

Fed 15D-13
Garfield County, CO
Q200043 & RM-200044
Design #2

Company Name: Caerus Oil & Gas
Fed 15D-13
Garfield County, CO
Rig: H&P #629
Created By: Will Jirick
Date: 5:06, January 15 2020

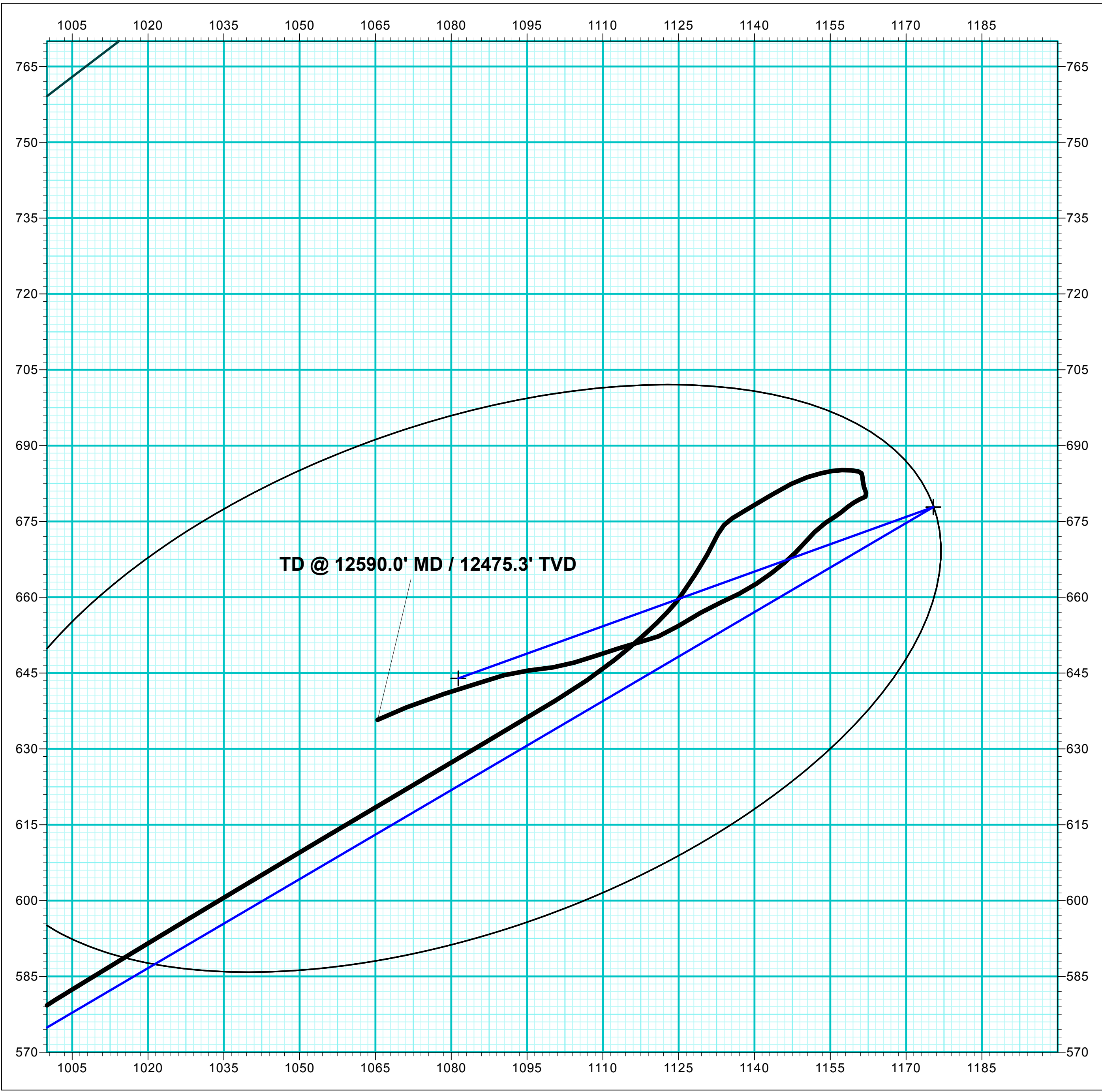
PROJECT DETAILS:	Garfield County, CO
Geodetic System:	Universal Transverse Mercator (US Survey Feet)
Datum:	NAD 1927 - Western US
Ellipsoid:	Clarke 1866
Zone:	Zone 12N (114 W to 108 W)
System Datum:	Mean Sea Level

