



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 414-17
County & State	Garfield County, CO
SDI Job No.	OP.010001
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 10,787 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

11-May-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 414-17 - Slot RU 414-17 (A13)
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 414-17	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 414-17 - Slot RU 414-17 (A13)					
Well Position	+N/-S	0.00 usft	Northing:	1,594,581.40 usft	Latitude:	39.4433738
	+E/-W	0.00 usft	Easting:	2,351,274.50 usft	Longitude:	-107.7973382
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	5/5/2018	9.18	65.57	51,565

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	240.14	

Survey Program	Date	5/11/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
123.00	585.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
660.00	1,078.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,182.00	10,787.00	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	
123.00	0.25	353.14	123.00	0.27	-0.03	-0.10	0.20	0.20	0.00	
First SDI Gyro MWD Survey										
216.00	1.85	245.74	215.98	-0.15	-1.43	1.31	2.09	1.72	-115.48	
308.00	3.96	225.53	307.86	-2.98	-5.05	5.86	2.51	2.29	-21.97	
400.00	5.72	230.10	399.53	-8.15	-10.83	13.45	1.96	1.91	4.97	
492.00	7.74	241.26	490.90	-14.07	-19.78	24.16	2.61	2.20	12.13	
585.00	11.09	244.95	582.63	-20.87	-33.38	39.34	3.66	3.60	3.97	

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
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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)
Last SDI Gyro MWD Survey									
660.00	13.40	239.52	655.92	-28.34	-47.41	55.22	3.44	3.08	-7.24
First SDI Surface MWD Survey									
754.00	16.67	238.06	746.69	-41.00	-68.24	79.59	3.50	3.48	-1.55
849.00	19.59	239.41	836.97	-56.31	-93.52	109.14	3.11	3.07	1.42
943.00	20.37	238.37	925.31	-72.91	-121.01	141.25	0.91	0.83	-1.11
1,037.00	21.37	236.81	1,013.14	-90.87	-149.28	174.70	1.22	1.06	-1.66
1,078.00	22.60	235.85	1,051.16	-99.38	-162.05	190.01	3.13	3.00	-2.34
Last SDI Surface MWD Survey									
1,182.00	23.97	234.68	1,146.69	-122.81	-195.82	230.97	1.39	1.32	-1.13
First SDI Production MWD Survey									
1,277.00	22.55	233.76	1,233.96	-144.74	-226.26	268.29	1.54	-1.49	-0.97
1,371.00	22.14	237.27	1,320.91	-164.97	-255.70	303.89	1.48	-0.44	3.73
1,466.00	21.63	240.86	1,409.07	-183.18	-286.06	339.28	1.51	-0.54	3.78
1,560.00	20.68	239.80	1,496.73	-199.96	-315.53	373.20	1.09	-1.01	-1.13
1,654.00	21.72	245.25	1,584.38	-215.60	-345.68	407.13	2.37	1.11	5.80
1,749.00	20.66	243.58	1,672.95	-230.41	-376.65	441.37	1.28	-1.12	-1.76
1,844.00	19.77	242.35	1,762.10	-245.33	-405.89	474.15	1.04	-0.94	-1.29
1,938.00	21.10	243.85	1,850.18	-260.16	-435.17	506.92	1.52	1.41	1.60
2,033.00	20.84	243.67	1,938.89	-275.19	-465.66	540.86	0.28	-0.27	-0.19
2,127.00	20.21	243.35	2,026.92	-289.89	-495.16	573.76	0.68	-0.67	-0.34
2,222.00	19.52	242.79	2,116.27	-304.51	-523.94	605.99	0.75	-0.73	-0.59
2,316.00	21.02	242.97	2,204.45	-319.35	-552.93	638.52	1.60	1.60	0.19
2,410.00	20.14	241.83	2,292.45	-334.66	-582.21	671.54	1.03	-0.94	-1.21
2,505.00	19.20	241.67	2,381.90	-349.79	-610.38	703.50	0.99	-0.99	-0.17
2,599.00	20.58	241.91	2,470.29	-364.91	-638.56	735.47	1.47	1.47	0.26
2,694.00	20.14	241.04	2,559.36	-380.69	-667.60	768.51	0.56	-0.46	-0.92
2,788.00	19.05	240.17	2,647.91	-396.15	-695.07	800.03	1.20	-1.16	-0.93
2,883.00	20.05	240.24	2,737.44	-411.95	-722.66	831.82	1.05	1.05	0.07
2,978.00	18.11	239.63	2,827.21	-427.50	-749.53	862.87	2.05	-2.04	-0.64
3,072.00	19.43	240.68	2,916.21	-442.54	-775.77	893.12	1.45	1.40	1.12
3,167.00	20.82	239.99	3,005.41	-458.72	-804.17	925.80	1.48	1.46	-0.73
3,261.00	20.40	240.07	3,093.39	-475.25	-832.83	958.89	0.45	-0.45	0.09
3,356.00	21.33	238.47	3,182.16	-492.55	-861.91	992.72	1.15	0.98	-1.68
3,450.00	20.49	237.96	3,269.97	-510.22	-890.43	1,026.25	0.91	-0.89	-0.54
3,545.00	21.81	240.60	3,358.57	-527.70	-919.90	1,060.51	1.71	1.39	2.78
3,639.00	20.66	240.42	3,446.19	-544.46	-949.54	1,094.56	1.23	-1.22	-0.19
3,734.00	19.51	239.91	3,535.41	-560.69	-977.84	1,127.18	1.22	-1.21	-0.54
3,828.00	21.98	239.28	3,623.31	-577.55	-1,006.55	1,160.47	2.64	2.63	-0.67
3,923.00	21.37	239.63	3,711.59	-595.38	-1,036.76	1,195.56	0.66	-0.64	0.37
4,017.00	22.43	241.43	3,798.81	-612.62	-1,067.29	1,230.61	1.33	1.13	1.91
4,112.00	21.38	242.70	3,886.95	-629.23	-1,098.60	1,266.03	1.21	-1.11	1.34
4,206.00	20.49	243.32	3,974.74	-644.47	-1,128.52	1,299.58	0.98	-0.95	0.66
4,301.00	19.51	244.60	4,064.01	-658.74	-1,157.71	1,332.00	1.13	-1.03	1.35

