

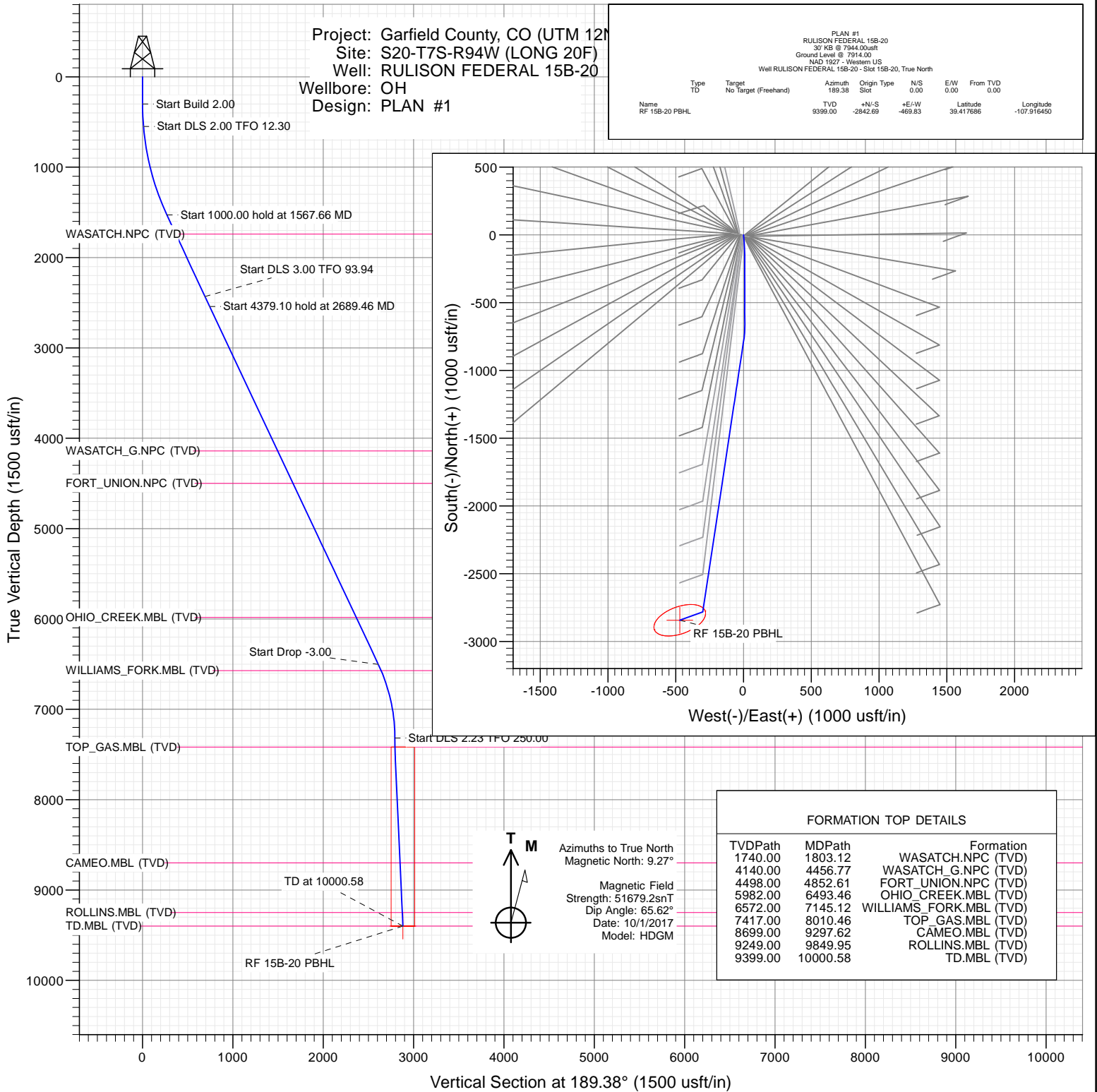


SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	
3	550.00	5.00	170.00	549.68	-10.74	1.89	2.00	170.00	10.28	
4	1567.66	25.26	180.00	1527.06	-274.32	9.68	2.00	12.30	269.07	
5	2567.66	25.26	180.00	2431.44	-701.05	9.68	0.00	0.00	690.09	
6	2689.46	25.26	188.57	2541.63	-752.75	5.80	3.00	93.94	741.72	
7	7068.56	25.26	188.57	6502.13	-2600.29	-272.62	0.00	0.00	2609.95	
8	7910.43	0.00	0.00	7317.00	-2780.82	-299.83	3.00	180.00	2792.49	
9	8146.33	5.26	250.00	7552.56	-2784.52	-310.00	2.23	250.00	2797.80	
10	10000.58	5.26	250.00	9399.00	-2842.69	-469.83	0.00	0.00	2881.25	RF 15B-20 PBHL

Project: Garfield County, CO (UTM 12N)
Site: S20-T7S-R94W (LONG 20F)
Well: RULISON FEDERAL 15B-20
Wellbore: OH
Design: PLAN #1

PLAN #1 RULISON FEDERAL 15B-20 30' KB @ 7944.00usft Ground Level @ 7914.00 NAD 1927 - Western US Well RULISON FEDERAL 15B-20 - Slot 15B-20, True North									
Type	Target	Azimuth	Origin	N/S	E/W	From	TVD	+N/-S	+E/-W
TD	No Target (Freehand)	189.38	Slot	0.00	0.00	0.00	0.00	0.00	0.00
Name	RF 15B-20 PBHL	TVD	9399.00	-2842.69	-469.83	Latitude	39.417686	Longitude	-107.916450



WELL DETAILS: RULISON FEDERAL 15B-20

		7914.00			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	14331761.10	2511735.30	39.425486	-107.914788

15B-20

CATHEDRAL



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well RULISON FEDERAL 15B-20 - Slot 15B-20
Company:	Caerus Oil & Gas	TVD Reference:	30' KB @ 7944.00usft
Project:	Garfield County, CO (UTM 12N)	MD Reference:	30' KB @ 7944.00usft
