



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 512-24-597
County & State	Garfield County, CO
SDI Job No.	OP.001438 & OP.002690
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 128 feet to a measured depth of 10,392 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

21-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 512-24-597 - Slot A11 (TR 512-23-597)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
Site:	TR 32-23-597 Pad	MD Reference:	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
Well:	TR 512-24-597	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 512-24-597 - Slot A11 (TR 512-23-597)					
Well Position	+N/-S	0.00 usft	Northing:	1,654,893.10 usft	Latitude:	39.5994798
	+E/-W	0.00 usft	Easting:	2,227,639.40 usft	Longitude:	-108.2413676
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	5/23/2017	9.77	65.93	51,608

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	77.87	

Survey Program	Date	7/21/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
128.00	621.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
690.00	2,949.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
3,063.00	10,392.00	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	
128.00	0.88	95.63	127.99	-0.10	0.98	0.94	0.69	0.69	0.00	
First SDI Gyro MWD Survey										
263.00	3.17	84.38	262.90	0.17	5.73	5.63	1.71	1.70	-8.33	
352.00	5.10	85.52	351.67	0.72	12.12	12.00	2.17	2.17	1.28	
442.00	7.30	81.04	441.13	1.92	21.76	21.67	2.50	2.44	-4.98	
532.00	9.77	79.28	530.13	4.23	34.91	35.02	2.76	2.74	-1.96	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well TR 512-24-597 - Slot A11 (TR 512-23-597)
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Site:	TR 32-23-597 Pad	MD Reference:	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
Well:	TR 512-24-597	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)
621.00	12.14	78.93	617.50	7.43	51.52	51.93	2.66	2.66	-0.39
Last SDI Gyro MWD Survey									
690.00	14.42	77.38	684.65	10.70	67.02	67.77	3.34	3.30	-2.25
First SDI Surface MWD Survey									
779.00	15.74	80.31	770.59	15.16	89.74	90.92	1.71	1.48	3.29
868.00	17.29	78.38	855.91	19.85	114.59	116.21	1.85	1.74	-2.17
958.00	17.46	76.07	941.81	25.80	140.80	143.07	0.79	0.19	-2.57
1,053.00	18.65	71.69	1,032.13	34.00	169.05	172.42	1.90	1.25	-4.61
