GEOLOGIC & DRILLING PROGNOSIS Prepared: 23-Oct-25 CMW

WELL NAME: **FED RGU 521-7-297**
Directional from the pad RGU 44-1-298

API: 05-103-12658
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	**704**	Potentially Useable Water
A Groove	850	**858**	Potentially Useable Water
B Groove	1050	**1067**	Potentially Useable Water
Dissolution Surface	1350	**1391**	Possible Lost Circ Zone
Garden Gulch	2250	**2399**	Potentially Useable Water
Orange Marker	2420	**2590**	Potentially Useable Water
Upper Wasatch	2500	**2679**	Potentially Useable Water
Top of "G" Sand	5110	**5603**	Possible Lost Circ Zone
Fort Union	5370	**5894**	Gas and Limited Use and Quality Water
Lower Wasatch	6160	**6779**	Potentially Useable Water
Ohio Creek	6816	**7511**	Possible Lost Circ Zone
Upper Measaverde	7536	**8268**	Gas and Limited Use and Quality Water
Approx. Top Gas	8336	**9074**	Gas and Limited Use and Quality Water
Cameo Coals	9906	**10644**	Gas, Coal, and Limited Use and Quality Water
Rollins SS	10636	**11374**	Gas and Limited Use and Quality Water
Cozzette	10786	**11524**	Gas and Limited Use and Quality Water
Corcoran	11111	**11849**	Gas and Limited Use and Quality Water
Upper Sego	11371	**12109**	Gas and Limited Use and Quality Water
Lower Sego	11616	**12354**	Gas and Limited Use and Quality Water
TD	12116	**12854**	

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	3239	12.25	188	1.68	112	749	2.53	296	
Liner or Production:	4.5	12116	12854	8.75	1345	1.88	715	309	2.09	148	
							Surface (sacks):	553	**Prod. (sacks):**	863	

ANTICIPATED PRESSURES (psi)

MASP	Prod Csg Test Pressure	Anticipated BHP	Prod. Csg. Grade
2,968	8,500	5,634	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	3239	WBM	8.3-9.5	45-50	7-15	Bentonite/PHPA
3239	12854	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.

TEP GEOLOGIST: **Office** **Cell**
Stephen Sunnenberg **281-936-0361** **303-918-4327** ssunnenberg@terraep.com
(note: if there are questions concerning TD or logging, please call Geologist)

CASING & CEMENTING PLAN

Operator: TEP Rocky Mountain
Well Name & Number: FED RGU 521-7-297
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	0-3239	3,239	3,000	2,020	3,520	453,000
Production	8.75	4.500	11.6	P-110	EB (BTC)	0-12854	12,854	12,116	8,300	10,690	367,000

	Surface Casing Shoe		Production Casing Shoe	
	Max MW =	9.5 ppg	Max MW =	10.0 ppg
	HP =	1,482 psi	HP =	6,300 psi

True Vertical Depth =	12,116	ft
Bottom Hole Pressure =	5,634	psi
Pore Pressure Gradient =	0.465	psi/ft
Max. Sur. Pressure =	2,968	psi
BOP Required =	5M	System

Bottom Hole Temperature = 260 degrees Farenheit

Casing Safety Factors

Surface Casing	Pb = 1.19	Min = 1.100	Pass
	Pc = 1.36	Min = 1.125	Pass
	Sj = 3.88	Min = 1.500	Pass
Production Casing	Pb = 3.60	Min = 1.100	Pass
	Pc = 1.32	Min = 1.125	Pass
	Sj = 2.46	Min = 1.500	Pass

Cement Design Calculations

Critical Depths - Permitting Purposes Only

Casing/Formation	Measured Depth
DV Tool	900 ft
Surface Casing	3,239 ft
Top of Mesaverde	8,268 ft
Top of Gas	9,074 ft
Total Depth	12,854 ft

Surface Cement	Stg II Lead	Stg I Lead	Tail
Top of Cement (ft)	0	900	2,739
Bottom of Cement (ft)	900	2,739	3,239
Cement Type	Type I/II	Type I/II	Class G
Additives (lb/sk)	.25 IntegraSeal	.25 IntegraSeal	.25 IntegraSeal
Volume, bbls	50	103	28
Annular vol w/ excess, ft^3	366	749	188
Volume (sks)	145	296	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 =		553
	Total Cubic Ft. =		1,303

Production Cement	Lead	Tail
Top of Cement (ft)	8068	8068
Bottom of Cement (ft)	8068	12854
Cement Type	Type I/II	Class G
Additives (lb/sk)	.25 IntegraSeal	35% Silica
Volume, bbls	44	218
Annular vol w/excess, ft^3	309	1345
Volume (sks)	148	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 =		863
Total Cubic Ft. =		1,654

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 9074 to 8574

Casing Design Calculations

Surface Casing - 36#

Burst

Bottom Hole Pressure = TVD * Pore Pressure Gradient
= 12116 * 0.465
= 5633.9 psi

Pburst = Bottom Hole Presure - (0.22 * TVD)
= 5633.94 - (0.22 * 12116)
= 2968.4 psi

Pb = Casing Burst Rating / Pburst
= 3520 / 2968.42
= 1.19

Pb ≥ 1.1
1.19 ≥ 1.1

Collapse

If: Max MW * Setting TVD * 0.052 ≥ Pore Pressure Gradient * Setting TVD
9.5 * 3000 * 0.052 ≥ 0.465 * 3000
1482 ≥ 1395

Pcollapse = Max MW * Setting TVD *0.052
= 1482 psi

Else:
Pcollapse = Pore Pressure Gradient * Setting TVD
= 1395 psi
Pcollapse= 1482 psi

Pc = Casing Collapse Rating / Pcollapse
= 2020 / 1482
= 1.36

Pc ≥ 1.125
1.36 ≥ 1.125

Tensile

Tension = (Weight1 * Length1)
= (36 * 3239)
= 116604 lbs

Sj = Casing Tension Rating / Tension
= 453000 / 116604
= 3.88

Sj ≥ 1.5
3.88 ≥ 1.5

Production Casing

Burst

Bottom Hole Pressure = TVD * Pore Pressure Gradient
= 12116 * 0.465
= 5633.9 psi

Pburst = Bottom Hole Presure - (0.22 * TVD)
= 5633.94 - (0.22 * 12116)
= 2968.4 psi

Pb = Casing Burst Rating / Pburst
= 10690 / 2968.42
= 3.60

Pb ≥ 1.1
3.60 ≥ 1.1

Collapse

If: Max MW * Setting TVD * 0.052 ≥ Pore Pressure Gradient * Setting TVD
10 * 12116 * 0.052 ≥ 0.465 * 12116
6300.3 ≥ 5633.94

Pcollapse = Max MW * Setting TVD *0.052
= 6300.3 psi

Else:
Pcollapse = Pore Pressure Gradient * Setting TVD
= 5633.9 psi

Pcollapse= 6300.3 psi
Pc = Casing Collapse Rating / Pcollapse
= 8300 / 6300.32
= 1.32

Pc ≥ 1.125
1.32 ≥ 1.125

Tensile

Tension = Weight * Length
= 11.6 * 12854
= 149106 lbs

Sj = Casing Tension Rating / Tension
= 367000 / 149106.4
= 2.46

Sj ≥ 1.5
2.46 ≥ 1.5