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
6213.0	6295.9	Wasatch G
6739.0	6829.6	Fort Union
8551.0	8665.1	Ohio Creek
8855.0	8969.2	Williams Fork
8905.0	9019.2	TOG
11786.0	11901.1	Cameo
12286.0	12401.3	Rollins

DESIGN TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude
OHCR - 15D-13	8551.0	8551.0	677.8	1175.4	14428287.08	2450292.95
PBHL - 15D-13	12486.0	12486.0	644.0	1081.4	14428250.20	2450200.10

WELL DETAILS: Fed 15D-13					
				8128.0	
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14427571.90	2449139.90	39.693961	-108.125364

DESIGN ANNOTATIONS							
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure
275.0	0.00	0.00	275.0	0.0	0.0	0.0	Build 3° / 100'
441.7	5.00	85.00	441.5	0.6	7.2	6.5	7.3 EOB @ 5.00° Inc. / 85.00° Azm
541.7	5.00	85.00	541.1	1.4	15.9	14.4	16.0 Build 3° / 100'
730.7	9.77	59.59	728.5	10.2	38.0	37.9	40.0 EOB @ 9.77° Inc. / 59.59° Azm
8339.4	9.77	59.59	8226.9	663.8	1151.5	1329.0	1331.1 Drop 3° / 100'
8665.1	0.00	0.00	8551.0	677.8	1175.4	1356.7	1358.8 EOD @ Vertical / Build 1.5° / 100'
8763.3	1.47	250.17	8649.2	677.4	1174.2	1355.5	1360.1 EOB @ 1.47° Inc. / 250.17° Azm
12601.4	1.47	250.17	12486.0	644.0	1081.4	1258.6	1458.7 TD @ 12601.4' MD / 12486.0' TVD



ANNOTATIONS							
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure
128.0	0.00	0.00	128.0	0.0	0.0	0.0	First MWD Survey @ 128.0' MD / 128.0' TVD
12590.0	5.30	246.70	12475.3	635.8	1065.4	1240.7	1470.4 TD @ 12590.0' MD / 12475.3' TVD

