

**GEOLOGIC & DRILLING PROGNOSIS**

Prepared: 30-Dec-25 CMW

**WELL NAME:** FEDERAL RGU 41-6-297  
Directional from the pad RGU 23-6-297

API: 05-103-12641  
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	1012	Potentially Useable Water
Dissolution Surface	1300	1331	Possible Lost Circ Zone
Garden Gulch	2200	2342	Potentially Useable Water
Orange Marker	2207	2522	Potentially Useable Water
Upper Wasatch	2440	2613	Potentially Useable Water
Top of "G" Sand	5050	5558	Possible Lost Circ Zone
Fort Union	5310	5852	Gas and Limited Use and Quality Water
Lower Wasatch	6100	6743	Potentially Useable Water
Ohio Creek	7042	7802	Possible Lost Circ Zone
Upper Measaverde	7762	8559	Gas and Limited Use and Quality Water
Approx. Top Gas	8562	9365	Gas and Limited Use and Quality Water
Cameo Coals	10132	10935	Gas, Coal, and Limited Use and Quality Water
Rollins SS	10862	11665	Gas and Limited Use and Quality Water
Cozzette	11012	11815	Gas and Limited Use and Quality Water
Corcoran	11337	12140	Gas and Limited Use and Quality Water
Upper Segro	11597	12400	Gas and Limited Use and Quality Water
Lower Segro	11842	12645	Gas and Limited Use and Quality Water
<b>TD</b>	<b>12342</b>	<b>13145</b>	

**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	2725	12.25	188	1.68	112	906	2.53	358	
Liner or Production:	4.5	12342	13145	8.75	1685	1.88	896	1106	2.09	529	
							<b>Surface (sacks):</b>	<b>470</b>	<b>Prod. (sacks):</b>	<b>1425</b>	

**ANTICIPATED PRESSURES (psi)**

MASP	Prod Csg Test Pressure	Anticipated BHP	Prod. Csg. Grade
3,703	8,500	5,739	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	2725	WBM	8.3-9.5	45-50	7-15	Bentonite/PHPA
2725	13145	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.

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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 41-6-297  
 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	0-2725	2,725	2,540	2,020	3,520	453,000
Production	8.75	4.500	11.6	HCP-110	GB (BTC)	0-13145	13,145	12,342	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 = 6,418 psi

True Vertical Depth = 12,342 ft  
 Bottom Hole Pressure = 5,739 psi  
 Pore Pressure Gradient = 0.465 psi/ft  
 Max. Sur. Pressure = 3,703 psi  
 BOP Required = 5M System

Bottom Hole Temperature = 260 degrees Fahrenheit

Casing Safety Factors			
Surface Casing	Pb = 1.16	Min = 1.100	Pass
	Pc = 1.61	Min = 1.125	Pass
	Sj = 4.62	Min = 1.500	Pass
Production Casing	Pb = 3.54	Min = 1.100	Pass
	Pc = 1.35	Min = 1.125	Pass
	Sj = 2.41	Min = 1.500	Pass

Cement Design Calculations

Critical Depths - Permitting Purposes Only	
Casing/Formation	Measured Depth
Surface Casing	2,725 ft
Top of "G" Sand	5,558 ft
Top of Mesaverde	8,559 ft
Top of Gas	9,365 ft
Total Depth	13,145 ft

Surface Cement	Stg II Lead	Stg I Lead	Tail
Top of Cement (ft)	0	0	2,225
Bottom of Cement (ft)	0	2,225	2,725
Cement Type	Type II	Type II	Class G
Additives (lb/sk)	.25 IntegraSeal	.25 IntegraSeal	.25 IntegraSeal
Volume, bbls	0	124	28
Annular vol w/ excess, ft <sup>3</sup>	0	906	188
Volume (sks)	0	358	112
Slurry Density (ppg)	12.3	12.3	13.9
Slurry Yield (ft <sup>3</sup> /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
<b>Total Sacks =</b>			470
<b>Total Cubic Ft. =</b>			1,094

Production Cement	Lead	Tail
Top of Cement (ft)	5358	8359
Bottom of Cement (ft)	8359	13145
Cement Type	Type II	Class G
Additives (lb/sk)	.25 IntegraSeal	35% Silica
Volume, bbls	197	300
Annular vol w/excess, ft <sup>3</sup>	1,106	1685
Volume (sks)	529	896
Slurry Density (ppg)	12.7	13.5
Slurry Yield (ft <sup>3</sup> /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
<b>Total Sacks =</b>	1,425	
<b>Total Cubic Ft. =</b>	2,791	

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 9365 to 8865

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

<b>Surface Casing - 36#</b>	<p><b>Burst</b></p> <p>Bottom Hole Pressure = TVD * Pore Pressure Gradient                      = 12342 * 0.465                      RG 312-24-298 5739 psi                      RGU 23-6-297</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD)                      = 5739.03 - (0.22 * 12342)                      = 3023.8 psi</p> <p>Pb = Casing Burst Rating / Pburst                      = 3520 / 3023.79                      = 1.16</p> <p>Pb ≥ 1.1                      1.16 ≥ 1.1</p> <hr/> <p><b>Collapse</b></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><b>Tensile</b></p> <p>Tension = (Weight1 * Length1)                      = (36 * 2725)                      = 98100 lbs</p> <p>Sj = Casing Tension Rating / Tension                      = 453000 / 98100                      = 4.62</p> <p>Sj ≥ 1.5                      4.62 ≥ 1.5</p>
<b>Production Casing</b>	<p><b>Burst</b></p> <p>Bottom Hole Pressure = TVD * Pore Pressure Gradient                      = 12342 * 0.465                      = 5739 psi</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD)                      = 5739.03 - (0.22 * 12342)                      = 3023.8 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><b>Collapse</b></p> <p>If: Max MW * Setting TVD * 0.052 ≥ Pore Pressure Gradient * Setting TVD                      10 * 12342 * 0.052 ≥ 0.465 * 12342                      6417.8 ≥ 5739.03</p> <p>Pcollapse = Max MW * Setting TVD * 0.052                      = 6417.8 psi</p> <p>Else:                      Pcollapse = Pore Pressure Gradient * Setting TVD                      = 5739 psi</p> <p>Pcollapse = 6417.8 psi</p> <p>Pc = Casing Collapse Rating / Pcollapse                      = 8650 / 6417.84                      = 1.35</p> <p>Pc ≥ 1.125                      1.35 ≥ 1.125</p> <hr/> <p><b>Tensile</b></p> <p>Tension = Weight * Length                      = 11.6 * 13145                      = 152482 lbs</p> <p>Sj = Casing Tension Rating / Tension                      = 367000 / 152482                      = 2.41</p> <p>Sj ≥ 1.5                      2.41 ≥ 1.5</p>