



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.	SR 512-12
County & State	Garfield County, CO
SDI Job No.	OP.006082
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 9,942 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

28-Nov-17

Date

Mel Mireles Jr.

Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well SR 512-12 - Slot SR 512-12 (B4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Site:	SR 23-12 Pad	MD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Well:	SR 512-12	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		SR 23-12 Pad			
Site Position:		Northing:	1,597,713.40 usft	Latitude:	39.4511965
From:	Map	Easting:	2,340,229.70 usft	Longitude:	-107.8367194
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.47 °

Well		SR 512-12 - Slot SR 512-12 (B4)				
Well Position	+N/-S	0.00 usft	Northing:	1,597,696.00 usft	Latitude:	39.4511500
	+E/-W	0.00 usft	Easting:	2,340,247.20 usft	Longitude:	-107.8366559
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,478.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/22/2017	9.22	65.65	51,645

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	293.51	

Survey Program	Date	11/28/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
122.00	675.00	Survey #1 - Gyro Survey MWD (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
752.00	1,068.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,182.00	9,942.00	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	
122.00	0.09	305.51	122.00	0.06	-0.08	0.09	0.07	0.07	0.00	
First SDI Gyro MWD Survey										
214.00	1.94	316.05	213.98	1.22	-1.22	1.60	2.01	2.01	11.46	
307.00	3.26	303.84	306.88	3.82	-4.51	5.66	1.53	1.42	-13.13	
399.00	5.45	299.88	398.61	7.46	-10.47	12.57	2.40	2.38	-4.30	
492.00	8.36	296.89	490.93	12.72	-20.33	23.72	3.15	3.13	-3.22	
584.00	11.35	295.84	581.56	19.69	-34.45	39.44	3.26	3.25	-1.14	
675.00	14.34	291.71	670.28	27.76	-52.98	59.66	3.44	3.29	-4.54	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well SR 512-12 - Slot SR 512-12 (B4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Site:	SR 23-12 Pad	MD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Well:	SR 512-12	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									
752.00	17.52	291.26	744.31	35.50	-72.64	80.77	4.13	4.13	-0.58
First SDI Surface MWD Survey									
847.00	20.60	291.85	834.09	46.90	-101.49	111.77	3.25	3.24	0.62
941.00	23.64	291.88	921.16	60.08	-134.33	147.15	3.23	3.23	0.03
1,036.00	25.29	293.23	1,007.63	75.19	-170.66	186.49	1.83	1.74	1.42
1,068.00	25.76	293.46	1,036.51	80.65	-183.32	200.27	1.50	1.47	0.72
