



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 21-23-597
County & State	Garfield County, CO
SDI Job No.	OP.001629 & OP.002387
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 172 feet to a measured depth of 10,529 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

05-Jul-17

Date

Mel Mireles Jr.

Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well TR 21-23-597 - Slot B11 (TR 21-23-597)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 8545.20' & RKB24' @ 8569.20usft (H&P 318)
Site:	TR 32-23-597 Pad	MD Reference:	GL 8545.20' & RKB24' @ 8569.20usft (H&P 318)
Well:	TR 21-23-597	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		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 21-23-597 - Slot B11 (TR 21-23-597)					
Well Position	+N/-S	0.00 usft	Northing:	1,654,899.30 usft	Latitude:	39.5994962
	+E/-W	0.00 usft	Easting:	2,227,631.60 usft	Longitude:	-108.2413959
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	8,545.20 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	6/1/2017	9.75	65.93	51,605

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	328.67	

Survey Program	Date	7/5/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
172.00	798.00	Survey #1 - Gyro MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
867.00	2,948.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
3,061.00	10,529.00	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	
172.00	0.97	334.34	171.99	1.31	-0.63	1.45	0.56	0.56	0.00	
First SDI Gyro MWD Survey										
262.00	2.99	333.46	261.93	4.10	-2.01	4.55	2.24	2.24	-0.98	
351.00	5.98	322.56	350.65	9.86	-5.87	11.47	3.48	3.36	-12.25	
441.00	8.89	325.02	439.89	19.28	-12.70	23.07	3.25	3.23	2.73	
530.00	11.52	326.16	527.47	32.30	-21.60	38.82	2.96	2.96	1.28	
620.00	14.43	329.24	615.16	49.40	-32.34	59.02	3.32	3.23	3.42	
709.00	18.21	332.21	700.56	71.24	-44.50	83.99	4.35	4.25	3.34	

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Site:	TR 32-23-597 Pad	MD Reference:	GL 8545.20' & RKB24' @ 8569.20usft (H&P 318)
Well:	TR 21-23-597	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)
798.00	20.41	329.06	784.55	96.86	-58.96	113.40	2.73	2.47	-3.54
Last SDI Gyro MWD Survey									
867.00	21.44	326.56	849.00	117.70	-72.10	138.03	1.98	1.49	-3.62
First SDI Surface MWD Survey									
957.00	22.43	319.59	932.50	144.51	-92.30	171.43	3.09	1.10	-7.74
1,052.00	24.45	317.63	1,019.66	172.84	-117.30	208.63	2.28	2.13	-2.06
1,147.00	26.56	319.39	1,105.40	203.49	-144.38	248.89	2.36	2.22	1.85
1,241.00	28.37	327.30	1,188.83	238.25	-170.13	291.97	4.33	1.93	8.41
