



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.	GM 311-10
County & State	Garfield County, CO
SDI Job No.	Op.002873
Rig	H&P 273

I, Mel Mireles Jr., having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 75 feet to a measured depth of 7,417 feet is true and correct as determined from all available records.


Signature

01-Aug-17
Date

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

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 311-10 - Slot B9
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 311-10	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		MV 5-10 Pad			
Site Position:		Northing:	1,600,344.70 usft	Latitude:	39.4529509
From:	Map	Easting:	2,266,881.70 usft	Longitude:	-108.0966291
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.64 °

Well		Federal GM 311-10 - Slot B9				
Well Position	+N/-S	0.00 usft	Northing:	1,600,354.20 usft	Latitude:	39.4529768
	+E/-W	0.00 usft	Easting:	2,266,878.60 usft	Longitude:	-108.0966411
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,148.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	7/18/2017	9.53	65.75	51,783

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	312.98	

Survey Program	Date	8/1/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
75.00	767.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4
840.00	948.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1
1,083.00	7,417.00	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
75.00	0.35	296.98	75.00	0.10	-0.20	0.22	0.47	0.47	0.00
First SDI Gyro MWD Survey									
123.00	1.23	319.39	122.99	0.56	-0.67	0.87	1.91	1.83	46.69
213.00	5.45	315.26	212.82	4.33	-4.31	6.11	4.69	4.69	-4.59
305.00	9.41	312.89	304.03	12.56	-12.90	18.00	4.32	4.30	-2.58
397.00	13.64	312.19	394.16	24.97	-26.45	36.37	4.60	4.60	-0.76
490.00	17.24	314.91	483.79	42.07	-44.34	61.12	3.95	3.87	2.92
582.00	21.11	314.65	570.67	63.34	-65.79	91.32	4.21	4.21	-0.28

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 311-10 - Slot B9
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 311-10	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)
675.00	24.46	312.89	656.40	88.22	-91.82	127.32	3.68	3.60	-1.89
767.00	27.10	309.81	739.24	114.61	-121.88	167.30	3.22	2.87	-3.35
Last SDI Gyro MWD Survey									
840.00	30.07	312.23	803.33	137.55	-148.20	202.20	4.37	4.07	3.32
First SDI Surface MWD Survey									
935.00	32.17	314.27	884.66	171.21	-183.94	251.29	2.47	2.21	2.15
948.00	32.45	313.72	895.65	176.03	-188.94	258.23	3.12	2.15	-4.23
Last SDI Surface MWD Survey									
1,083.00	32.26	311.74	1,009.69	225.05	-242.00	330.47	0.80	-0.14	-1.47
First SDI Production MWD Survey									
1,177.00	29.58	313.02	1,090.33	257.59	-277.69	378.76	2.94	-2.85	1.36
1,272.00	28.25	315.87	1,173.48	289.73	-310.49	424.67	2.02	-1.40	3.00
1,366.00	27.42	315.81	1,256.61	321.22	-341.06	468.51	0.88	-0.88	-0.06
1,461.00	28.27	318.47	1,340.61	353.74	-371.23	512.75	1.58	0.89	2.80
1,555.00	30.73	322.39	1,422.43	389.44	-400.65	558.61	3.33	2.62	4.17
1,650.00	31.24	322.77	1,503.87	428.28	-430.37	606.83	0.57	0.54	0.40
1,744.00	32.20	322.48	1,583.83	467.56	-460.37	655.56	1.03	1.02	-0.31
1,839.00	32.34	324.02	1,664.15	508.20	-490.72	705.46	0.88	0.15	1.62
1,934.00	32.88	321.86	1,744.18	549.04	-521.57	755.88	1.35	0.57	-2.27
2,028.00	32.95	318.10	1,823.10	588.14	-554.41	806.56	2.17	0.07	-4.00
2,123.00	32.01	313.79	1,903.25	624.80	-589.84	857.47	2.63	-0.99	-4.54
2,217.00	32.56	314.82	1,982.72	659.87	-625.77	907.66	0.83	0.59	1.10
2,311.00	32.57	312.07	2,061.94	694.66	-662.49	958.25	1.57	0.01	-2.93
2,406.00	31.44	311.26	2,142.50	728.13	-700.10	1,008.58	1.27	-1.19	-0.85
2,500.00	30.22	314.06	2,223.22	760.75	-735.53	1,056.74	2.00	-1.30	2.98
2,594.00	28.86	314.83	2,305.00	793.20	-768.62	1,103.07	1.50	-1.45	0.82
2,689.00	28.29	317.97	2,388.44	826.08	-799.96	1,148.41	1.69	-0.60	3.31
2,784.00	30.45	318.74	2,471.22	860.91	-830.91	1,194.80	2.31	2.27	0.81
2,878.00	31.38	317.82	2,551.87	896.95	-863.05	1,242.88	1.11	0.99	-0.98
2,972.00	29.41	313.04	2,632.95	930.84	-896.36	1,290.36	3.32	-2.10	-5.09
3,067.00	29.13	315.48	2,715.83	963.25	-929.62	1,336.79	1.29	-0.29	2.57
3,161.00	28.13	315.54	2,798.33	995.38	-961.18	1,381.78	1.06	-1.06	0.06
3,256.00	29.51	316.27	2,881.57	1,028.27	-993.05	1,427.52	1.50	1.45	0.77
3,350.00	31.84	318.20	2,962.41	1,063.49	-1,025.58	1,475.33	2.69	2.48	2.05
3,445.00	33.54	314.50	3,042.37	1,100.58	-1,061.01	1,526.53	2.76	1.79	-3.89
3,540.00	30.52	313.20	3,122.90	1,135.49	-1,097.32	1,576.90	3.26	-3.18	-1.37
3,634.00	31.66	317.67	3,203.40	1,170.07	-1,131.34	1,625.36	2.74	1.21	4.76
3,729.00	31.48	317.42	3,284.34	1,206.77	-1,164.91	1,674.94	0.23	-0.19	-0.26
3,823.00	30.77	316.13	3,364.81	1,242.18	-1,198.18	1,723.42	1.04	-0.76	-1.37
3,918.00	31.42	316.50	3,446.16	1,277.66	-1,232.07	1,772.40	0.71	0.68	0.39
4,012.00	30.79	316.31	3,526.65	1,312.83	-1,265.55	1,820.87	0.68	-0.67	-0.20
4,107.00	30.52	315.75	3,608.37	1,347.69	-1,299.18	1,869.24	0.41	-0.28	-0.59
4,202.00	27.89	314.75	3,691.29	1,380.62	-1,331.80	1,915.55	2.82	-2.77	-1.05
4,297.00	25.33	312.81	3,776.22	1,410.07	-1,362.49	1,958.09	2.85	-2.69	-2.04