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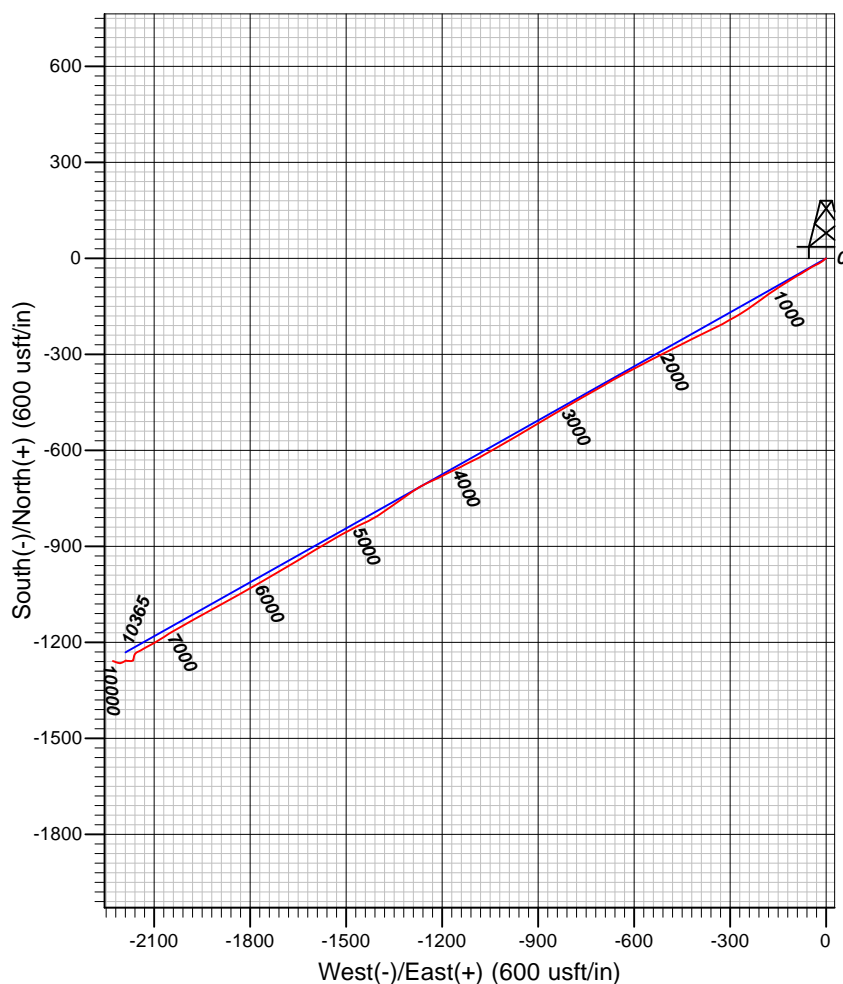
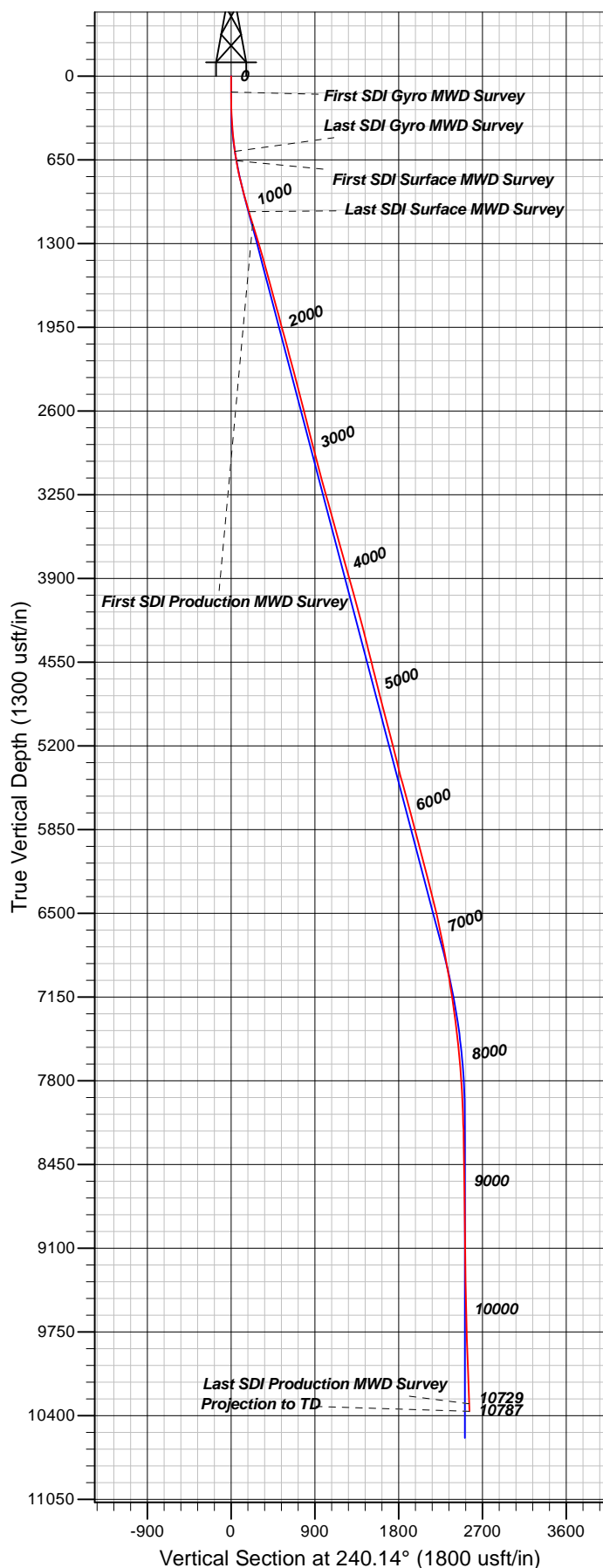
Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
4,395.00	21.24	243.63	4,152.13	-673.04	-1,187.15	1,364.64	1.88	1.84	-1.03	
4,490.00	20.62	244.34	4,240.86	-687.93	-1,217.64	1,398.50	0.71	-0.65	0.75	
4,584.00	19.08	244.55	4,329.27	-701.70	-1,246.44	1,430.33	1.64	-1.64	0.22	
4,679.00	18.73	239.45	4,419.15	-716.12	-1,273.60	1,461.06	1.78	-0.37	-5.37	
4,773.00	20.14	234.71	4,507.80	-733.15	-1,299.80	1,492.27	2.25	1.50	-5.04	
4,867.00	18.89	234.63	4,596.40	-751.30	-1,325.42	1,523.53	1.33	-1.33	-0.09	
4,961.00	19.96	235.41	4,685.05	-769.22	-1,351.04	1,554.66	1.17	1.14	0.83	
5,056.00	18.38	235.06	4,774.78	-787.01	-1,376.67	1,585.74	1.67	-1.66	-0.37	
5,150.00	19.79	236.64	4,863.61	-804.24	-1,402.11	1,616.39	1.60	1.50	1.68	
5,244.00	20.84	243.85	4,951.77	-820.37	-1,430.41	1,648.96	2.89	1.12	7.67	
5,339.00	18.98	245.81	5,041.09	-834.15	-1,459.68	1,681.20	2.08	-1.96	2.06	
5,434.00	20.22	240.95	5,130.59	-848.45	-1,488.12	1,713.00	2.16	1.31	-5.12	
5,529.00	19.59	240.96	5,219.92	-864.15	-1,516.40	1,745.34	0.66	-0.66	0.01	
