.18
3,163.00	34.67	334.94	2,806.47	1,175.63	-535.63	1,291.81	0.63	0.52	-0.62
3,258.00	34.38	333.85	2,884.74	1,224.18	-558.90	1,345.63	0.72	-0.31	-1.15
3,352.00	33.67	333.56	2,962.64	1,271.34	-582.20	1,398.18	0.77	-0.76	-0.31
3,447.00	33.52	333.43	3,041.78	1,318.38	-605.65	1,450.68	0.18	-0.16	-0.14
3,542.00	32.92	333.47	3,121.25	1,364.93	-628.92	1,502.67	0.63	-0.63	0.04
3,636.00	32.19	331.74	3,200.48	1,409.84	-652.18	1,553.15	1.26	-0.78	-1.84
3,731.00	33.39	333.86	3,280.35	1,455.60	-675.68	1,604.51	1.75	1.26	2.23
3,825.00	33.74	334.86	3,358.67	1,502.45	-698.17	1,656.45	0.70	0.37	1.06
3,920.00	34.82	337.81	3,437.18	1,551.46	-719.62	1,709.94	2.09	1.14	3.11
4,015.00	34.21	336.67	3,515.45	1,601.09	-740.44	1,763.76	0.94	-0.64	-1.20
4,109.00	33.06	336.75	3,593.72	1,648.92	-761.03	1,815.82	1.22	-1.22	0.09
4,204.00	35.28	337.25	3,672.31	1,698.03	-781.87	1,869.17	2.36	2.34	0.53
4,298.00	34.91	336.58	3,749.22	1,747.75	-803.06	1,923.21	0.57	-0.39	-0.71
4,393.00	33.68	336.58	3,827.70	1,796.86	-824.33	1,976.73	1.29	-1.29	0.00

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well NR 311-3 - Slot NR 311-3 (B4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6720' & RKB 24' @ 6744.00usft
Site:	NR 23-3 Pad	MD Reference:	GL 6720' & RKB 24' @ 6744.00usft
Well:	NR 311-3	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)
4,487.00	34.56	336.49	3,905.52	1,845.23	-845.33	2,029.46	0.94	0.94	-0.10
4,582.00	33.39	336.75	3,984.30	1,893.96	-866.40	2,082.54	1.24	-1.23	0.27
4,676.00	34.59	336.90	4,062.24	1,942.27	-887.08	2,135.09	1.28	1.28	0.16
4,771.00	33.33	336.75	4,141.03	1,991.05	-907.96	2,188.15	1.33	-1.33	-0.16
4,865.00	34.10	336.49	4,219.22	2,038.94	-928.67	2,240.33	0.83	0.82	-0.28
4,960.00	33.32	335.12	4,298.25	2,087.04	-950.27	2,293.05	1.15	-0.82	-1.44
5,054.00	33.87	335.09	4,376.55	2,134.22	-972.16	2,345.05	0.59	0.59	-0.03
5,149.00	32.54	334.73	4,456.04	2,181.33	-994.22	2,397.06	1.42	-1.40	-0.38
5,243.00	33.68	335.88	4,534.77	2,227.98	-1,015.66	2,448.40	1.38	1.21	1.22
5,338.00	35.31	336.61	4,613.07	2,277.23	-1,037.33	2,502.20	1.77	1.72	0.77
5,432.00	34.12	335.70	4,690.33	2,326.19	-1,058.96	2,555.73	1.38	-1.27	-0.97
5,526.00	34.47	334.91	4,767.99	2,374.31	-1,081.09	2,608.69	0.60	0.37	-0.84
5,621.00	32.98	334.82	4,847.00	2,422.06	-1,103.49	2,661.42	1.57	-1.57	-0.09
5,715.00	34.03	335.17	4,925.38	2,469.09	-1,125.43	2,713.30	1.14	1.12	0.37
5,810.00	33.19	334.48	5,004.50	2,516.68	-1,147.79	2,765.87	0.97	-0.88	-0.73
5,904.00	35.14	334.59	5,082.27	2,564.33	-1,170.49	2,818.63	2.08	2.07	0.12
5,999.00	33.59	334.56	5,160.69	2,612.76	-1,193.51	2,872.23	1.63	-1.63	-0.03