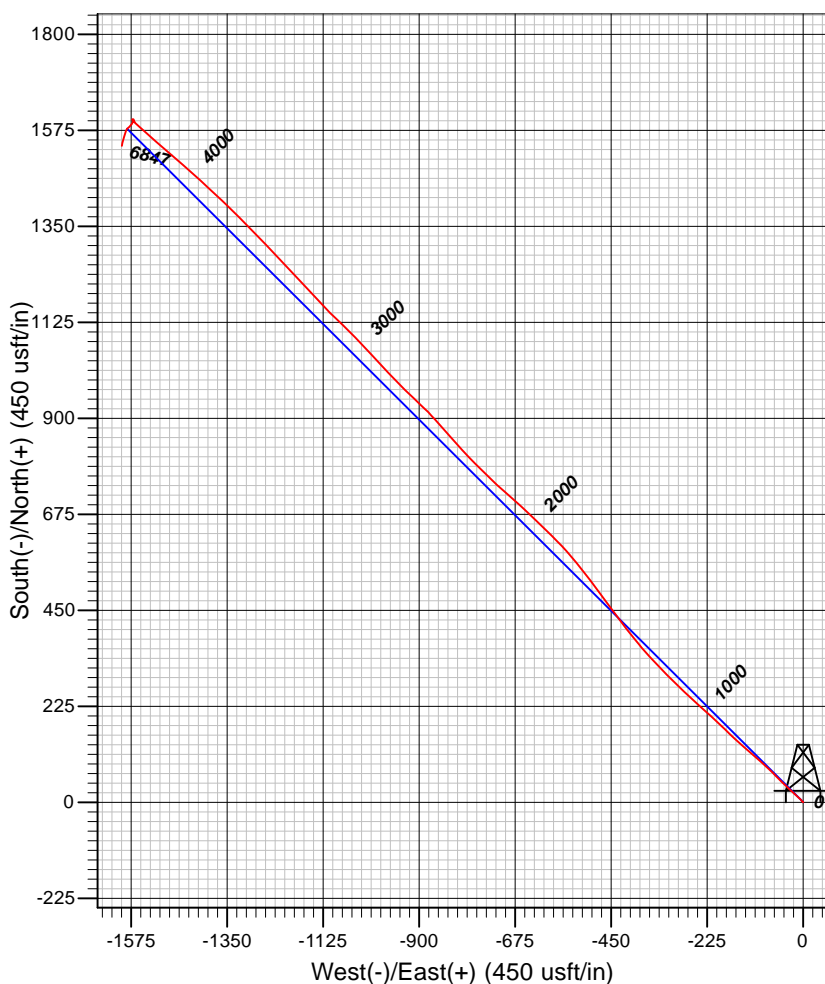
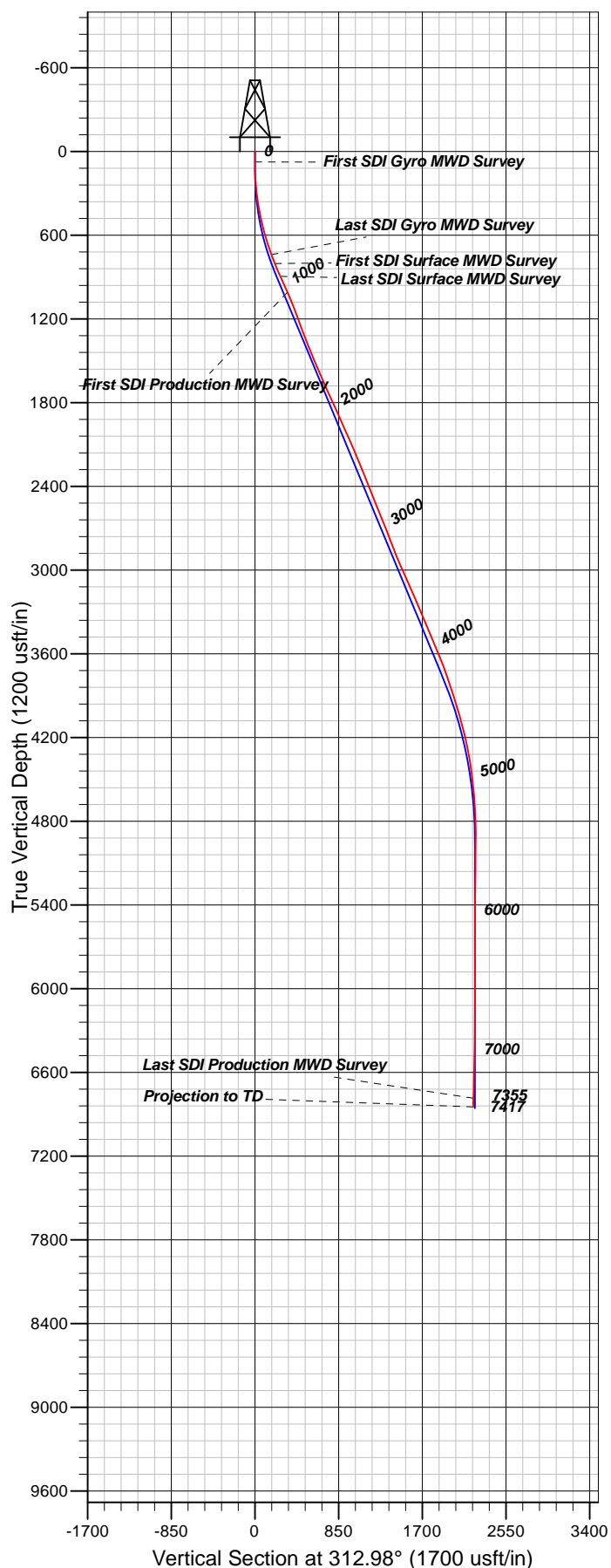
Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 311-10 - Slot B9
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 311-10	North Reference:	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)
4,391.00	25.28	312.94	3,861.20	1,437.41	-1,391.94	1,998.27	0.08	-0.05	0.14
4,486.00	23.65	312.07	3,947.67	1,464.00	-1,420.93	2,037.61	1.76	-1.72	-0.92
4,580.00	22.42	311.96	4,034.17	1,488.62	-1,448.26	2,074.38	1.31	-1.31	-0.12
4,675.00	20.84	311.08	4,122.48	1,511.84	-1,474.47	2,109.39	1.70	-1.66	-0.93
4,769.00	17.35	310.36	4,211.29	1,531.91	-1,497.76	2,140.11	3.72	-3.71	-0.77
4,864.00	14.71	310.97	4,302.59	1,548.99	-1,517.67	2,166.32	2.78	-2.78	0.64
4,958.00	12.14	310.49	4,394.01	1,563.24	-1,534.20	2,188.12	2.74	-2.73	-0.51
5,053.00	9.94	313.19	4,487.25	1,575.34	-1,547.77	2,206.31	2.38	-2.32	2.84
5,148.00	7.56	313.02	4,581.14	1,585.21	-1,558.32	2,220.76	2.51	-2.51	-0.18
5,243.00	5.89	313.54	4,675.48	1,592.84	-1,566.43	2,231.88	1.76	-1.76	0.55
5,337.00	2.71	313.46	4,769.20	1,597.69	-1,571.54	2,238.93	3.38	-3.38	-0.09
5,432.00	0.92	33.65	4,864.16	1,599.87	-1,572.74	2,241.30	2.85	-1.88	84.41
5,519.49	0.85	66.29	4,951.65	1,600.71	-1,571.76	2,241.15	0.57	-0.08	37.31
GM 311-10 KMV									
5,526.00	0.86	68.75	4,958.15	1,600.75	-1,571.67	2,241.11	0.57	0.10	37.80
5,621.00	0.68	108.33	5,053.14	1,600.83	-1,570.47	2,240.29	0.58	-0.19	41.66
5,715.00	0.96	132.10	5,147.13	1,600.13	-1,569.36	2,239.00	0.46	0.30	25.29
