



## 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.	TR 322-23-597
County & State	Garfield County, CO
SDI Job No.	OP.001674 & OP.002204
Rig	H&P 271

I, Mel Mireles Jr., having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 142 feet to a measured depth of 10,458 feet is true and correct as determined from all available records.

  
Signature

29-Jun-17  
Date

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

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well TR 322-23-597 - Slot B8 (TR 322-23-597)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 8545.2' & RKB 24' @ 8569.20usft (H&P 318)
<b>Site:</b>	TR 32-23-597 Pad	<b>MD Reference:</b>	GL 8545.2' & RKB 24' @ 8569.20usft (H&P 318)
<b>Well:</b>	TR 322-23-597	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

<b>Project</b>	Garfield County, CO NAD83		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Central Zone		

Site		TR 32-23-597 Pad			
Site Position:		Northing:	1,654,899.00 usft	Latitude:	39.5994964
From:	Map	Easting:	2,227,644.00 usft	Longitude:	-108.2413519
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.73 °

Well	TR 322-23-597 - Slot B8 (TR 322-23-597)					
Well Position	+N/-S	0.00 usft	Northing:	1,654,881.40 usft	Latitude:	39.5994459
	+E/-W	0.00 usft	Easting:	2,227,617.50 usft	Longitude:	-108.2414440
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	8,545.20 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	6/7/2017	9.75	65.93	51,603

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	301.20	

<b>Survey Program</b>	<b>Date</b>	6/29/2017		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
142.00	798.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4
867.00	2,940.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1
3,061.00	10,458.00	Survey #3 - Production MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
142.00	0.97	289.60	141.99	0.40	-1.13	1.18	0.68	0.68	0.00	
<b>First SDI Gyro MWD Survey</b>										
172.00	1.58	306.65	171.99	0.74	-1.70	1.84	2.37	2.03	56.83	
262.00	3.96	311.75	261.87	3.55	-5.02	6.13	2.66	2.64	5.67	
351.00	6.51	306.30	350.50	8.58	-11.38	14.18	2.92	2.87	-6.12	
441.00	8.97	305.07	439.67	15.63	-21.23	26.26	2.74	2.73	-1.37	
530.00	11.44	300.59	527.26	24.11	-34.51	42.01	2.91	2.78	-5.03	
620.00	13.99	299.27	615.04	33.97	-51.69	61.81	2.85	2.83	-1.47	