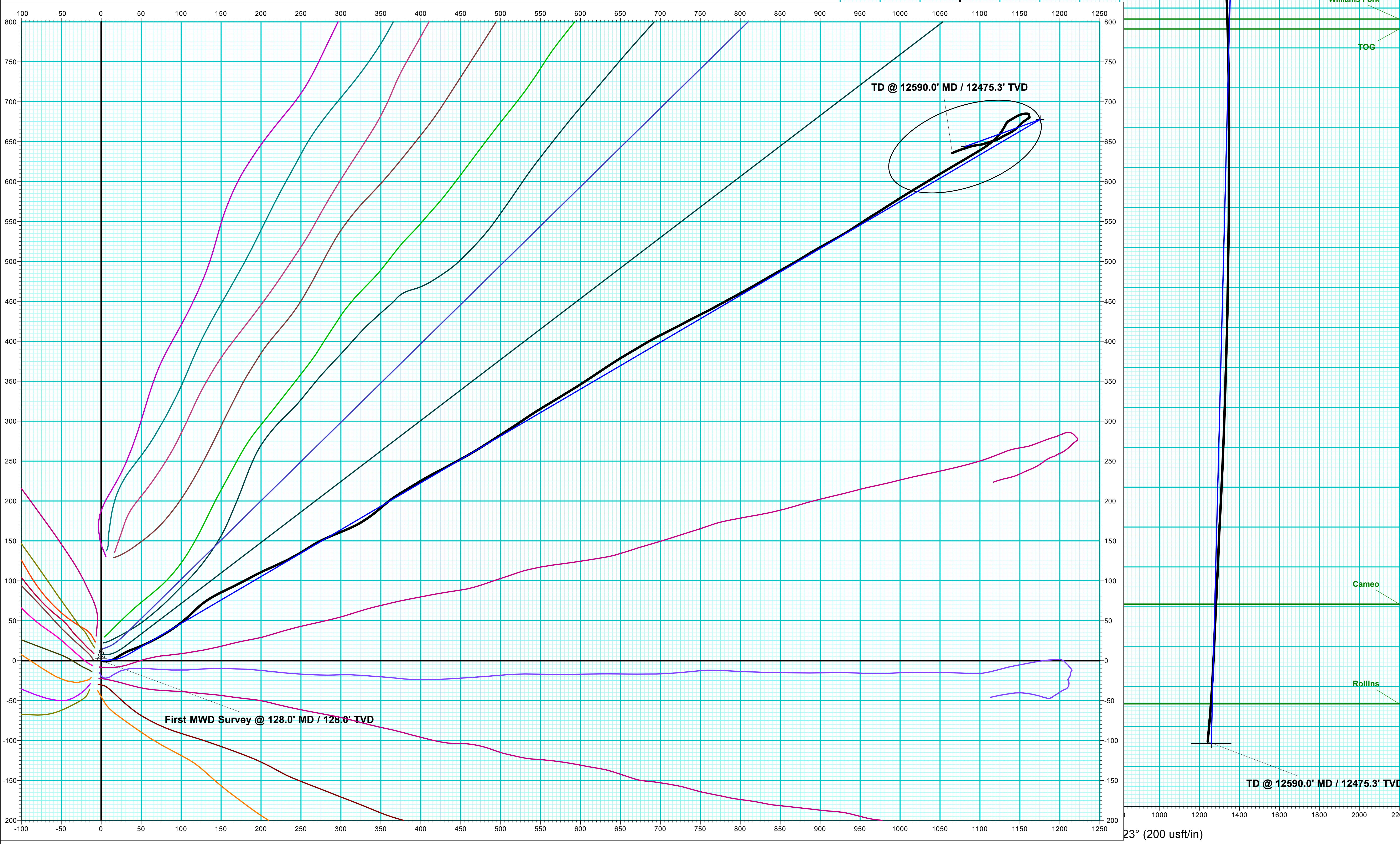


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Azimuths to True North
Magnetic North: 9.47°

Strength: 51224.8nT
Dip Angle: 65.82°
Date: 12/31/2019
Model: HDGM_FILE





Caerus Oil & Gas

Garfield County, CO

Sec 24, T4S, R96W

Fed 15D-13 - Slot Fed 15D-13

Wellbore #1

Design: Wellbore #1

QES Survey Report

15 January, 2020



Company:	Caerus Oil & Gas	Local Co-ordinate Reference:	Well Fed 15D-13 - Slot Fed 15D-13
Project:	Garfield County, CO	TVD Reference:	RKB @ 8158.0usft (H&P #629)
Site:	Sec 24, T4S, R96W	MD Reference:	RKB @ 8158.0usft (H&P #629)
Well:	Fed 15D-13	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Garfield County, CO		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 - Western US		
Map Zone:	Zone 12N (114 W to 108 W)		

Site	Sec 24, T4S, R96W		
Site Position:		Northing:	14,427,542.90 usft
From:	Map	Easting:	2,449,127.20 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	39.693883
		Longitude:	-108.125370
		Grid Convergence:	1.84 °

