

GEOLOGIC & DRILLING PROGNOSIS

Prepared: 23-Oct-25 CMW

WELL NAME: FED RGU 421-12-298
Directional from the pad RGU 44-1-298

API: 05-103-12667
STATE: CO
COUNTY: RIO BLANCO
BOTTOM HOLE LOCATION: Sec. 1 T 2S R 98W
TYPE OF UNIT: FED
FEDERAL EA: Yes
HARDLINE: No

ELEVATION (ft):
PAD (ft): 6282
GROUND (ft): 6282
KELLY BUSHING (ft): 6312

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	700	700	Potentially Useable Water
A Groove	850	851	Potentially Useable Water
B Groove	1050	1054	Potentially Useable Water
Dissolution Surface	1350	1363	Possible Lost Circ Zone
Garden Gulch	2250	2330	Potentially Useable Water
Orange Marker	2420	2513	Potentially Useable Water
Upper Wasatch	2500	2599	Potentially Useable Water
Top of "G" Sand	5110	5412	Possible Lost Circ Zone
Fort Union	5370	5693	Gas and Limited Use and Quality Water
Lower Wasatch	6160	6544	Potentially Useable Water
Ohio Creek	6636	7041	Possible Lost Circ Zone
Upper Measaverde	7356	7769	Gas and Limited Use and Quality Water
Approx. Top Gas	8156	8569	Gas and Limited Use and Quality Water
Cameo Coals	9726	10139	Gas, Coal, and Limited Use and Quality Water
Rollins SS	10456	10869	Gas and Limited Use and Quality Water
Cozzette	10606	11019	Gas and Limited Use and Quality Water
Corcoran	10931	11344	Gas and Limited Use and Quality Water
Upper Sego	11191	11604	Gas and Limited Use and Quality Water
Lower Sego	11436	11849	Gas and Limited Use and Quality Water
TD	11936	12349	

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					
DV Tool:	9.625	900	900	12.25	-	-	-	366	2.53	145	
Surface:	9.625	3000	3138	12.25	188	1.68	112	708	2.53	280	
Liner or Production:	4.5	11936	12349	8.75	1345	1.88	715	307	2.09	147	
							Surface (sacks):	536	Prod. (sacks):	862	

ANTICIPATED PRESSURES (psi)

MASP	Prod Csg Test Pressure	Anticipated BHP	Prod. Csg. Grade
2,924	8,500	5,550	P-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	3138	WBM	8.3-9.5	45-50	7-15	Bentonite/PHPA
3138	12349	LSND	8.6-11.0	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.

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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: FED RGU 421-12-298
 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	0-3138	3,138	3,000	2,020	3,520	453,000
Production	8.75	4.500	11.6	P-110	EB (BTC)	0-12349	12,349	11,936	8,300	10,690	367,000

Surface Casing Shoe	Production Casing Shoe
Max MW = 9.5 ppg HP = 1,482 psi	Max MW = 10.0 ppg HP = 6,207 psi

True Vertical Depth = 11,936 ft
 Bottom Hole Pressure = 5,550 psi
 Pore Pressure Gradient = 0.465 psi/ft
 Max. Sur. Pressure = 2,924 psi
 BOP Required = 5M System

Bottom Hole Temperature = 260 degrees Fahrenheit

Casing Safety Factors			
Surface Casing	Pb = 1.20	Min = 1.100	Pass
	Pc = 1.36	Min = 1.125	Pass
	Sj = 4.01	Min = 1.500	Pass
Production Casing	Pb = 3.66	Min = 1.100	Pass
	Pc = 1.34	Min = 1.125	Pass
	Sj = 2.56	Min = 1.500	Pass

Cement Design Calculations

Critical Depths - Permitting Purposes Only	
Casing/Formation	Measured Depth
DV Tool	900 ft
Surface Casing	3,138 ft
Top of Mesaverde	7,769 ft
Top of Gas	8,569 ft
Total Depth	12,349 ft

