



Directional Survey Certification

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

Operator	Terra Energy Partners
Well Name & No.	GM 422-9
County & State	Garfield, CO
SDI Job No.	420716DEFK372821
Rig	H&P 318

I, Janie Collins, having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 82 feet to a measured depth of 7,035 feet is true and correct as determined from all available records.

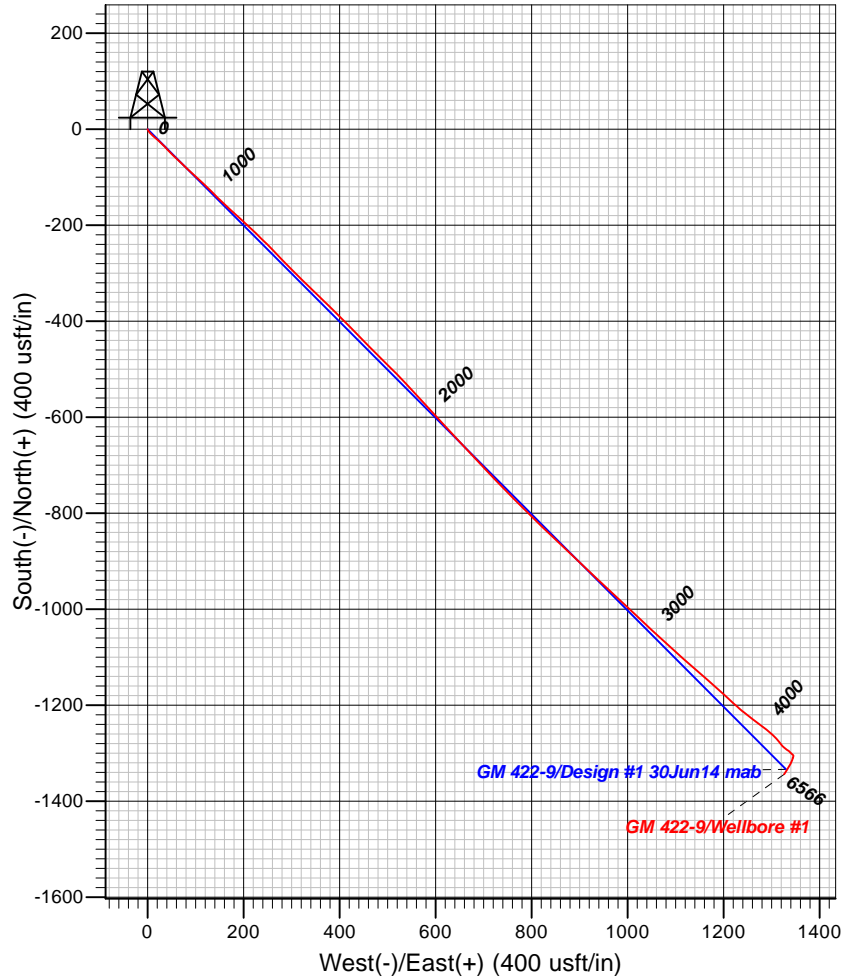
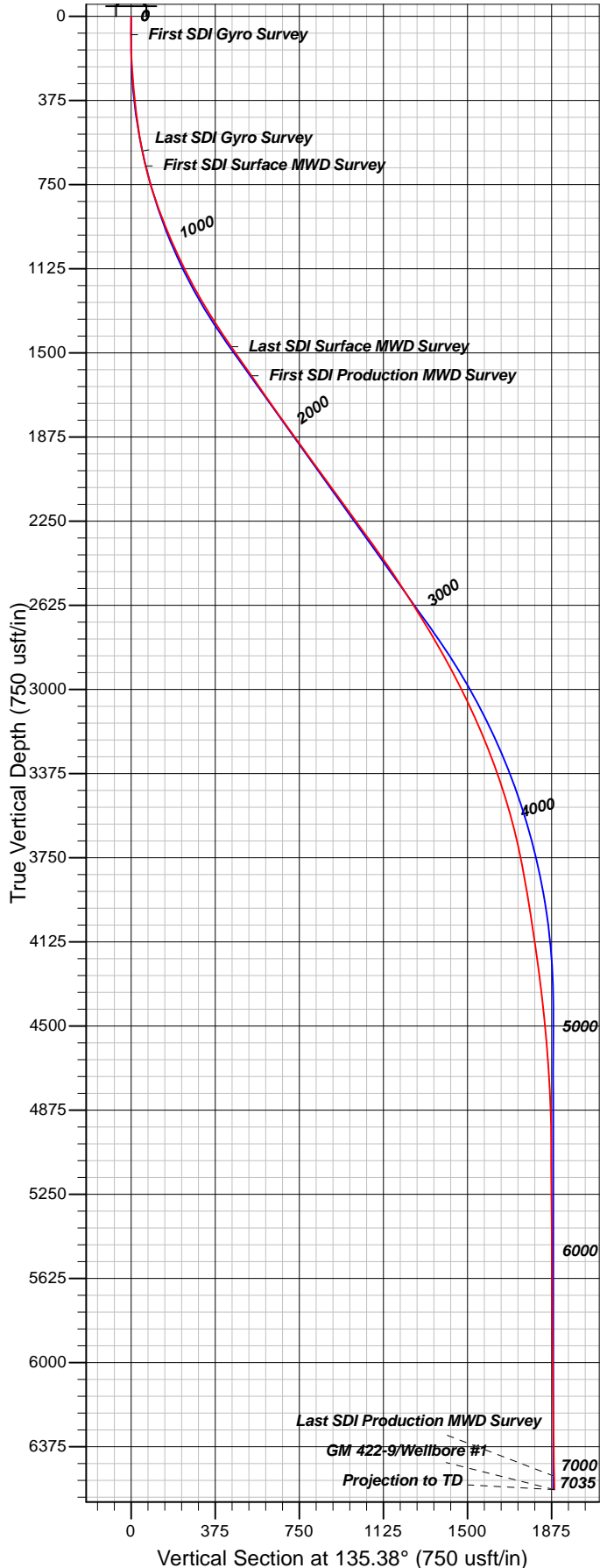