6,094.00	36.47	333.69	5,238.47	2,661.81	-1,217.32	2,926.72	3.08	3.03	-0.92
6,188.00	37.03	331.92	5,313.79	2,711.83	-1,243.02	2,982.86	1.27	0.60	-1.88
6,283.00	34.12	333.15	5,391.05	2,760.85	-1,268.53	3,038.01	3.15	-3.06	1.29
6,377.00	32.49	332.75	5,469.61	2,806.82	-1,291.99	3,089.54	1.75	-1.73	-0.43
6,472.00	30.07	334.38	5,550.80	2,850.97	-1,313.97	3,138.81	2.70	-2.55	1.72
6,566.00	27.86	334.56	5,633.04	2,892.05	-1,333.59	3,184.31	2.35	-2.35	0.19
6,661.00	25.41	334.56	5,717.95	2,930.50	-1,351.89	3,226.88	2.58	-2.58	0.00
6,756.00	24.89	332.45	5,803.94	2,966.63	-1,369.89	3,267.20	1.09	-0.55	-2.22
6,851.00	23.96	334.49	5,890.44	3,001.77	-1,387.44	3,306.43	1.32	-0.98	2.15
6,945.00	21.46	338.51	5,977.15	3,035.00	-1,401.97	3,342.70	3.13	-2.66	4.28
7,040.00	19.52	337.99	6,066.14	3,065.89	-1,414.28	3,375.93	2.05	-2.04	-0.55
7,135.00	18.47	338.34	6,155.96	3,094.59	-1,425.78	3,406.83	1.11	-1.11	0.37
7,229.00	17.23	339.48	6,245.44	3,121.47	-1,436.16	3,435.61	1.37	-1.32	1.21
7,324.00	14.68	340.80	6,336.77	3,146.02	-1,445.05	3,461.66	2.71	-2.68	1.39
7,419.00	15.30	345.02	6,428.54	3,169.50	-1,452.25	3,486.04	1.32	0.65	4.44
7,513.00	14.51	344.75	6,519.38	3,192.84	-1,458.55	3,509.94	0.84	-0.84	-0.29
7,608.00	12.06	345.19	6,611.83	3,213.92	-1,464.22	3,531.51	2.58	-2.58	0.46
7,702.00	11.35	345.79	6,703.87	3,232.38	-1,469.00	3,550.33	0.77	-0.76	0.64
7,797.00	9.73	348.30	6,797.27	3,249.30	-1,472.93	3,567.40	1.77	-1.71	2.64
7,891.00	7.56	348.09	6,890.19	3,263.13	-1,475.81	3,581.21	2.31	-2.31	-0.22
7,986.00	6.77	355.48	6,984.45	3,274.83	-1,477.54	3,592.61	1.28	-0.83	7.78
8,080.00	5.36	356.27	7,077.92	3,284.74	-1,478.27	3,601.97	1.50	-1.50	0.84
8,175.00	4.22	356.71	7,172.59	3,292.65	-1,478.76	3,609.41	1.20	-1.20	0.46
8,269.00	2.64	0.31	7,266.42	3,298.27	-1,478.94	3,614.62	1.70	-1.68	3.83
8,363.00	2.19	347.01	7,360.34	3,302.19	-1,479.33	3,618.36	0.76	-0.48	-14.15
8,458.00	1.85	339.74	7,455.28	3,305.39	-1,480.27	3,621.67	0.45	-0.36	-7.65

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8,476.61	1.75	337.35	7,473.88	3,305.94	-1,480.49	3,622.26	0.65	-0.51	-12.85
NR 311-3 BTV									
8,552.00	1.41	324.54	7,549.24	3,307.76	-1,481.47	3,624.32	0.65	-0.46	-16.99
8,647.00	0.88	285.25	7,644.22	3,308.90	-1,482.85	3,625.92	0.97	-0.56	-41.36
8,741.00	1.08	253.38	7,738.21	3,308.84	-1,484.40	3,626.49	0.61	0.21	-33.90
8,836.00	0.32	230.88	7,833.20	3,308.42	-1,485.46	3,626.53	0.84	-0.80	-23.68
8,930.00	0.79	134.61	7,927.20	3,307.80	-1,485.20	3,625.86	0.94	0.50	-102.41
9,025.00	1.38	157.19	8,022.18	3,306.28	-1,484.29	3,624.11	0.76	0.62	23.77
