



## Directional Survey Certification

2948 I-70 Business Loop  
Grand Junction, CO 81504  
(970)-245-9447 Fax (970)-245-9454

<b>Operator</b>	TEP Rocky Mountain, LLC.
<b>Well Name &amp; No.</b>	TR 324-23-597
<b>County &amp; State</b>	Garfield County, CO
<b>SDI Job No.</b>	OP.000903 & OP.003635
<b>Rig</b>	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 154 feet to a measured depth of 10,385 feet is true and correct as determined from all available records.

  
Signature

05-Sep-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 324-23-597 - Slot A1 (TR 324-23-597)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
<b>Site:</b>	TR 32-23-597 Pad	<b>MD Reference:</b>	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
<b>Well:</b>	TR 324-23-597	<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 324-23-597 - Slot A1 (TR 324-23-597)					
Well Position	+N/-S	0.00 usft	Northing:	1,654,834.10 usft	Latitude:	39.5993141
	+E/-W	0.00 usft	Easting:	2,227,593.10 usft	Longitude:	-108.2415255
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	4/24/2017	9.77	65.93	51,618

<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	218.35	

<b>Survey Program</b>	<b>Date</b>	9/5/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
154.00	587.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
659.00	2,927.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
3,013.00	10,385.00	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	
154.00	1.06	214.37	153.99	-1.18	-0.80	1.42	0.69	0.69	0.00	
<b>First SDI Gyro MWD Survey</b>										
215.00	2.46	218.32	214.96	-2.67	-1.93	3.29	2.30	2.30	6.48	
306.00	4.84	220.43	305.77	-7.12	-5.64	9.08	2.62	2.62	2.32	
402.00	8.18	214.80	401.14	-15.82	-12.16	19.95	3.54	3.48	-5.86	
494.00	11.79	218.06	491.73	-28.60	-21.69	35.89	3.97	3.92	3.54	

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<b>Site:</b>	TR 32-23-597 Pad	<b>MD Reference:</b>	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
<b>Well:</b>	TR 324-23-597	<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)
587.00	14.60	220.61	582.27	-44.98	-35.18	57.10	3.08	3.02	2.74
<b>Last SDI Gyro MWD Survey</b>									
659.00	17.32	215.26	651.49	-60.62	-47.28	76.88	4.29	3.78	-7.43
<b>First SDI Surface MWD Survey</b>									
750.00	19.74	214.64	737.76	-84.33	-63.84	105.74	2.67	2.66	-0.68
842.00	22.24	216.66	823.65	-111.08	-83.07	138.66	2.83	2.72	2.20
935.00	25.26	216.23	908.77	-141.22	-105.31	176.09	3.25	3.25	-0.46
1,027.00	27.61	217.72	991.14	-173.92	-129.96	217.03	2.65	2.55	1.62
1,126.00	29.49	219.77	1,078.10	-210.80	-159.58	264.33	2.14	1.90	2.07
1,221.00	29.65	219.81	1,160.73	-246.82	-189.59	311.20	0.17	0.17	0.04
1,315.00	27.46	219.19	1,243.29	-281.48	-218.17	356.12	2.35	-2.33	-0.66
1,410.00	26.41	218.25	1,327.99	-315.05	-245.09	399.15	1.19	-1.11	-0.99
1,505.00	27.81	218.19	1,412.55	-349.06	-271.88	442.44	1.47	1.47	-0.06
1,600.00	27.09	217.56	1,496.85	-383.63	-298.76	486.23	0.82	-0.76	-0.66
1,694.00	24.71	216.90	1,581.40	-416.31	-323.61	527.28	2.55	-2.53	-0.70
1,789.00	24.33	217.13	1,667.83	-447.79	-347.35	566.69	0.41	-0.40	0.24
1,884.00	24.43	217.91	1,754.36	-478.90	-371.23	605.90	0.35	0.11	0.82
1,979.00	24.12	221.19	1,840.97	-509.00	-396.08	644.94	1.46	-0.33	3.45
2,073.00	24.24	220.06	1,926.72	-538.23	-421.15	683.41	0.51	0.13	-1.20
2,168.00	24.27	218.16	2,013.34	-568.51	-445.77	722.42	0.82	0.03	-2.00
2,263.00	23.39	217.63	2,100.24	-598.79	-469.34	760.80	0.95	-0.93	-0.56
2,357.00	23.30	220.53	2,186.54	-627.70	-492.82	798.04	1.23	-0.10	3.09
2,452.00	22.75	219.18	2,273.98	-656.22	-516.63	835.18	0.80	-0.58	-1.42
2,548.00	21.63	217.01	2,362.87	-684.74	-539.01	871.43	1.45	-1.17	-2.26
2,642.00	21.47	218.58	2,450.30	-712.02	-560.17	905.95	0.64	-0.17	1.67
2,737.00	21.45	220.07	2,538.71	-738.90	-582.19	940.70	0.57	-0.02	1.57
2,832.00	21.13	221.17	2,627.23	-765.09	-604.64	975.17	0.54	-0.34	1.16
2,927.00	21.57	220.76	2,715.71	-791.20	-627.32	1,009.72	0.49	0.46	-0.43
<b>Last SDI Surface MWD Survey</b>									
3,013.00	21.54	221.23	2,795.69	-815.05	-648.04	1,041.28	0.20	-0.03	0.55
<b>First SDI Production MWD Survey</b>									
3,162.00	21.10	219.53	2,934.50	-856.31	-683.14	1,095.41	0.51	-0.30	-1.14
3,256.00	22.33	219.80	3,021.83	-883.08	-705.34	1,130.18	1.31	1.31	0.29
3,351.00	21.98	218.21	3,109.81	-910.91	-727.89	1,166.00	0.73	-0.37	-1.67
3,445.00	22.09	218.23	3,196.95	-938.62	-749.71	1,201.27	0.12	0.12	0.02
3,540.00	22.35	218.33	3,284.89	-966.82	-771.97	1,237.19	0.28	0.27	0.11
3,634.00	22.32	217.48	3,371.84	-995.01	-793.91	1,272.91	0.35	-0.03	-0.90
3,729.00	24.03	222.15	3,459.18	-1,023.67	-817.87	1,310.26	2.64	1.80	4.92
3,824.00	25.84	219.04	3,545.32	-1,054.09	-843.90	1,350.26	2.35	1.91	-3.27
3,918.00	27.31	218.68	3,629.39	-1,086.84	-870.28	1,392.31	1.57	1.56	-0.38
4,013.00	28.46	219.18	3,713.36	-1,121.40	-898.20	1,436.74	1.24	1.21	0.53
4,107.00	27.61	217.86	3,796.33	-1,155.96	-925.72	1,480.92	1.12	-0.90	-1.40
4,202.00	27.00	218.82	3,880.74	-1,190.14	-952.75	1,524.50	0.79	-0.64	1.01