Signature

25-Jul-16

Date

Janie Collins
Colorado District Well Planner
Scientific Drilling International



Well Details: GM 422-9

TVD Reference: KB @ 6111.00usft (HP 318)		Ground Level: 6087.00		Slot
+N/-S	+E/-W	Northing	Easting	Latitude
0.00	0.00	1601974.88	2260343.70	39.4569094
				Longitude
				-108.1199397
				Slot
				A03

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 422-9 - Slot A03, True North
 Vertical (TVD) Reference: KB @ 6111.00usft (HP 318)
 Section (VS) Reference: Slot - A03(0.00N, 0.00E)
 Measured Depth Reference: KB @ 6111.00usft (HP 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: Wellbore #1

15:35, July 25 2016
 Created By: Janie Collins

Company:	Terra Energy Partners	Local Co-ordinate Reference:	Well GM 422-9 - Slot A03
Project:	Garfield County, CO NAD83	TVD Reference:	KB @ 6111.00usft (HP 318)
Site:	MV 16-9 Pad	MD Reference:	KB @ 6111.00usft (HP 318)
Well:	GM 422-9	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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 16-9 Pad			
Site Position:		Northing:	1,601,987.28 usft	Latitude:	39.4569441
From:	Map	Easting:	2,260,352.30 usft	Longitude:	-108.1199106
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.65 °

Well		GM 422-9 - Slot A03				
Well Position	+N/-S	0.00 usft	Northing:	1,601,974.88 usft	Latitude:	39.4569094
	+E/-W	0.00 usft	Easting:	2,260,343.70 usft	Longitude:	-108.1199397
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,087.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/16/2016	9.84	65.55	51,593

