

**GEOLOGIC & DRILLING PROGNOSIS**

Prepared: 30-Dec-25 CMW

**WELL NAME:** FEDERAL RGU 443-6-297  
Directional from the pad RGU 23-6-297

API: 05-103-12649  
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	657	Potentially Useable Water
A Groove	800	814	Potentially Useable Water
B Groove	1000	1023	Potentially Useable Water
Dissolution Surface	1300	1337	Possible Lost Circ Zone
Garden Gulch	2200	2279	Potentially Useable Water
Orange Marker	2268	2446	Potentially Useable Water
Upper Wasatch	2440	2530	Potentially Useable Water
Top of "G" Sand	5050	5262	Possible Lost Circ Zone
Fort Union	5310	5534	Gas and Limited Use and Quality Water
Lower Wasatch	6100	6360	Potentially Useable Water
Ohio Creek	6962	7262	Possible Lost Circ Zone
Upper Measaverde	7682	8012	Gas and Limited Use and Quality Water
Approx. Top Gas	8482	8818	Gas and Limited Use and Quality Water
Cameo Coals	10052	10388	Gas, Coal, and Limited Use and Quality Water
Rollins SS	10782	11118	Gas and Limited Use and Quality Water
Cozzette	10932	11268	Gas and Limited Use and Quality Water
Corcoran	11257	11593	Gas and Limited Use and Quality Water
Upper Segro	11517	11853	Gas and Limited Use and Quality Water
Lower Segro	11762	12098	Gas and Limited Use and Quality Water
<b>TD</b>	<b>12262</b>	<b>12598</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	2635	12.25	188	1.68	112	869	2.53	344	
Liner or Production:	4.5	12262	12598	8.75	1685	1.88	896	1014	2.09	485	
							<b>Surface (sacks):</b>	<b>455</b>	<b>Prod. (sacks):</b>	<b>1381</b>	

**ANTICIPATED PRESSURES (psi)**

MASP	Prod Csg Test Pressure	Anticipated BHP	Prod. Csg. Grade
3,679	8,500	5,702	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	2635	WBM	8.3-9.5	45-50	7-15	Bentonite/PHPA
2635	12598	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 443-6-297  
 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	0-2635	2,635	2,540	2,020	3,520	453,000
Production	8.75	4.500	11.6	HCP-110	GB (BTC)	0-12598	12,598	12,262	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 = 6,376 psi

True Vertical Depth = 12,262 ft  
 Bottom Hole Pressure = 5,702 psi  
 Pore Pressure Gradient = 0.465 psi/ft  
 Max. Sur. Pressure = 3,679 psi  
 BOP Required = 5M System

Bottom Hole Temperature = 260 degrees Farenheit

Casing Safety Factors			
Surface Casing	Pb = 1.17	Min = 1.100	Pass
	Pc = 1.61	Min = 1.125	Pass
	Sj = 4.78	Min = 1.500	Pass
Production Casing	Pb = 3.56	Min = 1.100	Pass
	Pc = 1.36	Min = 1.125	Pass
	Sj = 2.51	Min = 1.500	Pass

#### Cement Design Calculations

Critical Depths - Permitting Purposes Only	
Casing/Formation	Measured Depth
Surface Casing	2,635 ft
Top of "G" Sand	5,262 ft
Top of Mesaverde	8,012 ft
Top of Gas	8,818 ft
Total Depth	12,598 ft

Surface Cement	Stg II Lead	Stg I Lead	Tail
Top of Cement (ft)	0	0	2,135
Bottom of Cement (ft)	0	2,135	2,635
Cement Type	Type II	Type II	Class G
Additives (lb/sk)	.25 IntegraSeal	.25 IntegraSeal	.25 IntegraSeal
Volume, bbls	0	119	28
Annular vol w/ excess, ft <sup>3</sup>	0	869	188
Volume (sks)	0	344	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 (BBbl)	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>	455		
<b>Total Cubic Ft. =</b>	1,057		

Production Cement	Lead	Tail
Top of Cement (ft)	5062	7812
Bottom of Cement (ft)	7812	12598
Cement Type	Type II	Class G
Additives (lb/sk)	.25 IntegraSeal	35% Silica
Volume, bbls	181	300
Annular vol w/excess, ft <sup>3</sup>	1,014	1685
Volume (sks)	485	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 (BBbl)	0.0547	0.0547
Annular Capacity (CF)	0.3072	0.3072
Excess (%)	0.20	0.10
<b>Total Sacks =</b>	1,381	
<b>Total Cubic Ft. =</b>	2,698	

#### 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 8818 to 8318

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          = 12262 * 0.465          RG 312-24-298 5701.8 psi          RGU 23-6-297</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD)          = 5701.83 - (0.22 * 12262)          = 3004.2 psi</p> <p>Pb = Casing Burst Rating / Pburst          = 3520 / 3004.19          = 1.17</p> <p>Pb ≥ 1.1          1.17 ≥ 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:</p> <p>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 * 2635)          = 94860 lbs</p> <p>Sj = Casing Tension Rating / Tension          = 453000 / 94860          = 4.78</p> <p>Sj ≥ 1.5          4.78 ≥ 1.5</p>
<b>Production Casing</b>	<p><b>Burst</b></p> <p>Bottom Hole Pressure = TVD * Pore Pressure Gradient          = 12262 * 0.465          = 5701.8 psi</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD)          = 5701.83 - (0.22 * 12262)          = 3004.2 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 * 12262 * 0.052 ≥ 0.465 * 12262          6376.2 ≥ 5701.83</p> <p>Pcollapse = Max MW * Setting TVD * 0.052          = 6376.2 psi</p> <p>Else:</p> <p>Pcollapse = Pore Pressure Gradient * Setting TVD          = 5701.8 psi</p> <p>Pcollapse = 6376.2 psi</p> <p>Pc = Casing Collapse Rating / Pcollapse          = 8650 / 6376.24          = 1.36</p> <p>Pc ≥ 1.125          1.36 ≥ 1.125</p> <hr/> <p><b>Tensile</b></p> <p>Tension = Weight * Length          = 11.6 * 12598          = 146137 lbs</p> <p>Sj = Casing Tension Rating / Tension          = 367000 / 146136.8          = 2.51</p> <p>Sj ≥ 1.5          2.51 ≥ 1.5</p>