1,148.00	18.13	71.77	1,122.28	43.40	197.51	202.22	0.55	-0.55	0.08
1,243.00	16.09	75.95	1,213.08	51.22	224.33	230.08	2.51	-2.15	4.40
1,337.00	14.07	74.37	1,303.83	57.46	247.97	254.51	2.19	-2.15	-1.68
1,432.00	13.28	76.74	1,396.14	63.07	269.71	276.94	1.02	-0.83	2.49
1,527.00	15.97	81.48	1,488.06	67.51	293.26	300.90	3.10	2.83	4.99
1,621.00	16.97	78.24	1,578.20	72.23	319.48	327.52	1.44	1.06	-3.45
1,716.00	16.80	74.02	1,669.11	78.83	346.25	355.09	1.30	-0.18	-4.44
1,811.00	17.41	75.16	1,759.91	86.25	373.19	382.98	0.73	0.64	1.20
1,906.00	18.11	79.38	1,850.38	92.61	401.44	411.94	1.54	0.74	4.44
2,000.00	18.20	81.51	1,939.71	97.47	430.32	441.20	0.71	0.10	2.27
2,095.00	17.84	82.20	2,030.05	101.64	459.41	470.51	0.44	-0.38	0.73
2,190.00	16.18	80.72	2,120.89	105.75	486.89	498.24	1.81	-1.75	-1.56
2,285.00	16.36	79.03	2,212.08	110.43	513.09	524.84	0.53	0.19	-1.78
2,380.00	16.88	77.80	2,303.11	115.89	539.71	552.01	0.66	0.55	-1.29
2,475.00	17.94	78.15	2,393.76	121.81	567.51	580.43	1.12	1.12	0.37
2,569.00	17.06	78.32	2,483.41	127.57	595.18	608.70	0.94	-0.94	0.18
2,664.00	17.65	77.92	2,574.08	133.41	622.91	637.04	0.63	0.62	-0.42
2,759.00	18.38	77.71	2,664.43	139.61	651.63	666.42	0.77	0.77	-0.22
2,854.00	21.02	77.09	2,753.86	146.61	682.88	698.44	2.79	2.78	-0.65
2,949.00	21.66	77.97	2,842.34	154.07	716.63	733.01	0.75	0.67	0.93
Last SDI Surface MWD Survey									
3,063.00	21.07	78.39	2,948.51	162.58	757.28	774.54	0.53	-0.52	0.37
First SDI Production MWD Survey									
3,158.00	20.21	79.50	3,037.41	169.00	790.14	808.01	0.99	-0.91	1.17
3,252.00	18.24	79.25	3,126.16	174.71	820.56	838.95	2.10	-2.10	-0.27
3,346.00	18.19	74.83	3,215.46	181.29	849.18	868.31	1.47	-0.05	-4.70
3,441.00	19.11	72.61	3,305.47	189.82	878.33	898.61	1.22	0.97	-2.34
3,535.00	19.41	76.77	3,394.21	197.99	908.22	929.55	1.49	0.32	4.43
3,629.00	19.61	78.57	3,482.82	204.69	938.89	960.94	0.67	0.21	1.91
3,724.00	18.64	78.13	3,572.57	210.98	969.37	992.06	1.03	-1.02	-0.46
3,818.00	20.40	78.83	3,661.17	217.24	1,000.15	1,023.47	1.89	1.87	0.74
3,912.00	19.61	79.09	3,749.49	223.40	1,031.71	1,055.62	0.85	-0.84	0.28
4,006.00	18.55	78.30	3,838.33	229.42	1,061.84	1,086.34	1.16	-1.13	-0.84
4,101.00	19.24	80.77	3,928.21	234.99	1,092.09	1,117.08	1.11	0.73	2.60
4,195.00	17.23	79.30	4,017.49	240.06	1,121.06	1,146.47	2.19	-2.14	-1.56

