



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.	RU 13-17
County & State	Garfield County, CO
SDI Job No.	OP.008982
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 123 feet to a measured depth of 10,720 feet is true and correct as determined from all available records.


Signature

5-Apr-18
Date

Mel Mireles Jr.
Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well RU 13-17 - Slot RU 13-17 (A4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
Site:	RU 23-17 Pad	MD Reference:	GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
Well:	RU 13-17	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		RU 23-17 Pad			
Site Position:		Northing:	1,594,634.40 usft	Latitude:	39.4435163
From:	Map	Easting:	2,351,232.80 usft	Longitude:	-107.7974906
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.45 °

Well		RU 13-17 - Slot RU 13-17 (A4)				
Well Position	+N/-S	0.00 usft	Northing:	1,594,634.40 usft	Latitude:	39.4435163
	+E/-W	0.00 usft	Easting:	2,351,232.80 usft	Longitude:	-107.7974906
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	8,368.60 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	3/24/2018	9.18	65.57	51,579

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	286.86	

Survey Program	Date	4/5/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
123.00	771.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4
849.00	1,057.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1
1,182.00	10,720.00	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
123.00	0.26	114.52	123.00	-0.12	0.25	-0.28	0.21	0.21	0.00
132.00	0.26	109.72	132.00	-0.13	0.29	-0.32	0.24	0.02	-53.33
First SDI Gyro MWD Survey									
214.00	0.35	75.23	214.00	-0.13	0.71	-0.72	0.24	0.11	-42.06
307.00	2.20	294.87	306.98	0.69	-0.63	0.81	2.67	1.99	-150.92
399.00	5.10	287.31	398.78	2.65	-6.14	6.65	3.19	3.15	-8.22
492.00	8.09	290.04	491.16	6.13	-16.24	17.32	3.23	3.22	2.94
584.00	11.52	284.06	581.80	10.58	-31.24	32.96	3.88	3.73	-6.50

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Site:	RU 23-17 Pad	MD Reference:	GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
Well:	RU 13-17	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)
676.00	15.31	283.97	671.27	15.74	-51.94	54.27	4.12	4.12	-0.10
771.00	16.89	282.74	762.55	21.81	-77.57	80.57	1.70	1.66	-1.29
Last SDI Gyro MWD Survey									
849.00	17.91	280.75	836.98	26.55	-100.41	103.80	1.51	1.31	-2.55
First SDI Surface MWD Survey									
944.00	19.36	279.16	926.99	31.78	-130.31	133.93	1.62	1.53	-1.67
1,038.00	19.88	283.59	1,015.54	38.02	-161.23	165.32	1.68	0.55	4.71
1,057.00	20.05	285.07	1,033.40	39.62	-167.51	171.80	2.81	0.89	7.79
Last SDI Surface MWD Survey									
1,182.00	20.65	284.28	1,150.60	50.63	-209.56	215.24	0.53	0.48	-0.63
First SDI Production MWD Survey									
1,276.00	20.04	283.99	1,238.73	58.61	-241.26	247.88	0.66	-0.65	-0.31
1,371.00	19.27	282.58	1,328.20	65.96	-272.35	279.77	0.95	-0.81	-1.48
1,465.00	18.54	281.65	1,417.13	72.36	-302.13	310.13	0.84	-0.78	-0.99
1,560.00	18.74	287.72	1,507.15	80.06	-331.46	340.43	2.05	0.21	6.39
1,654.00	18.63	286.33	1,596.20	88.87	-360.25	370.54	0.49	-0.12	-1.48
1,748.00	18.21	283.79	1,685.38	96.60	-388.92	400.22	0.96	-0.45	-2.70
1,843.00	18.68	291.92	1,775.52	105.81	-417.46	430.20	2.75	0.49	8.56
1,937.00	18.78	292.38	1,864.54	117.20	-445.41	460.26	0.19	0.11	0.49
2,032.00	18.94	291.76	1,954.44	128.73	-473.87	490.84	0.27	0.17	-0.65
2,126.00	18.82	291.61	2,043.38	139.97	-502.14	521.15	0.14	-0.13	-0.16
2,221.00	17.94	291.75	2,133.53	151.04	-529.97	551.00	0.93	-0.93	0.15
2,315.00	17.50	291.31	2,223.07	161.54	-556.59	579.51	0.49	-0.47	-0.47
2,409.00	16.88	288.58	2,312.88	171.02	-582.69	607.25	1.08	-0.66	-2.90
2,504.00	16.31	288.82	2,403.92	179.72	-608.39	634.36	0.60	-0.60	0.25
2,598.00	16.27	289.29	2,494.15	188.33	-633.31	660.71	0.15	-0.04	0.50
2,693.00	16.44	289.11	2,585.30	197.13	-658.58	687.44	0.19	0.18	-0.19
2,787.00	15.95	289.28	2,675.57	205.75	-683.34	713.64	0.52	-0.52	0.18
2,881.00	17.06	292.10	2,765.70	215.20	-708.30	740.27	1.46	1.18	3.00
2,975.00	16.35	292.16	2,855.73	225.38	-733.33	767.18	0.76	-0.76	0.06
3,069.00	18.11	292.54	2,945.51	235.97	-759.08	794.89	1.88	1.87	0.40
3,164.00	18.03	292.98	3,035.82	247.37	-786.25	824.20	0.17	-0.08	0.46
3,258.00	17.38	292.45	3,125.37	258.41	-812.62	852.64	0.71	-0.69	-0.56
3,352.00	19.70	291.75	3,214.49	269.64	-840.32	882.40	2.48	2.47	-0.74
3,447.00	21.54	287.04	3,303.40	280.69	-871.87	915.80	2.61	1.94	-4.96
3,541.00	20.58	285.86	3,391.12	290.26	-904.26	949.58	1.12	-1.02	-1.26
3,636.00	19.52	287.00	3,480.36	299.46	-935.50	982.14	1.19	-1.12	1.20
3,730.00	18.82	287.27	3,569.15	308.56	-965.00	1,013.01	0.75	-0.74	0.29
3,825.00	18.64	289.02	3,659.12	318.05	-993.98	1,043.50	0.62	-0.19	1.84
3,919.00	19.21	285.72	3,748.04	327.14	-1,023.07	1,073.98	1.29	0.61	-3.51
4,014.00	18.99	285.33	3,837.81	335.46	-1,053.02	1,105.06	0.27	-0.23	-0.41
4,108.00	18.61	285.91	3,926.80	343.62	-1,082.20	1,135.34	0.45	-0.40	0.62
4,203.00	18.03	286.39	4,016.98	351.92	-1,110.88	1,165.20	0.63	-0.61	0.51
4,297.00	17.50	287.00	4,106.50	360.16	-1,138.35	1,193.88	0.60	-0.56	0.65

