

GEOLOGIC & DRILLING PROGNOSIS

Prepared: 30-Dec-25 CMW

WELL NAME: FEDERAL RGU 544-6-297
Directional from the pad RGU 23-6-297

API: 05-103-12646
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	651	Potentially Useable Water
A Groove	800	803	Potentially Useable Water
B Groove	1000	1008	Potentially Useable Water
Dissolution Surface	1300	1322	Possible Lost Circ Zone
Garden Gulch	2200	2313	Potentially Useable Water
Orange Marker	2234	2490	Potentially Useable Water
Upper Wasatch	2440	2578	Potentially Useable Water
Top of "G" Sand	5050	5466	Possible Lost Circ Zone
Fort Union	5310	5753	Gas and Limited Use and Quality Water
Lower Wasatch	6100	6627	Potentially Useable Water
Ohio Creek	6912	7525	Possible Lost Circ Zone
Upper Measaverde	7632	8282	Gas and Limited Use and Quality Water
Approx. Top Gas	8432	9088	Gas and Limited Use and Quality Water
Cameo Coals	10002	10658	Gas, Coal, and Limited Use and Quality Water
Rollins SS	10732	11388	Gas and Limited Use and Quality Water
Cozzette	10882	11538	Gas and Limited Use and Quality Water
Corcoran	11207	11863	Gas and Limited Use and Quality Water
Upper Segro	11467	12123	Gas and Limited Use and Quality Water
Lower Segro	11712	12368	Gas and Limited Use and Quality Water
TD	12212	12868	

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	2689	12.25	188	1.68	112	891	2.53	352	
Liner or Production:	4.5	12212	12868	8.75	1685	1.88	896	1038	2.09	497	
							Surface (sacks):	464	Prod. (sacks):	1393	

ANTICIPATED PRESSURES (psi)

MASP	Prod Csg Test Pressure	Anticipated BHP	Prod. Csg. Grade
3,664	8,500	5,679	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	2689	WBM	8.3-9.5	45-50	7-15	Bentonite/PHPA
2689	12868	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 544-6-297
 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	0-2689	2,689	2,540	2,020	3,520	453,000
Production	8.75	4.500	11.6	HCP-110	GB (BTC)	0-12868	12,868	12,212	8,650	10,690	367,000

Surface Casing Shoe	Production Casing Shoe
Max MW = 9.5 ppg	Max MW = 10.0 ppg
HP = 1,255 psi	HP = 6,350 psi

True Vertical Depth = 12,212 ft
 Bottom Hole Pressure = 5,679 psi
 Pore Pressure Gradient = 0.465 psi/ft
 Max. Sur. Pressure = 3,664 psi
 BOP Required = 5M System

Bottom Hole Temperature = 260 degrees Fahrenheit

Casing Safety Factors			
Surface Casing	Pb = 1.18	Min = 1.100	Pass
	Pc = 1.61	Min = 1.125	Pass
	Sj = 4.68	Min = 1.500	Pass
Production Casing	Pb = 3.57	Min = 1.100	Pass
	Pc = 1.36	Min = 1.125	Pass
	Sj = 2.46	Min = 1.500	Pass

Cement Design Calculations

Critical Depths - Permitting Purposes Only	
Casing/Formation	Measured Depth
Surface Casing	2,689 ft
Top of "G" Sand	5,466 ft
Top of Mesaverde	8,282 ft
Top of Gas	9,088 ft
Total Depth	12,868 ft

Surface Cement	Stg II Lead	Stg I Lead	Tail
Top of Cement (ft)	0	0	2,189
Bottom of Cement (ft)	0	2,189	2,689
Cement Type	Type II	Type II	Class G
Additives (lb/sk)	.25 IntegraSeal	.25 IntegraSeal	.25 IntegraSeal
Volume, bbls	0	122	28
Annular vol w/ excess, ft ³	0	891	188
Volume (sks)	0	352	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 =	464		
Total Cubic Ft. =	1,079		

Production Cement	Lead	Tail
Top of Cement (ft)	5266	8082
Bottom of Cement (ft)	8082	12868
Cement Type	Type II	Class G
Additives (lb/sk)	.25 IntegraSeal	35% Silica
Volume, bbls	185	300
Annular vol w/excess, ft ³	1,038	1685
Volume (sks)	497	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 =	1,393	
Total Cubic Ft. =	2,723	

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 9088 to 8588

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 = 12212 * 0.465 RG 312-24-298 5678.6 psi RGU 23-6-297</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD) = 5678.58 - (0.22 * 12212) = 2991.9 psi</p> <p>Pb = Casing Burst Rating / Pburst = 3520 / 2991.94 = 1.18</p> <p>Pb ≥ 1.1 1.18 ≥ 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:</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>Tensile</p> <p>Tension = (Weight1 * Length1) = (36 * 2689) = 96804 lbs</p> <p>Sj = Casing Tension Rating / Tension = 453000 / 96804 = 4.68</p> <p>Sj ≥ 1.5 4.68 ≥ 1.5</p>
Production Casing	<p>Burst</p> <p>Bottom Hole Pressure = TVD * Pore Pressure Gradient = 12212 * 0.465 = 5678.6 psi</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD) = 5678.58 - (0.22 * 12212) = 2991.9 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 * 12212 * 0.052 ≥ 0.465 * 12212 6350.2 ≥ 5678.58</p> <p>Pcollapse = Max MW * Setting TVD * 0.052 = 6350.2 psi</p> <p>Else:</p> <p>Pcollapse = Pore Pressure Gradient * Setting TVD = 5678.6 psi</p> <p>Pcollapse = 6350.2 psi</p> <p>Pc = Casing Collapse Rating / Pcollapse = 8650 / 6350.24 = 1.36</p> <p>Pc ≥ 1.125 1.36 ≥ 1.125</p> <hr/> <p>Tensile</p> <p>Tension = Weight * Length = 11.6 * 12868 = 149269 lbs</p> <p>Sj = Casing Tension Rating / Tension = 367000 / 149268.8 = 2.46</p> <p>Sj ≥ 1.5 2.46 ≥ 1.5</p>