1,336.00	30.39	327.94	1,271.61	277.61	-195.08	338.57	2.15	2.13	0.67
1,431.00	30.78	328.18	1,353.39	318.63	-220.65	386.91	0.43	0.41	0.25
1,526.00	29.90	329.85	1,435.38	359.76	-245.36	434.89	1.28	-0.93	1.76
1,620.00	31.22	328.09	1,516.32	400.71	-270.01	482.67	1.70	1.40	-1.87
1,715.00	28.93	326.07	1,598.53	440.68	-295.85	530.25	2.64	-2.41	-2.13
1,810.00	27.08	322.29	1,682.41	476.85	-321.91	574.71	2.70	-1.95	-3.98
1,905.00	27.87	322.11	1,766.69	511.49	-348.77	618.26	0.84	0.83	-0.19
1,999.00	30.25	323.17	1,848.85	547.78	-376.47	663.66	2.59	2.53	1.13
2,094.00	30.81	321.41	1,930.68	585.95	-405.99	711.61	1.11	0.59	-1.85
2,189.00	30.49	325.00	2,012.42	624.72	-434.99	759.80	1.96	-0.34	3.78
2,284.00	27.72	326.98	2,095.42	662.99	-460.86	805.95	3.09	-2.92	2.08
2,378.00	26.29	328.14	2,179.17	699.01	-483.76	848.62	1.62	-1.52	1.23
2,474.00	26.73	328.62	2,265.07	735.49	-506.22	891.47	0.51	0.46	0.50
2,568.00	26.55	326.06	2,349.10	770.97	-528.96	933.60	1.24	-0.19	-2.72
2,663.00	26.80	324.27	2,433.99	805.97	-553.32	976.16	0.89	0.26	-1.88
2,758.00	26.25	327.03	2,518.99	840.99	-577.26	1,018.52	1.42	-0.58	2.91
2,853.00	27.00	330.20	2,603.92	877.33	-599.41	1,061.08	1.69	0.79	3.34
2,948.00	28.02	329.85	2,688.18	915.34	-621.34	1,104.94	1.09	1.07	-0.37
Last SDI Surface MWD Survey									
3,061.00	28.61	329.01	2,787.66	961.48	-648.60	1,158.54	0.63	0.52	-0.74
First SDI Production MWD Survey									
3,155.00	30.51	325.89	2,869.42	1,000.54	-673.57	1,204.88	2.60	2.02	-3.32
3,249.00	30.59	324.86	2,950.38	1,039.85	-700.72	1,252.58	0.56	0.09	-1.10
3,343.00	31.13	323.70	3,031.07	1,078.99	-728.87	1,300.65	0.85	0.57	-1.23
3,438.00	29.76	324.04	3,112.97	1,117.87	-757.26	1,348.62	1.45	-1.44	0.36
3,532.00	29.19	321.94	3,194.80	1,154.80	-785.09	1,394.64	1.26	-0.61	-2.23
3,626.00	28.41	318.82	3,277.18	1,189.68	-813.95	1,439.44	1.80	-0.83	-3.32
3,720.00	27.17	318.25	3,360.34	1,222.53	-842.96	1,482.58	1.35	-1.32	-0.61
3,815.00	26.64	320.80	3,445.06	1,255.22	-870.87	1,525.01	1.34	-0.56	2.68
3,909.00	25.94	326.68	3,529.35	1,288.73	-895.49	1,566.44	2.87	-0.74	6.26
4,004.00	25.41	325.28	3,614.97	1,322.85	-918.51	1,607.56	0.85	-0.56	-1.47
4,099.00	24.80	324.05	3,700.99	1,355.73	-941.81	1,647.76	0.84	-0.64	-1.29
4,193.00	24.57	322.72	3,786.40	1,387.24	-965.23	1,686.85	0.64	-0.24	-1.41
4,288.00	25.06	327.74	3,872.64	1,419.97	-987.93	1,726.62	2.28	0.52	5.28
4,382.00	23.92	326.77	3,958.18	1,452.75	-1,009.00	1,765.57	1.29	-1.21	-1.03
4,477.00	24.45	331.34	4,044.85	1,486.12	-1,028.99	1,804.46	2.05	0.56	4.81