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<b>Well:</b>	TR 324-23-597	<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

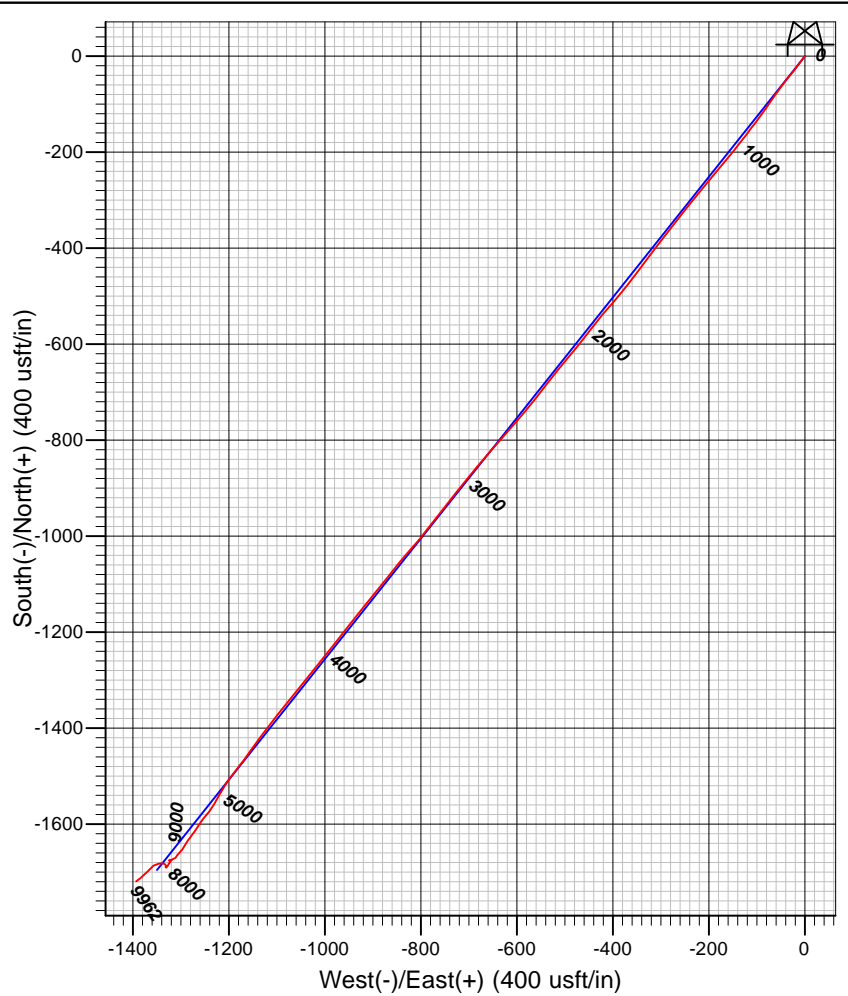
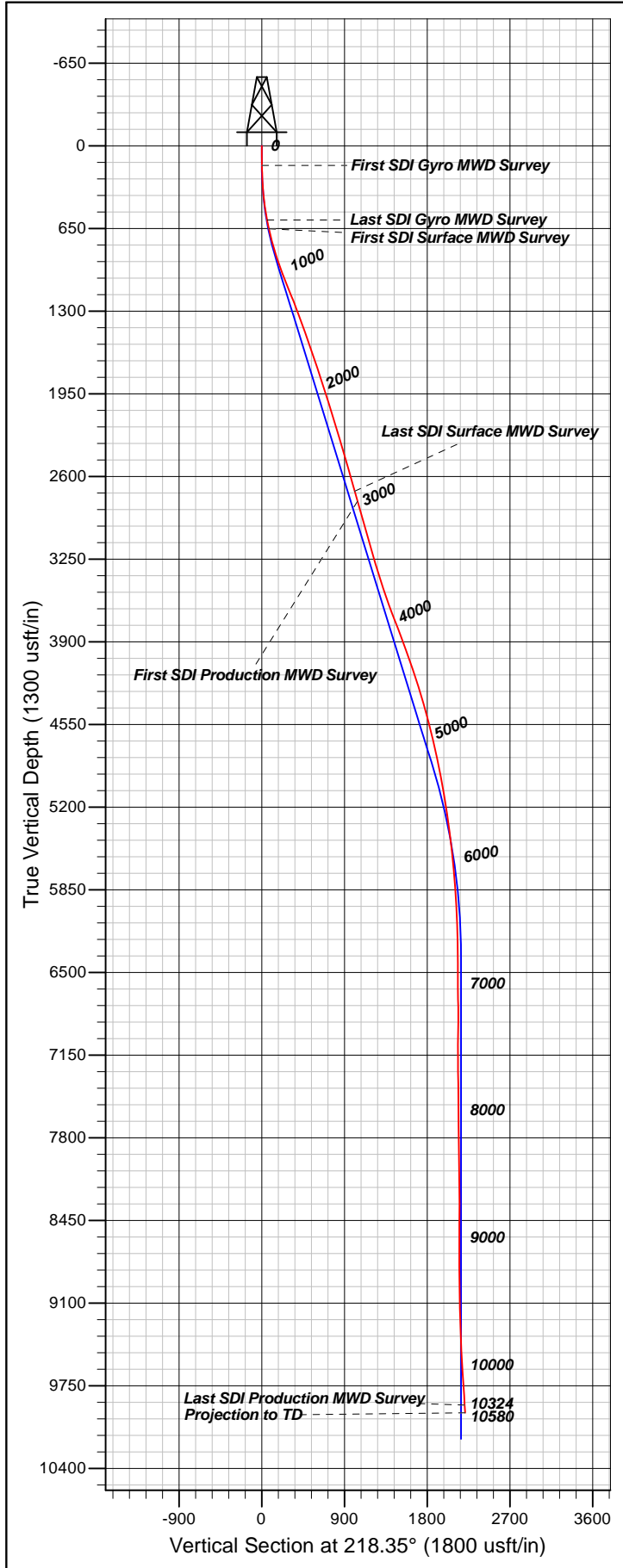
Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,296.00	27.27	217.92	3,964.40	-1,223.75	-979.36	1,567.37	0.52	0.29	-0.96
4,391.00	26.29	219.00	4,049.21	-1,257.27	-1,005.98	1,610.17	1.15	-1.03	1.14
4,485.00	25.00	218.86	4,133.94	-1,288.92	-1,031.54	1,650.85	1.37	-1.37	-0.15
4,580.00	24.39	219.07	4,220.26	-1,319.78	-1,056.50	1,690.54	0.65	-0.64	0.22
4,674.00	22.45	219.22	4,306.51	-1,348.76	-1,080.08	1,727.89	2.06	-2.06	0.16
4,769.00	21.54	218.82	4,394.59	-1,376.40	-1,102.48	1,763.47	0.97	-0.96	-0.42
4,863.00	19.99	215.26	4,482.49	-1,402.96	-1,122.58	1,796.77	2.13	-1.65	-3.79
4,958.00	18.82	216.19	4,572.09	-1,428.59	-1,141.00	1,828.30	1.27	-1.23	0.98
5,053.00	18.15	216.38	4,662.19	-1,452.87	-1,158.83	1,858.40	0.71	-0.71	0.20
5,147.00	16.93	217.50	4,751.82	-1,475.52	-1,175.84	1,886.72	1.35	-1.30	1.19
5,242.00	16.00	218.03	4,842.92	-1,496.81	-1,192.33	1,913.64	0.99	-0.98	0.56
