

GEOLOGIC & DRILLING PROGNOSIS

Prepared: 30-Dec-25 CMW

WELL NAME: FEDERAL RGU 42-6-297
Directional from the pad RGU 23-6-297

API: 05-103-12640
STATE: CO
COUNTY: RIO BLANCO
SURFACE HOLE LOCATION: Sec. 6 T 2S R 97W
TYPE OF UNIT: FED
FEDERAL EA: Yes
HARDLINE: No

ELEVATION (ft):
PAD (ft): 6222
GROUND (ft): 6222
KELLY BUSHING (ft): 6252

RIG INFORMATION:
RIG NAME: HP 522
KB HEIGHT (ft): 30

ESTIMATE TOPS:

Formation	TVD	MD	Formation Resource Notes
Uinta	30	30	Potentially Useable Water
Green River	650	653	Potentially Useable Water
A Groove	800	806	Potentially Useable Water
B Groove	1000	1014	Potentially Useable Water
Dissolution Surface	1300	1334	Possible Lost Circ Zone
Garden Gulch	2200	2300	Potentially Useable Water
Orange Marker	2246	2472	Potentially Useable Water
Upper Wasatch	2440	2558	Potentially Useable Water
Top of "G" Sand	5050	5361	Possible Lost Circ Zone
Fort Union	5310	5641	Gas and Limited Use and Quality Water
Lower Wasatch	6100	6489	Potentially Useable Water
Ohio Creek	7012	7469	Possible Lost Circ Zone
Upper Measaverde	7732	8225	Gas and Limited Use and Quality Water
Approx. Top Gas	8532	9031	Gas and Limited Use and Quality Water
Cameo Coals	10102	10601	Gas, Coal, and Limited Use and Quality Water
Rollins SS	10832	11331	Gas and Limited Use and Quality Water
Cozzette	10982	11481	Gas and Limited Use and Quality Water
Corcoran	11307	11806	Gas and Limited Use and Quality Water
Upper Segó	11567	12066	Gas and Limited Use and Quality Water
Lower Segó	11812	12311	Gas and Limited Use and Quality Water
TD	12312	12811	

MUD LOGGING: Type: (Optional) Remote Gas Unit
Interval: Base of surface casing to TD with total gas only

OPEN HOLE LOGS: Specifics: (Optional) Triple-Combo (DIL-GR-SP-Neutron Density)
Interval: (Optional) GR from TD to surface, DIL-SP and Neutron Density from TD to 100' inside surface casing

CASED HOLE LOGS: Cement Eval: CBL

CSG & CEMENT PROGRAM: SHOE TEST REQUIRED

	Csg Size (in)	Depth Set (tvd)	Depth Set (md)	Hole Size (in)	Approx. Cmt Tail (ft3)	Tail Yield (ft3/sx)	Approx. Sx Tail	Approx. Cmt Lead (ft3)	Lead Yield (ft3/sx)	Approx. Sx Lead	WOC (hrs)
Conductor:	20	80	80	30	230	1.15					
Surface:	9.625	2540	2665	12.25	188	1.68	112	882	2.53	348	
Liner or Production:	4.5	12312	12811	8.75	1685	1.88	896	1056	2.09	505	
							Surface (sacks):	460	Prod. (sacks):	1401	

ANTICIPATED PRESSURES (psi)

MASP	Prod Csg Test Pressure	Anticipated BHP	Prod. Csg. Grade
3,694	8,500	5,725	HCP-110

MUD PROGRAM: (Do not deviate from mud engineer's recommendation without prior consent from Parachute office)

FROM (md)	TO (md)	TYPE MUD	#/GAL	VIS	WL	CHEMICALS
0	2665	WBM	8.3-9.5	45-50	7-15	Bentonite/PHPA
2665	12811	LSND	8.6-10.0	40-80	6-10	PHPA/Barite

(Write mud added to system on tour sheets and report all mud mixed and daily cost in morning report)

LOST CIRCULATION: Report depth and bbls of mud lost on morning report and tour sheet. Any severe lost circulation problems should be reported immediately to well supervisor.

