

Project: Garfield County, CO
 Site: Sec 17, T7S, R93W
 Well: RU 321-17
 Wellbore: Wellbore #1
 Design: Plan 4
 Latitude: 39.449979
 Longitude: -107.795847
 Ground Level: 7861.40
 KB=24' @ 7885.40usft (H&P #318)

PROJECT DETAILS: Garfield County, CO

Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Colorado Central Zone
 System Datum: Mean Sea Level

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well RU 321-17, True North
 Vertical (TVD) Reference: KB=24' @ 7885.40usft (H&P #318)
 Section (VS) Reference: Slot - (0.00N, 0.00E)
 Measured Depth Reference: KB=24' @ 7885.40usft (H&P #318)
 Calculation Method: Minimum Curvature

WELL DETAILS: RU 321-17

7861.40
 +N/-S 0.00 +E/-W 0.00 Northing 1596975.83 Easting 2351756.28 Latitude 39.449979 Longitude -107.795847

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)

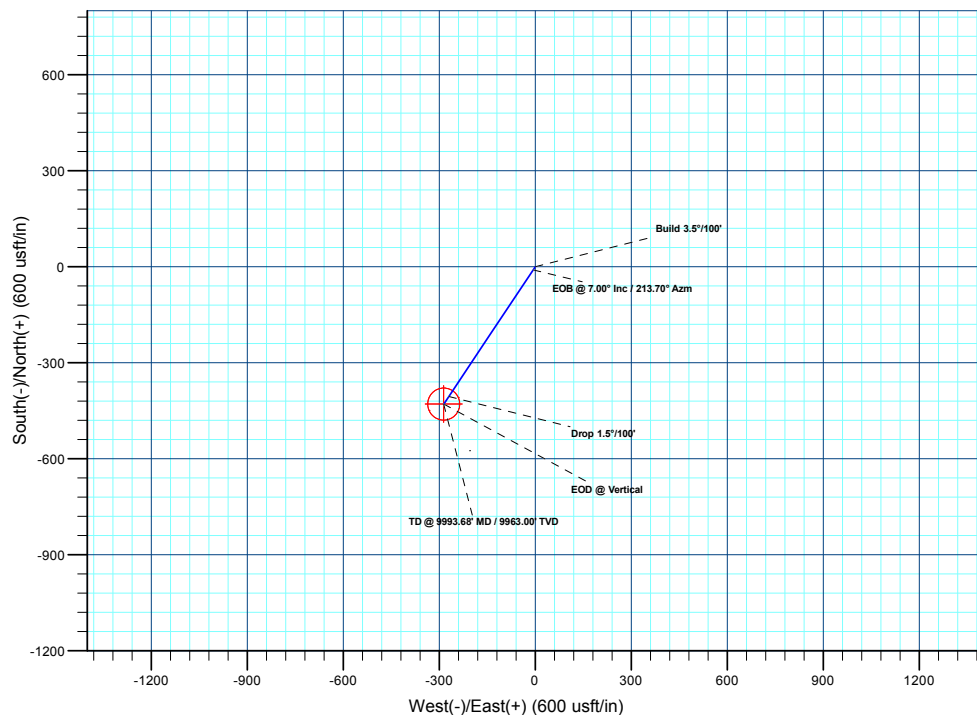
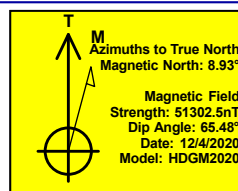
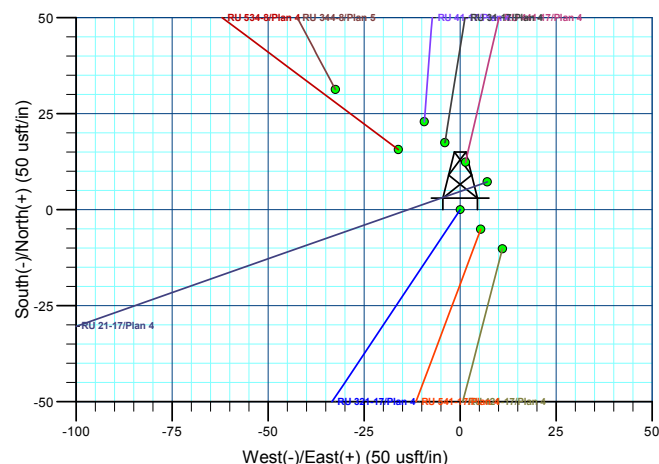
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
321-17 VP	6263.00	-428.91	-286.00	1596554.29	2351459.53	39.448801	-107.796860	Point
321-17 PBHL	9963.00	-428.91	-286.00	1596554.29	2351459.53	39.448801	-107.796860	Circle (Radius: 50.00)