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well TR 322-23-597 - Slot B8 (TR 322-23-597)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 8545.2' & RKB 24' @ 8569.20usft (H&P 318)
<b>Site:</b>	TR 32-23-597 Pad	<b>MD Reference:</b>	GL 8545.2' & RKB 24' @ 8569.20usft (H&P 318)
<b>Well:</b>	TR 322-23-597	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)
709.00	15.92	300.85	701.02	45.50	-71.55	84.77	2.22	2.17	1.78
798.00	16.72	305.68	786.44	59.22	-92.43	109.74	1.77	0.90	5.43
Last SDI Gyro MWD Survey									
867.00	17.56	306.60	852.38	71.22	-108.85	130.00	1.28	1.22	1.33
First SDI Surface MWD Survey									
957.00	18.08	300.48	938.07	86.40	-131.79	157.48	2.16	0.58	-6.80
1,052.00	18.72	296.14	1,028.21	100.59	-158.18	187.41	1.59	0.67	-4.57
1,147.00	18.64	295.92	1,118.21	113.94	-185.52	217.72	0.11	-0.08	-0.23
1,241.00	18.30	301.24	1,207.37	128.17	-211.65	247.43	1.83	-0.36	5.66
1,336.00	19.18	308.20	1,297.35	145.55	-236.67	277.84	2.53	0.93	7.33
1,431.00	21.72	308.93	1,386.35	166.25	-262.61	310.75	2.69	2.67	0.77
1,526.00	23.55	312.53	1,474.04	190.13	-290.28	346.79	2.42	1.93	3.79
1,620.00	23.65	312.18	1,560.17	215.49	-318.09	383.71	0.18	0.11	-0.37
1,715.00	22.34	310.42	1,647.62	239.99	-345.96	420.24	1.56	-1.38	-1.85
1,810.00	20.75	312.80	1,735.99	263.13	-372.05	454.55	1.91	-1.67	2.51
1,905.00	21.72	312.01	1,824.53	286.33	-397.46	488.30	1.06	1.02	-0.83
1,999.00	23.92	311.74	1,911.17	310.66	-424.61	524.12	2.34	2.34	-0.29
2,094.00	23.37	314.39	1,998.20	336.66	-452.44	561.40	1.26	-0.58	2.79
2,189.00	21.38	315.33	2,086.04	362.16	-478.08	596.54	2.13	-2.09	0.99
2,284.00	21.15	313.22	2,174.57	386.21	-502.75	630.10	0.84	-0.24	-2.22
2,378.00	21.46	310.86	2,262.15	409.08	-528.11	663.64	0.97	0.33	-2.51
2,474.00	20.75	309.54	2,351.71	431.39	-554.51	697.77	0.89	-0.74	-1.38
2,568.00	21.02	311.13	2,439.54	453.08	-580.05	730.86	0.67	0.29	1.69
2,663.00	20.05	310.16	2,528.50	474.79	-605.33	763.72	1.08	-1.02	-1.02
2,758.00	20.58	309.81	2,617.59	495.98	-630.60	796.32	0.57	0.56	-0.37
2,853.00	22.34	310.25	2,706.00	518.34	-657.21	830.66	1.86	1.85	0.46
2,940.00	22.07	308.14	2,786.55	539.12	-682.68	863.21	0.97	-0.31	-2.43
Last SDI Surface MWD Survey									
3,061.00	21.75	306.08	2,898.81	566.36	-718.68	908.12	0.69	-0.26	-1.70
First SDI Production MWD Survey									
3,156.00	20.66	305.24	2,987.38	586.40	-746.59	942.37	1.19	-1.15	-0.88
3,250.00	21.98	307.53	3,074.95	606.68	-774.09	976.40	1.66	1.40	2.44
3,344.00	20.61	303.58	3,162.53	626.55	-801.83	1,010.42	2.11	-1.46	-4.20
3,439.00	19.43	305.51	3,251.79	644.98	-828.62	1,042.88	1.42	-1.24	2.03
3,533.00	19.17	306.47	3,340.51	663.24	-853.76	1,073.84	0.44	-0.28	1.02
3,627.00	20.05	310.52	3,429.06	682.88	-878.42	1,105.11	1.72	0.94	4.31
3,721.00	20.75	312.98	3,517.16	704.70	-902.85	1,137.32	1.18	0.74	2.62
3,816.00	19.70	310.69	3,606.31	726.61	-927.31	1,169.58	1.38	-1.11	-2.41
3,910.00	21.02	313.68	3,694.43	748.59	-951.51	1,201.67	1.79	1.40	3.18
4,005.00	20.14	314.03	3,783.37	771.72	-975.60	1,234.25	0.94	-0.93	0.37
4,100.00	18.20	312.36	3,873.10	793.09	-998.32	1,264.76	2.12	-2.04	-1.76
4,194.00	16.80	312.19	3,962.75	812.10	-1,019.23	1,292.50	1.49	-1.49	-0.18
4,289.00	17.23	312.80	4,053.59	830.88	-1,039.73	1,319.76	0.49	0.45	0.64
4,383.00	15.83	311.22	4,143.70	848.79	-1,059.59	1,346.02	1.56	-1.49	-1.68

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well TR 322-23-597 - Slot B8 (TR 322-23-597)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 8545.2' & RKB 24' @ 8569.20usft (H&P 318)
<b>Site:</b>	TR 32-23-597 Pad	<b>MD Reference:</b>	GL 8545.2' & RKB 24' @ 8569.20usft (H&P 318)
<b>Well:</b>	TR 322-23-597	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