Design	Wellbore #1				
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	135.38	

Survey Program	Date	7/25/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
82.00	603.00	Survey #1 - Gyro Survey (Wellbore #1)	SDI MWD	SDI MWD - Standard ver 1.0.1	
672.00	1,568.00	Survey #2 - Surface MWD Survey (Wellbo	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,726.00	7,035.00	Survey #3 - Production MWD Survey (Wel	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	
82.00	0.18	290.65	82.00	0.05	-0.12	-0.12	0.22	0.22	0.00	
First SDI Gyro Survey										
148.00	1.41	163.56	147.99	-0.70	0.01	0.50	2.31	1.86	-192.56	
239.00	4.40	145.63	238.87	-4.65	2.30	4.93	3.39	3.29	-19.70	
330.00	5.72	132.71	329.51	-10.61	7.60	12.89	1.91	1.45	-14.20	
421.00	6.25	129.64	420.02	-16.85	14.75	22.35	0.68	0.58	-3.37	
511.00	8.53	132.89	509.26	-24.52	23.41	33.90	2.57	2.53	3.61	
603.00	11.70	136.41	599.82	-35.92	34.85	50.04	3.51	3.45	3.83	

Company:	Terra Energy Partners	Local Co-ordinate Reference:	Well GM 422-9 - Slot A03
Project:	Garfield County, CO NAD83	TVD Reference:	KB @ 6111.00usft (HP 318)
Site:	MV 16-9 Pad	MD Reference:	KB @ 6111.00usft (HP 318)
Well:	GM 422-9	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
Last SDI Gyro Survey									
672.00	13.48	135.04	667.16	-46.68	45.36	65.08	2.62	2.58	-1.99
First SDI Surface MWD Survey									
763.00	16.83	133.99	754.99	-63.34	62.33	88.86	3.69	3.68	-1.15
854.00	19.57	132.87	841.42	-82.86	82.98	117.27	3.04	3.01	-1.23
945.00	21.78	132.31	926.56	-104.60	106.64	149.35	2.44	2.43	-0.62
1,040.00	24.01	135.04	1,014.07	-130.14	133.34	186.29	2.60	2.35	2.87
1,134.00	26.04	133.72	1,099.24	-157.93	161.77	226.04	2.24	2.16	-1.40
1,228.00	27.61	131.40	1,183.13	-186.60	193.02	268.40	2.01	1.67	-2.47
1,323.00	30.06	134.13	1,266.35	-217.73	226.62	314.15	2.93	2.58	2.87
1,417.00	32.39	136.48	1,346.73	-252.39	260.86	362.87	2.80	2.48	2.50
1,511.00	34.12	134.93	1,425.33	-289.27	296.86	414.41	2.05	1.84	-1.65
1,568.00	35.26	134.30	1,472.20	-312.05	319.96	446.85	2.10	2.00	-1.11
Last SDI Surface MWD Survey									
1,726.00	34.36	134.06	1,601.92	-374.91	384.64	537.02	0.58	-0.57	-0.15