9,119.00	1.85	173.72	8,116.14	3,303.73	-1,483.69	3,621.53	0.70	0.50	17.59
9,213.00	1.44	176.11	8,210.10	3,301.04	-1,483.44	3,618.97	0.44	-0.44	2.54
9,307.00	0.44	155.79	8,304.09	3,299.53	-1,483.21	3,617.50	1.10	-1.06	-21.62
9,402.00	0.47	36.45	8,399.09	3,299.52	-1,482.83	3,617.33	0.83	0.03	-125.62
9,496.00	0.69	135.64	8,493.09	3,299.42	-1,482.21	3,616.99	0.95	0.23	105.52
9,591.00	1.06	175.74	8,588.08	3,298.14	-1,481.74	3,615.63	0.73	0.39	42.21
9,685.00	1.45	195.94	8,682.05	3,296.13	-1,482.01	3,613.89	0.62	0.41	21.49
9,779.00	1.14	195.43	8,776.03	3,294.08	-1,482.58	3,612.26	0.33	-0.33	-0.54
9,873.00	1.06	220.48	8,870.01	3,292.52	-1,483.39	3,611.16	0.51	-0.09	26.65
9,968.00	1.06	224.43	8,965.00	3,291.22	-1,484.58	3,610.45	0.08	0.00	4.16
10,062.00	1.23	203.86	9,058.98	3,289.68	-1,485.60	3,609.45	0.47	0.18	-21.88
10,157.00	1.67	192.09	9,153.95	3,287.39	-1,486.30	3,607.64	0.56	0.46	-12.39
10,251.00	2.62	189.36	9,247.88	3,283.93	-1,486.94	3,604.73	1.02	1.01	-2.90
10,345.00	2.80	180.65	9,341.78	3,279.52	-1,487.31	3,600.85	0.48	0.19	-9.27
10,440.00	3.08	188.66	9,436.65	3,274.67	-1,487.72	3,596.58	0.52	0.29	8.43
10,534.00	4.04	190.50	9,530.47	3,268.92	-1,488.71	3,591.72	1.03	1.02	1.96
10,629.00	4.65	200.38	9,625.20	3,262.02	-1,490.66	3,586.20	1.01	0.64	10.40
10,723.00	3.78	219.86	9,718.95	3,256.07	-1,493.97	3,582.09	1.77	-0.93	20.72
10,817.00	4.41	227.28	9,812.71	3,251.24	-1,498.61	3,579.55	0.87	0.67	7.89
10,911.00	3.96	220.30	9,906.46	3,246.31	-1,503.36	3,576.96	0.72	-0.48	-7.43
10,970.00	4.04	216.52	9,965.31	3,243.09	-1,505.92	3,575.05	0.47	0.14	-6.41
Last SDI Production MWD Survey									
11,028.00	4.04	216.52	10,023.17	3,239.80	-1,508.35	3,573.03	0.00	0.00	0.00
Projection to TD - NR 311-3 PBHL									



Scientific Drilling, Intl
Survey Report

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well NR 311-3 - Slot NR 311-3 (B4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6720' & RKB 24' @ 6744.00usft
Site:	NR 23-3 Pad	MD Reference:	GL 6720' & RKB 24' @ 6744.00usft
Well:	NR 311-3	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		Comment
		+N/-S (usft)	+E/-W (usft)	
122.00	122.00	0.50	-0.27	First SDI Gyro MWD Survey
673.00	671.16	36.61	-16.78	Last SDI Gyro MWD Survey
746.00	742.53	50.72	-22.61	First SDI Surface MWD Survey
1,069.00	1,047.00	147.14	-67.41	Last SDI Surface MWD Survey
1,178.00	1,145.71	189.01	-87.01	First SDI Production MWD Survey
10,970.00	9,965.31	3,243.09	-1,505.92	Last SDI Production MWD Survey
11,028.00	10,023.17	3,239.80	-1,508.35	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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