



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 514-17
County & State	Garfield County, CO
SDI Job No.	OP.010082
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 124 feet to a measured depth of 10,872 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

01-Jun-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 514-17 - Slot RU 514-17 (A14)
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 514-17	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 514-17 - Slot RU 514-17 (A14)					
Well Position	+N/-S	0.00 usft	Northing:	1,594,575.50 usft	Latitude:	39.4433579
	+E/-W	0.00 usft	Easting:	2,351,279.20 usft	Longitude:	-107.7973210
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	5/10/2018	9.17	65.57	51,563

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	230.78	

Survey Program	Date	6/1/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
124.00	1,078.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
469.00	1,078.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,183.00	10,872.00	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	
124.00	0.44	243.37	124.00	-0.21	-0.43	0.46	0.35	0.35	0.00	
First SDI Gyro MWD Survey										
216.00	2.73	226.05	215.96	-1.89	-2.32	2.99	2.51	2.49	-18.83	
308.00	6.07	224.74	307.67	-6.87	-7.32	10.02	3.63	3.63	-1.42	
400.00	9.24	221.48	398.84	-15.86	-15.64	22.15	3.48	3.45	-3.54	
Last SDI Gyro MWD Survey										
469.00	11.26	222.62	466.74	-24.97	-23.87	34.28	2.94	2.93	1.65	

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Well:	RU 514-17	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)
First SDI Surface MWD Survey									
564.00	13.43	222.60	559.54	-39.92	-37.62	54.39	2.28	2.28	-0.02
655.00	16.36	227.84	647.47	-56.30	-54.28	77.65	3.54	3.22	5.76
750.00	18.45	232.66	738.12	-74.40	-76.15	106.04	2.67	2.20	5.07
844.00	21.52	235.57	826.45	-93.18	-102.21	138.10	3.43	3.27	3.10
938.00	21.92	234.52	913.78	-113.11	-130.71	172.79	0.59	0.43	-1.12
1,032.00	23.04	234.35	1,000.64	-134.02	-159.95	208.65	1.19	1.19	-0.18
1,078.00	24.09	233.47	1,042.80	-144.85	-174.81	227.02	2.41	2.28	-1.91
Last SDI Surface MWD Survey									
1,183.00	24.75	233.56	1,138.41	-170.66	-209.71	270.38	0.63	0.63	0.09
First SDI Production MWD Survey									
1,277.00	23.28	232.66	1,224.27	-193.62	-240.31	308.60	1.61	-1.56	-0.96
1,371.00	23.87	234.60	1,310.42	-215.90	-270.58	346.14	1.04	0.63	2.06
1,466.00	22.50	232.50	1,397.75	-238.10	-300.67	383.49	1.68	-1.44	-2.21
1,560.00	23.10	235.02	1,484.41	-259.63	-330.05	419.86	1.22	0.64	2.68
1,654.00	22.27	233.50	1,571.13	-280.79	-359.48	456.04	1.08	-0.88	-1.62
1,749.00	22.64	235.00	1,658.93	-301.99	-388.93	492.26	0.72	0.39	1.58
1,844.00	21.63	234.70	1,746.93	-322.59	-418.20	527.96	1.07	-1.06	-0.32
1,938.00	22.49	235.49	1,834.05	-342.79	-447.15	563.17	0.97	0.91	0.84
2,033.00	23.50	239.38	1,921.50	-362.73	-478.43	600.01	1.92	1.06	4.09
2,127.00	22.86	239.79	2,007.91	-381.47	-510.33	636.57	0.70	-0.68	0.44
2,222.00	22.29	240.39	2,095.63	-399.65	-541.94	672.56	0.65	-0.60	0.63
2,316.00	21.35	240.08	2,182.90	-417.00	-572.27	707.02	1.01	-1.00	-0.33
2,411.00	22.32	239.55	2,271.08	-434.77	-602.81	741.92	1.04	1.02	-0.56
2,505.00	21.79	239.73	2,358.20	-452.61	-633.27	776.79	0.57	-0.56	0.19
2,599.00	20.75	241.03	2,445.80	-469.47	-662.91	810.42	1.21	-1.11	1.38
2,694.00	21.53	239.76	2,534.41	-486.40	-692.69	844.20	0.95	0.82	-1.34
2,788.00	20.78	240.22	2,622.07	-503.37	-722.07	877.68	0.82	-0.80	0.49
2,883.00	21.84	237.37	2,710.58	-521.27	-751.58	911.86	1.56	1.12	-3.00
2,978.00	21.08	233.01	2,799.00	-541.07	-780.11	946.49	1.86	-0.80	-4.59
3,072.00	20.27	232.76	2,886.94	-561.10	-806.57	979.66	0.87	-0.86	-0.27
3,167.00	21.03	231.90	2,975.84	-581.58	-833.09	1,013.14	0.86	0.80	-0.91
3,261.00	22.12	235.74	3,063.25	-601.95	-860.99	1,047.64	1.90	1.16	4.09
3,356.00	21.45	234.23	3,151.47	-622.17	-889.87	1,082.80	0.92	-0.71	-1.59
3,450.00	22.42	234.52	3,238.66	-642.62	-918.41	1,117.85	1.04	1.03	0.31
3,545.00	21.42	232.85	3,326.80	-663.61	-946.99	1,153.26	1.24	-1.05	-1.76
3,639.00	22.41	234.68	3,414.00	-684.34	-975.29	1,188.29	1.28	1.05	1.95
3,734.00	20.80	235.35	3,502.33	-704.40	-1,003.94	1,223.17	1.71	-1.69	0.71
3,829.00	21.30	237.30	3,590.99	-723.31	-1,032.34	1,257.13	0.91	0.53	2.05
3,923.00	23.35	236.04	3,677.94	-742.94	-1,062.16	1,292.65	2.24	2.18	-1.34
4,018.00	22.17	236.82	3,765.54	-763.27	-1,092.78	1,329.22	1.28	-1.24	0.82
4,112.00	23.70	235.26	3,852.11	-783.74	-1,123.15	1,365.70	1.75	1.63	-1.66
4,206.00	22.77	234.52	3,938.48	-805.07	-1,153.49	1,402.68	1.04	-0.99	-0.79
4,301.00	21.63	234.79	4,026.44	-825.83	-1,182.76	1,438.49	1.20	-1.20	0.28