Last SDI Surface MWD Survey									
1,182.00	26.24	293.43	1,138.97	100.53	-229.17	250.25	0.42	0.42	-0.03
First SDI Production MWD Survey									
1,276.00	26.03	292.58	1,223.36	116.72	-267.28	291.65	0.46	-0.22	-0.90
1,371.00	26.53	291.87	1,308.54	132.62	-306.22	333.70	0.62	0.53	-0.75
1,465.00	26.64	291.00	1,392.60	148.00	-345.37	375.74	0.43	0.12	-0.93
1,559.00	26.88	289.85	1,476.53	162.76	-385.04	418.00	0.61	0.26	-1.22
1,654.00	26.98	288.56	1,561.23	176.92	-425.66	460.90	0.62	0.11	-1.36
1,749.00	27.32	287.68	1,645.77	190.40	-466.86	504.06	0.55	0.36	-0.93
1,843.00	28.14	291.09	1,728.97	204.92	-508.10	547.67	1.90	0.87	3.63
1,938.00	28.84	291.17	1,812.47	221.26	-550.37	592.95	0.74	0.74	0.08
2,032.00	28.75	296.79	1,894.86	239.64	-591.70	638.18	2.88	-0.10	5.98
2,126.00	28.89	296.31	1,977.22	259.89	-632.23	683.43	0.29	0.15	-0.51
2,221.00	29.24	296.33	2,060.26	280.36	-673.60	729.52	0.37	0.37	0.02
2,315.00	29.84	296.05	2,142.04	300.81	-715.19	775.82	0.65	0.64	-0.30
2,409.00	29.79	295.34	2,223.59	321.07	-757.30	822.52	0.38	-0.05	-0.76
2,504.00	30.12	295.37	2,305.90	341.39	-800.17	869.93	0.35	0.35	0.03
2,598.00	30.60	295.03	2,387.01	361.62	-843.16	917.42	0.54	0.51	-0.36
2,693.00	28.43	293.19	2,469.68	380.75	-885.86	964.21	2.48	-2.28	-1.94
2,787.00	28.28	292.96	2,552.40	398.25	-926.93	1,008.85	0.20	-0.16	-0.24
2,882.00	27.93	292.47	2,636.20	415.53	-968.21	1,053.60	0.44	-0.37	-0.52
2,977.00	27.82	292.24	2,720.18	432.43	-1,009.29	1,098.01	0.16	-0.12	-0.24
3,071.00	27.66	291.61	2,803.38	448.76	-1,049.88	1,141.75	0.36	-0.17	-0.67
3,165.00	27.21	291.33	2,886.80	464.62	-1,090.18	1,185.03	0.50	-0.48	-0.30
3,260.00	26.66	291.47	2,971.50	480.32	-1,130.25	1,228.03	0.58	-0.58	0.15
3,354.00	26.27	291.49	3,055.65	495.66	-1,169.23	1,269.90	0.42	-0.41	0.02
3,448.00	25.87	292.12	3,140.08	511.00	-1,207.58	1,311.19	0.52	-0.43	0.67
3,543.00	25.50	292.40	3,225.70	526.60	-1,245.69	1,352.35	0.41	-0.39	0.29
3,637.00	24.53	292.05	3,310.88	541.63	-1,282.49	1,392.09	1.04	-1.03	-0.37
3,732.00	25.28	295.72	3,397.05	557.84	-1,319.04	1,432.08	1.81	0.79	3.86
3,826.00	24.31	294.62	3,482.38	574.61	-1,354.71	1,471.48	1.14	-1.03	-1.17
3,921.00	24.18	294.91	3,569.00	590.95	-1,390.14	1,510.48	0.19	-0.14	0.31
4,015.00	23.99	294.77	3,654.82	607.07	-1,424.95	1,548.83	0.21	-0.20	-0.15
4,109.00	23.39	294.86	3,740.90	622.92	-1,459.23	1,586.59	0.64	-0.64	0.10
4,204.00	23.01	294.82	3,828.21	638.64	-1,493.19	1,624.00	0.40	-0.40	-0.04
4,298.00	21.81	296.97	3,915.12	654.27	-1,525.43	1,659.80	1.55	-1.28	2.29
4,393.00	19.99	297.65	4,003.86	669.81	-1,555.55	1,693.62	1.93	-1.92	0.72