5,336.00	15.65	211.88	4,933.36	-1,517.78	-1,207.01	1,939.20	1.82	-0.37	-6.54
5,431.00	14.07	210.21	5,025.18	-1,538.64	-1,219.59	1,963.36	1.72	-1.66	-1.76
5,525.00	12.84	209.68	5,116.60	-1,557.59	-1,230.51	1,985.00	1.32	-1.31	-0.56
5,620.00	11.73	217.83	5,209.43	-1,574.39	-1,241.66	2,005.09	2.16	-1.17	8.58
5,714.00	10.82	219.53	5,301.62	-1,588.74	-1,253.13	2,023.47	1.03	-0.97	1.81
5,809.00	10.34	211.96	5,395.01	-1,602.85	-1,263.32	2,040.86	1.55	-0.51	-7.97
5,903.00	9.41	215.13	5,487.61	-1,616.30	-1,272.21	2,056.92	1.15	-0.99	3.37
5,998.00	9.06	217.51	5,581.38	-1,628.58	-1,281.23	2,072.15	0.55	-0.37	2.51
6,092.00	7.48	209.74	5,674.40	-1,639.76	-1,288.78	2,085.60	2.06	-1.68	-8.27
6,187.00	7.30	214.43	5,768.62	-1,650.11	-1,295.26	2,097.74	0.66	-0.19	4.94
6,281.00	5.17	222.42	5,862.06	-1,658.17	-1,301.49	2,107.92	2.44	-2.27	8.50
6,376.00	4.49	220.78	5,956.72	-1,664.14	-1,306.81	2,115.90	0.73	-0.72	-1.73
6,470.00	2.91	214.51	6,050.52	-1,668.89	-1,310.56	2,121.96	1.73	-1.68	-6.67
6,565.00	1.94	249.65	6,145.44	-1,671.44	-1,313.44	2,125.74	1.82	-1.02	36.99
6,659.00	2.37	245.19	6,239.37	-1,672.81	-1,316.69	2,128.84	0.49	0.46	-4.74