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation
350.00	0.00	0.00	350.00	0.00	0.00	0.00	0.00	Build 3.5"/100'
549.86	7.00	213.70	549.37	-10.14	-6.76	12.19	12.19	EOB @ 7.00° Inc / 213.70° Azm
4449.33	7.00	213.70	4419.81	-405.26	-270.23	487.09	487.09	Drop 1.5"/100'
4915.68	0.00	0.00	4885.00	-428.91	-286.00	515.52	515.52	EOD @ Vertical
9993.68	0.00	0.00	9963.00	-428.91	-286.00	515.52	515.52	TD @ 9993.68' MD / 9963.00' TVD

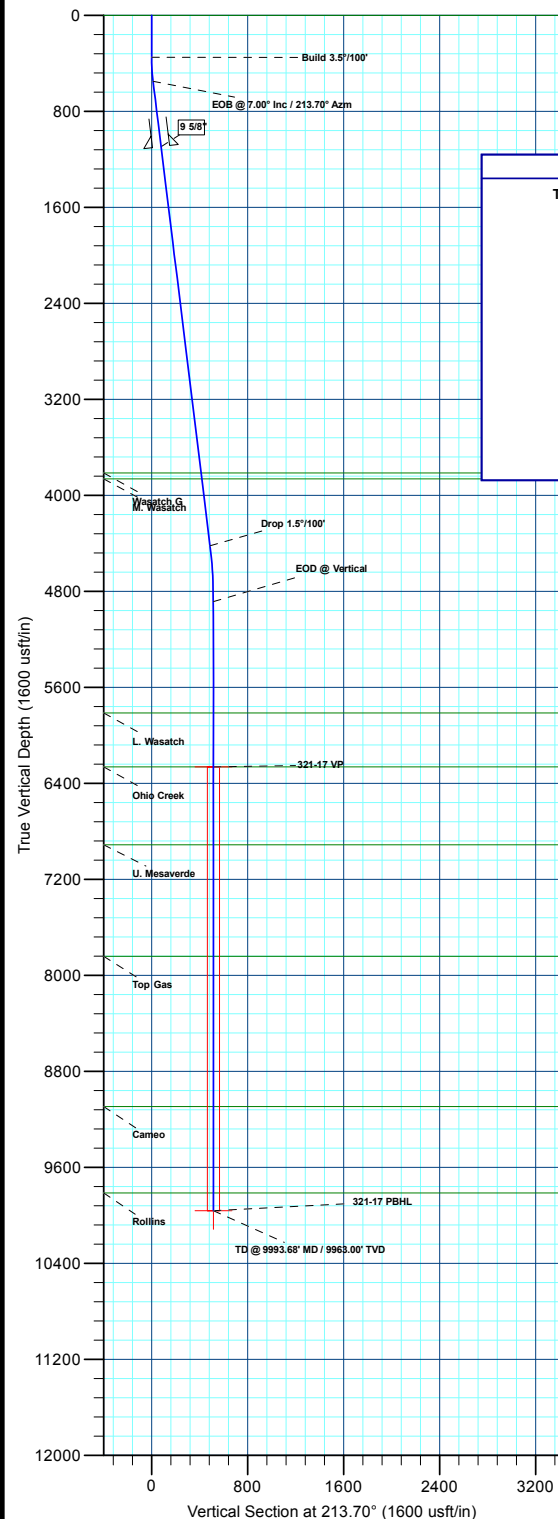
FORMATION TOP DETAILS

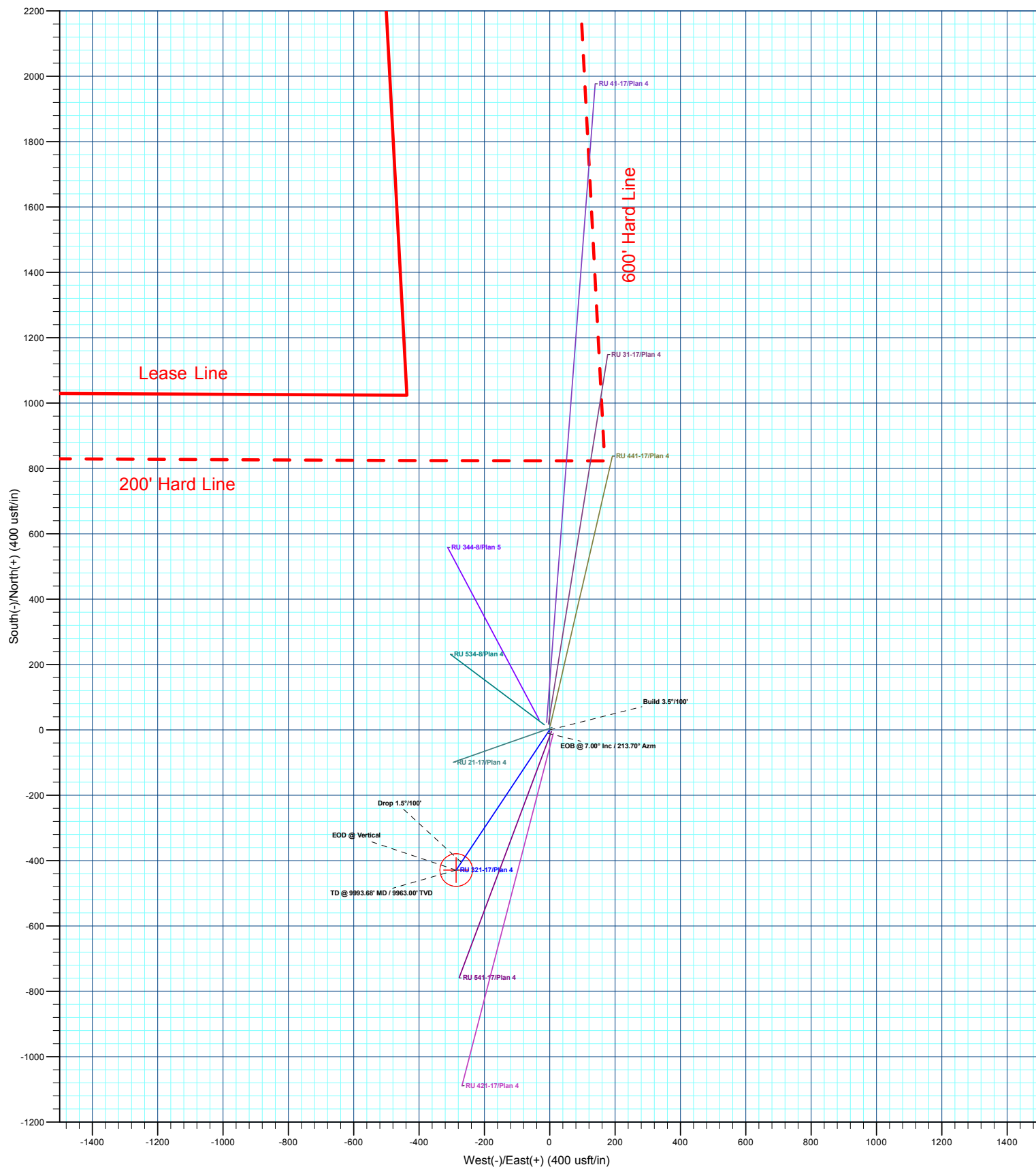
TVDPath	MDPath	Formation
0.00	0.00	U. Wasatch
3813.00	3837.97	Wasatch G
3863.00	3888.35	M. Wasatch
5813.00	5843.68	L. Wasatch
6263.00	6293.68	Ohio Creek
6913.00	6943.68	U. Mesaverde
7843.00	7873.68	Top Gas
9093.00	9123.68	Cameo
9813.00	9843.68	Rollins