Well	Fed 15D-13 - Slot Fed 15D-13		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft		Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	HDGM_FILE	12/31/2019	9.47
			Dip Angle
			(°)
			65.82
			Field Strength
			(nT)
			51,224.80000000

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			59.17

Survey Program	Date	1/15/2020		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
128.0	12,590.0	QES MWD Surveys (Wellbore #1)	MWD	OWSG MWD - Standard

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
First MWD Survey @ 128.0' MD / 128.0' TVD									
128.0	0.00	0.00	128.0	0.0	0.0	0.0	0.00	0.00	0.00
240.0	3.10	102.50	239.9	-0.7	3.0	2.2	2.77	2.77	0.00
331.0	4.10	81.10	330.8	-0.7	8.6	7.0	1.82	1.10	-23.52
423.0	5.20	62.30	422.5	1.8	15.5	14.2	2.03	1.20	-20.43
515.0	5.80	56.10	514.0	6.3	23.1	23.0	0.92	0.65	-6.74
609.0	6.00	65.40	607.6	11.0	31.5	32.7	1.04	0.21	9.89
703.0	7.30	69.90	700.9	15.1	41.6	43.4	1.49	1.38	4.79
798.0	9.40	65.70	794.9	20.4	54.3	57.0	2.30	2.21	-4.42
892.0	10.30	61.70	887.5	27.5	68.7	73.1	1.20	0.96	-4.26