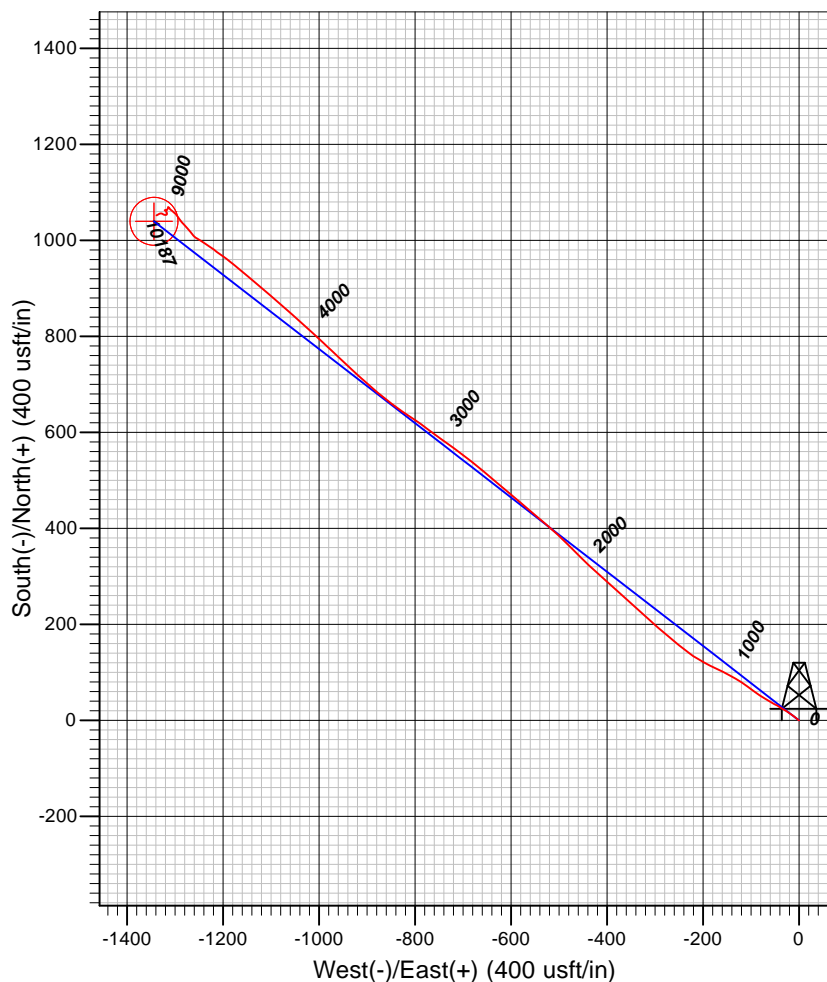
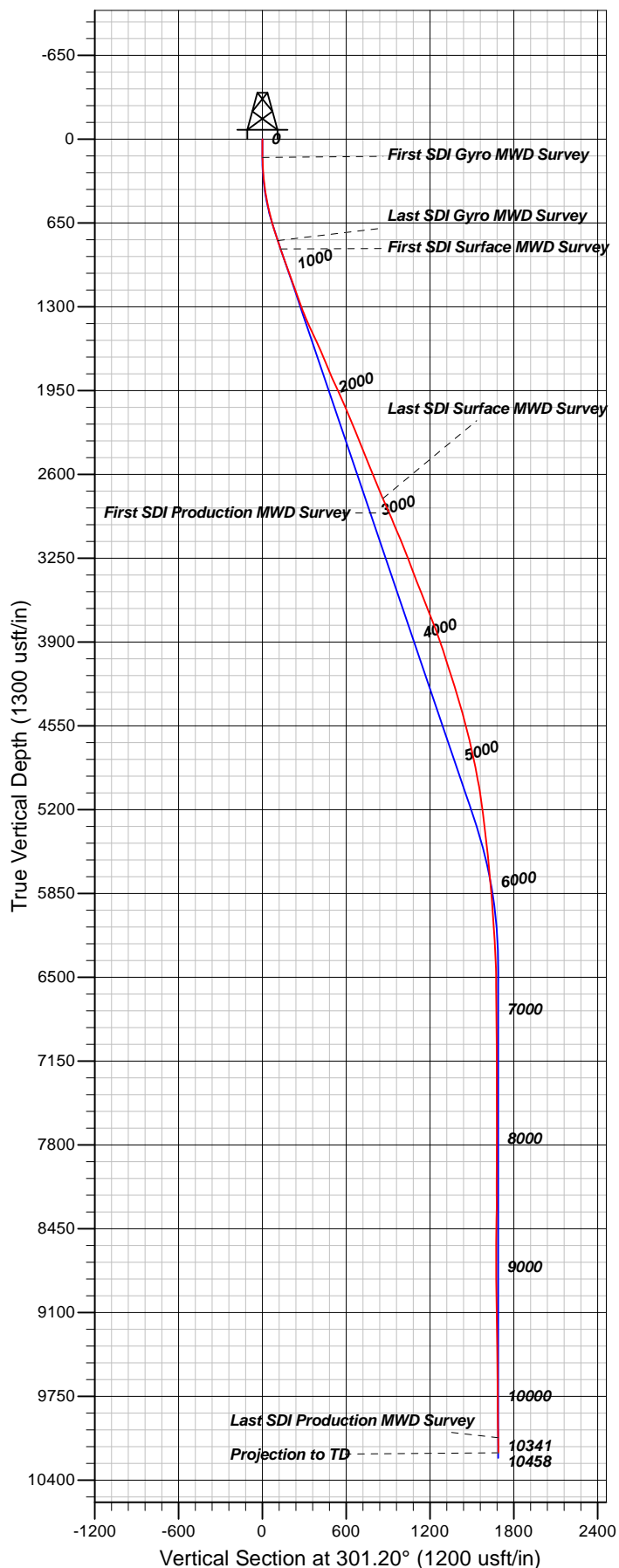
Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,477.00	17.06	310.95	4,233.85	866.28	-1,079.65	1,372.24	1.31	1.31	-0.29
4,572.00	16.00	310.69	4,324.93	883.95	-1,100.10	1,398.89	1.12	-1.12	-0.27
4,667.00	14.68	310.60	4,416.54	900.32	-1,119.17	1,423.68	1.39	-1.39	-0.09
4,762.00	13.63	309.72	4,508.65	915.31	-1,136.92	1,446.62	1.13	-1.11	-0.93
4,857.00	12.93	309.90	4,601.11	929.28	-1,153.68	1,468.20	0.74	-0.74	0.19
4,952.00	12.75	310.08	4,693.74	942.84	-1,169.86	1,489.06	0.19	-0.19	0.19
5,047.00	11.52	307.61	4,786.61	955.38	-1,185.39	1,508.85	1.41	-1.29	-2.60
5,142.00	10.38	305.42	4,879.88	966.13	-1,199.88	1,526.81	1.28	-1.20	-2.31
5,236.00	9.67	308.05	4,972.45	975.91	-1,213.00	1,543.09	0.90	-0.76	2.80
5,331.00	8.35	304.89	5,066.27	984.77	-1,224.94	1,557.90	1.48	-1.39	-3.33
5,425.00	7.47	302.87	5,159.38	991.99	-1,235.67	1,570.82	0.98	-0.94	-2.15
5,520.00	6.68	302.61	5,253.65	998.32	-1,245.51	1,582.52	0.83	-0.83	-0.27
5,614.00	6.16	300.23	5,347.06	1,003.81	-1,254.48	1,593.02	0.62	-0.55	-2.53
