

Project: Garfield County, CO
 Site: Sec 17, T7S, R93W
 Well: RU 21-17
 Wellbore: Wellbore #1
 Design: Plan 4
 Latitude: 39.449999
 Longitude: -107.795822
 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 21-17, 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 21-17

				7861.40	
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	1596982.94	2351763.52	39.449999	-107.795822

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

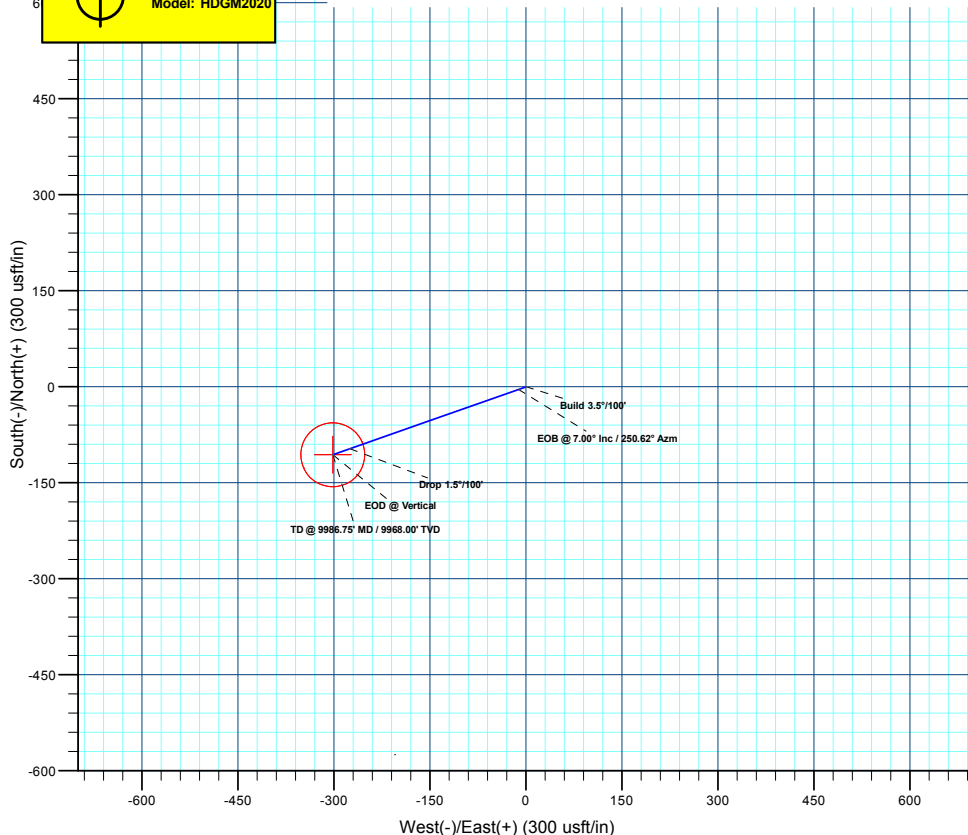
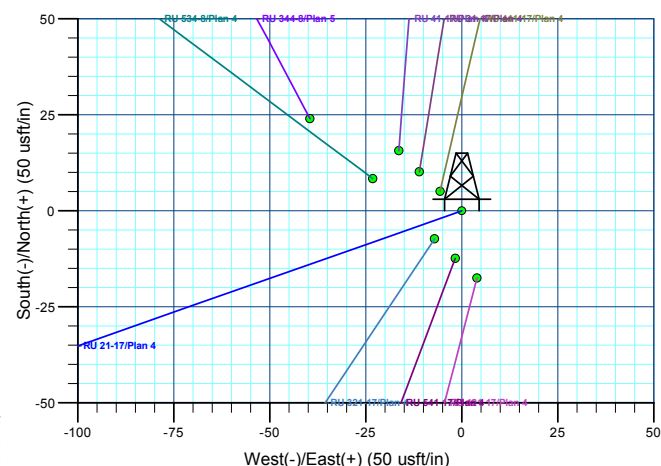
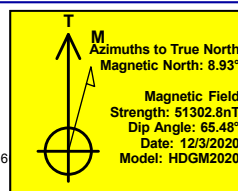
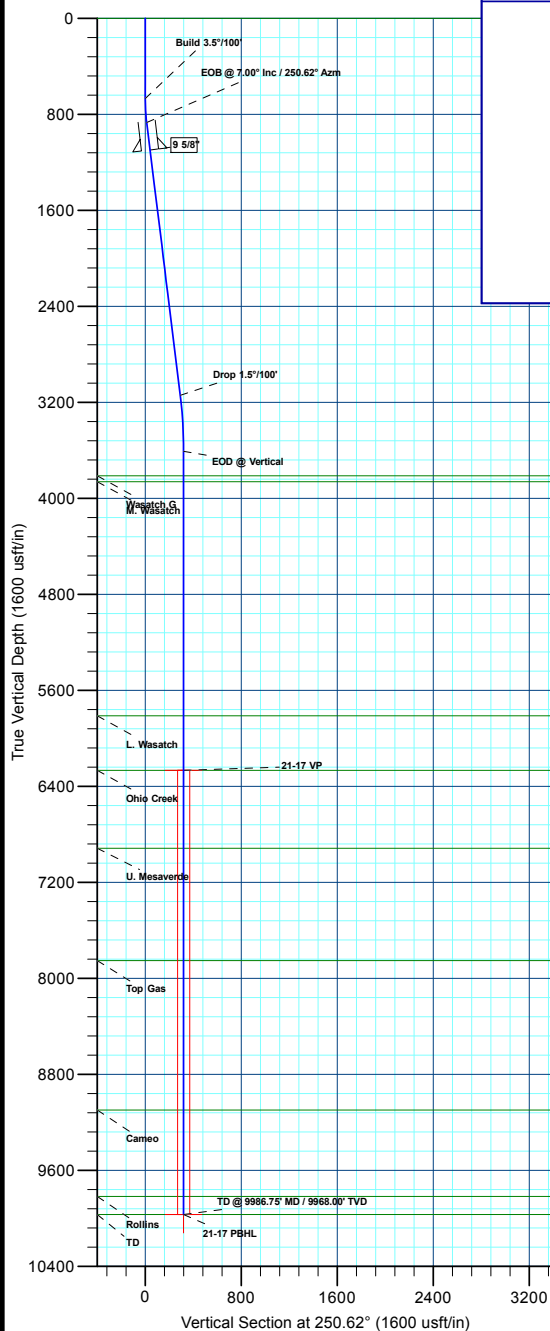
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
21-17 VP	6268.00	-106.16	-301.87	1596884.44	2351459.07	39.449707	-107.796891	Point
21-17 PBHL	9968.00	-106.16	-301.87	1596884.44	2351459.07	39.449707	-107.796891	Circle (Radius: 50.00)