Site:	S20-T7S-R94W (LONG 20F)	North Reference:	True
Well:	RULISON FEDERAL 15B-20	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1		

Project	Garfield County, CO (UTM 12N)		
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		S20-T7S-R94W (LONG 20F)			
Site Position:		Northing:	14,331,773.27 usft	Latitude:	39.425526
From:	Map	Easting:	2,511,668.92 usft	Longitude:	-107.915021
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.96 °

Well	RULISON FEDERAL 15B-20 - Slot 15B-20					
Well Position	+N/-S	0.00 usft	Northing:	14,331,761.10 usft	Latitude:	39.425486
	+E/-W	0.00 usft	Easting:	2,511,735.30 usft	Longitude:	-107.914788
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	7,914.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/1/2017	9.27	65.62	51,679.20000000

Design	PLAN #1			
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	189.38

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	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
550.00	5.00	170.00	549.68	-10.74	1.89	2.00	2.00	0.00	170.00	
1,567.66	25.26	180.00	1,527.06	-274.32	9.68	2.00	1.99	0.98	12.30	
2,567.66	25.26	180.00	2,431.44	-701.05	9.68	0.00	0.00	0.00	0.00	
2,689.46	25.26	188.57	2,541.63	-752.75	5.80	3.00	0.00	7.04	93.94	
7,068.56	25.26	188.57	6,502.13	-2,600.29	-272.62	0.00	0.00	0.00	0.00	
7,910.43	0.00	0.00	7,317.00	-2,780.82	-299.83	3.00	-3.00	0.00	180.00	
8,146.33	5.26	250.00	7,552.56	-2,784.52	-310.00	2.23	2.23	-46.63	250.00	
10,000.58	5.26	250.00	9,399.00	-2,842.69	-469.83	0.00	0.00	0.00	0.00	RF 15B-20 PBHL