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Well:	TR 21-23-597	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

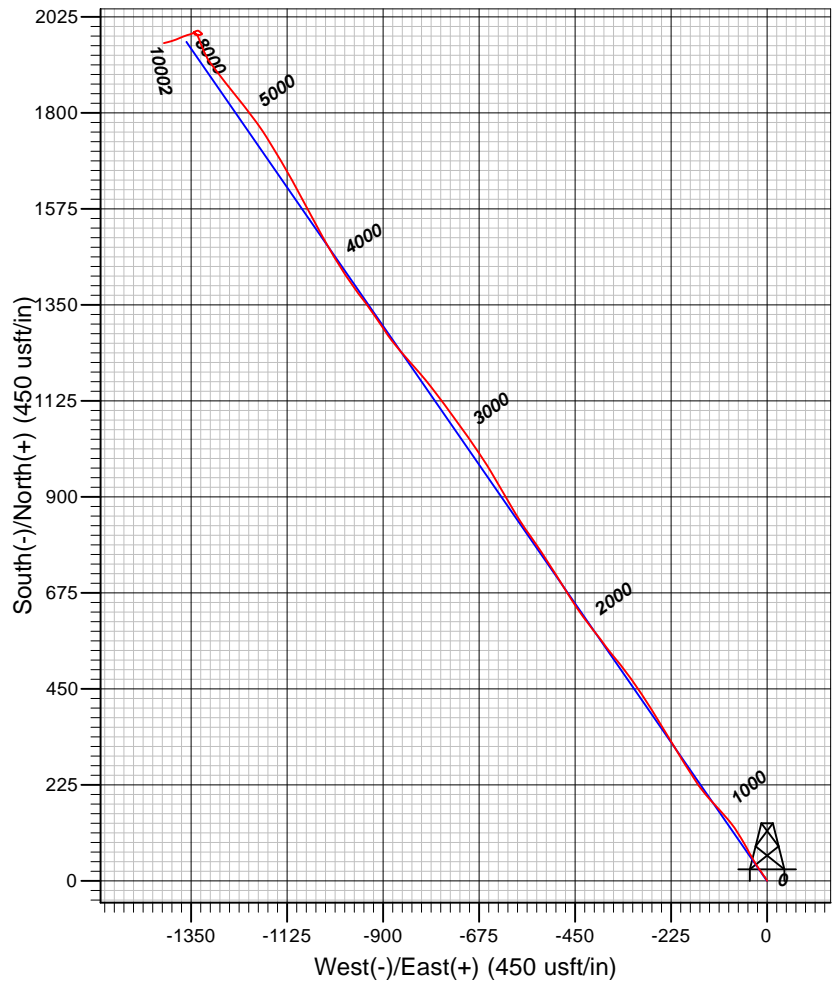
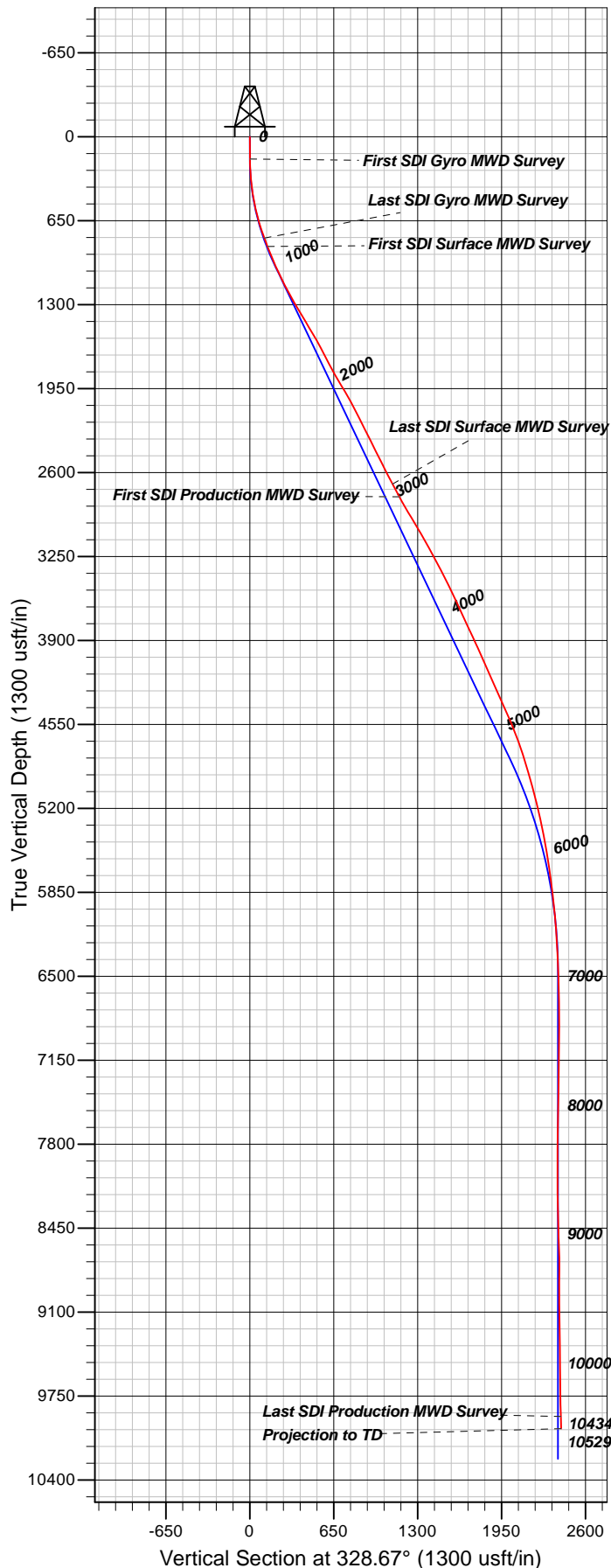
Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,571.00	23.13	331.96	4,130.86	1,519.48	-1,047.00	1,842.33	1.43	-1.40	0.66
4,666.00	24.89	331.69	4,217.64	1,553.55	-1,065.25	1,880.92	1.86	1.85	-0.28
4,761.00	24.97	332.05	4,303.79	1,588.87	-1,084.13	1,920.90	0.18	0.08	0.38
4,856.00	24.80	330.90	4,389.97	1,623.99	-1,103.22	1,960.83	0.54	-0.18	-1.21
4,951.00	22.60	330.20	4,476.95	1,657.24	-1,121.98	1,998.99	2.33	-2.32	-0.74
5,046.00	22.16	329.85	4,564.80	1,688.58	-1,140.05	2,035.15	0.48	-0.46	-0.37
5,141.00	19.61	328.53	4,653.55	1,717.67	-1,157.38	2,069.01	2.73	-2.68	-1.39
5,235.00	19.52	327.92	4,742.12	1,744.43	-1,173.95	2,100.49	0.24	-0.10	-0.65
5,330.00	16.62	324.14	4,832.43	1,768.90	-1,190.34	2,129.91	3.29	-3.05	-3.98
5,424.00	16.53	322.64	4,922.52	1,790.42	-1,206.33	2,156.61	0.47	-0.10	-1.60
5,519.00	15.12	324.14	5,013.92	1,811.20	-1,221.79	2,182.40	1.55	-1.48	1.58
5,613.00	15.12	320.44	5,104.67	1,830.59	-1,236.78	2,206.75	1.03	0.00	-3.94
5,708.00	13.98	319.83	5,196.62	1,848.91	-1,252.08	2,230.36	1.21	-1.20	-0.64
5,802.00	12.75	322.50	5,288.07	1,865.82	-1,265.72	2,251.89	1.46	-1.31	2.84
5,897.00	11.52	322.82	5,380.95	1,881.70	-1,277.83	2,271.75	1.30	-1.29	0.34
5,991.00	9.76	320.88	5,473.33	1,895.36	-1,288.53	2,288.98	1.91	-1.87	-2.06
6,086.00	8.53	324.58	5,567.12	1,907.35	-1,297.70	2,303.99	1.43	-1.29	3.89
6,180.00	8.62	324.05	5,660.07	1,918.73	-1,305.87	2,317.96	0.13	0.10	-0.56
6,275.00	8.00	332.49	5,754.08	1,930.36	-1,313.10	2,331.66	1.44	-0.65	8.88