Company:	Caerus Oil & Gas	Local Co-ordinate Reference:	Well Fed 15D-13 - Slot Fed 15D-13
Project:	Garfield County, CO	TVD Reference:	RKB @ 8158.0usft (H&P #629)
Site:	Sec 24, T4S, R96W	MD Reference:	RKB @ 8158.0usft (H&P #629)
Well:	Fed 15D-13	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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)
987.0	11.80	58.00	980.8	36.7	84.4	91.3	1.75	1.58	-3.89
1,081.0	11.30	51.80	1,072.9	47.5	99.8	110.0	1.42	-0.53	-6.60
1,176.0	9.30	45.60	1,166.3	58.6	112.6	126.7	2.40	-2.11	-6.53
1,270.0	8.00	48.23	1,259.3	68.3	122.9	140.5	1.45	-1.38	2.80
1,364.0	9.70	57.60	1,352.1	76.9	134.5	154.9	2.37	1.81	9.97
1,458.0	11.20	63.40	1,444.6	85.2	149.3	171.9	1.95	1.60	6.17
1,553.0	12.10	64.80	1,537.6	93.6	166.6	191.0	0.99	0.95	1.47
1,647.0	12.40	60.80	1,629.5	102.7	184.3	210.9	0.96	0.32	-4.26
1,742.0	11.20	64.70	1,722.5	111.6	201.5	230.3	1.52	-1.26	4.11
1,836.0	10.60	66.70	1,814.8	118.9	217.7	247.9	0.75	-0.64	2.13
1,930.0	10.80	63.10	1,907.1	126.3	233.5	265.3	0.74	0.21	-3.83
2,025.0	10.30	59.00	2,000.5	134.7	248.8	282.6	0.95	-0.53	-4.32
2,119.0	9.30	57.10	2,093.2	143.2	262.3	298.6	1.12	-1.06	-2.02
2,213.0	8.80	63.90	2,186.0	150.5	275.2	313.4	1.26	-0.53	7.23
2,308.0	10.10	67.90	2,279.7	156.8	289.4	328.9	1.53	1.37	4.21
2,402.0	10.60	67.20	2,372.2	163.3	305.0	345.6	0.55	0.53	-0.74
2,496.0	10.00	62.10	2,464.7	170.4	320.2	362.3	1.16	-0.64	-5.43
2,591.0	9.90	55.20	2,558.2	178.9	334.2	378.7	1.26	-0.11	-7.26
2,685.0	9.60	49.20	2,650.9	188.7	346.8	394.5	1.13	-0.32	-6.38
2,780.0	9.20	50.70	2,744.6	198.7	358.6	409.8	0.49	-0.42	1.58
2,874.0	9.80	57.90	2,837.3	207.7	371.2	425.2	1.41	0.64	7.66
2,921.0	9.80	59.00	2,883.6	211.9	378.0	433.2	0.40	0.00	2.34
3,079.0	9.20	58.30	3,039.5	225.4	400.3	459.3	0.39	-0.38	-0.44
3,174.0	8.70	62.70	3,133.3	232.7	413.2	474.0	0.89	-0.53	4.63
3,268.0	9.70	62.30	3,226.1	239.7	426.5	489.1	1.07	1.06	-0.43
3,363.0	10.40	60.90	3,319.6	247.5	441.1	505.6	0.78	0.74	-1.47
3,457.0	10.40	61.70	3,412.1	255.7	456.0	522.6	0.15	0.00	0.85
3,551.0	10.00	58.00	3,504.6	264.0	470.4	539.2	0.82	-0.43	-3.94
3,646.0	9.10	57.80	3,598.3	272.4	483.7	555.0	0.95	-0.95	-0.21
3,740.0	9.90	56.50	3,691.0	280.8	496.7	570.5	0.88	0.85	-1.38
3,835.0	9.10	58.10	3,784.7	289.3	509.9	586.1	0.89	-0.84	1.68
3,929.0	10.50	55.60	3,877.3	298.1	523.3	602.1	1.56	1.49	-2.66
4,023.0	8.80	56.60	3,970.0	306.9	536.4	617.8	1.82	-1.81	1.06
4,117.0	10.50	58.30	4,062.7	315.3	549.7	633.6	1.83	1.81	1.81
4,211.0	9.80	59.50	4,155.2	323.9	563.8	650.2	0.78	-0.74	1.28
4,306.0	9.30	57.90	4,248.9	332.1	577.3	665.9	0.60	-0.53	-1.68
4,400.0	8.80	59.30	4,341.7	339.8	589.9	680.7	0.58	-0.53	1.49
4,495.0	10.20	56.70	4,435.4	348.1	603.2	696.4	1.54	1.47	-2.74
4,589.0	10.00	55.90	4,527.9	357.3	616.9	712.8	0.26	-0.21	-0.85
4,683.0	9.30	56.80	4,620.6	366.0	630.0	728.6	0.76	-0.74	0.96
4,778.0	8.70	57.20	4,714.4	374.1	642.5	743.4	0.64	-0.63	0.42
4,873.0	10.00	58.90	4,808.2	382.2	655.6	758.9	1.40	1.37	1.79
4,967.0	9.50	60.00	4,900.8	390.3	669.3	774.8	0.57	-0.53	1.17