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well RULISON FEDERAL 15B-20 - Slot 15B-20
Company:	Caerus Oil & Gas	TVD Reference:	30' KB @ 7944.00usft
Project:	Garfield County, CO (UTM 12N)	MD Reference:	30' KB @ 7944.00usft
Site:	S20-T7S-R94W (LONG 20F)	North Reference:	True
Well:	RULISON FEDERAL 15B-20	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
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	
200.00	0.00	0.00	200.00	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	
400.00	2.00	170.00	399.98	-1.72	0.30	1.65	2.00	2.00	
500.00	4.00	170.00	499.84	-6.87	1.21	6.58	2.00	2.00	
550.00	5.00	170.00	549.68	-10.74	1.89	10.28	2.00	2.00	
600.00	5.98	172.05	599.45	-15.46	2.63	14.83	2.00	1.96	
700.00	7.96	174.62	698.71	-27.51	4.00	26.49	2.00	1.98	
800.00	9.94	176.17	797.49	-43.02	5.23	41.59	2.00	1.99	
900.00	11.93	177.21	895.67	-61.96	6.31	60.10	2.00	1.99	
1,000.00	13.93	177.96	993.13	-84.31	7.24	82.01	2.00	1.99	
1,100.00	15.92	178.52	1,089.75	-110.05	8.02	107.27	2.00	1.99	
1,200.00	17.92	178.96	1,185.42	-139.15	8.65	135.87	2.00	2.00	
1,300.00	19.91	179.32	1,280.01	-171.56	9.13	167.77	2.00	2.00	
1,400.00	21.91	179.61	1,373.42	-207.25	9.46	202.93	2.00	2.00	
1,500.00	23.91	179.85	1,465.53	-246.17	9.64	241.30	2.00	2.00	
1,567.66	25.26	180.00	1,527.06	-274.32	9.68	269.07	2.00	2.00	
1,600.00	25.26	180.00	1,556.30	-288.12	9.68	282.68	0.00	0.00	
1,700.00	25.26	180.00	1,646.74	-330.79	9.68	324.79	0.00	0.00	
1,800.00	25.26	180.00	1,737.18	-373.46	9.68	366.89	0.00	0.00	
1,803.12	25.26	180.00	1,740.00	-374.80	9.68	368.20	0.00	0.00	WASATCH.NPC (TVD)
1,900.00	25.26	180.00	1,827.61	-416.14	9.68	408.99	0.00	0.00	
2,000.00	25.26	180.00	1,918.05	-458.81	9.68	451.09	0.00	0.00	
2,100.00	25.26	180.00	2,008.49	-501.48	9.68	493.19	0.00	0.00	
2,200.00	25.26	180.00	2,098.93	-544.15	9.68	535.29	0.00	0.00	
2,300.00	25.26	180.00	2,189.37	-586.83	9.68	577.39	0.00	0.00	
2,400.00	25.26	180.00	2,279.80	-629.50	9.68	619.50	0.00	0.00	
2,500.00	25.26	180.00	2,370.24	-672.17	9.68	661.60	0.00	0.00	
2,567.66	25.26	180.00	2,431.44	-701.05	9.68	690.09	0.00	0.00	
2,600.00	25.21	182.27	2,460.69	-714.83	9.40	703.73	3.00	-0.15	
2,689.46	25.26	188.57	2,541.63	-752.75	5.80	741.72	3.00	0.05	
2,700.00	25.26	188.57	2,551.16	-757.19	5.13	746.22	0.00	0.00	
2,800.00	25.26	188.57	2,641.60	-799.38	-1.23	788.88	0.00	0.00	
2,900.00	25.26	188.57	2,732.04	-841.57	-7.58	831.54	0.00	0.00	