5,623.00	18.20	241.30	5,308.85	-878.85	-1,543.06	1,775.77	1.48	-1.48	0.36	
5,718.00	19.43	238.14	5,398.77	-894.32	-1,569.49	1,806.40	1.68	1.29	-3.33	
5,812.00	21.46	239.28	5,486.85	-911.36	-1,597.56	1,839.22	2.20	2.16	1.21	
5,907.00	20.84	238.66	5,575.45	-929.02	-1,626.93	1,873.49	0.69	-0.65	-0.65	
6,002.00	19.70	239.19	5,664.56	-946.01	-1,655.11	1,906.39	1.22	-1.20	0.56	
6,096.00	20.93	239.10	5,752.71	-962.75	-1,683.13	1,939.02	1.31	1.31	-0.10	
6,191.00	20.14	239.28	5,841.68	-979.82	-1,711.75	1,972.34	0.83	-0.83	0.19	
6,286.00	19.13	240.04	5,931.15	-995.95	-1,739.30	2,004.26	1.10	-1.06	0.80	
6,381.00	20.84	240.16	6,020.43	-1,012.13	-1,767.44	2,036.73	1.80	1.80	0.13	
6,475.00	19.52	240.51	6,108.66	-1,028.19	-1,795.62	2,069.16	1.41	-1.40	0.37	
6,570.00	18.03	241.65	6,198.60	-1,042.98	-1,822.37	2,099.73	1.62	-1.57	1.20	
6,665.00	20.49	240.68	6,288.27	-1,058.11	-1,849.81	2,131.05	2.61	2.59	-1.02	
6,759.00	19.53	240.62	6,376.60	-1,073.87	-1,877.85	2,163.22	1.02	-1.02	-0.06	
6,854.00	18.20	240.16	6,466.49	-1,089.04	-1,904.56	2,193.93	1.41	-1.40	-0.48	
6,949.00	16.71	241.47	6,557.12	-1,102.95	-1,929.43	2,222.43	1.62	-1.57	1.38	