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

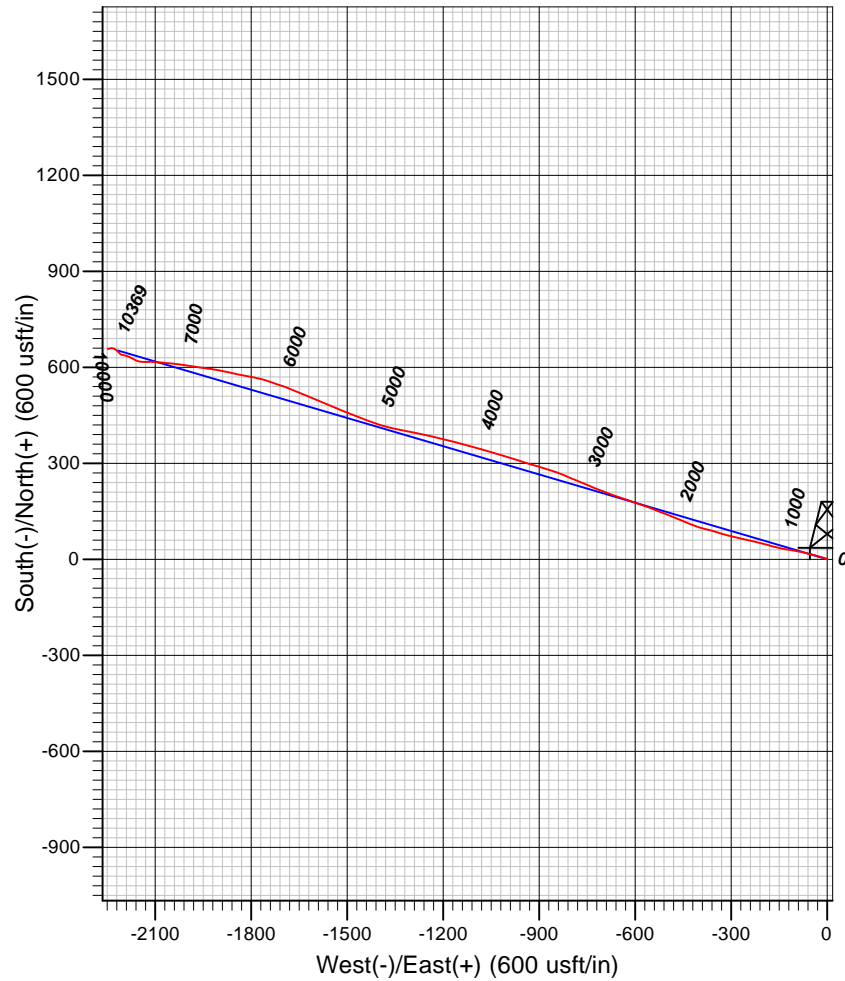
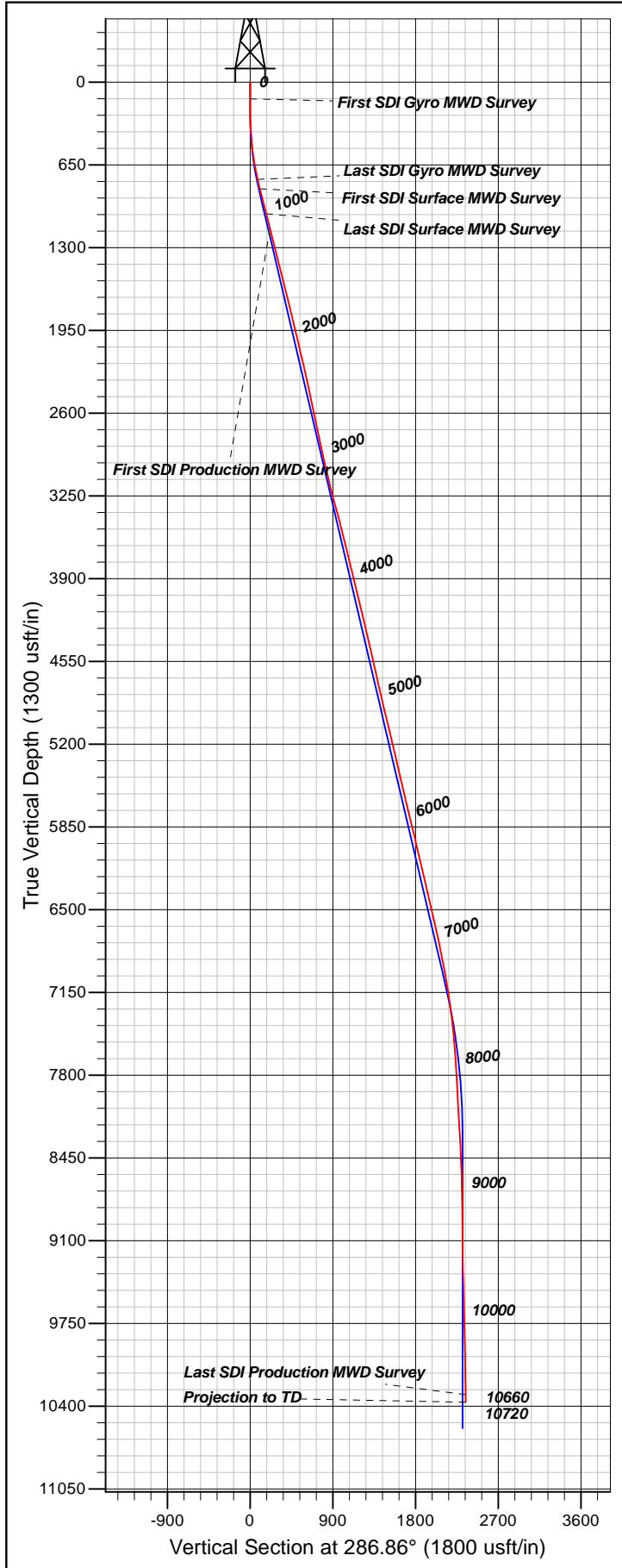
Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,391.00	19.35	282.96	4,195.68	367.78	-1,167.05	1,223.55	2.39	1.97	-4.30
4,486.00	18.94	282.09	4,285.43	374.54	-1,197.46	1,254.62	0.53	-0.43	-0.92
4,581.00	17.50	283.41	4,375.66	381.08	-1,226.43	1,284.24	1.58	-1.52	1.39
4,675.00	16.53	284.01	4,465.55	387.60	-1,253.15	1,311.71	1.05	-1.03	0.64
4,770.00	18.03	281.20	4,556.26	393.73	-1,280.69	1,339.84	1.81	1.58	-2.96
4,864.00	17.63	280.50	4,645.74	399.15	-1,308.96	1,368.46	0.48	-0.43	-0.74
4,959.00	17.01	281.72	4,736.43	404.59	-1,336.71	1,396.60	0.76	-0.65	1.28
5,053.00	18.20	284.54	4,826.03	411.07	-1,364.38	1,424.96	1.56	1.27	3.00
5,148.00	17.62	285.44	4,916.43	418.62	-1,392.60	1,454.16	0.68	-0.61	0.95
5,242.00	19.55	290.07	5,005.53	427.81	-1,421.09	1,484.09	2.58	2.05	4.93
5,336.00	18.89	290.85	5,094.29	438.62	-1,450.09	1,514.97	0.75	-0.70	0.83
5,431.00	18.17	291.94	5,184.36	449.63	-1,478.20	1,545.07	0.84	-0.76	1.15
5,525.00	17.87	292.34	5,273.75	460.59	-1,505.13	1,574.02	0.35	-0.32	0.43