SURVEYS: Run every 100' on surface hole and trips unless otherwise instructed.

TEP GEOLOGIST: Office: 281-936-0361 Cell: 303-918-4327
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(note: if there are questions concerning TD or logging, please call Geologist)

CASING & CEMENTING PLAN

Operator: TEP Rocky Mountain
 Well Name & Number: FEDERAL RGU 42-6-297
 Location: Ryan Gulch

Casing Design Calculations											
Type of Casing	Size of Hole (inches)	Size of Casing (inches)	Weight per Foot (lbs/ft)	Grade	Thread	Interval (ft - ft)	Length (feet)	Setting Depth (TVD feet)	Collapse (psi)	Burst (psi)	Tension (lbs)
Surface	12.25	9.625	36.0	J-55	BTC	0-2665	2,665	2,540	2,020	3,520	453,000
Production	8.75	4.500	11.6	HCP-110	GB (BTC)	0-12811	12,811	12,312	8,650	10,690	367,000

Surface Casing Shoe	Production Casing Shoe
Max MW = 9.5 ppg HP = 1,255 psi	Max MW = 10.0 ppg HP = 6,402 psi

True Vertical Depth = 12,312 ft
 Bottom Hole Pressure = 5,725 psi
 Pore Pressure Gradient = 0.465 psi/ft
 Max. Sur. Pressure = 3,694 psi
 BOP Required = 5M System

Bottom Hole Temperature = 260 degrees Fahrenheit

Casing Safety Factors			
Surface Casing	Pb = 1.17	Min = 1.100	Pass
	Pc = 1.61	Min = 1.125	Pass
	Sj = 4.72	Min = 1.500	Pass
Production Casing	Pb = 3.54	Min = 1.100	Pass
	Pc = 1.35	Min = 1.125	Pass
	Sj = 2.47	Min = 1.500	Pass

Cement Design Calculations

Critical Depths - Permitting Purposes Only	
Casing/Formation	Measured Depth
Surface Casing	2,665 ft
Top of "G" Sand	5,361 ft
Top of Mesaverde	8,225 ft
Top of Gas	9,031 ft
Total Depth	12,811 ft

Surface Cement	Stg II Lead	Stg I Lead	Tail
Top of Cement (ft)	0	0	2,165
Bottom of Cement (ft)	0	2,165	2,665
Cement Type	Type IL	Type IL	Class G
Additives (lb/sk)	.25 IntegraSeal	.25 IntegraSeal	.25 IntegraSeal
Volume, bbls	0	121	28
Annular vol w/ excess, ft ³	0	882	188
Volume (sks)	0	348	112
Slurry Density (ppg)	12.3	12.3	13.9
Slurry Yield (ft ³ /sk)	2.530	2.530	1.680
Mixwater (gal/sk)	14.80	14.80	8.27
Annular Capacity (BBL)	0.0558	0.0558	0.0558
Annular Capacity (CF)	0.3132	0.3132	0.3132
Excess (%)	0.30	0.30	0.20
Total Sacks =	460		
Total Cubic Ft. =	1,069		

Production Cement	Lead	Tail
Top of Cement (ft)	5161	8025
Bottom of Cement (ft)	8025	12811
Cement Type	Type IL	Class G
Additives (lb/sk)	.25 IntegraSeal	35% Silica
Volume, bbls	188	300
Annular vol w/ excess, ft ³	1,056	1685
Volume (sks)	505	896
Slurry Density (ppg)	12.7	13.5
Slurry Yield (ft ³ /sk)	2.090	1.880
Mixwater (gal/sk)	11,200	9,100
Annular Capacity (BBL)	0.0547	0.0547
Annular Capacity (CF)	0.3072	0.3072
Excess (%)	0.20	0.10
Total Sacks =	1,401	
Total Cubic Ft. =	2,740	

NOTES:

Surface

Single track guide shoe and float collar. Bowspring Centralize 1st, 2nd, & 3rd jt. & every 4th joint.
 WOC prior to drill out for a minimum of 500 psi compressive.