First SDI Production MWD Survey									
1,820.00	35.42	136.43	1,679.03	-413.09	422.48	590.78	1.83	1.13	2.52
1,914.00	35.38	134.99	1,755.65	-452.07	460.50	645.23	0.89	-0.04	-1.53
2,009.00	35.15	134.15	1,833.22	-490.56	499.57	700.07	0.57	-0.24	-0.88
2,103.00	35.88	137.31	1,909.74	-529.66	537.67	754.66	2.10	0.78	3.36
2,197.00	35.76	137.62	1,985.96	-570.20	574.86	809.64	0.23	-0.13	0.33
2,291.00	36.81	137.14	2,061.73	-611.13	612.53	865.23	1.16	1.12	-0.51
2,385.00	36.35	136.78	2,137.21	-652.07	650.76	921.23	0.54	-0.49	-0.38
2,480.00	35.41	137.14	2,214.19	-692.77	688.76	976.89	1.01	-0.99	0.38
2,575.00	36.44	135.51	2,291.12	-733.07	727.26	1,032.61	1.48	1.08	-1.72
2,669.00	35.53	135.66	2,367.18	-772.52	765.91	1,087.84	0.97	-0.97	0.16
2,764.00	34.45	134.70	2,445.01	-811.16	804.31	1,142.32	1.28	-1.14	-1.01
2,858.00	32.88	134.12	2,523.24	-847.63	841.52	1,194.41	1.70	-1.67	-0.62
2,953.00	32.88	132.91	2,603.02	-883.14	878.92	1,245.96	0.69	0.00	-1.27
3,047.00	31.39	133.25	2,682.62	-917.29	915.44	1,295.92	1.60	-1.59	0.36
3,141.00	30.50	132.50	2,763.24	-950.18	950.86	1,344.21	1.03	-0.95	-0.80
3,235.00	29.26	133.43	2,844.74	-982.09	985.13	1,390.99	1.41	-1.32	0.99
3,330.00	28.63	133.56	2,927.88	-1,013.73	1,018.49	1,436.94	0.67	-0.66	0.14
3,424.00	25.76	132.80	3,011.48	-1,043.14	1,049.80	1,479.87	3.08	-3.05	-0.81
3,519.00	24.18	131.93	3,097.59	-1,070.17	1,079.42	1,519.91	1.71	-1.66	-0.92
3,614.00	24.02	132.05	3,184.31	-1,096.12	1,108.26	1,558.64	0.18	-0.17	0.13
3,708.00	21.38	130.52	3,271.03	-1,120.07	1,135.49	1,594.81	2.88	-2.81	-1.63
3,803.00	20.10	131.59	3,359.87	-1,142.15	1,160.87	1,628.36	1.41	-1.35	1.13
3,898.00	17.61	132.50	3,449.76	-1,162.70	1,183.67	1,659.00	2.64	-2.62	0.96
3,993.00	15.45	132.25	3,540.83	-1,180.92	1,203.64	1,685.99	2.27	-2.27	-0.26
4,087.00	14.39	132.04	3,631.66	-1,197.16	1,221.58	1,710.16	1.13	-1.13	-0.22
4,181.00	12.29	129.34	3,723.12	-1,211.33	1,238.00	1,731.77	2.33	-2.23	-2.87
4,276.00	10.33	126.49	3,816.27	-1,222.80	1,252.66	1,750.24	2.14	-2.06	-3.00
4,371.00	9.74	128.48	3,909.82	-1,232.87	1,265.80	1,766.63	0.72	-0.62	2.09