5,810.00	1.40	196.06	5,242.12	1,598.48	-1,569.09	2,237.68	1.37	0.46	67.33
5,905.00	1.58	153.98	5,337.09	1,596.19	-1,568.83	2,235.93	1.14	0.19	-44.29
6,000.00	0.58	58.78	5,432.08	1,595.26	-1,567.85	2,234.57	1.82	-1.05	-100.21
6,094.00	0.28	333.70	5,526.07	1,595.71	-1,567.54	2,234.66	0.66	-0.32	-90.51
6,189.00	0.94	261.81	5,621.07	1,595.81	-1,568.42	2,235.36	0.94	0.69	-75.67
6,283.00	2.02	239.36	5,715.04	1,594.86	-1,570.60	2,236.32	1.28	1.15	-23.88
6,378.00	1.47	193.83	5,810.00	1,592.82	-1,572.34	2,236.19	1.52	-0.58	-47.93
6,473.00	2.02	209.31	5,904.95	1,590.18	-1,573.45	2,235.21	0.76	0.58	16.29
6,567.00	2.46	225.57	5,998.88	1,587.32	-1,575.70	2,234.91	0.82	0.47	17.30
6,662.00	3.69	222.31	6,093.74	1,583.63	-1,579.21	2,234.96	1.31	1.29	-3.43
6,756.00	4.47	228.04	6,187.50	1,578.95	-1,583.97	2,235.25	0.94	0.83	6.10
6,851.00	2.93	197.55	6,282.31	1,574.15	-1,587.46	2,234.53	2.58	-1.62	-32.09
6,946.00	3.17	197.09	6,377.18	1,569.33	-1,588.96	2,232.35	0.25	0.25	-0.48
7,040.00	3.14	192.32	6,471.04	1,564.33	-1,590.28	2,229.90	0.28	-0.03	-5.07
7,135.00	3.87	200.22	6,565.86	1,558.78	-1,591.94	2,227.33	0.92	0.77	8.32
7,230.00	4.33	193.31	6,660.61	1,552.28	-1,593.87	2,224.32	0.71	0.48	-7.27
7,324.00	4.44	195.35	6,754.34	1,545.32	-1,595.65	2,220.87	0.20	0.12	2.17
7,355.00	4.36	194.03	6,785.25	1,543.02	-1,596.26	2,219.75	0.42	-0.26	-4.26
Last SDI Production MWD Survey									
7,417.00	4.36	194.03	6,847.07	1,538.45	-1,597.40	2,217.46	0.00	0.00	0.00
Projection to TD - GM 311-10 PBHL									