Plan: Plan 4 (RU 321-17/Wellbore #1)

Created By: Chase Chambers Date: 10:27, December 11 2020





Plan: Plan 4 (RU 321-17/Wellbore #1)

Created By: Chase Chambers Date: 10:28, December 11 2020



Terra Energy Partners, LLP

Garfield County, CO

Sec 17, T7S, R93W

RU 321-17

Wellbore #1

Plan: Plan 4

QES Well Planning Report

11 December, 2020



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well RU 321-17
Company:	Terra Energy Partners, LLP	TVD Reference:	KB=24' @ 7885.40usft (H&P #318)
Project:	Garfield County, CO	MD Reference:	KB=24' @ 7885.40usft (H&P #318)
Site:	Sec 17, T7S, R93W	North Reference:	True
Well:	RU 321-17	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan 4		

Project	Garfield County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		Sec 17, T7S, R93W			
Site Position:		Northing:	1,596,982.95 usft	Latitude:	39.449999
From:	Lat/Long	Easting:	2,351,763.53 usft	Longitude:	-107.795822
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.45 °

Well	RU 321-17					
Well Position	+N/-S	-7.30 usft	Northing:	1,596,975.83 usft	Latitude:	39.449979
	+E/-W	-7.06 usft	Easting:	2,351,756.28 usft	Longitude:	-107.795847
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	7,861.40 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM2020	12/4/2020	8.93	65.48	51,302.50000000

Design	Plan 4			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	213.70

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
350.00	0.00	0.00	350.00	0.00	0.00	0.00	0.00	0.00	0.00	
549.86	7.00	213.70	549.37	-10.14	-6.76	3.50	3.50	0.00	213.70	
4,449.33	7.00	213.70	4,419.81	-405.26	-270.23	0.00	0.00	0.00	0.00	
4,915.68	0.00	0.00	4,885.00	-428.91	-286.00	1.50	-1.50	0.00	180.00	
9,993.68	0.00	0.00	9,963.00	-428.91	-286.00	0.00	0.00	0.00	0.00	321-17 PBHL

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Project:	Garfield County, CO	MD Reference:	KB=24' @ 7885.40usft (H&P #318)
Site:	Sec 17, T7S, R93W	North Reference:	True
Well:	RU 321-17	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan 4		