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Site:	TR 32-23-597 Pad	MD Reference:	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
Well:	TR 512-24-597	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)
4,290.00	18.87	80.88	4,107.81	245.11	1,150.05	1,175.88	1.80	1.73	1.66
4,385.00	19.43	82.35	4,197.55	249.65	1,180.88	1,206.98	0.78	0.59	1.55
4,479.00	18.79	80.92	4,286.37	254.12	1,211.33	1,237.68	0.84	-0.68	-1.52
4,574.00	16.97	79.97	4,376.78	258.95	1,240.09	1,266.82	1.94	-1.92	-1.00
4,668.00	18.47	77.60	4,466.32	264.53	1,268.14	1,295.42	1.77	1.60	-2.52
4,762.00	17.23	79.01	4,555.79	270.39	1,296.35	1,324.23	1.40	-1.32	1.50
4,857.00	15.56	79.09	4,646.93	275.48	1,322.68	1,351.03	1.76	-1.76	0.08
4,952.00	14.86	76.54	4,738.60	280.73	1,347.04	1,375.95	1.02	-0.74	-2.68
5,047.00	13.54	74.26	4,830.69	286.58	1,369.59	1,399.23	1.51	-1.39	-2.40
5,142.00	12.75	73.29	4,923.20	292.61	1,390.34	1,420.78	0.86	-0.83	-1.02
5,237.00	10.99	74.79	5,016.17	298.00	1,409.12	1,440.27	1.88	-1.85	1.58
5,332.00	9.85	74.96	5,109.60	302.49	1,425.70	1,457.43	1.20	-1.20	0.18
5,427.00	8.79	74.79	5,203.35	306.50	1,440.55	1,472.80	1.12	-1.12	-0.18
5,521.00	9.06	74.61	5,296.21	310.35	1,454.62	1,487.36	0.29	0.29	-0.19
5,615.00	8.44	72.94	5,389.11	314.34	1,468.35	1,501.62	0.71	-0.66	-1.78
5,710.00	7.47	74.79	5,483.20	318.00	1,480.97	1,514.73	1.06	-1.02	1.95
5,804.00	7.91	84.11	5,576.36	320.27	1,493.31	1,527.26	1.41	0.47	9.91
5,899.00	7.47	84.10	5,670.50	321.57	1,505.95	1,539.90	0.46	-0.46	-0.01
5,994.00	6.51	84.45	5,764.79	322.73	1,517.45	1,551.39	1.01	-1.01	0.37
6,088.00	5.72	82.17	5,858.26	323.88	1,527.40	1,561.35	0.88	-0.84	-2.43
6,183.00	4.92	63.80	5,952.86	326.33	1,535.74	1,570.03	1.97	-0.84	-19.34
6,277.00	4.57	65.73	6,046.53	329.65	1,542.77	1,577.60	0.41	-0.37	2.05
6,372.00	4.03	62.06	6,141.27	332.77	1,549.17	1,584.51	0.64	-0.57	-3.86
6,466.00	3.78	65.99	6,235.05	335.57	1,554.92	1,590.72	0.39	-0.27	4.18
6,561.00	3.25	67.14	6,329.87	337.89	1,560.26	1,596.43	0.56	-0.56	1.21
6,655.00	2.76	58.48	6,423.74	340.11	1,564.65	1,601.18	0.71	-0.52	-9.21
6,749.00	2.90	59.05	6,517.63	342.52	1,568.62	1,605.57	0.15	0.15	0.61
6,793.99	2.81	54.98	6,562.55	343.74	1,570.50	1,607.66	0.49	-0.20	-9.04
TR 512-24-597 MVRD									
6,844.00	2.73	50.18	6,612.51	345.20	1,572.42	1,609.85	0.49	-0.16	-9.60
6,938.00	1.94	60.31	6,706.43	347.42	1,575.52	1,613.35	0.95	-0.84	10.78
7,033.00	1.91	43.39	6,801.38	349.37	1,578.00	1,616.19	0.60	-0.03	-17.81
7,127.00	1.41	38.93	6,895.34	351.41	1,579.81	1,618.38	0.55	-0.53	-4.74
7,222.00	1.38	21.28	6,990.31	353.39	1,580.95	1,619.92	0.45	-0.03	-18.58
7,316.00	1.93	32.34	7,084.27	355.78	1,582.21	1,621.65	0.67	0.59	11.77
7,411.00	1.59	37.70	7,179.23	358.17	1,583.87	1,623.78	0.40	-0.36	5.64
7,505.00	1.07	43.49	7,273.20	359.84	1,585.28	1,625.50	0.57	-0.55	6.16
7,600.00	0.70	36.29	7,368.19	360.95	1,586.23	1,626.66	0.41	-0.39	-7.58
7,694.00	0.53	5.27	7,462.19	361.85	1,586.61	1,627.22	0.39	-0.18	-33.00
7,789.00	0.79	340.74	7,557.18	362.90	1,586.43	1,627.27	0.40	0.27	-25.82
7,883.00	1.67	46.75	7,651.16	364.45	1,587.22	1,628.36	1.63	0.94	70.22
7,978.00	0.97	19.06	7,746.14	366.16	1,588.49	1,629.97	0.98	-0.74	-29.15