6,754.00	0.74	203.69	6,334.34	-1,674.20	-1,318.72	2,131.18	1.98	-1.72	-43.68
6,805.19	0.88	212.06	6,385.52	-1,674.83	-1,319.06	2,131.89	0.36	0.28	16.35
TR 324-23-597 MVRD									
6,848.00	1.01	217.18	6,428.33	-1,675.41	-1,319.47	2,132.60	0.36	0.30	11.96
6,943.00	0.17	333.34	6,523.32	-1,675.95	-1,320.04	2,133.38	1.15	-0.88	122.27
7,037.00	0.85	262.17	6,617.32	-1,675.92	-1,320.79	2,133.82	0.86	0.72	-75.71
7,132.00	1.49	261.28	6,712.30	-1,676.21	-1,322.71	2,135.23	0.67	0.67	-0.94
7,226.00	0.36	323.91	6,806.28	-1,676.15	-1,324.09	2,136.05	1.45	-1.20	66.63
7,321.00	0.74	304.22	6,901.28	-1,675.57	-1,324.77	2,136.01	0.44	0.40	-20.73
7,415.00	0.79	95.69	6,995.28	-1,675.29	-1,324.63	2,135.71	1.58	0.05	161.14
7,510.00	0.53	98.85	7,090.27	-1,675.42	-1,323.54	2,135.14	0.28	-0.27	3.33
7,605.00	0.66	121.59	7,185.26	-1,675.78	-1,322.64	2,134.86	0.28	0.14	23.94
7,699.00	0.62	178.92	7,279.26	-1,676.57	-1,322.17	2,135.18	0.65	-0.04	60.99
7,793.00	0.81	181.08	7,373.25	-1,677.74	-1,322.18	2,136.11	0.20	0.20	2.30
7,888.00	0.79	209.60	7,468.24	-1,678.98	-1,322.51	2,137.29	0.42	-0.02	30.02
7,982.00	0.97	216.19	7,562.23	-1,680.19	-1,323.30	2,138.72	0.22	0.19	7.01