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation
670.00	0.00	0.00	670.00	0.00	0.00	0.00	0.00	Build 3.5"/100'
870.08	7.00	250.62	869.58	-4.05	-11.52	12.21	12.21	EOB @ 7.00° Inc / 250.62° Azm
3160.90	7.00	250.62	3143.31	-96.71	-274.99	291.50	291.50	Drop 1.5"/100'
3627.75	0.00	0.00	3609.00	-106.17	-301.87	320.00	320.00	EOD @ Vertical
9986.75	0.00	0.00	9968.00	-106.17	-301.87	320.00	320.00	TD @ 9986.75' MD / 9968.00' TVD

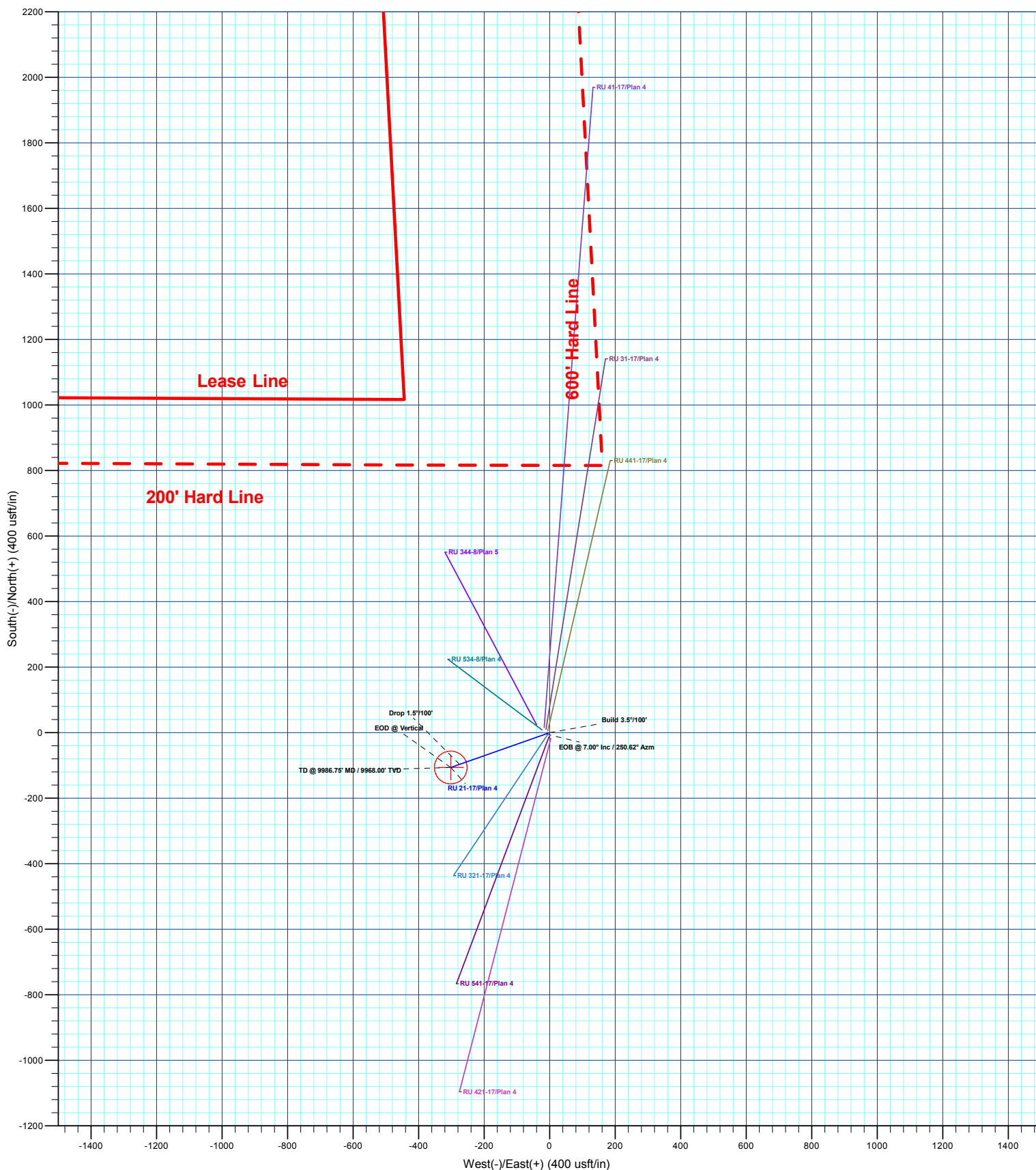
FORMATION TOP DETAILS

TVDPath	MDPath	Formation
0.00	0.00	U. Wasatch
3813.00	3831.75	Wasatch G
3863.00	3881.75	M. Wasatch
5813.00	5831.75	L. Wasatch
6268.00	6286.75	Ohio Creek
6918.00	6936.75	U. Mesaverde
7853.00	7871.75	Top Gas
9098.00	9116.75	Cameo
9818.00	9836.75	Rollins
9968.00	9986.75	TD



Plan: Plan 4 (RU 21-17/Wellbore #1)

Created By: Chase Chambers Date: 10:14, December 11 2020



Plan: Plan 4 (RU 21-17/Wellbore #1)

Created By: Chase Chambers Date: 10:15, December 11 2020



Terra Energy Partners, LLP

Garfield County, CO

Sec 17, T7S, R93W

RU 21-17

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 21-17
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 21-17	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 21-17					
Well Position	+N/-S	-0.01 usft	Northing:	1,596,982.94 usft	Latitude:	39.449999
	+E/-W	0.00 usft	Easting:	2,351,763.53 usft	Longitude:	-107.795822
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	12/3/2020	8.93	65.48	51,302.80000000