Planned 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)
U. Wasatch									
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
Build 3.5°/100'									
350.00	0.00	0.00	350.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	1.75	213.70	399.99	-0.64	-0.42	0.76	3.50	3.50	0.00
500.00	5.25	213.70	499.79	-5.71	-3.81	6.87	3.50	3.50	0.00
EOB @ 7.00° Inc / 213.70° Azm									
549.86	7.00	213.70	549.37	-10.14	-6.76	12.19	3.50	3.50	0.00
600.00	7.00	213.70	599.13	-15.22	-10.15	18.29	0.00	0.00	0.00
700.00	7.00	213.70	698.39	-25.35	-16.90	30.47	0.00	0.00	0.00
800.00	7.00	213.70	797.64	-35.48	-23.66	42.65	0.00	0.00	0.00
900.00	7.00	213.70	896.90	-45.62	-30.42	54.83	0.00	0.00	0.00
1,000.00	7.00	213.70	996.15	-55.75	-37.17	67.01	0.00	0.00	0.00
9 5/8"									
1,100.00	7.00	213.70	1,095.41	-65.88	-43.93	79.19	0.00	0.00	0.00
1,200.00	7.00	213.70	1,194.66	-76.01	-50.69	91.36	0.00	0.00	0.00
1,300.00	7.00	213.70	1,293.92	-86.15	-57.44	103.54	0.00	0.00	0.00
1,400.00	7.00	213.70	1,393.18	-96.28	-64.20	115.72	0.00	0.00	0.00
1,500.00	7.00	213.70	1,492.43	-106.41	-70.96	127.90	0.00	0.00	0.00
1,600.00	7.00	213.70	1,591.69	-116.54	-77.71	140.08	0.00	0.00	0.00
1,700.00	7.00	213.70	1,690.94	-126.68	-84.47	152.26	0.00	0.00	0.00
1,800.00	7.00	213.70	1,790.20	-136.81	-91.23	164.44	0.00	0.00	0.00
1,900.00	7.00	213.70	1,889.45	-146.94	-97.98	176.61	0.00	0.00	0.00
2,000.00	7.00	213.70	1,988.71	-157.08	-104.74	188.79	0.00	0.00	0.00
2,100.00	7.00	213.70	2,087.97	-167.21	-111.50	200.97	0.00	0.00	0.00
2,200.00	7.00	213.70	2,187.22	-177.34	-118.25	213.15	0.00	0.00	0.00
2,300.00	7.00	213.70	2,286.48	-187.47	-125.01	225.33	0.00	0.00	0.00
2,400.00	7.00	213.70	2,385.73	-197.61	-131.77	237.51	0.00	0.00	0.00
2,500.00	7.00	213.70	2,484.99	-207.74	-138.52	249.69	0.00	0.00	0.00
2,600.00	7.00	213.70	2,584.24	-217.87	-145.28	261.87	0.00	0.00	0.00
2,700.00	7.00	213.70	2,683.50	-228.00	-152.04	274.04	0.00	0.00	0.00
2,800.00	7.00	213.70	2,782.75	-238.14	-158.79	286.22	0.00	0.00	0.00
2,900.00	7.00	213.70	2,882.01	-248.27	-165.55	298.40	0.00	0.00	0.00
3,000.00	7.00	213.70	2,981.27	-258.40	-172.31	310.58	0.00	0.00	0.00
3,100.00	7.00	213.70	3,080.52	-268.53	-179.06	322.76	0.00	0.00	0.00
3,200.00	7.00	213.70	3,179.78	-278.67	-185.82	334.94	0.00	0.00	0.00
3,300.00	7.00	213.70	3,279.03	-288.80	-192.57	347.12	0.00	0.00	0.00
3,400.00	7.00	213.70	3,378.29	-298.93	-199.33	359.30	0.00	0.00	0.00
3,500.00	7.00	213.70	3,477.54	-309.06	-206.09	371.47	0.00	0.00	0.00
3,600.00	7.00	213.70	3,576.80	-319.20	-212.84	383.65	0.00	0.00	0.00
3,700.00	7.00	213.70	3,676.06	-329.33	-219.60	395.83	0.00	0.00	0.00
3,800.00	7.00	213.70	3,775.31	-339.46	-226.36	408.01	0.00	0.00	0.00
Wasatch G									
3,837.97	7.00	213.70	3,813.00	-343.31	-228.92	412.63	0.00	0.00	0.00
M. Wasatch									
3,888.35	7.00	213.70	3,863.00	-348.41	-232.33	418.77	0.00	0.00	0.00
3,900.00	7.00	213.70	3,874.57	-349.59	-233.11	420.19	0.00	0.00	0.00
4,000.00	7.00	213.70	3,973.82	-359.73	-239.87	432.37	0.00	0.00	0.00
4,100.00	7.00	213.70	4,073.08	-369.86	-246.63	444.55	0.00	0.00	0.00
4,200.00	7.00	213.70	4,172.33	-379.99	-253.38	456.73	0.00	0.00	0.00