Production

Reamer/Guide Shoe, 1jt blank, and Single Valve FC. Spiralizer Centralize 1st, 2nd, 3rd, 6th and 8th. 10' short jt above Ohio Creek
 5 Spiralizers every other joint above drop/TOG From 9031 to 8531

All Casing strings will be tested to .22psi/ft, or 1500 psi, whichever is greater, but will not exceed 70% of the minimum internal yield. If pressure declines more than 10% in 30 minutes, notification will be made and corrective actions will be taken.

Casing Design Calculations

Surface Casing - 36#	<p>Burst</p> <p>Bottom Hole Pressure = TVD * Pore Pressure Gradient = 12312 * 0.465 RG 312-24-298 5725.1 psi RGU 23-6-297</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD) = 5725.08 - (0.22 * 12312) = 3016.4 psi</p> <p>Pb = Casing Burst Rating / Pburst = 3520 / 3016.44 = 1.17</p> <p>Pb ≥ 1.1 1.17 ≥ 1.1</p> <hr/> <p>Collapse</p> <p>If: Max MW * Setting TVD * 0.052 ≥ Pore Pressure Gradient * Setting TVD 9.5 * 2540 * 0.052 ≥ 0.465 * 2540 1254.8 ≥ 1181.1</p> <p>Pcollapse = Max MW * Setting TVD * 0.052 = 1254.8 psi</p> <p>Else: Pcollapse = Pore Pressure Gradient * Setting TVD = 1181.1 psi Pcollapse = 1254.8 psi</p> <p>Pc = Casing Collapse Rating / Pcollapse = 2020 / 1254.76 = 1.61</p> <p>Pc ≥ 1.125 1.61 ≥ 1.125</p> <hr/> <p>Tensile</p> <p>Tension = (Weight1 * Length1) = (36 * 2665) = 95940 lbs</p> <p>Sj = Casing Tension Rating / Tension = 453000 / 95940 = 4.72</p> <p>Sj ≥ 1.5 4.72 ≥ 1.5</p>
Production Casing	<p>Burst</p> <p>Bottom Hole Pressure = TVD * Pore Pressure Gradient = 12312 * 0.465 = 5725.1 psi</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD) = 5725.08 - (0.22 * 12312) = 3016.4 psi</p> <p>Pburst = MATP = 8,500 psi Pburstmax = 8,500 psi</p> <p>Pb = Casing Burst Rating / Pburst max = 10690 / 8500 = 1.26</p> <p>Pb ≥ 1.1 1.26 ≥ 1.1</p> <hr/> <p>Collapse</p> <p>If: Max MW * Setting TVD * 0.052 ≥ Pore Pressure Gradient * Setting TVD 10 * 12312 * 0.052 ≥ 0.465 * 12312 6402.2 ≥ 5725.08</p> <p>Pcollapse = Max MW * Setting TVD * 0.052 = 6402.2 psi</p> <p>Else: Pcollapse = Pore Pressure Gradient * Setting TVD = 5725.1 psi</p> <p>Pcollapse = 6402.2 psi Pc = Casing Collapse Rating / Pcollapse = 8650 / 6402.24 = 1.35</p> <p>Pc ≥ 1.125 1.35 ≥ 1.125</p> <hr/> <p>Tensile</p> <p>Tension = Weight * Length = 11.6 * 12811 = 148608 lbs</p> <p>Sj = Casing Tension Rating / Tension = 367000 / 148607.6 = 2.47</p> <p>Sj ≥ 1.5 2.47 ≥ 1.5</p>