Company:	Caerus Oil & Gas	Local Co-ordinate Reference:	Well Fed 15D-13 - Slot Fed 15D-13
Project:	Garfield County, CO	TVD Reference:	RKB @ 8158.0usft (H&P #629)
Site:	Sec 24, T4S, R96W	MD Reference:	RKB @ 8158.0usft (H&P #629)
Well:	Fed 15D-13	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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)	
5,062.0	9.00	58.80	4,994.6	398.1	682.5	790.0	0.56	-0.53	-1.26	
5,156.0	10.00	63.20	5,087.3	405.6	696.0	805.5	1.31	1.06	4.68	
5,251.0	9.00	63.10	5,181.0	412.7	710.0	821.2	1.05	-1.05	-0.11	
5,345.0	10.70	62.30	5,273.6	420.1	724.3	837.2	1.81	1.81	-0.85	
5,440.0	10.10	62.20	5,367.0	428.0	739.5	854.4	0.63	-0.63	-0.11	
5,535.0	9.30	64.00	5,460.7	435.3	753.7	870.3	0.90	-0.84	1.89	
5,629.0	10.30	61.30	5,553.3	442.7	767.9	886.3	1.17	1.06	-2.87	
5,724.0	9.80	61.50	5,646.9	450.6	782.5	902.9	0.53	-0.53	0.21	
5,819.0	9.40	61.20	5,740.5	458.2	796.4	918.7	0.42	-0.42	-0.32	
5,914.0	8.70	61.50	5,834.3	465.4	809.5	933.6	0.74	-0.74	0.32	
6,008.0	10.40	59.30	5,927.0	473.1	823.1	949.2	1.85	1.81	-2.34	
6,103.0	9.70	60.40	6,020.6	481.4	837.4	965.8	0.76	-0.74	1.16	
6,197.0	10.70	60.50	6,113.1	489.6	851.9	982.4	1.06	1.06	0.11	
6,292.0	10.00	60.40	6,206.5	498.0	866.7	999.5	0.74	-0.74	-0.11	
6,387.0	9.30	57.50	6,300.2	506.2	880.4	1,015.4	0.90	-0.74	-3.05	
6,481.0	10.20	60.60	6,392.8	514.4	894.0	1,031.3	1.11	0.96	3.30	
6,576.0	9.90	60.80	6,486.4	522.5	908.5	1,047.9	0.32	-0.32	0.21	
6,671.0	8.90	60.80	6,580.1	530.1	922.0	1,063.4	1.05	-1.05	0.00	
6,765.0	8.80	58.60	6,673.0	537.4	934.5	1,077.9	0.38	-0.11	-2.34	
6,860.0	9.20	55.40	6,766.8	545.5	947.0	1,092.7	0.67	0.42	-3.37	
6,955.0	10.00	58.30	6,860.5	554.1	960.2	1,108.5	0.98	0.84	3.05	
7,049.0	9.30	58.00	6,953.2	562.4	973.6	1,124.3	0.75	-0.74	-0.32	
7,143.0	10.50	57.00	7,045.8	571.1	987.2	1,140.4	1.29	1.28	-1.06	
7,237.0	10.20	57.80	7,138.2	580.2	1,001.5	1,157.3	0.35	-0.32	0.85	
7,332.0	9.80	59.20	7,231.8	588.9	1,015.5	1,173.8	0.49	-0.42	1.47	
7,426.0	9.30	58.70	7,324.5	596.9	1,028.9	1,189.4	0.54	-0.53	-0.53	
7,521.0	10.50	59.30	7,418.1	605.3	1,042.9	1,205.7	1.27	1.26	0.63	
7,616.0	10.80	59.10	7,511.4	614.3	1,058.0	1,223.3	0.32	0.32	-0.21	
7,710.0	10.40	59.70	7,603.8	623.1	1,072.9	1,240.6	0.44	-0.43	0.64	
7,804.0	9.80	59.20	7,696.4	631.5	1,087.1	1,257.1	0.65	-0.64	-0.53	
7,898.0	9.40	59.00	7,789.0	639.5	1,100.5	1,272.7	0.43	-0.43	-0.21	
7,993.0	7.90	51.40	7,883.0	647.6	1,112.3	1,287.0	1.98	-1.58	-8.00	
8,087.0	5.80	45.50	7,976.3	655.0	1,120.7	1,298.0	2.35	-2.23	-6.28	
8,181.0	3.10	33.60	8,070.0	660.4	1,125.5	1,304.9	3.02	-2.87	-12.66	
8,275.0	2.90	34.40	8,163.9	664.5	1,128.2	1,309.4	0.22	-0.21	0.85	
8,369.0	2.80	27.80	8,257.8	668.5	1,130.7	1,313.5	0.36	-0.11	-7.02	
8,464.0	2.70	26.90	8,352.6	672.5	1,132.8	1,317.3	0.11	-0.11	-0.95	
8,558.0	2.60	58.70	8,446.6	675.6	1,135.6	1,321.4	1.55	-0.11	33.83	
8,652.0	2.90	59.10	8,540.4	677.9	1,139.4	1,325.9	0.32	0.32	0.43	
8,747.0	2.80	60.00	8,635.3	680.3	1,143.5	1,330.6	0.12	-0.11	0.95	
8,841.0	2.40	61.40	8,729.2	682.4	1,147.2	1,334.8	0.43	-0.43	1.49	
8,935.0	1.90	74.80	8,823.2	683.8	1,150.5	1,338.3	0.75	-0.53	14.26	
9,030.0	1.50	73.80	8,918.1	684.5	1,153.2	1,341.0	0.42	-0.42	-1.05	