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	250.62

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	
670.00	0.00	0.00	670.00	0.00	0.00	0.00	0.00	0.00	0.00	
870.08	7.00	250.62	869.58	-4.05	-11.52	3.50	3.50	0.00	250.62	
3,160.90	7.00	250.62	3,143.31	-96.71	-274.99	0.00	0.00	0.00	0.00	
3,627.75	0.00	0.00	3,609.00	-106.17	-301.87	1.50	-1.50	0.00	180.00	
9,986.75	0.00	0.00	9,968.00	-106.17	-301.87	0.00	0.00	0.00	0.00	21-17 PBHL

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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 21-17	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
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
Build 3.5°/100'									
670.00	0.00	0.00	670.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	1.05	250.62	700.00	-0.09	-0.26	0.27	3.50	3.50	0.00
800.00	4.55	250.62	799.86	-1.71	-4.87	5.16	3.50	3.50	0.00
EOB @ 7.00° Inc / 250.62° Azm									
870.08	7.00	250.62	869.58	-4.05	-11.52	12.21	3.50	3.50	0.00
900.00	7.00	250.62	899.28	-5.26	-14.96	15.86	0.00	0.00	0.00
1,000.00	7.00	250.62	998.53	-9.31	-26.46	28.05	0.00	0.00	0.00
9 5/8"									
1,100.00	7.00	250.62	1,097.79	-13.35	-37.96	40.24	0.00	0.00	0.00
1,200.00	7.00	250.62	1,197.04	-17.40	-49.46	52.43	0.00	0.00	0.00
1,300.00	7.00	250.62	1,296.30	-21.44	-60.97	64.63	0.00	0.00	0.00
1,400.00	7.00	250.62	1,395.55	-25.49	-72.47	76.82	0.00	0.00	0.00
1,500.00	7.00	250.62	1,494.80	-29.53	-83.97	89.01	0.00	0.00	0.00
1,600.00	7.00	250.62	1,594.06	-33.58	-95.47	101.20	0.00	0.00	0.00
1,700.00	7.00	250.62	1,693.31	-37.62	-106.97	113.39	0.00	0.00	0.00
1,800.00	7.00	250.62	1,792.57	-41.67	-118.47	125.59	0.00	0.00	0.00
1,900.00	7.00	250.62	1,891.82	-45.71	-129.97	137.78	0.00	0.00	0.00
2,000.00	7.00	250.62	1,991.07	-49.76	-141.47	149.97	0.00	0.00	0.00
2,100.00	7.00	250.62	2,090.33	-53.80	-152.98	162.16	0.00	0.00	0.00
2,200.00	7.00	250.62	2,189.58	-57.85	-164.48	174.35	0.00	0.00	0.00
2,300.00	7.00	250.62	2,288.84	-61.89	-175.98	186.54	0.00	0.00	0.00
2,400.00	7.00	250.62	2,388.09	-65.94	-187.48	198.74	0.00	0.00	0.00
2,500.00	7.00	250.62	2,487.34	-69.98	-198.98	210.93	0.00	0.00	0.00
2,600.00	7.00	250.62	2,586.60	-74.03	-210.48	223.12	0.00	0.00	0.00
2,700.00	7.00	250.62	2,685.85	-78.07	-221.98	235.31	0.00	0.00	0.00
2,800.00	7.00	250.62	2,785.11	-82.12	-233.48	247.50	0.00	0.00	0.00
2,900.00	7.00	250.62	2,884.36	-86.16	-244.98	259.69	0.00	0.00	0.00
3,000.00	7.00	250.62	2,983.61	-90.21	-256.49	271.89	0.00	0.00	0.00
3,100.00	7.00	250.62	3,082.87	-94.25	-267.99	284.08	0.00	0.00	0.00
Drop 1.5°/100'									
3,160.90	7.00	250.62	3,143.31	-96.71	-274.99	291.50	0.00	0.00	0.00
3,200.00	6.42	250.62	3,182.15	-98.23	-279.30	296.07	1.50	-1.50	0.00
3,300.00	4.92	250.62	3,281.65	-101.51	-288.61	305.94	1.50	-1.50	0.00
3,400.00	3.42	250.62	3,381.39	-103.92	-295.47	313.21	1.50	-1.50	0.00
3,500.00	1.92	250.62	3,481.28	-105.46	-299.86	317.86	1.50	-1.50	0.00
3,600.00	0.42	250.62	3,581.25	-106.13	-301.78	319.90	1.50	-1.50	0.00
EOD @ Vertical									
3,627.75	0.00	0.00	3,609.00	-106.17	-301.87	320.00	1.50	-1.50	394.18
3,700.00	0.00	0.00	3,681.25	-106.17	-301.87	320.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,781.25	-106.17	-301.87	320.00	0.00	0.00	0.00
Wasatch G									
3,831.75	0.00	0.00	3,813.00	-106.17	-301.87	320.00	0.00	0.00	0.00
M. Wasatch									
3,881.75	0.00	0.00	3,863.00	-106.17	-301.87	320.00	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 21-17	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)
3,900.00	0.00	0.00	3,881.25	-106.17	-301.87	320.00	0.00	0.00	0.00