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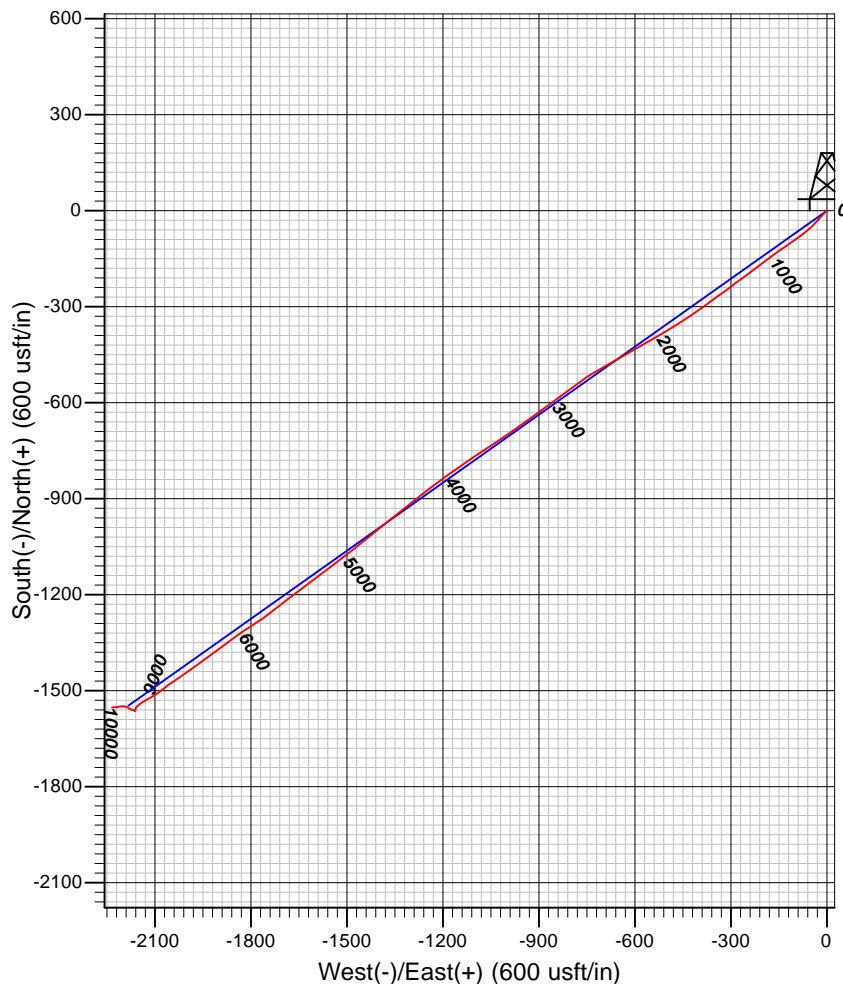
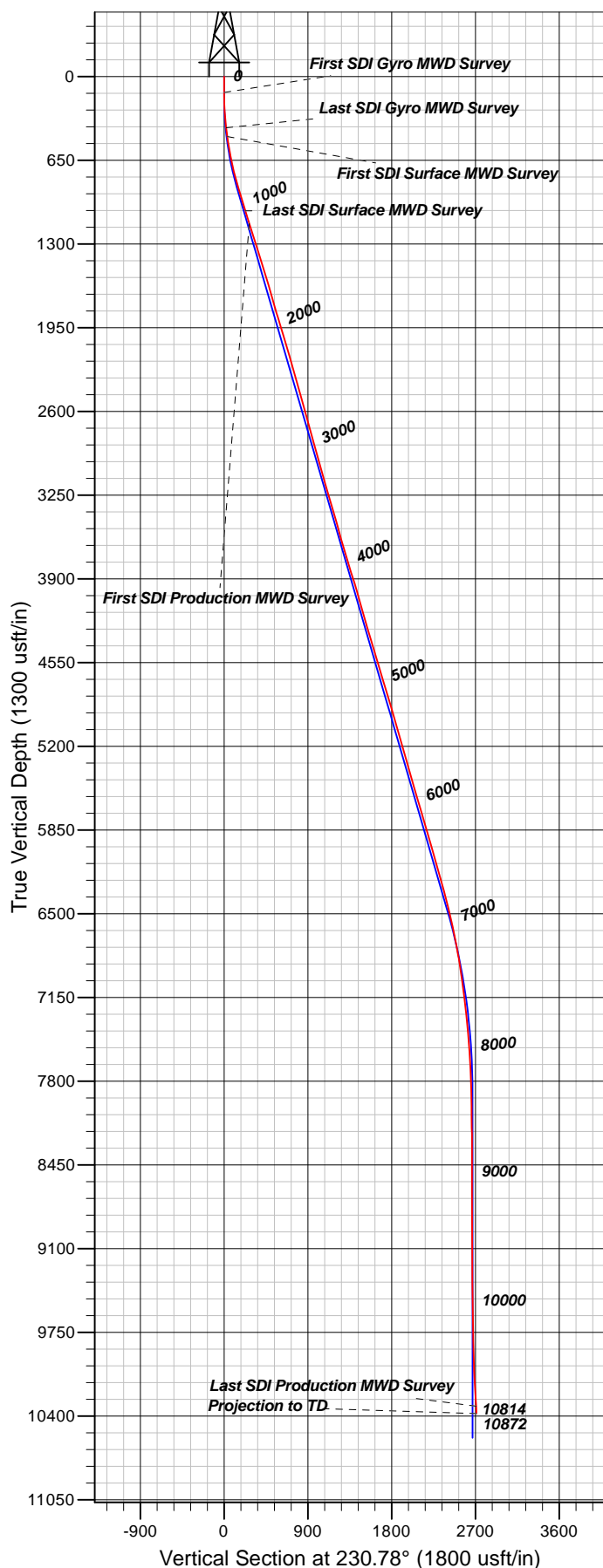
Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,395.00	20.75	235.37	4,114.08	-845.29	-1,210.62	1,472.38	0.96	-0.94	0.62
4,490.00	22.69	231.53	4,202.34	-866.25	-1,238.82	1,507.48	2.53	2.04	-4.04
4,584.00	21.86	231.56	4,289.32	-888.41	-1,266.72	1,543.10	0.88	-0.88	0.03
4,679.00	23.13	231.88	4,377.09	-910.92	-1,295.25	1,579.45	1.34	1.34	0.34
4,773.00	21.63	231.80	4,464.01	-933.04	-1,323.40	1,615.23	1.60	-1.60	-0.09
4,867.00	23.40	230.79	4,550.84	-955.55	-1,351.48	1,651.22	1.93	1.88	-1.07
4,962.00	22.16	232.15	4,638.43	-978.47	-1,380.24	1,688.00	1.42	-1.31	1.43
5,056.00	23.40	230.10	4,725.10	-1,001.33	-1,408.56	1,724.39	1.57	1.32	-2.18
5,150.00	22.34	231.18	4,811.71	-1,024.50	-1,436.80	1,760.92	1.21	-1.13	1.15
5,245.00	21.18	231.98	4,899.94	-1,046.39	-1,464.39	1,796.13	1.26	-1.22	0.84
5,339.00	22.51	231.36	4,987.18	-1,068.08	-1,491.82	1,831.10	1.44	1.41	-0.66
5,434.00	21.02	232.15	5,075.41	-1,089.89	-1,519.48	1,866.32	1.60	-1.57	0.83
5,529.00	22.26	233.65	5,163.71	-1,111.02	-1,547.43	1,901.33	1.43	1.31	1.58