3,000.00	25.26	188.57	2,822.48	-883.76	-13.94	874.21	0.00	0.00	
3,100.00	25.26	188.57	2,912.92	-925.95	-20.30	916.87	0.00	0.00	
3,200.00	25.26	188.57	3,003.36	-968.14	-26.66	959.53	0.00	0.00	
3,300.00	25.26	188.57	3,093.80	-1,010.33	-33.02	1,002.19	0.00	0.00	
3,400.00	25.26	188.57	3,184.24	-1,052.52	-39.37	1,044.85	0.00	0.00	
3,500.00	25.26	188.57	3,274.69	-1,094.71	-45.73	1,087.52	0.00	0.00	
3,600.00	25.26	188.57	3,365.13	-1,136.90	-52.09	1,130.18	0.00	0.00	
3,700.00	25.26	188.57	3,455.57	-1,179.09	-58.45	1,172.84	0.00	0.00	
3,800.00	25.26	188.57	3,546.01	-1,221.28	-64.81	1,215.50	0.00	0.00	
3,900.00	25.26	188.57	3,636.45	-1,263.47	-71.16	1,258.17	0.00	0.00	
4,000.00	25.26	188.57	3,726.89	-1,305.66	-77.52	1,300.83	0.00	0.00	
4,100.00	25.26	188.57	3,817.33	-1,347.85	-83.88	1,343.49	0.00	0.00	
4,200.00	25.26	188.57	3,907.77	-1,390.04	-90.24	1,386.15	0.00	0.00	
4,300.00	25.26	188.57	3,998.21	-1,432.23	-96.60	1,428.81	0.00	0.00	
4,400.00	25.26	188.57	4,088.65	-1,474.42	-102.95	1,471.48	0.00	0.00	
4,456.77	25.26	188.57	4,140.00	-1,498.38	-106.56	1,495.70	0.00	0.00	WASATCH_G.NPC (TVD)
4,500.00	25.26	188.57	4,179.10	-1,516.61	-109.31	1,514.14	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well RULISON FEDERAL 15B-20 - Slot 15B-20
Company:	Caerus Oil & Gas	TVD Reference:	30' KB @ 7944.00usft
Project:	Garfield County, CO (UTM 12N)	MD Reference:	30' KB @ 7944.00usft
Site:	S20-T7S-R94W (LONG 20F)	North Reference:	True
Well:	RULISON FEDERAL 15B-20	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
4,600.00	25.26	188.57	4,269.54	-1,558.80	-115.67	1,556.80	0.00	0.00	
4,700.00	25.26	188.57	4,359.98	-1,600.99	-122.03	1,599.46	0.00	0.00	
4,800.00	25.26	188.57	4,450.42	-1,643.18	-128.39	1,642.13	0.00	0.00	
4,852.61	25.26	188.57	4,498.00	-1,665.38	-131.73	1,664.57	0.00	0.00	FORT_UNION.NPC (TVD)
4,900.00	25.26	188.57	4,540.86	-1,685.37	-134.75	1,684.79	0.00	0.00	
5,000.00	25.26	188.57	4,631.30	-1,727.56	-141.10	1,727.45	0.00	0.00	
5,100.00	25.26	188.57	4,721.74	-1,769.75	-147.46	1,770.11	0.00	0.00	
5,200.00	25.26	188.57	4,812.18	-1,811.94	-153.82	1,812.77	0.00	0.00	
5,300.00	25.26	188.57	4,902.62	-1,854.13	-160.18	1,855.44	0.00	0.00	
5,400.00	25.26	188.57	4,993.06	-1,896.32	-166.54	1,898.10	0.00	0.00	
5,500.00	25.26	188.57	5,083.50	-1,938.51	-172.89	1,940.76	0.00	0.00	
5,600.00	25.26	188.57	5,173.95	-1,980.70	-179.25	1,983.42	0.00	0.00	