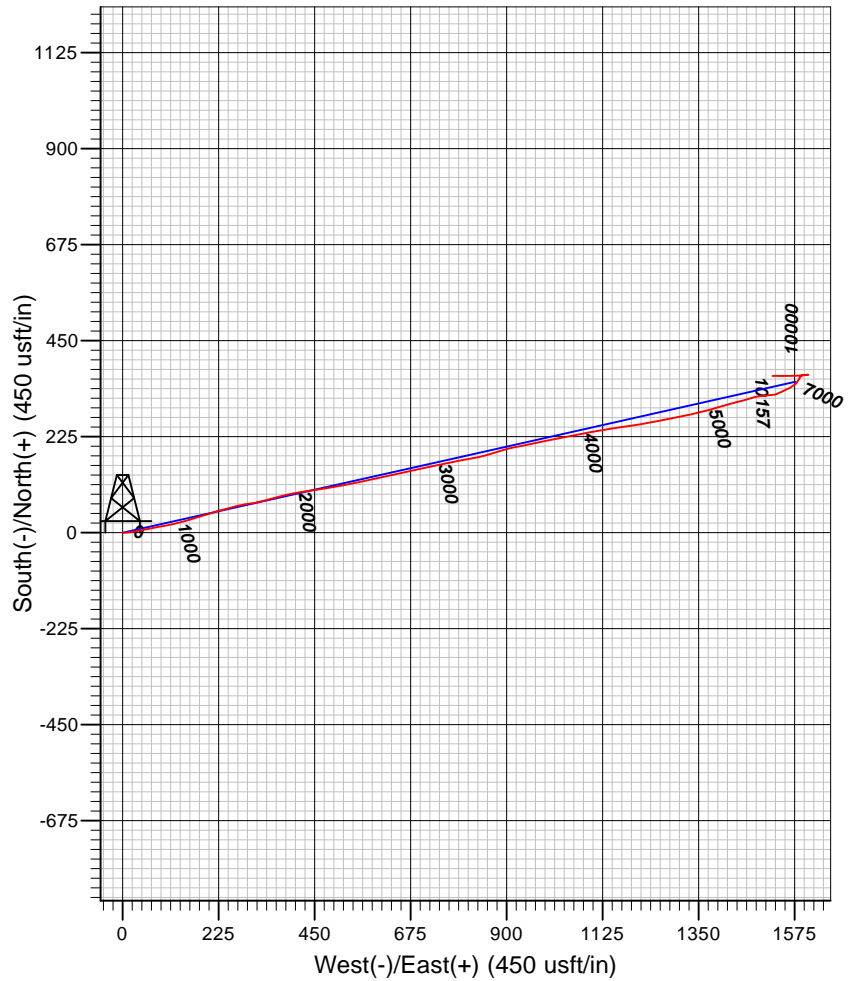
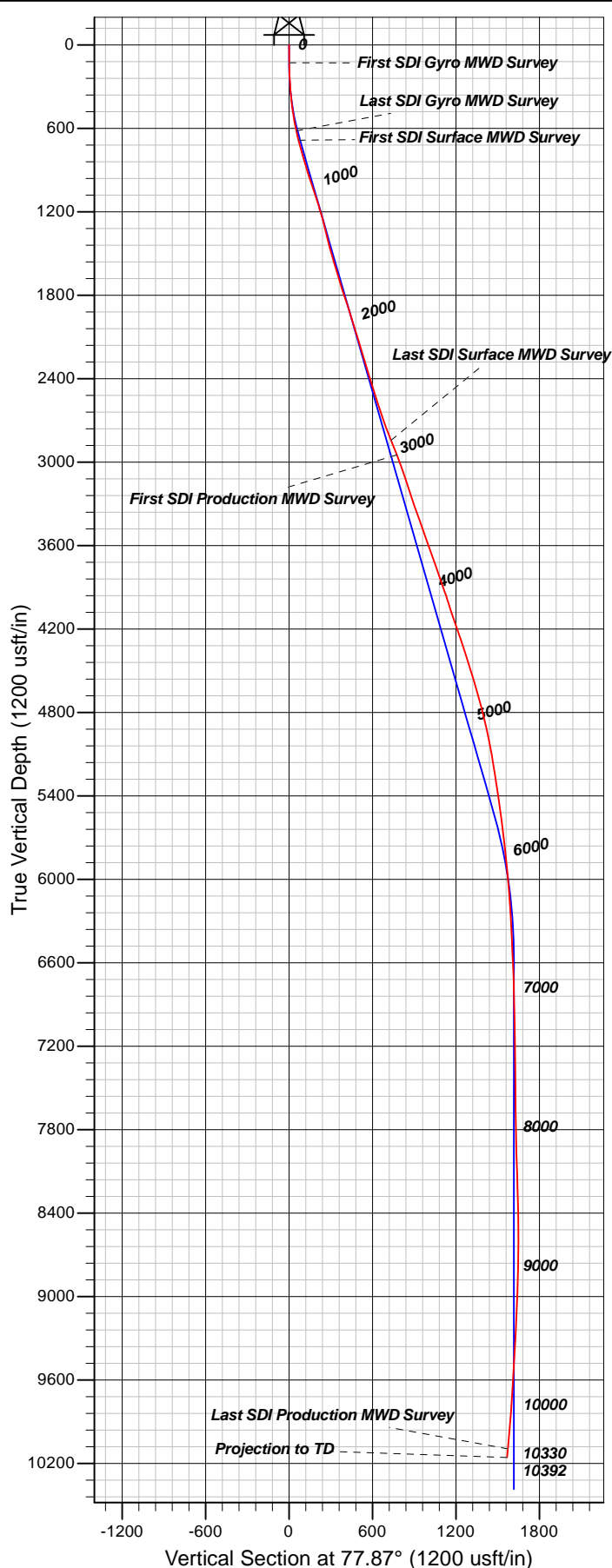
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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