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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)	
8,077.00	1.41	228.23	7,657.21	-1,681.61	-1,324.65	2,140.68	0.53	0.46	12.67	
8,171.00	0.35	183.49	7,751.20	-1,682.67	-1,325.53	2,142.05	1.26	-1.13	-47.60	
8,266.00	0.79	186.92	7,846.20	-1,683.61	-1,325.63	2,142.85	0.46	0.46	3.61	
8,454.00	0.97	225.19	8,034.17	-1,686.02	-1,326.91	2,145.54	0.32	0.10	20.36	
8,549.00	1.41	204.22	8,129.15	-1,687.65	-1,327.96	2,147.47	0.64	0.46	-22.07	
8,643.00	0.70	222.25	8,223.14	-1,689.13	-1,328.82	2,149.16	0.82	-0.76	19.18	
8,737.00	1.40	238.14	8,317.12	-1,690.16	-1,330.18	2,150.82	0.80	0.74	16.90	
8,832.00	0.57	306.82	8,412.11	-1,690.49	-1,331.55	2,151.92	1.37	-0.87	72.29	
8,926.00	1.58	14.26	8,506.09	-1,688.96	-1,331.60	2,150.75	1.55	1.07	71.74	
9,020.00	1.25	358.90	8,600.07	-1,686.68	-1,331.30	2,148.77	0.53	-0.35	-16.34	
9,114.00	1.10	324.55	8,694.05	-1,684.92	-1,331.85	2,147.73	0.75	-0.16	-36.54	
9,209.00	1.49	291.25	8,789.02	-1,683.72	-1,333.53	2,147.84	0.87	0.41	-35.05	
9,304.00	1.11	310.76	8,884.00	-1,682.68	-1,335.37	2,148.16	0.61	-0.40	20.54	
9,398.00	1.84	277.34	8,977.97	-1,681.89	-1,337.56	2,148.90	1.17	0.78	-35.55	
9,493.00	2.74	265.79	9,072.89	-1,681.86	-1,341.34	2,151.23	1.06	0.95	-12.16	
9,587.00	3.34	255.13	9,166.76	-1,682.73	-1,346.22	2,154.94	0.87	0.64	-11.34	
9,682.00	4.80	251.07	9,261.52	-1,684.73	-1,352.66	2,160.50	1.57	1.54	-4.27	
9,776.00	2.78	228.59	9,355.31	-1,687.51	-1,358.09	2,166.05	2.63	-2.15	-23.91	
9,965.00	3.25	222.78	9,544.05	-1,694.48	-1,365.17	2,175.90	0.30	0.25	-3.07	
10,060.00	5.68	226.71	9,638.76	-1,699.68	-1,370.42	2,183.24	2.58	2.56	4.14	
10,155.00	5.62	225.54	9,733.30	-1,706.16	-1,377.16	2,192.51	0.14	-0.06	-1.23	
10,250.00	5.11	229.82	9,827.88	-1,712.15	-1,383.71	2,201.27	0.68	-0.54	4.51	
10,324.00	5.17	233.54	9,901.58	-1,716.25	-1,388.91	2,207.72	0.46	0.08	5.03	
Last SDI Production MWD Survey										
10,385.00	5.17	233.54	9,962.33	-1,719.52	-1,393.33	2,213.02	0.00	0.00	0.00	
Projection to TD - TR 324-23-597 PBHL										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
154.00	153.99	-1.18	-0.80	First SDI Gyro MWD Survey	
587.00	582.27	-44.98	-35.18	Last SDI Gyro MWD Survey	
659.00	651.49	-60.62	-47.28	First SDI Surface MWD Survey	
2,927.00	2,715.71	-791.20	-627.32	Last SDI Surface MWD Survey	
3,013.00	2,795.69	-815.05	-648.04	First SDI Production MWD Survey	
10,324.00	9,901.58	-1,716.25	-1,388.91	Last SDI Production MWD Survey	
10,385.00	9,962.33	-1,719.52	-1,393.33	Projection to TD	

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



#### Well Details: TR 324-23-597

TVD Reference: GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318) Level: 8545.20  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.00 0.00 1654834.10 2227593.10 39.5993140 -108.2415251 TR 324-23-597

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well TR 324-23-597 - Slot A1 (TR 324-23-597), True North  
 Vertical (TVD) Reference: GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)  
 Section (VS) Reference: Slot - A1 (TR 324-23-597) (0.00N, 0.00E)  
 Measured Depth Reference: GL 8545.20' & 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

11:11, September 05 2017  
 Created By: Mel Mireles Jr.