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Site:	Sec 24, T4S, R96W	MD Reference:	RKB @ 8158.0usft (H&P #629)
Well:	Fed 15D-13	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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)	
9,125.0	1.20	83.30	9,013.1	685.0	1,155.4	1,343.1	0.39	-0.32	10.00	
9,219.0	1.20	86.70	9,107.1	685.2	1,157.3	1,344.9	0.08	0.00	3.62	
9,314.0	1.10	96.50	9,202.1	685.1	1,159.2	1,346.5	0.23	-0.11	10.32	
9,408.0	0.60	105.00	9,296.0	684.9	1,160.6	1,347.6	0.55	-0.53	9.04	
9,503.0	0.30	153.90	9,391.0	684.5	1,161.2	1,347.9	0.49	-0.32	51.47	
9,597.0	0.40	174.70	9,485.0	684.0	1,161.3	1,347.7	0.17	0.11	22.13	
9,691.0	0.70	170.30	9,579.0	683.1	1,161.4	1,347.4	0.32	0.32	-4.68	
9,786.0	0.80	170.10	9,674.0	681.9	1,161.7	1,347.0	0.11	0.11	-0.21	
9,880.0	0.80	150.90	9,768.0	680.6	1,162.1	1,346.7	0.28	0.00	-20.43	
9,975.0	0.60	249.10	9,863.0	679.9	1,161.9	1,346.2	1.12	-0.21	103.37	
10,069.0	0.90	244.30	9,957.0	679.4	1,160.8	1,345.0	0.33	0.32	-5.11	
10,164.0	0.80	236.20	10,052.0	678.7	1,159.6	1,343.6	0.16	-0.11	-8.53	
10,258.0	1.10	233.20	10,146.0	677.8	1,158.3	1,342.0	0.32	0.32	-3.19	
10,352.0	0.70	224.80	10,240.0	676.8	1,157.2	1,340.6	0.45	-0.43	-8.94	
10,447.0	1.10	241.40	10,335.0	676.0	1,156.0	1,339.1	0.50	0.42	17.47	
10,541.0	1.70	233.90	10,428.9	674.7	1,154.1	1,336.8	0.67	0.64	-7.98	
10,636.0	1.70	225.70	10,523.9	672.9	1,151.9	1,334.0	0.26	0.00	-8.63	
10,730.0	1.70	220.30	10,617.8	670.9	1,150.0	1,331.3	0.17	0.00	-5.74	
10,825.0	1.70	226.00	10,712.8	668.8	1,148.1	1,328.6	0.18	0.00	6.00	
10,919.0	1.90	228.40	10,806.8	666.8	1,145.9	1,325.8	0.23	0.21	2.55	
11,013.0	2.00	233.90	10,900.7	664.8	1,143.4	1,322.6	0.23	0.11	5.85	
11,107.0	2.40	236.10	10,994.6	662.8	1,140.5	1,319.0	0.43	0.43	2.34	
11,202.0	2.50	242.60	11,089.5	660.7	1,137.0	1,314.9	0.31	0.11	6.84	
11,296.0	2.40	246.60	11,183.5	659.0	1,133.4	1,310.9	0.21	-0.11	4.26	
11,390.0	3.00	240.30	11,277.4	657.0	1,129.4	1,306.5	0.71	0.64	-6.70	
11,484.0	3.30	238.60	11,371.2	654.4	1,125.0	1,301.4	0.33	0.32	-1.81	
11,579.0	2.10	248.10	11,466.1	652.3	1,121.0	1,296.9	1.34	-1.26	10.00	
11,673.0	2.40	257.20	11,560.0	651.2	1,117.5	1,293.3	0.50	0.32	9.68	
11,767.0	3.10	250.70	11,653.9	649.9	1,113.2	1,289.0	0.81	0.74	-6.91	
11,862.0	2.80	253.30	11,748.8	648.4	1,108.5	1,284.2	0.35	-0.32	2.74	
11,956.0	2.60	251.80	11,842.7	647.1	1,104.3	1,279.9	0.23	-0.21	-1.60	
12,050.0	2.70	262.40	11,936.6	646.1	1,100.1	1,275.8	0.53	0.11	11.28	
12,145.0	3.00	263.00	12,031.5	645.5	1,095.4	1,271.5	0.32	0.32	0.63	
12,239.0	3.20	255.70	12,125.3	644.6	1,090.4	1,266.7	0.47	0.21	-7.77	
12,334.0	3.60	250.30	12,220.2	642.9	1,085.1	1,261.2	0.54	0.42	-5.68	
12,429.0	4.50	254.50	12,314.9	640.9	1,078.7	1,254.7	1.00	0.95	4.42	
12,523.0	5.30	246.70	12,408.6	638.2	1,071.1	1,246.8	1.11	0.85	-8.30	
TD @ 12590.0' MD / 12475.3' TVD										
12,590.0	5.30	246.70	12,475.3	635.8	1,065.4	1,240.7	0.00	0.00	0.00	

Company:	Caerus Oil & Gas	Local Co-ordinate Reference:	Well Fed 15D-13 - Slot Fed 15D-13
Project:	Garfield County, CO	TVD Reference:	RKB @ 8158.0usft (H&P #629)
Site:	Sec 24, T4S, R96W	MD Reference:	RKB @ 8158.0usft (H&P #629)
Well:	Fed 15D-13	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
128.0	128.0	0.0	0.0	First MWD Survey @ 128.0' MD / 128.0' TVD	
12,590.0	12,475.3	635.8	1,065.4	TD @ 12590.0' MD / 12475.3' TVD	