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 311-10 - Slot B9
Project:	Garfield County, CO NAD83	TVD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Site:	MV 5-10 Pad	MD Reference:	GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
Well:	Federal GM 311-10	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
75.00	75.00	0.10	-0.20	First SDI Gyro MWD Survey
767.00	739.24	114.61	-121.88	Last SDI Gyro MWD Survey
840.00	803.33	137.55	-148.20	First SDI Surface MWD Survey
948.00	895.65	176.03	-188.94	Last SDI Surface MWD Survey
1,083.00	1,009.69	225.05	-242.00	First SDI Production MWD Survey
7,355.00	6,785.25	1,543.02	-1,596.26	Last SDI Production MWD Survey
7,417.00	6,847.07	1,538.45	-1,597.40	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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Well Details: Federal GM 311-10

TVD Reference: GL 6148' & RKB 24' @ 6172.00usft (H&P 318)		H&P 318 Level: 6148.00		Slot B9
+N/-S 0.00	+E/-W 0.00	Northing 1600354.20	Easting 2266878.60	
		Latitude 39.4529767	Longitude -108.0966410	

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Federal GM 311-10 - Slot B9, True North
 Vertical (TVD) Reference: GL 6148' & RKB 24' @ 6172.00usft (H&P 318)
 Section (VS) Reference: Slot - B9(0.00N, 0.00E)
 Measured Depth Reference: GL 6148' & RKB 24' @ 6172.00usft (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

13:58, August 01 2017
 Created By: Mel Mireles Jr.