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Company:	Terra Energy Partners, LLP	TVD Reference:	KB=24' @ 7885.40usft (H&P #318)
Project:	Garfield County, CO	MD Reference:	KB=24' @ 7885.40usft (H&P #318)
Site:	Sec 17, T7S, R93W	North Reference:	True
Well:	RU 321-17	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan 4		

Planned 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)	
4,300.00	7.00	213.70	4,271.59	-390.13	-260.14	468.90	0.00	0.00	0.00	
4,400.00	7.00	213.70	4,370.84	-400.26	-266.90	481.08	0.00	0.00	0.00	
Drop 1.5°/100'										
4,449.33	7.00	213.70	4,419.81	-405.26	-270.23	487.09	0.00	0.00	0.00	
4,500.00	6.24	213.70	4,470.14	-410.11	-273.47	492.93	1.50	-1.50	0.00	
4,600.00	4.74	213.70	4,569.68	-418.07	-278.77	502.49	1.50	-1.50	0.00	
4,700.00	3.24	213.70	4,669.43	-423.85	-282.63	509.44	1.50	-1.50	0.00	
4,800.00	1.74	213.70	4,769.34	-427.46	-285.03	513.77	1.50	-1.50	0.00	
4,900.00	0.24	213.70	4,869.32	-428.89	-285.99	515.49	1.50	-1.50	0.00	
EOD @ Vertical										
4,915.68	0.00	0.00	4,885.00	-428.91	-286.00	515.52	1.50	-1.50	0.00	
5,000.00	0.00	0.00	4,969.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
5,100.00	0.00	0.00	5,069.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
5,200.00	0.00	0.00	5,169.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
5,300.00	0.00	0.00	5,269.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
5,400.00	0.00	0.00	5,369.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
5,500.00	0.00	0.00	5,469.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
5,600.00	0.00	0.00	5,569.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
5,700.00	0.00	0.00	5,669.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
5,800.00	0.00	0.00	5,769.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
L. Wasatch										
5,843.68	0.00	0.00	5,813.00	-428.91	-286.00	515.52	0.00	0.00	0.00	
5,900.00	0.00	0.00	5,869.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
6,000.00	0.00	0.00	5,969.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
6,100.00	0.00	0.00	6,069.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
6,200.00	0.00	0.00	6,169.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
Ohio Creek										
6,293.68	0.00	0.00	6,263.00	-428.91	-286.00	515.52	0.00	0.00	0.00	
6,300.00	0.00	0.00	6,269.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
6,400.00	0.00	0.00	6,369.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
6,500.00	0.00	0.00	6,469.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
6,600.00	0.00	0.00	6,569.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
6,700.00	0.00	0.00	6,669.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
6,800.00	0.00	0.00	6,769.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
6,900.00	0.00	0.00	6,869.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
U. Mesaverde										
6,943.68	0.00	0.00	6,913.00	-428.91	-286.00	515.52	0.00	0.00	0.00	
7,000.00	0.00	0.00	6,969.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
7,100.00	0.00	0.00	7,069.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
7,200.00	0.00	0.00	7,169.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
7,300.00	0.00	0.00	7,269.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
7,400.00	0.00	0.00	7,369.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
7,500.00	0.00	0.00	7,469.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
7,600.00	0.00	0.00	7,569.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
7,700.00	0.00	0.00	7,669.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
7,800.00	0.00	0.00	7,769.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
Top Gas										
7,873.68	0.00	0.00	7,843.00	-428.91	-286.00	515.52	0.00	0.00	0.00	
7,900.00	0.00	0.00	7,869.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
8,000.00	0.00	0.00	7,969.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
8,100.00	0.00	0.00	8,069.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
8,200.00	0.00	0.00	8,169.32	-428.91	-286.00	515.52	0.00	0.00	0.00	
8,300.00	0.00	0.00	8,269.32	-428.91	-286.00	515.52	0.00	0.00	0.00	