5,620.00	16.49	292.85	5,364.51	471.36	-1,531.04	1,601.94	1.46	-1.45	0.54
5,715.00	18.97	291.49	5,454.99	482.26	-1,557.84	1,630.75	2.65	2.61	-1.43
5,809.00	18.15	292.13	5,544.10	493.37	-1,585.62	1,660.56	0.90	-0.87	0.68
5,904.00	18.64	293.51	5,634.25	505.00	-1,613.24	1,690.37	0.69	0.52	1.45
5,998.00	17.97	292.25	5,723.49	516.48	-1,640.44	1,719.73	0.83	-0.71	-1.34
6,093.00	18.48	294.48	5,813.73	528.27	-1,667.71	1,749.24	0.91	0.54	2.35
6,187.00	19.00	288.88	5,902.75	539.40	-1,695.75	1,779.30	1.99	0.55	-5.96
6,282.00	17.74	287.86	5,992.91	548.84	-1,724.16	1,809.23	1.37	-1.33	-1.07
6,376.00	17.17	289.80	6,082.58	557.93	-1,750.84	1,837.41	0.87	-0.61	2.06
6,471.00	18.64	281.55	6,172.99	565.72	-1,778.92	1,866.53	3.08	1.55	-8.68
6,566.00	18.51	281.32	6,263.04	571.72	-1,808.58	1,896.66	0.16	-0.14	-0.24
6,660.00	17.82	281.23	6,352.36	577.45	-1,837.32	1,925.82	0.73	-0.73	-0.10
6,755.00	18.11	282.81	6,442.72	583.56	-1,865.97	1,955.02	0.60	0.31	1.66
6,849.00	18.21	280.52	6,532.04	589.48	-1,894.66	1,984.19	0.77	0.11	-2.44
7,038.00	16.59	277.19	6,712.39	598.25	-1,950.47	2,040.14	1.01	-0.86	-1.76