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well SR 512-12 - Slot SR 512-12 (B4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Site:	SR 23-12 Pad	MD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Well:	SR 512-12	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

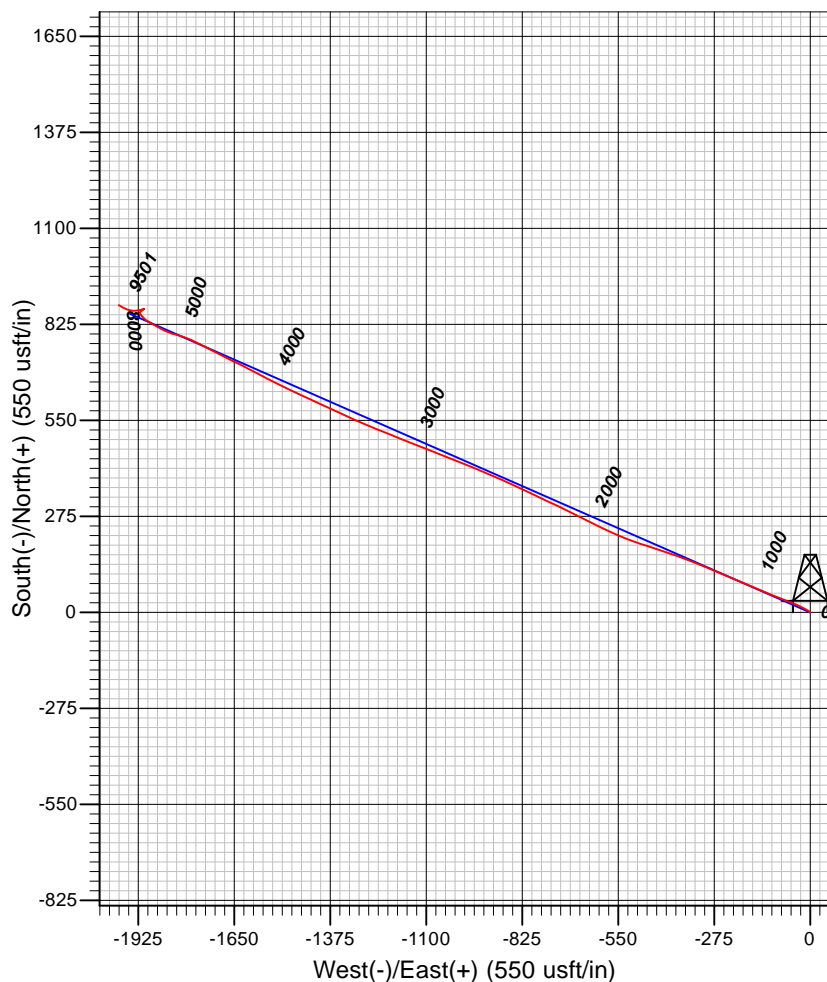
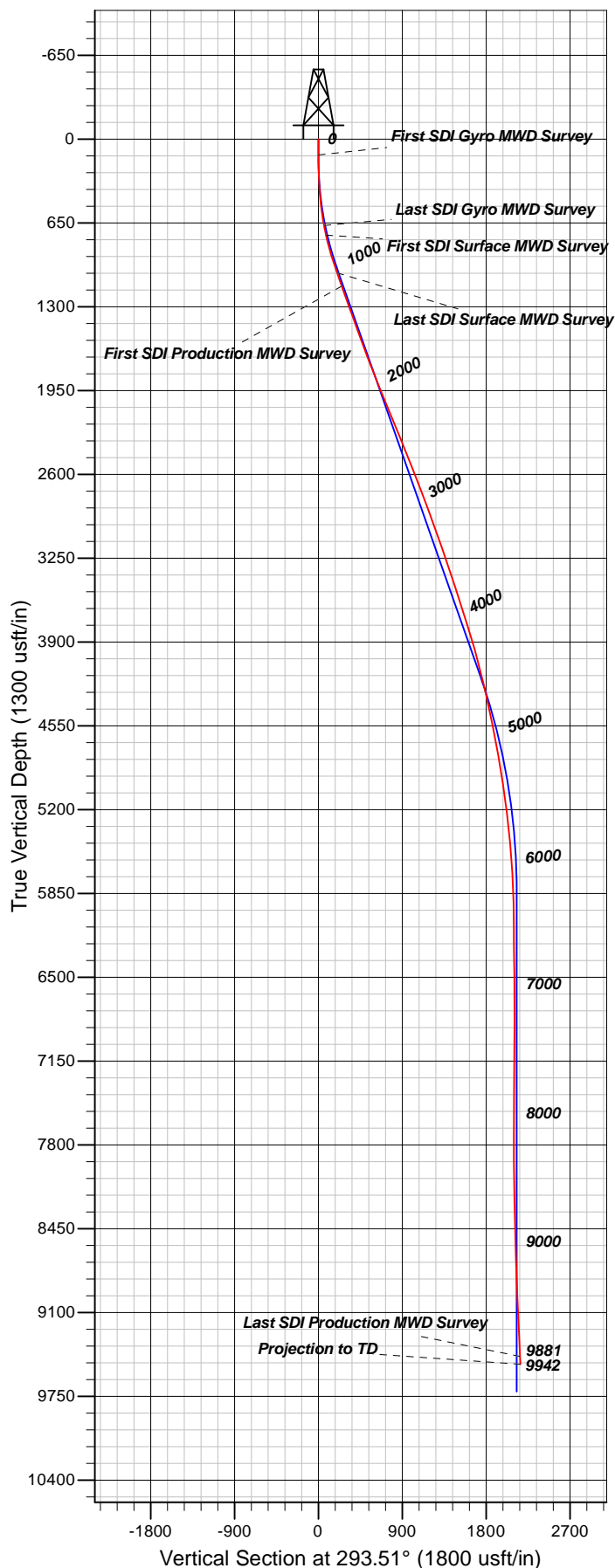
Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,487.00	19.71	297.48	4,092.28	684.58	-1,583.84	1,725.45	0.30	-0.30	-0.18
4,582.00	19.30	297.62	4,181.82	699.25	-1,611.96	1,757.09	0.43	-0.43	0.15
4,676.00	17.13	295.99	4,271.11	712.52	-1,638.17	1,786.42	2.37	-2.31	-1.73
4,771.00	17.05	296.21	4,361.91	724.81	-1,663.25	1,814.31	0.11	-0.08	0.23
4,865.00	16.85	296.34	4,451.83	736.94	-1,687.82	1,841.68	0.22	-0.21	0.14
4,959.00	15.16	297.24	4,542.18	748.61	-1,710.96	1,867.56	1.82	-1.80	0.96
5,054.00	14.77	297.94	4,633.96	759.97	-1,732.70	1,892.03	0.45	-0.41	0.74
5,149.00	14.74	299.06	4,725.83	771.51	-1,753.96	1,916.13	0.30	-0.03	1.18
5,244.00	13.28	291.17	4,818.01	781.33	-1,774.70	1,939.06	2.53	-1.54	-8.31
5,339.00	12.99	290.07	4,910.52	788.93	-1,794.91	1,960.62	0.40	-0.31	-1.16
5,434.00	11.13	284.82	5,003.43	794.94	-1,813.80	1,980.35	2.27	-1.96	-5.53
5,529.00	10.82	286.34	5,096.69	799.79	-1,831.22	1,998.26	0.45	-0.33	1.60
5,624.00	9.76	294.63	5,190.17	805.66	-1,847.10	2,015.16	1.91	-1.12	8.73
5,719.00	9.54	300.16	5,283.82	812.97	-1,861.23	2,031.03	1.00	-0.23	5.82
5,813.00	8.19	300.53	5,376.70	820.29	-1,873.73	2,045.41	1.44	-1.44	0.39
5,907.00	7.65	300.84	5,469.80	826.89	-1,884.87	2,058.26	0.58	-0.57	0.33
6,002.00	5.48	301.05	5,564.17	832.48	-1,894.19	2,069.03	2.28	-2.28	0.22
6,096.00	5.19	299.61	5,657.76	836.89	-1,901.73	2,077.71	0.34	-0.31	-1.53