5,709.00	5.80	320.97	5,441.56	1,010.10	-1,261.91	1,602.64	2.29	-0.38	21.83
5,803.00	5.72	319.92	5,535.08	1,017.38	-1,267.91	1,611.54	0.14	-0.09	-1.12
5,898.00	5.43	319.05	5,629.63	1,024.39	-1,273.91	1,620.31	0.32	-0.31	-0.92
5,992.00	5.45	318.86	5,723.21	1,031.11	-1,279.76	1,628.79	0.03	0.02	-0.20
6,087.00	4.57	317.02	5,817.85	1,037.28	-1,285.31	1,636.73	0.94	-0.93	-1.94
6,181.00	4.84	323.44	5,911.53	1,043.21	-1,290.22	1,644.01	0.63	0.29	6.83
6,276.00	4.31	325.46	6,006.23	1,049.37	-1,294.63	1,650.97	0.58	-0.56	2.13
6,370.00	3.17	318.25	6,100.03	1,054.21	-1,298.37	1,656.68	1.31	-1.21	-7.67
6,464.00	2.90	308.49	6,193.90	1,057.63	-1,301.96	1,661.52	0.62	-0.29	-10.38
6,559.00	2.73	308.49	6,288.78	1,060.54	-1,305.61	1,666.15	0.18	-0.18	0.00
6,653.00	2.46	311.13	6,382.68	1,063.26	-1,308.88	1,670.35	0.31	-0.29	2.81
6,676.53	2.02	312.52	6,406.19	1,063.87	-1,309.57	1,671.26	1.91	-1.89	5.93
TR 322-23-597 MVRD									
6,748.00	0.69	327.80	6,477.64	1,065.08	-1,310.72	1,672.87	1.91	-1.85	21.37
6,842.00	0.88	336.36	6,571.64	1,066.22	-1,311.31	1,673.97	0.24	0.20	9.11