4,000.00	0.00	0.00	3,981.25	-106.17	-301.87	320.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,081.25	-106.17	-301.87	320.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,181.25	-106.17	-301.87	320.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,281.25	-106.17	-301.87	320.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,381.25	-106.17	-301.87	320.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,481.25	-106.17	-301.87	320.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,581.25	-106.17	-301.87	320.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,681.25	-106.17	-301.87	320.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,781.25	-106.17	-301.87	320.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,881.25	-106.17	-301.87	320.00	0.00	0.00	0.00
5,000.00	0.00	0.00	4,981.25	-106.17	-301.87	320.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,081.25	-106.17	-301.87	320.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,181.25	-106.17	-301.87	320.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,281.25	-106.17	-301.87	320.00	0.00	0.00	0.00
5,400.00	0.00	0.00	5,381.25	-106.17	-301.87	320.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,481.25	-106.17	-301.87	320.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,581.25	-106.17	-301.87	320.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,681.25	-106.17	-301.87	320.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,781.25	-106.17	-301.87	320.00	0.00	0.00	0.00
L. Wasatch									
5,831.75	0.00	0.00	5,813.00	-106.17	-301.87	320.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,881.25	-106.17	-301.87	320.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,981.25	-106.17	-301.87	320.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,081.25	-106.17	-301.87	320.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,181.25	-106.17	-301.87	320.00	0.00	0.00	0.00
Ohio Creek									
6,286.75	0.00	0.00	6,268.00	-106.17	-301.87	320.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,281.25	-106.17	-301.87	320.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,381.25	-106.17	-301.87	320.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,481.25	-106.17	-301.87	320.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,581.25	-106.17	-301.87	320.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,681.25	-106.17	-301.87	320.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,781.25	-106.17	-301.87	320.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,881.25	-106.17	-301.87	320.00	0.00	0.00	0.00
U. Mesaverde									
6,936.75	0.00	0.00	6,918.00	-106.17	-301.87	320.00	0.00	0.00	0.00
7,000.00	0.00	0.00	6,981.25	-106.17	-301.87	320.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,081.25	-106.17	-301.87	320.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,181.25	-106.17	-301.87	320.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,281.25	-106.17	-301.87	320.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,381.25	-106.17	-301.87	320.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,481.25	-106.17	-301.87	320.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,581.25	-106.17	-301.87	320.00	0.00	0.00	0.00
7,700.00	0.00	0.00	7,681.25	-106.17	-301.87	320.00	0.00	0.00	0.00
7,800.00	0.00	0.00	7,781.25	-106.17	-301.87	320.00	0.00	0.00	0.00
Top Gas									
7,871.75	0.00	0.00	7,853.00	-106.17	-301.87	320.00	0.00	0.00	0.00
7,900.00	0.00	0.00	7,881.25	-106.17	-301.87	320.00	0.00	0.00	0.00
8,000.00	0.00	0.00	7,981.25	-106.17	-301.87	320.00	0.00	0.00	0.00
8,100.00	0.00	0.00	8,081.25	-106.17	-301.87	320.00	0.00	0.00	0.00
8,200.00	0.00	0.00	8,181.25	-106.17	-301.87	320.00	0.00	0.00	0.00
8,300.00	0.00	0.00	8,281.25	-106.17	-301.87	320.00	0.00	0.00	0.00
8,400.00	0.00	0.00	8,381.25	-106.17	-301.87	320.00	0.00	0.00	0.00