6,190.00	3.17	318.42	5,751.51	840.94	-1,907.15	2,084.30	2.57	-2.15	20.01
6,285.00	2.93	316.50	5,846.38	844.66	-1,910.57	2,088.91	0.27	-0.25	-2.02
6,289.21	2.90	316.46	5,850.58	844.82	-1,910.71	2,089.11	0.60	-0.60	-0.93
SR 512-12 BTV									
6,379.00	2.37	315.43	5,940.28	847.79	-1,913.58	2,092.93	0.60	-0.60	-1.15
6,473.00	1.14	321.79	6,034.23	849.91	-1,915.53	2,095.56	1.32	-1.31	6.77
6,568.00	0.53	318.07	6,129.22	850.98	-1,916.40	2,096.79	0.64	-0.64	-3.92
6,662.00	0.97	313.67	6,223.21	851.85	-1,917.27	2,097.93	0.47	0.47	-4.68
6,757.00	1.06	320.35	6,318.20	853.08	-1,918.41	2,099.47	0.16	0.09	7.03
6,851.00	1.14	340.48	6,412.18	854.64	-1,919.28	2,100.88	0.42	0.09	21.41
6,946.00	1.06	346.98	6,507.16	856.38	-1,919.79	2,102.05	0.16	-0.08	6.84
7,040.00	1.41	346.33	6,601.14	858.35	-1,920.26	2,103.27	0.37	0.37	-0.69
7,135.00	0.59	23.36	6,696.13	859.94	-1,920.34	2,103.97	1.06	-0.86	38.98
7,229.00	0.53	75.61	6,790.12	860.49	-1,919.73	2,103.63	0.53	-0.06	55.59
7,323.00	0.62	57.19	6,884.12	860.87	-1,918.88	2,103.01	0.22	0.10	-19.60
7,418.00	0.70	52.35	6,979.11	861.51	-1,917.99	2,102.44	0.10	0.08	-5.09
7,512.00	0.62	50.35	7,073.11	862.18	-1,917.15	2,101.94	0.09	-0.09	-2.13
7,606.00	0.57	45.18	7,167.10	862.84	-1,916.42	2,101.53	0.08	-0.05	-5.50
7,701.00	0.82	44.47	7,262.10	863.65	-1,915.61	2,101.12	0.26	0.26	-0.75
7,795.00	0.88	51.85	7,356.08	864.58	-1,914.57	2,100.53	0.13	0.06	7.85
7,889.00	1.08	55.73	7,450.07	865.52	-1,913.27	2,099.72	0.22	0.21	4.13
7,983.00	0.70	54.40	7,544.06	866.36	-1,912.07	2,098.95	0.40	-0.40	-1.41
8,078.00	0.59	62.72	7,639.05	866.92	-1,911.17	2,098.34	0.15	-0.12	8.76
8,172.00	1.14	39.63	7,733.04	867.86	-1,910.14	2,097.78	0.68	0.59	-24.56
8,267.00	0.53	44.64	7,828.03	868.90	-1,909.23	2,097.36	0.65	-0.64	5.27