Surface Cement	Stg II Lead	Stg I Lead	Tail
Top of Cement (ft)	0	900	2,638
Bottom of Cement (ft)	900	2,638	3,138
Cement Type	Type I/II	Type I/II	Class G
Additives (lb/sk)	.25 IntegraSeal	.25 IntegraSeal	.25 IntegraSeal
Volume, bbls	50	97	28
Annular vol w/ excess, ft ³	366	708	188
Volume (sks)	145	280	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 =		536
	Total Cubic Ft. =		1,262

Production Cement	Lead	Tail	
Top of Cement (ft)	7569	7569	
Bottom of Cement (ft)	7569	12349	
Cement Type	Type I/II	Class G	
Additives (lb/sk)	.25 IntegraSeal	35% Silica	
Volume, bbls	44	218	
Annular vol w/excess, ft ³	307	1345	
Volume (sks)	147	715	
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 (%)	0.25	0.10	
	Total Sacks =		862
	Total Cubic Ft. =		1,652

NOTES:

Surface and Intermediate

Single track guide shoe and float collar. Bowspring Centralize 1st, 2nd, & 3rd jt. Above/below DV tool @ 900', & every 4th joint.

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 8569 to 8069

Casing Design Calculations

Surface Casing - 36#	Burst
	<p>Bottom Hole Pressure = TVD * Pore Pressure Gradient = 11936 * 0.465 = 5550.2 psi</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD) = 5550.24 - (0.22 * 11936) = 2924.3 psi</p> <p>Pb = Casing Burst Rating / Pburst = 3520 / 2924.32 = 1.20</p> <p>Pb ≥ 1.1 1.20 ≥ 1.1</p>
	<p>Collapse</p> <p>If: Max MW * Setting TVD * 0.052 ≥ Pore Pressure Gradient * Setting TVD 9.5 * 3000 * 0.052 ≥ 0.465 * 3000 1482 ≥ 1395</p> <p>Pcollapse = Max MW * Setting TVD * 0.052 = 1482 psi</p> <p>Else: Pcollapse = Pore Pressure Gradient * Setting TVD = 1395 psi Pcollapse = 1482 psi</p> <p>Pc = Casing Collapse Rating / Pcollapse = 2020 / 1482 = 1.36</p> <p>Pc ≥ 1.125 1.36 ≥ 1.125</p>
	<p>Tensile</p> <p>Tension = (Weight * Length) = (36 * 3138) = 112968 lbs</p> <p>Sj = Casing Tension Rating / Tension = 453000 / 112968 = 4.01</p> <p>Sj ≥ 1.5 4.01 ≥ 1.5</p>
Production Casing	Burst
	<p>Bottom Hole Pressure = TVD * Pore Pressure Gradient = 11936 * 0.465 = 5550.2 psi</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD) = 5550.24 - (0.22 * 11936) = 2924.3 psi</p> <p>Pb = Casing Burst Rating / Pburst = 10690 / 2924.32 = 3.66</p> <p>Pb ≥ 1.1 3.66 ≥ 1.1</p>
	<p>Collapse</p> <p>If: Max MW * Setting TVD * 0.052 ≥ Pore Pressure Gradient * Setting TVD 10 * 11936 * 0.052 ≥ 0.465 * 11936 6206.7 ≥ 5550.24</p> <p>Pcollapse = Max MW * Setting TVD * 0.052 = 6206.7 psi</p> <p>Else: Pcollapse = Pore Pressure Gradient * Setting TVD = 5550.2 psi</p> <p>Pcollapse = 6206.7 psi</p> <p>Pc = Casing Collapse Rating / Pcollapse = 8300 / 6206.72 = 1.34</p> <p>Pc ≥ 1.125 1.34 ≥ 1.125</p>
	<p>Tensile</p> <p>Tension = Weight * Length = 11.6 * 12349 = 143248 lbs</p> <p>Sj = Casing Tension Rating / Tension = 367000 / 143248.4 = 2.56</p> <p>Sj ≥ 1.5 2.56 ≥ 1.5</p>