5,623.00	20.49	233.64	5,251.24	-1,131.32	-1,575.02	1,935.54	1.88	-1.88	-0.01
5,718.00	22.42	232.59	5,339.66	-1,152.19	-1,602.80	1,970.26	2.07	2.03	-1.11
5,813.00	21.10	232.68	5,427.89	-1,173.56	-1,630.79	2,005.46	1.39	-1.39	0.09
5,907.00	22.51	232.15	5,515.16	-1,194.86	-1,658.46	2,040.36	1.51	1.50	-0.56
6,002.00	21.72	233.20	5,603.17	-1,216.55	-1,686.89	2,076.10	0.93	-0.83	1.11
6,097.00	22.35	231.73	5,691.23	-1,238.27	-1,715.15	2,111.73	0.88	0.66	-1.55
6,191.00	21.38	232.14	5,778.47	-1,259.85	-1,742.71	2,146.73	1.04	-1.03	0.44
6,286.00	22.77	236.54	5,866.51	-1,280.62	-1,771.72	2,182.33	2.27	1.46	4.63
6,381.00	21.19	237.25	5,954.60	-1,300.05	-1,801.50	2,217.69	1.69	-1.66	0.75
6,476.00	21.63	236.46	6,043.04	-1,319.01	-1,830.53	2,252.17	0.55	0.46	-0.83
6,570.00	22.07	232.76	6,130.29	-1,339.27	-1,859.04	2,287.06	1.54	0.47	-3.94
6,665.00	21.37	232.94	6,218.55	-1,360.50	-1,887.06	2,322.20	0.74	-0.74	0.19
6,759.00	20.58	233.73	6,306.32	-1,380.60	-1,914.04	2,355.81	0.89	-0.84	0.84
6,854.00	19.96	234.17	6,395.44	-1,399.97	-1,940.65	2,388.67	0.67	-0.65	0.46
6,949.00	17.67	233.20	6,485.35	-1,418.10	-1,965.35	2,419.27	2.43	-2.41	-1.02