7,043.00	15.92	241.39	6,647.33	-1,115.58	-1,952.62	2,248.82	0.84	-0.84	-0.09	
7,138.00	15.48	240.77	6,738.79	-1,128.01	-1,975.12	2,274.53	0.50	-0.46	-0.65	
7,233.00	14.76	242.00	6,830.50	-1,139.88	-1,996.87	2,299.30	0.83	-0.76	1.29	
7,327.00	13.96	240.70	6,921.56	-1,151.05	-2,017.33	2,322.61	0.92	-0.85	-1.38	
7,418.00	13.19	239.72	7,010.02	-1,161.66	-2,035.87	2,343.97	0.88	-0.85	-1.08	
7,517.00	11.61	236.20	7,106.71	-1,172.90	-2,053.90	2,365.20	1.77	-1.60	-3.56	
7,611.00	10.99	238.05	7,198.88	-1,182.90	-2,069.36	2,383.59	0.76	-0.66	1.97	
7,706.00	10.29	239.72	7,292.25	-1,191.97	-2,084.38	2,401.12	0.81	-0.74	1.76	
7,801.00	9.58	240.51	7,385.83	-1,200.14	-2,098.58	2,417.51	0.76	-0.75	0.83	
7,895.00	8.71	239.76	7,478.63	-1,207.57	-2,111.54	2,432.45	0.93	-0.93	-0.80	
7,990.00	7.70	240.27	7,572.66	-1,214.35	-2,123.28	2,446.01	1.07	-1.06	0.54	
8,085.00	6.68	241.12	7,666.91	-1,220.18	-2,133.65	2,457.90	1.08	-1.07	0.89	
8,179.00	6.24	242.35	7,760.31	-1,225.19	-2,142.96	2,468.47	0.49	-0.47	1.31	
8,274.00	4.92	244.20	7,854.86	-1,229.36	-2,151.20	2,477.70	1.40	-1.39	1.95	
8,369.00	3.52	231.98	7,949.60	-1,232.93	-2,157.17	2,484.65	1.74	-1.47	-12.86	