5,700.00	25.26	188.57	5,264.39	-2,022.89	-185.61	2,026.09	0.00	0.00	
5,800.00	25.26	188.57	5,354.83	-2,065.08	-191.97	2,068.75	0.00	0.00	
5,900.00	25.26	188.57	5,445.27	-2,107.28	-198.33	2,111.41	0.00	0.00	
6,000.00	25.26	188.57	5,535.71	-2,149.47	-204.68	2,154.07	0.00	0.00	
6,100.00	25.26	188.57	5,626.15	-2,191.66	-211.04	2,196.73	0.00	0.00	
6,200.00	25.26	188.57	5,716.59	-2,233.85	-217.40	2,239.40	0.00	0.00	
6,300.00	25.26	188.57	5,807.03	-2,276.04	-223.76	2,282.06	0.00	0.00	
6,400.00	25.26	188.57	5,897.47	-2,318.23	-230.12	2,324.72	0.00	0.00	
6,493.46	25.26	188.57	5,982.00	-2,357.66	-236.06	2,364.59	0.00	0.00	OHIO_CREEK.MBL (TVD)
6,500.00	25.26	188.57	5,987.91	-2,360.42	-236.47	2,367.38	0.00	0.00	
6,600.00	25.26	188.57	6,078.36	-2,402.61	-242.83	2,410.05	0.00	0.00	
6,700.00	25.26	188.57	6,168.80	-2,444.80	-249.19	2,452.71	0.00	0.00	
6,800.00	25.26	188.57	6,259.24	-2,486.99	-255.55	2,495.37	0.00	0.00	
6,900.00	25.26	188.57	6,349.68	-2,529.18	-261.91	2,538.03	0.00	0.00	
7,000.00	25.26	188.57	6,440.12	-2,571.37	-268.27	2,580.69	0.00	0.00	
7,068.56	25.26	188.57	6,502.13	-2,600.29	-272.62	2,609.95	0.00	0.00	
7,100.00	24.31	188.57	6,530.67	-2,613.32	-274.59	2,623.12	3.00	-3.00	
7,145.12	22.96	188.57	6,572.00	-2,631.21	-277.28	2,641.21	3.00	-3.00	WILLIAMS_FORK.MBL (TVD)
7,200.00	21.31	188.57	6,622.84	-2,651.66	-280.37	2,661.89	3.00	-3.00	
7,300.00	18.31	188.57	6,716.91	-2,685.17	-285.42	2,695.77	3.00	-3.00	
7,400.00	15.31	188.57	6,812.62	-2,713.77	-289.73	2,724.69	3.00	-3.00	
7,500.00	12.31	188.57	6,909.72	-2,737.38	-293.28	2,748.56	3.00	-3.00	
7,600.00	9.31	188.57	7,007.93	-2,755.93	-296.08	2,767.32	3.00	-3.00	
7,700.00	6.31	188.57	7,106.99	-2,769.37	-298.10	2,780.91	3.00	-3.00	
7,800.00	3.31	188.57	7,206.63	-2,777.66	-299.35	2,789.30	3.00	-3.00	
7,900.00	0.31	188.57	7,306.57	-2,780.79	-299.83	2,792.46	3.00	-3.00	
7,910.43	0.00	0.00	7,317.00	-2,780.82	-299.83	2,792.49	3.00	-3.00	
8,000.00	2.00	250.00	7,406.55	-2,781.35	-301.30	2,793.26	2.23	2.23	
8,010.46	2.23	250.00	7,417.00	-2,781.49	-301.66	2,793.45	2.23	2.23	TOP_GAS.MBL (TVD)
8,100.00	4.23	250.00	7,506.39	-2,783.21	-306.40	2,795.92	2.23	2.23	
8,146.33	5.26	250.00	7,552.56	-2,784.52	-310.00	2,797.80	2.23	2.23	
8,200.00	5.26	250.00	7,606.01	-2,786.21	-314.63	2,800.22	0.00	0.00	
8,300.00	5.26	250.00	7,705.59	-2,789.34	-323.25	2,804.72	0.00	0.00	
8,400.00	5.26	250.00	7,805.16	-2,792.48	-331.87	2,809.22	0.00	0.00	