6,937.00	0.62	313.94	6,666.63	1,067.25	-1,311.98	1,675.07	0.41	-0.27	-23.60
7,031.00	0.44	298.39	6,760.62	1,067.77	-1,312.66	1,675.93	0.24	-0.19	-16.54
7,126.00	0.44	312.80	6,855.62	1,068.19	-1,313.25	1,676.65	0.12	0.00	15.17
7,220.00	1.14	313.06	6,949.61	1,069.08	-1,314.20	1,677.92	0.74	0.74	0.28
7,315.00	0.62	163.47	7,044.61	1,069.23	-1,314.74	1,678.46	1.79	-0.55	-157.46
7,409.00	0.88	168.13	7,138.60	1,068.04	-1,314.45	1,677.59	0.28	0.28	4.96
7,504.00	0.97	212.17	7,233.59	1,066.64	-1,314.73	1,677.11	0.74	0.09	46.36
7,598.00	0.97	213.48	7,327.57	1,065.30	-1,315.59	1,677.15	0.02	0.00	1.39
7,693.00	0.88	217.18	7,422.56	1,064.05	-1,316.47	1,677.26	0.11	-0.09	3.89
7,787.00	1.23	248.11	7,516.55	1,063.10	-1,317.85	1,677.94	0.70	0.37	32.90
7,882.00	1.41	259.98	7,611.52	1,062.52	-1,319.94	1,679.43	0.34	0.19	12.49
7,976.00	0.53	253.83	7,705.51	1,062.20	-1,321.50	1,680.60	0.94	-0.94	-6.54
8,071.00	1.32	87.89	7,800.50	1,062.11	-1,320.83	1,679.98	1.94	0.83	-174.67
8,166.00	0.70	81.30	7,895.48	1,062.24	-1,319.16	1,678.62	0.66	-0.65	-6.94
8,260.00	0.62	120.94	7,989.48	1,062.07	-1,318.16	1,677.67	0.48	-0.09	42.17