Company:	Terra Energy Partners	Local Co-ordinate Reference:	Well GM 422-9 - Slot A03
Project:	Garfield County, CO NAD83	TVD Reference:	KB @ 6111.00usft (HP 318)
Site:	MV 16-9 Pad	MD Reference:	KB @ 6111.00usft (HP 318)
Well:	GM 422-9	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
4,465.00	8.98	127.61	4,002.57	-1,242.29	1,277.84	1,781.80	0.82	-0.81	-0.93
4,559.00	8.56	129.70	4,095.47	-1,251.24	1,289.03	1,796.03	0.56	-0.45	2.22
4,654.00	8.22	128.53	4,189.45	-1,259.99	1,299.79	1,809.81	0.40	-0.36	-1.23
4,748.00	7.25	138.80	4,282.60	-1,268.64	1,308.95	1,822.40	1.79	-1.03	10.93
4,842.00	6.24	141.48	4,375.95	-1,277.10	1,316.04	1,833.40	1.13	-1.07	2.85
4,937.00	5.45	138.06	4,470.45	-1,284.49	1,322.27	1,843.04	0.91	-0.83	-3.60
5,031.00	5.56	125.72	4,564.02	-1,290.47	1,328.95	1,851.99	1.26	0.12	-13.13
5,125.00	4.13	128.23	4,657.68	-1,295.22	1,335.31	1,859.84	1.54	-1.52	2.67
5,220.00	3.25	137.24	4,752.49	-1,299.32	1,339.82	1,865.92	1.11	-0.93	9.48
5,314.00	2.65	131.77	4,846.36	-1,302.72	1,343.25	1,870.76	0.70	-0.64	-5.82
5,408.00	0.35	168.49	4,940.32	-1,304.45	1,344.93	1,873.16	2.53	-2.45	39.06
5,503.00	0.27	179.14	5,035.32	-1,304.96	1,344.99	1,873.57	0.10	-0.08	11.21
5,597.00	0.73	187.84	5,129.32	-1,305.77	1,344.91	1,874.09	0.49	0.49	9.26
5,691.00	1.47	188.05	5,223.30	-1,307.56	1,344.66	1,875.19	0.79	0.79	0.22
5,786.00	0.34	241.44	5,318.29	-1,308.90	1,344.24	1,875.85	1.36	-1.19	56.20
5,880.00	0.24	171.38	5,412.29	-1,309.23	1,344.03	1,875.93	0.36	-0.11	-74.53
5,975.00	0.92	200.02	5,507.28	-1,310.14	1,343.80	1,876.42	0.76	0.72	30.15
6,069.00	1.01	200.09	5,601.27	-1,311.63	1,343.26	1,877.10	0.10	0.10	0.07
6,163.00	0.83	195.89	5,695.26	-1,313.06	1,342.78	1,877.79	0.20	-0.19	-4.47
6,258.00	1.19	194.24	5,790.24	-1,314.68	1,342.35	1,878.64	0.38	0.38	-1.74
6,352.00	1.38	195.06	5,884.22	-1,316.72	1,341.82	1,879.71	0.20	0.20	0.87
6,447.00	1.95	213.49	5,979.18	-1,319.17	1,340.63	1,880.62	0.82	0.60	19.40
6,541.00	2.05	212.09	6,073.12	-1,321.93	1,338.85	1,881.34	0.12	0.11	-1.49
6,636.00	2.45	211.44	6,168.05	-1,325.10	1,336.89	1,882.22	0.42	0.42	-0.68
6,730.00	2.64	206.81	6,261.96	-1,328.75	1,334.87	1,883.39	0.30	0.20	-4.93
6,825.00	3.12	210.59	6,356.84	-1,332.93	1,332.57	1,884.75	0.54	0.51	3.98
6,919.00	3.46	211.24	6,450.68	-1,337.56	1,329.79	1,886.09	0.36	0.36	0.69
6,975.00	3.61	211.38	6,506.57	-1,340.51	1,328.00	1,886.93	0.27	0.27	0.25
Last SDI Production MWD Survey									
7,035.00	3.61	211.38	6,566.45	-1,343.73	1,326.03	1,887.85	0.00	0.00	0.00
Projection to TD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
82.00	82.00	0.05	-0.12	First SDI Gyro Survey
603.00	599.82	-35.92	34.85	Last SDI Gyro Survey
672.00	667.16	-46.68	45.36	First SDI Surface MWD Survey
1,568.00	1,472.20	-312.05	319.96	Last SDI Surface MWD Survey
1,726.00	1,601.92	-374.91	384.64	First SDI Production MWD Survey
6,975.00	6,506.57	-1,340.51	1,328.00	Last SDI Production MWD Survey
7,035.00	6,566.45	-1,343.73	1,326.03	Projection to TD

Company:	Terra Energy Partners	Local Co-ordinate Reference:	Well GM 422-9 - Slot A03
Project:	Garfield County, CO NAD83	TVD Reference:	KB @ 6111.00usft (HP 318)
Site:	MV 16-9 Pad	MD Reference:	KB @ 6111.00usft (HP 318)
Well:	GM 422-9	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Grand Junction District

Checked By: _____	Approved By: _____	Date: _____
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