6,369.00	6.33	335.47	5,847.34	1,940.87	-1,318.28	2,343.33	1.82	-1.78	3.17
6,464.00	6.51	338.55	5,941.74	1,950.65	-1,322.42	2,353.84	0.41	0.19	3.24
6,558.00	5.40	335.03	6,035.23	1,959.62	-1,326.24	2,363.48	1.24	-1.18	-3.74
6,652.00	4.13	341.27	6,128.91	1,966.84	-1,329.19	2,371.18	1.46	-1.35	6.64
6,747.00	3.34	340.31	6,223.71	1,972.68	-1,331.22	2,377.23	0.83	-0.83	-1.01
6,842.00	3.43	336.18	6,318.54	1,977.89	-1,333.30	2,382.76	0.27	0.09	-4.35
6,936.00	2.02	325.10	6,412.43	1,981.82	-1,335.39	2,387.20	1.59	-1.50	-11.79
6,987.69	1.77	319.65	6,464.09	1,983.17	-1,336.42	2,388.90	0.60	-0.48	-10.55
TR 21-23-597 MVRD									
7,030.00	1.58	313.94	6,506.39	1,984.08	-1,337.27	2,390.11	0.60	-0.45	-13.49
7,125.00	1.93	298.91	6,601.34	1,985.76	-1,339.61	2,392.76	0.61	0.37	-15.82
7,219.00	0.88	297.59	6,695.31	1,986.86	-1,341.64	2,394.76	1.12	-1.12	-1.40
7,314.00	0.79	330.99	6,790.30	1,987.77	-1,342.60	2,396.03	0.51	-0.09	35.16
7,408.00	0.97	331.78	6,884.29	1,989.04	-1,343.29	2,397.48	0.19	0.19	0.84
7,503.00	0.44	121.11	6,979.29	1,989.56	-1,343.36	2,397.96	1.44	-0.56	157.19
7,598.00	1.06	155.39	7,074.28	1,988.57	-1,342.68	2,396.76	0.78	0.65	36.08
7,692.00	1.32	182.28	7,168.26	1,986.70	-1,342.36	2,394.99	0.65	0.28	28.61
7,787.00	1.58	154.95	7,263.23	1,984.42	-1,341.85	2,392.78	0.77	0.27	-28.77
7,881.00	1.76	94.30	7,357.20	1,983.13	-1,339.86	2,390.65	1.80	0.19	-64.52
7,976.00	2.20	87.89	7,452.14	1,983.09	-1,336.59	2,388.91	0.52	0.46	-6.75
8,070.00	1.93	92.37	7,546.08	1,983.09	-1,333.20	2,387.15	0.33	-0.29	4.77
8,165.00	1.41	103.00	7,641.04	1,982.76	-1,330.46	2,385.45	0.63	-0.55	11.19
8,259.00	0.97	80.94	7,735.02	1,982.63	-1,328.55	2,384.34	0.67	-0.47	-23.47
8,354.00	1.06	65.30	7,830.00	1,983.12	-1,326.96	2,383.93	0.31	0.09	-16.46