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Project:	Garfield County, CO	MD Reference:	KB=24' @ 7885.40usft (H&P #318)
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Wellbore:	Wellbore #1		
Design:	Plan 4		

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8,500.00	0.00	0.00	8,481.25	-106.17	-301.87	320.00	0.00	0.00	0.00
8,600.00	0.00	0.00	8,581.25	-106.17	-301.87	320.00	0.00	0.00	0.00
8,700.00	0.00	0.00	8,681.25	-106.17	-301.87	320.00	0.00	0.00	0.00
8,800.00	0.00	0.00	8,781.25	-106.17	-301.87	320.00	0.00	0.00	0.00
8,900.00	0.00	0.00	8,881.25	-106.17	-301.87	320.00	0.00	0.00	0.00
9,000.00	0.00	0.00	8,981.25	-106.17	-301.87	320.00	0.00	0.00	0.00
9,100.00	0.00	0.00	9,081.25	-106.17	-301.87	320.00	0.00	0.00	0.00
Cameo									
9,116.75	0.00	0.00	9,098.00	-106.17	-301.87	320.00	0.00	0.00	0.00
9,200.00	0.00	0.00	9,181.25	-106.17	-301.87	320.00	0.00	0.00	0.00
9,300.00	0.00	0.00	9,281.25	-106.17	-301.87	320.00	0.00	0.00	0.00
9,400.00	0.00	0.00	9,381.25	-106.17	-301.87	320.00	0.00	0.00	0.00
9,500.00	0.00	0.00	9,481.25	-106.17	-301.87	320.00	0.00	0.00	0.00
9,600.00	0.00	0.00	9,581.25	-106.17	-301.87	320.00	0.00	0.00	0.00
9,700.00	0.00	0.00	9,681.25	-106.17	-301.87	320.00	0.00	0.00	0.00
9,800.00	0.00	0.00	9,781.25	-106.17	-301.87	320.00	0.00	0.00	0.00
Rollins									
9,836.75	0.00	0.00	9,818.00	-106.17	-301.87	320.00	0.00	0.00	0.00
9,900.00	0.00	0.00	9,881.25	-106.17	-301.87	320.00	0.00	0.00	0.00
TD @ 9986.75' MD / 9968.00' TVD - TD									
9,986.75	0.00	0.00	9,968.00	-106.17	-301.87	320.00	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
21-17 VP - plan hits target center - Point	0.00	0.00	6,268.00	-106.16	-301.87	1,596,884.44	2,351,459.07	39.449708	-107.796891
21-17 PBHL - plan hits target center - Circle (radius 50.00)	0.00	0.00	9,968.00	-106.16	-301.87	1,596,884.44	2,351,459.07	39.449708	-107.796891

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,100.00	1,097.79	9 5/8"	9-5/8	12-1/4	

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well RU 21-17
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 21-17	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				
3,831.75	3,813.00	Wasatch G				
3,881.75	3,863.00	M. Wasatch				
5,831.75	5,813.00	L. Wasatch				
6,286.75	6,268.00	Ohio Creek				
6,936.75	6,918.00	U. Mesaverde				
7,871.75	7,853.00	Top Gas				
9,116.75	9,098.00	Cameo				
9,836.75	9,818.00	Rollins				
9,986.75	9,968.00	TD				

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
670.00	670.00	0.00	0.00	Build 3.5°/100'
870.08	869.58	-4.05	-11.52	EOB @ 7.00° Inc / 250.62° Azm
3,160.90	3,143.31	-96.71	-274.99	Drop 1.5°/100'
3,627.75	3,609.00	-106.17	-301.87	EOD @ Vertical
9,986.75	9,968.00	-106.17	-301.87	TD @ 9986.75' MD / 9968.00' TVD