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Planned 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)
8,400.00	0.00	0.00	8,369.32	-428.91	-286.00	515.52	0.00	0.00	0.00
8,500.00	0.00	0.00	8,469.32	-428.91	-286.00	515.52	0.00	0.00	0.00
8,600.00	0.00	0.00	8,569.32	-428.91	-286.00	515.52	0.00	0.00	0.00
8,700.00	0.00	0.00	8,669.32	-428.91	-286.00	515.52	0.00	0.00	0.00
8,800.00	0.00	0.00	8,769.32	-428.91	-286.00	515.52	0.00	0.00	0.00
8,900.00	0.00	0.00	8,869.32	-428.91	-286.00	515.52	0.00	0.00	0.00
9,000.00	0.00	0.00	8,969.32	-428.91	-286.00	515.52	0.00	0.00	0.00
9,100.00	0.00	0.00	9,069.32	-428.91	-286.00	515.52	0.00	0.00	0.00
Cameo									
9,123.68	0.00	0.00	9,093.00	-428.91	-286.00	515.52	0.00	0.00	0.00
9,200.00	0.00	0.00	9,169.32	-428.91	-286.00	515.52	0.00	0.00	0.00
9,300.00	0.00	0.00	9,269.32	-428.91	-286.00	515.52	0.00	0.00	0.00
9,400.00	0.00	0.00	9,369.32	-428.91	-286.00	515.52	0.00	0.00	0.00
9,500.00	0.00	0.00	9,469.32	-428.91	-286.00	515.52	0.00	0.00	0.00
9,600.00	0.00	0.00	9,569.32	-428.91	-286.00	515.52	0.00	0.00	0.00
9,700.00	0.00	0.00	9,669.32	-428.91	-286.00	515.52	0.00	0.00	0.00
9,800.00	0.00	0.00	9,769.32	-428.91	-286.00	515.52	0.00	0.00	0.00
Rollins									
9,843.68	0.00	0.00	9,813.00	-428.91	-286.00	515.52	0.00	0.00	0.00
9,900.00	0.00	0.00	9,869.32	-428.91	-286.00	515.52	0.00	0.00	0.00
TD @ 9993.68' MD / 9963.00' TVD									
9,993.68	0.00	0.00	9,963.00	-428.91	-286.00	515.52	0.00	0.00	0.00

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
321-17 VP - plan hits target center - Point	0.00	0.00	6,263.00	-428.91	-286.00	1,596,554.29	2,351,459.53	39.448801	-107.796860
321-17 PBHL - plan hits target center - Circle (radius 50.00)	0.00	0.00	9,963.00	-428.91	-286.00	1,596,554.29	2,351,459.53	39.448801	-107.796860

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name		Casing Diameter (")	Hole Diameter (")
1,100.00	1,095.41	9 5/8"		9-5/8	12-1/4

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well RU 321-17
Company:	Terra Energy Partners, LLP	TVD Reference:	KB=24' @ 7885.40usft (H&P #318)
Project:	Garfield County, CO	MD Reference:	KB=24' @ 7885.40usft (H&P #318)
Site:	Sec 17, T7S, R93W	North Reference:	True
Well:	RU 321-17	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan 4		

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
0.00	0.00	U. Wasatch			
3,837.97	3,813.00	Wasatch G			
3,888.35	3,863.00	M. Wasatch			
5,843.68	5,813.00	L. Wasatch			
6,293.68	6,263.00	Ohio Creek			
6,943.68	6,913.00	U. Mesaverde			
7,873.68	7,843.00	Top Gas			
9,123.68	9,093.00	Cameo			
9,843.68	9,813.00	Rollins			

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
350.00	350.00	0.00	0.00	Build 3.5°/100'
549.86	549.37	-10.14	-6.76	EOB @ 7.00° Inc / 213.70° Azm
4,449.33	4,419.81	-405.26	-270.23	Drop 1.5°/100'
4,915.68	4,885.00	-428.91	-286.00	EOD @ Vertical
9,993.68	9,963.00	-428.91	-286.00	TD @ 9993.68' MD / 9963.00' TVD