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)	
8,072.00	1.85	56.51	7,840.11	367.75	1,590.01	1,631.79	1.31	0.94	39.84	
8,167.00	0.79	55.45	7,935.08	368.97	1,591.83	1,633.83	1.12	-1.12	-1.12	
8,261.00	2.46	88.32	8,029.04	369.40	1,594.38	1,636.41	1.96	1.78	34.97	
8,356.00	1.76	83.84	8,123.98	369.61	1,597.87	1,639.86	0.76	-0.74	-4.72	
8,450.00	1.93	87.62	8,217.93	369.83	1,600.89	1,642.86	0.22	0.18	4.02	
8,545.00	1.06	83.66	8,312.90	370.00	1,603.36	1,645.31	0.92	-0.92	-4.17	
8,639.00	1.32	84.98	8,406.88	370.19	1,605.30	1,647.25	0.28	0.28	1.40	
8,734.00	0.62	100.98	8,501.86	370.18	1,606.90	1,648.81	0.78	-0.74	16.84	
8,829.00	0.14	317.38	8,596.86	370.17	1,607.32	1,649.22	0.78	-0.51	-151.16	
8,923.00	0.79	278.43	8,690.86	370.35	1,606.60	1,648.56	0.73	0.69	-41.44	
9,018.00	1.41	269.11	8,785.84	370.43	1,604.79	1,646.80	0.68	0.65	-9.81	
9,112.00	1.58	256.98	8,879.81	370.12	1,602.37	1,644.37	0.38	0.18	-12.90	
9,207.00	1.93	265.69	8,974.76	369.70	1,599.50	1,641.47	0.46	0.37	9.17	
9,301.00	2.40	268.74	9,068.69	369.54	1,595.95	1,637.97	0.51	0.50	3.24	
9,396.00	2.81	264.28	9,163.60	369.27	1,591.65	1,633.71	0.48	0.43	-4.69	
9,491.00	3.08	262.08	9,258.47	368.68	1,586.80	1,628.85	0.31	0.28	-2.32	
9,585.00	3.43	262.61	9,352.32	367.97	1,581.51	1,623.52	0.37	0.37	0.56	
9,680.00	2.81	270.43	9,447.18	367.62	1,576.36	1,618.42	0.79	-0.65	8.23	
9,774.00	3.08	273.16	9,541.05	367.78	1,571.54	1,613.73	0.32	0.29	2.90	
9,869.00	3.22	269.50	9,635.91	367.90	1,566.32	1,608.66	0.26	0.15	-3.85	
9,964.00	3.62	265.66	9,730.74	367.65	1,560.66	1,603.08	0.48	0.42	-4.04	
10,058.00	4.68	270.16	9,824.49	367.43	1,553.87	1,596.39	1.18	1.13	4.79	
10,153.00	4.86	273.21	9,919.16	367.67	1,545.98	1,588.72	0.33	0.19	3.21	
10,247.00	5.60	270.23	10,012.77	367.91	1,537.41	1,580.40	0.84	0.79	-3.17	
10,330.00	5.54	267.36	10,095.38	367.74	1,529.36	1,572.49	0.34	-0.07	-3.46	
Last SDI Production MWD Survey										
10,392.00	5.54	267.36	10,157.09	367.47	1,523.38	1,566.59	0.00	0.00	0.00	
Projection to TD - TR 512-24-597 PBHL										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
128.00	127.99	-0.10	0.98	First SDI Gyro MWD Survey	
621.00	617.50	7.43	51.52	Last SDI Gyro MWD Survey	
690.00	684.65	10.70	67.02	First SDI Surface MWD Survey	
2,949.00	2,842.34	154.07	716.63	Last SDI Surface MWD Survey	
3,063.00	2,948.51	162.58	757.28	First SDI Production MWD Survey	
10,330.00	10,095.38	367.74	1,529.36	Last SDI Production MWD Survey	
10,392.00	10,157.09	367.47	1,523.38	Projection to TD	

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Project:	Garfield County, CO NAD83	TVD Reference:	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
Site:	TR 32-23-597 Pad	MD Reference:	GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
Well:	TR 512-24-597	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

Checked By: _____	Approved By: _____	Date: _____
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Well Details: TR 512-24-597

TVD Reference: GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318) Level: 8545.20					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	1654893.10	2227639.40	39.5994798	-108.2413676

Slot: TR 512-23-597

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well TR 512-24-597 - Slot A11 (TR 512-23-597), True North
 Vertical (TVD) Reference: GL 8545.20' & RKB 24' @ 8569.20usft (H&P 318)
 Section (VS) Reference: Slot - A11 (TR 512-23-597)(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

16:28, July 21 2017
 Created By: Mel Mireles Jr.