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8,463.00	3.08	203.42	8,043.45	-1,237.02	-2,160.45	2,489.53	1.79	-0.47	-30.38
8,558.00	3.34	202.45	8,138.30	-1,241.92	-2,162.52	2,493.76	0.28	0.27	-1.02
8,653.00	2.29	188.92	8,233.19	-1,246.36	-2,163.87	2,497.14	1.30	-1.11	-14.24
8,747.00	1.80	186.45	8,327.13	-1,249.68	-2,164.32	2,499.19	0.53	-0.52	-2.63
8,842.00	1.41	185.49	8,422.09	-1,252.32	-2,164.60	2,500.75	0.41	-0.41	-1.01
8,937.00	1.14	186.54	8,517.07	-1,254.43	-2,164.82	2,501.99	0.29	-0.28	1.11
9,031.00	1.14	228.47	8,611.05	-1,255.98	-2,165.63	2,503.46	0.87	0.00	44.61
9,126.00	1.23	261.25	8,706.03	-1,256.76	-2,167.35	2,505.34	0.71	0.09	34.51
9,221.00	1.49	250.79	8,801.00	-1,257.32	-2,169.52	2,507.50	0.38	0.27	-11.01
9,315.00	1.32	270.30	8,894.97	-1,257.72	-2,171.76	2,509.64	0.54	-0.18	20.76
9,410.00	1.49	270.04	8,989.95	-1,257.71	-2,174.09	2,511.65	0.18	0.18	-0.27
9,502.00	1.49	268.98	9,081.92	-1,257.73	-2,176.48	2,513.74	0.03	0.00	-1.15
9,599.00	1.32	275.84	9,178.89	-1,257.64	-2,178.85	2,515.75	0.25	-0.18	7.07
9,693.00	1.14	270.39	9,272.86	-1,257.52	-2,180.86	2,517.44	0.23	-0.19	-5.80
9,787.00	1.41	273.64	9,366.84	-1,257.44	-2,182.95	2,519.21	0.30	0.29	3.46
9,881.00	1.14	272.50	9,460.82	-1,257.33	-2,185.04	2,520.96	0.29	-0.29	-1.21
9,976.00	1.14	288.06	9,555.80	-1,256.99	-2,186.88	2,522.40	0.32	0.00	16.38
10,070.00	1.67	256.59	9,649.77	-1,257.02	-2,189.10	2,524.34	0.98	0.56	-33.48
10,165.00	2.37	239.19	9,744.71	-1,258.35	-2,192.14	2,527.63	0.97	0.74	-18.32
10,259.00	2.99	240.42	9,838.61	-1,260.55	-2,195.94	2,532.02	0.66	0.66	1.31
10,353.00	4.13	242.27	9,932.43	-1,263.34	-2,201.07	2,537.86	1.22	1.21	1.97
10,448.00	3.96	274.79	10,027.20	-1,264.66	-2,207.37	2,543.98	2.39	-0.18	34.23
10,542.00	3.82	286.04	10,120.99	-1,263.52	-2,213.61	2,548.83	0.82	-0.15	11.97
10,636.00	3.96	288.94	10,214.77	-1,261.60	-2,219.69	2,553.14	0.26	0.15	3.09
10,729.00	3.78	290.69	10,307.56	-1,259.48	-2,225.59	2,557.21	0.23	-0.19	1.88
Last SDI Production MWD Survey									
10,787.00	3.78	290.69	10,365.43	-1,258.13	-2,229.17	2,559.64	0.00	0.00	0.00
Projection to TD - PBHL(RU_414-17)									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
123.00	123.00	0.27	-0.03	First SDI Gyro MWD Survey
585.00	582.63	-20.87	-33.38	Last SDI Gyro MWD Survey
660.00	655.92	-28.34	-47.41	First SDI Surface MWD Survey
1,078.00	1,051.16	-99.38	-162.05	Last SDI Surface MWD Survey
1,182.00	1,146.69	-122.81	-195.82	First SDI Production MWD Survey
10,729.00	10,307.56	-1,259.48	-2,225.59	Last SDI Production MWD Survey
10,787.00	10,365.43	-1,258.13	-2,229.17	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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Well Details: RU 414-17

+N/-S	+E/-W	North	East	Latitude	Longitude	Slot
0.00	0.00	1594581.40	2351274.50	39.4433737	-107.7973382	RU 414-17 (A13)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well RU 414-17 - Slot RU 414-17 (A13), True North
 Vertical (TVD) Reference: GL 8368.6' & RKB 24' @ 8392.60usft (H&P 318)
 Section (VS) Reference: Slot - RU 414-17 (A13)(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

11:36, May 11 2018
 Created By: Mel Mireles Jr.