7,132.00	16.26	278.90	6,802.56	601.97	-1,976.78	2,066.41	0.62	-0.35	1.82
7,227.00	14.45	277.91	6,894.16	605.65	-2,001.67	2,091.29	1.93	-1.91	-1.04
7,321.00	13.98	278.04	6,985.28	608.86	-2,024.53	2,114.09	0.50	-0.50	0.14
7,416.00	13.24	275.89	7,077.62	611.58	-2,046.71	2,136.11	0.94	-0.78	-2.26
7,510.00	12.66	275.86	7,169.23	613.73	-2,067.67	2,156.79	0.62	-0.62	-0.03
7,605.00	11.17	274.61	7,262.18	615.54	-2,087.19	2,176.01	1.59	-1.57	-1.32
7,699.00	9.94	272.59	7,354.58	616.64	-2,104.38	2,192.77	1.37	-1.31	-2.15
7,793.00	8.88	271.36	7,447.32	617.17	-2,119.73	2,207.62	1.15	-1.13	-1.31
7,887.00	6.51	271.01	7,540.47	617.44	-2,132.32	2,219.74	2.52	-2.52	-0.37
7,982.00	5.72	268.72	7,634.92	617.43	-2,142.43	2,229.42	0.87	-0.83	-2.41
8,076.00	4.78	279.14	7,728.53	617.95	-2,150.98	2,237.75	1.42	-1.00	11.09
8,171.00	5.01	299.75	7,823.19	620.63	-2,158.49	2,245.72	1.86	0.24	21.69
8,265.00	4.57	299.75	7,916.86	624.53	-2,165.31	2,253.37	0.47	-0.47	0.00
8,360.00	4.57	298.96	8,011.56	628.24	-2,171.91	2,260.76	0.07	0.00	-0.83
8,455.00	4.22	295.09	8,106.28	631.55	-2,178.38	2,267.92	0.48	-0.37	-4.07