7,044.00	16.53	234.17	6,576.15	-1,434.65	-1,987.85	2,447.16	1.24	-1.20	1.02
7,138.00	15.65	236.10	6,666.47	-1,449.54	-2,009.21	2,473.14	1.10	-0.94	2.05
7,233.00	15.39	238.39	6,758.01	-1,463.30	-2,030.59	2,498.39	0.70	-0.27	2.41
7,328.00	13.54	233.38	6,850.00	-1,476.54	-2,050.25	2,522.00	2.35	-1.95	-5.27
7,418.00	11.34	231.45	6,937.88	-1,488.34	-2,065.63	2,541.37	2.49	-2.44	-2.14
7,517.00	10.90	231.27	7,035.02	-1,500.26	-2,080.54	2,560.47	0.45	-0.44	-0.18
7,611.00	9.58	237.16	7,127.52	-1,510.07	-2,094.05	2,577.13	1.79	-1.40	6.27
7,706.00	8.97	239.18	7,221.28	-1,518.15	-2,107.05	2,592.31	0.73	-0.64	2.13
7,801.00	8.62	240.76	7,315.16	-1,525.42	-2,119.62	2,606.65	0.45	-0.37	1.66
7,895.00	6.60	241.11	7,408.33	-1,531.47	-2,130.50	2,618.90	2.15	-2.15	0.37
7,990.00	6.16	238.83	7,502.74	-1,536.75	-2,139.64	2,629.32	0.53	-0.46	-2.40
8,085.00	4.84	226.00	7,597.31	-1,542.17	-2,146.89	2,638.36	1.89	-1.39	-13.51
8,179.00	4.84	234.87	7,690.97	-1,547.21	-2,152.98	2,646.27	0.80	0.00	9.44
8,274.00	3.17	213.78	7,785.74	-1,551.70	-2,157.72	2,652.78	2.32	-1.76	-22.20
8,369.00	1.67	205.43	7,880.65	-1,555.13	-2,159.78	2,656.54	1.62	-1.58	-8.79