8,500.00	5.26	250.00	7,904.74	-2,795.62	-340.49	2,813.72	0.00	0.00	
8,600.00	5.26	250.00	8,004.32	-2,798.75	-349.11	2,818.22	0.00	0.00	
8,700.00	5.26	250.00	8,103.90	-2,801.89	-357.73	2,822.72	0.00	0.00	
8,800.00	5.26	250.00	8,203.48	-2,805.03	-366.35	2,827.22	0.00	0.00	
8,900.00	5.26	250.00	8,303.06	-2,808.17	-374.97	2,831.72	0.00	0.00	
9,000.00	5.26	250.00	8,402.63	-2,811.30	-383.59	2,836.22	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well RULISON FEDERAL 15B-20 - Slot 15B-20
Company:	Caerus Oil & Gas	TVD Reference:	30' KB @ 7944.00usft
Project:	Garfield County, CO (UTM 12N)	MD Reference:	30' KB @ 7944.00usft
Site:	S20-T7S-R94W (LONG 20F)	North Reference:	True
Well:	RULISON FEDERAL 15B-20	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
9,100.00	5.26	250.00	8,502.21	-2,814.44	-392.20	2,840.72	0.00	0.00	
9,200.00	5.26	250.00	8,601.79	-2,817.58	-400.82	2,845.22	0.00	0.00	
9,297.62	5.26	250.00	8,699.00	-2,820.64	-409.24	2,849.62	0.00	0.00	CAMEO.MBL (TVD)
9,300.00	5.26	250.00	8,701.37	-2,820.71	-409.44	2,849.72	0.00	0.00	
9,400.00	5.26	250.00	8,800.95	-2,823.85	-418.06	2,854.23	0.00	0.00	
9,500.00	5.26	250.00	8,900.53	-2,826.99	-426.68	2,858.73	0.00	0.00	
9,600.00	5.26	250.00	9,000.11	-2,830.12	-435.30	2,863.23	0.00	0.00	
9,700.00	5.26	250.00	9,099.68	-2,833.26	-443.92	2,867.73	0.00	0.00	
9,800.00	5.26	250.00	9,199.26	-2,836.40	-452.54	2,872.23	0.00	0.00	
9,849.95	5.26	250.00	9,249.00	-2,837.96	-456.85	2,874.48	0.00	0.00	ROLLINS.MBL (TVD)
9,900.00	5.26	250.00	9,298.84	-2,839.53	-461.16	2,876.73	0.00	0.00	
10,000.00	5.26	250.00	9,398.42	-2,842.67	-469.78	2,881.23	0.00	0.00	
10,000.58	5.26	250.00	9,399.00	-2,842.69	-469.83	2,881.25	0.00	0.00	TD.MBL (TVD)

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
RF 15B-20 PBHL	0.00	0.00	9,399.00	-2,842.69	-469.83	14,328,904.00	2,511,363.00	39.417686	-107.916450
- plan hits target center									
- Ellipse (radii L200.00 W100.00 on 250.00 azi)									

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,803.12	1,740.00	WASATCH.NPC (TVD)			
4,456.77	4,140.00	WASATCH_G.NPC (TVD)			
4,852.61	4,498.00	FORT_UNION.NPC (TVD)			
6,493.46	5,982.00	OHIO_CREEK.MBL (TVD)			
7,145.12	6,572.00	WILLIAMS_FORK.MBL (TVD)			
8,010.46	7,417.00	TOP_GAS.MBL (TVD)			
9,297.62	8,699.00	CAMEO.MBL (TVD)			
9,849.95	9,249.00	ROLLINS.MBL (TVD)			
10,000.58	9,399.00	TD.MBL (TVD)			