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Well:	RU 13-17	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)	
8,549.00	4.12	292.80	8,200.03	634.33	-2,184.63	2,274.70	0.21	-0.11	-2.44	
8,644.00	4.31	280.67	8,294.78	636.31	-2,191.28	2,281.64	0.96	0.20	-12.77	
8,738.00	3.76	282.16	8,388.54	637.62	-2,197.77	2,288.23	0.60	-0.59	1.59	
8,833.00	3.69	280.76	8,483.34	638.84	-2,203.81	2,294.37	0.12	-0.07	-1.47	
8,928.00	2.29	315.30	8,578.22	640.76	-2,208.15	2,299.08	2.34	-1.47	36.36	
9,023.00	1.85	312.93	8,673.16	643.16	-2,210.61	2,302.13	0.47	-0.46	-2.49	
9,117.00	1.41	318.99	8,767.12	645.06	-2,212.48	2,304.47	0.50	-0.47	6.45	
9,212.00	1.49	308.62	8,862.09	646.72	-2,214.21	2,306.61	0.29	0.08	-10.92	
9,307.00	1.14	317.06	8,957.06	648.18	-2,215.82	2,308.57	0.42	-0.37	8.88	
9,402.00	1.06	317.41	9,052.05	649.52	-2,217.06	2,310.14	0.08	-0.08	0.37	
9,496.00	0.97	335.52	9,146.03	650.88	-2,217.98	2,311.42	0.35	-0.10	19.27	
9,591.00	1.23	304.14	9,241.01	652.19	-2,219.16	2,312.92	0.68	0.27	-33.03	
9,686.00	1.14	299.75	9,335.99	653.23	-2,220.82	2,314.82	0.13	-0.09	-4.62	
9,780.00	2.20	303.70	9,429.95	654.69	-2,223.13	2,317.46	1.13	1.13	4.20	
9,875.00	2.46	304.49	9,524.87	656.86	-2,226.33	2,321.15	0.28	0.27	0.83	
9,970.00	2.81	290.52	9,619.78	658.83	-2,230.19	2,325.41	0.77	0.37	-14.71	
10,064.00	2.02	271.18	9,713.69	659.67	-2,234.01	2,329.31	1.20	-0.84	-20.57	
10,159.00	2.02	263.10	9,808.63	659.50	-2,237.34	2,332.45	0.30	0.00	-8.51	
10,254.00	1.85	254.04	9,903.58	658.88	-2,240.48	2,335.27	0.37	-0.18	-9.54	
10,348.00	1.58	261.16	9,997.54	658.26	-2,243.22	2,337.72	0.37	-0.29	7.57	
10,443.00	1.14	268.37	10,092.51	658.04	-2,245.46	2,339.79	0.50	-0.46	7.59	
10,538.00	0.70	281.99	10,187.50	658.13	-2,246.97	2,341.27	0.51	-0.46	14.34	
10,632.00	0.44	263.62	10,281.49	658.21	-2,247.89	2,342.17	0.33	-0.28	-19.54	
10,660.00	0.70	294.12	10,309.49	658.27	-2,248.15	2,342.44	1.40	0.93	108.93	
Last SDI Production MWD Survey										
10,720.00	0.70	294.12	10,369.49	658.57	-2,248.82	2,343.17	0.00	0.00	0.00	
Projection to TD - PBHL(RU_13-17)										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
132.00	132.00	-0.13	0.29	First SDI Gyro MWD Survey	
771.00	762.55	21.81	-77.57	Last SDI Gyro MWD Survey	
849.00	836.98	26.55	-100.41	First SDI Surface MWD Survey	
1,057.00	1,033.40	39.62	-167.51	Last SDI Surface MWD Survey	
1,182.00	1,150.60	50.63	-209.56	First SDI Production MWD Survey	
10,660.00	10,309.49	658.27	-2,248.15	Last SDI Production MWD Survey	
10,720.00	10,369.49	658.57	-2,248.82	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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Well Details: RU 13-17

TVD Reference: GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318) Level: 8368.60
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.00 0.00 1594634.40 2351232.80 39.4435163 -107.7974905 RU 13-17 (A4)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well RU 13-17 - Slot RU 13-17 (A4), True North
 Vertical (TVD) Reference: GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
 Section (VS) Reference: Slot - RU 13-17 (A4)(0.00N, 0.00E)
 Measured Depth Reference: GL 8368.6' & RKB 24' @ 8392.60usft (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

10:46, April 05 2018
 Created By: Mel Mireles Jr.