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
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8,464.00	1.23	181.88	7,975.62	-1,557.40	-2,160.40	2,658.47	0.77	-0.46	-24.79
8,558.00	1.32	193.48	8,069.60	-1,559.46	-2,160.69	2,659.99	0.29	0.10	12.34
8,653.00	1.58	189.87	8,164.57	-1,561.82	-2,161.17	2,661.85	0.29	0.27	-3.80
8,747.00	0.35	207.10	8,258.56	-1,563.35	-2,161.52	2,663.09	1.33	-1.31	18.33
8,842.00	0.18	275.65	8,353.55	-1,563.59	-2,161.80	2,663.46	0.35	-0.18	72.16
8,937.00	0.09	51.36	8,448.55	-1,563.53	-2,161.89	2,663.49	0.27	-0.09	142.85
9,032.00	0.18	145.58	8,543.55	-1,563.61	-2,161.75	2,663.43	0.22	0.09	99.18
9,126.00	0.26	46.61	8,637.55	-1,563.58	-2,161.51	2,663.23	0.36	0.09	-105.29
9,221.00	0.26	3.11	8,732.55	-1,563.22	-2,161.34	2,662.87	0.20	0.00	-45.79
9,316.00	0.35	312.83	8,827.55	-1,562.81	-2,161.54	2,662.77	0.29	0.09	-52.93
9,410.00	0.62	299.12	8,921.55	-1,562.36	-2,162.20	2,662.99	0.31	0.29	-14.59
9,502.00	1.14	289.10	9,013.54	-1,561.82	-2,163.50	2,663.66	0.59	0.57	-10.89
9,599.00	1.58	283.65	9,110.51	-1,561.19	-2,165.71	2,664.97	0.47	0.45	-5.62
9,693.00	0.97	271.61	9,204.49	-1,560.86	-2,167.77	2,666.36	0.71	-0.65	-12.81
9,787.00	1.41	285.50	9,298.47	-1,560.53	-2,169.67	2,667.63	0.56	0.47	14.78
9,881.00	1.32	296.66	9,392.44	-1,559.74	-2,171.76	2,668.74	0.30	-0.10	11.87
9,976.00	2.02	290.24	9,487.40	-1,558.67	-2,174.31	2,670.04	0.76	0.74	-6.76
10,070.00	2.46	296.31	9,581.33	-1,557.20	-2,177.67	2,671.71	0.53	0.47	6.46
10,165.00	2.64	297.63	9,676.23	-1,555.28	-2,181.43	2,673.42	0.20	0.19	1.39
10,259.00	3.00	298.74	9,770.12	-1,553.09	-2,185.51	2,675.19	0.39	0.38	1.18
10,354.00	3.43	295.34	9,864.97	-1,550.68	-2,190.26	2,677.35	0.49	0.45	-3.58
10,448.00	4.34	273.91	9,958.76	-1,549.24	-2,196.35	2,681.15	1.81	0.97	-22.80
10,542.00	4.87	264.77	10,052.45	-1,549.36	-2,203.87	2,687.05	0.96	0.56	-9.72
10,636.00	5.19	263.54	10,146.09	-1,550.20	-2,212.07	2,693.94	0.36	0.34	-1.31
10,731.00	5.28	261.15	10,240.70	-1,551.35	-2,220.66	2,701.32	0.25	0.09	-2.52
10,814.00	5.28	262.82	10,323.34	-1,552.42	-2,228.22	2,707.86	0.19	0.00	2.01
Last SDI Production MWD Survey									
10,872.00	5.28	262.82	10,381.10	-1,553.09	-2,233.51	2,712.38	0.00	0.00	0.00
Projection to TD - PBHL(RU_514-17)									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
124.00	124.00	-0.21	-0.43	First SDI Gyro MWD Survey
400.00	398.84	-15.86	-15.64	Last SDI Gyro MWD Survey
469.00	466.74	-24.97	-23.87	First SDI Surface MWD Survey
1,078.00	1,042.80	-144.85	-174.81	Last SDI Surface MWD Survey
1,183.00	1,138.41	-170.66	-209.71	First SDI Production MWD Survey
10,814.00	10,323.34	-1,552.42	-2,228.22	Last SDI Production MWD Survey
10,872.00	10,381.10	-1,553.09	-2,233.51	Projection to TD

Checked By: _____ Approved By: _____ Date: _____



Well Details: RU 514-17

+N/-S	+E/-W	North	East	Latitude	Longitude	Slot
0.00	0.00	1594575.50	2351279.20	39.4433579	-107.7973210	RU 514-17 (A14)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well RU 514-17 - Slot RU 514-17 (A14), True North
 Vertical (TVD) Reference: GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
 Section (VS) Reference: Slot - RU 514-17 (A14)(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

16:10, June 01 2018
 Created By: Mel Mireles Jr.