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well SR 512-12 - Slot SR 512-12 (B4)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Site:	SR 23-12 Pad	MD Reference:	GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
Well:	SR 512-12	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)	
8,361.00	0.44	100.45	7,922.03	869.15	-1,908.57	2,096.85	0.49	-0.10	59.37	
8,456.00	1.67	266.39	8,017.02	868.99	-1,909.59	2,097.72	2.21	1.29	174.67	
8,550.00	2.15	256.39	8,110.97	868.49	-1,912.67	2,100.35	0.62	0.51	-10.64	
8,644.00	2.54	248.92	8,204.89	867.33	-1,916.33	2,103.24	0.53	0.41	-7.95	
8,739.00	2.64	253.29	8,299.79	865.94	-1,920.39	2,106.41	0.23	0.11	4.60	
8,833.00	2.02	267.09	8,393.71	865.24	-1,924.12	2,109.55	0.89	-0.66	14.68	
8,928.00	2.37	265.77	8,488.64	865.01	-1,927.75	2,112.78	0.37	0.37	-1.39	
9,022.00	2.46	260.24	8,582.56	864.52	-1,931.67	2,116.19	0.27	0.10	-5.88	
9,117.00	2.55	267.70	8,677.47	864.09	-1,935.80	2,119.80	0.36	0.09	7.85	
9,211.00	2.53	271.78	8,771.38	864.07	-1,939.96	2,123.61	0.19	-0.02	4.34	
9,305.00	2.90	279.48	8,865.27	864.53	-1,944.38	2,127.84	0.55	0.39	8.19	
9,400.00	3.69	285.37	8,960.11	865.73	-1,949.70	2,133.20	0.90	0.83	6.20	
9,494.00	3.99	285.58	9,053.90	867.41	-1,955.76	2,139.43	0.32	0.32	0.22	
9,589.00	3.87	294.25	9,148.68	869.62	-1,961.87	2,145.91	0.64	-0.13	9.13	
9,683.00	3.52	303.92	9,242.49	872.53	-1,967.16	2,151.92	0.76	-0.37	10.29	
9,778.00	3.36	299.66	9,337.31	875.53	-1,972.00	2,157.56	0.32	-0.17	-4.48	
9,881.00	3.61	297.50	9,440.12	878.53	-1,977.49	2,163.79	0.27	0.24	-2.10	
Last SDI Production MWD Survey										
9,942.00	3.61	297.50	9,501.00	880.30	-1,980.90	2,167.63	0.00	0.00	0.00	
Projection to TD - SR 512-12 PBHL										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
122.00	122.00	0.06	-0.08	First SDI Gyro MWD Survey	
675.00	670.28	27.76	-52.98	Last SDI Gyro MWD Survey	
752.00	744.31	35.50	-72.64	First SDI Surface MWD Survey	
1,068.00	1,036.51	80.65	-183.32	Last SDI Surface MWD Survey	
1,182.00	1,138.97	100.53	-229.17	First SDI Production MWD Survey	
9,881.00	9,440.12	878.53	-1,977.49	Last SDI Production MWD Survey	
9,942.00	9,501.00	880.30	-1,980.90	Projection to TD	

Checked By: _____ Approved By: _____ Date: _____



Well Details: SR 512-12

TVD Reference: GL 7478' & RKB 24' @ 7502.00usft (H&P 318) Level: 7478.00
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.00 0.00 1597696.00 2340247.20 39.4511500 -107.8366558 SR 512-12 (B4)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well SR 512-12 - Slot SR 512-12 (B4), True North
 Vertical (TVD) Reference: GL 7478' & RKB 24' @ 7502.00usft (H&P 318)
 Section (VS) Reference: Slot - SR 512-12 (B4)(0.00N, 0.00E)
 Measured Depth Reference: GL 7478' & RKB 24' @ 7502.00usft (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

21:58, November 28 2017
 Created By: Mel Mireles Jr.