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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)	
8,448.00	1.04	59.18	7,923.99	1,983.92	-1,325.44	2,383.82	0.12	-0.02	-6.51	
8,543.00	0.53	55.72	8,018.98	1,984.61	-1,324.33	2,383.84	0.54	-0.54	-3.64	
8,638.00	0.26	21.09	8,113.98	1,985.06	-1,323.89	2,383.99	0.37	-0.28	-36.45	
8,732.00	0.47	287.97	8,207.98	1,985.38	-1,324.18	2,384.42	0.58	0.22	-99.06	
8,827.00	1.32	307.35	8,302.96	1,986.16	-1,325.42	2,385.73	0.94	0.89	20.40	
8,921.00	1.93	316.58	8,396.93	1,987.97	-1,327.37	2,388.29	0.70	0.65	9.82	
9,016.00	2.46	313.76	8,491.86	1,990.54	-1,329.94	2,391.82	0.57	0.56	-2.97	
9,110.00	2.73	285.64	8,585.76	1,992.54	-1,333.56	2,395.41	1.37	0.29	-29.91	
9,205.00	2.37	243.28	8,680.68	1,992.27	-1,337.49	2,397.22	1.97	-0.38	-44.59	
9,299.00	2.46	233.43	8,774.59	1,990.19	-1,340.85	2,397.19	0.45	0.10	-10.48	
9,394.00	2.73	235.19	8,869.50	1,987.68	-1,344.34	2,396.87	0.30	0.28	1.85	
9,489.00	2.90	246.45	8,964.38	1,985.43	-1,348.40	2,397.06	0.61	0.18	11.85	
9,583.00	3.34	253.30	9,058.24	1,983.70	-1,353.20	2,398.07	0.61	0.47	7.29	
9,678.00	2.56	254.15	9,153.12	1,982.32	-1,357.90	2,399.34	0.82	-0.82	0.89	
9,772.00	2.64	251.01	9,247.02	1,981.04	-1,361.96	2,400.36	0.17	0.09	-3.34	
9,867.00	3.16	252.33	9,341.90	1,979.54	-1,366.53	2,401.44	0.55	0.55	1.39	
9,961.00	3.89	247.61	9,435.72	1,977.54	-1,371.94	2,402.55	0.84	0.78	-5.02	
10,056.00	3.61	244.24	9,530.52	1,975.01	-1,377.62	2,403.34	0.37	-0.29	-3.55	
10,151.00	3.66	246.83	9,625.32	1,972.52	-1,383.10	2,404.06	0.18	0.05	2.73	
10,245.00	4.26	249.08	9,719.10	1,970.09	-1,389.12	2,405.12	0.66	0.64	2.39	
10,340.00	4.83	252.33	9,813.80	1,967.61	-1,396.22	2,406.70	0.66	0.60	3.42	
10,434.00	5.54	257.34	9,907.42	1,965.42	-1,404.42	2,409.09	0.90	0.76	5.33	
Last SDI Production MWD Survey										
10,529.00	5.54	257.34	10,001.97	1,963.41	-1,413.37	2,412.03	0.00	0.00	0.00	
Projection to TD - TR 21-23-597 PBHL										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
172.00	171.99	1.31	-0.63	First SDI Gyro MWD Survey	
798.00	784.55	96.86	-58.96	Last SDI Gyro MWD Survey	
867.00	849.00	117.70	-72.10	First SDI Surface MWD Survey	
2,948.00	2,688.18	915.34	-621.34	Last SDI Surface MWD Survey	
3,061.00	2,787.66	961.48	-648.60	First SDI Production MWD Survey	
10,434.00	9,907.42	1,965.42	-1,404.42	Last SDI Production MWD Survey	
10,529.00	10,001.97	1,963.41	-1,413.37	Projection to TD	

Checked By: _____ Approved By: _____ Date: _____



Well Details: TR 21-23-597

+N/-S	+E/-W	North	East	Latitude	Longitude	Slot
0.00	0.00	1654899.30	2227631.60	39.5994961	-108.2413009	TR 21-23-597

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well TR 21-23-597 - Slot B11 (TR 21-23-597), True North
 Vertical (TVD) Reference: GL 8545.20' & RKB24' @ 8569.20usft (H&P 318)
 Section (VS) Reference: Slot - B11 (TR 21-23-597)(0.00N, 0.00E)
 Measured Depth Reference: GL 8545.20' & RKB24' @ 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

16:06, July 05 2017
 Created By: Mel Mireles Jr.