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well TR 322-23-597 - Slot B8 (TR 322-23-597)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 8545.2' & RKB 24' @ 8569.20usft (H&P 318)
<b>Site:</b>	TR 32-23-597 Pad	<b>MD Reference:</b>	GL 8545.2' & RKB 24' @ 8569.20usft (H&P 318)
<b>Well:</b>	TR 322-23-597	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)	
8,355.00	0.09	301.73	8,084.48	1,061.84	-1,317.78	1,677.23	0.75	-0.56	-188.64	
8,449.00	0.35	235.11	8,178.48	1,061.72	-1,318.08	1,677.42	0.35	0.28	-70.87	
8,544.00	0.70	247.67	8,273.47	1,061.33	-1,318.85	1,677.88	0.39	0.37	13.22	
8,639.00	1.23	148.71	8,368.46	1,060.24	-1,318.86	1,677.32	1.59	0.56	-104.17	
8,733.00	1.06	154.16	8,462.44	1,058.59	-1,317.96	1,675.70	0.21	-0.18	5.80	
8,827.00	1.06	158.82	8,556.43	1,057.00	-1,317.26	1,674.28	0.09	0.00	4.96	
8,922.00	1.14	159.26	8,651.41	1,055.30	-1,316.61	1,672.84	0.08	0.08	0.46	
9,016.00	1.14	226.49	8,745.40	1,053.78	-1,316.96	1,672.35	1.34	0.00	71.52	
9,111.00	0.97	249.69	8,840.38	1,052.85	-1,318.40	1,673.10	0.48	-0.18	24.42	
9,206.00	1.41	279.14	8,935.36	1,052.76	-1,320.31	1,674.69	0.78	0.46	31.00	
9,300.00	1.49	281.51	9,029.33	1,053.18	-1,322.65	1,676.91	0.11	0.09	2.52	
9,395.00	0.79	309.37	9,124.31	1,053.84	-1,324.36	1,678.72	0.92	-0.74	29.33	
9,489.00	0.35	294.34	9,218.31	1,054.37	-1,325.12	1,679.65	0.49	-0.47	-15.99	
9,584.00	0.46	288.42	9,313.30	1,054.61	-1,325.75	1,680.31	0.12	0.12	-6.23	
9,679.00	0.79	322.91	9,408.30	1,055.26	-1,326.51	1,681.29	0.51	0.35	36.31	
9,773.00	0.53	281.07	9,502.29	1,055.86	-1,327.32	1,682.30	0.56	-0.28	-44.51	
9,868.00	0.70	256.20	9,597.29	1,055.80	-1,328.32	1,683.12	0.33	0.18	-26.18	
9,962.00	0.88	284.24	9,691.28	1,055.84	-1,329.58	1,684.22	0.45	0.19	29.83	
10,057.00	0.53	260.07	9,786.27	1,055.95	-1,330.72	1,685.25	0.48	-0.37	-25.44	
10,151.00	0.79	241.61	9,880.27	1,055.56	-1,331.71	1,685.90	0.35	0.28	-19.64	
10,246.00	1.32	237.92	9,975.25	1,054.67	-1,333.22	1,686.72	0.56	0.56	-3.88	
10,341.00	1.76	246.62	10,070.22	1,053.51	-1,335.48	1,688.06	0.52	0.46	9.16	
Last SDI Production MWD Survey										
10,458.00	1.76	246.62	10,187.16	1,052.09	-1,338.78	1,690.14	0.00	0.00	0.00	
Projection to TD - TR 322-23-597 PBHL										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
142.00	141.99	0.40	-1.13	First SDI Gyro MWD Survey	
798.00	786.44	59.22	-92.43	Last SDI Gyro MWD Survey	
867.00	852.38	71.22	-108.85	First SDI Surface MWD Survey	
2,940.00	2,786.55	539.12	-682.68	Last SDI Surface MWD Survey	
3,061.00	2,898.81	566.36	-718.68	First SDI Production MWD Survey	
10,341.00	10,070.22	1,053.51	-1,335.48	Last SDI Production MWD Survey	
10,458.00	10,187.16	1,052.09	-1,338.78	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------



#### Well Details: TR 322-23-597

TVD Reference: GL 8545.2' & RKB 24' @ 8569.20usft (H&P 318) Level: 8545.20  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.00 0.00 1654881.40 2227617.50 39.5994459 -108.2414810 (TR 322-23-597)

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well TR 322-23-597 - Slot B8 (TR 322-23-597), True North  
 Vertical (TVD) Reference: GL 8545.2' & RKB 24' @ 8569.20usft (H&P 318)  
 Section (VS) Reference: Slot - B8 (TR 322-23-597)(0.00N, 0.00E)  
 Measured Depth Reference: GL 8545.2' & RKB 24' @ 8569.20usft (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

11:35, June 29 2017  
 Created By: Mel Mireles Jr.