

GEOLOGIC & DRILLING PROGNOSIS

Prepared: 18-Feb-21 DC

WELL NAME: RG 341-18-297
Directional from the pad RG 41-18-297

API: 05-103-12470-00
STATE: CO
COUNTY: RIO BLANCO
BOTTOM HOLE LOCATION: Sec. 18 T 2S R 97W
TYPE OF UNIT: FED
FEDERAL EA: Yes
HARDLINE: No

Unspaced

ELEVATION (ft):
PAD (ft): 6621
GROUND (ft): 6620
KELLY BUSHING (ft): 6651

RIG INFORMATION:
RIG NAME: HP 329
KB HEIGHT (ft): 30

ESTIMATE TOPS:

| Formation | TVD | MD | Formation Resource Notes |
|---------------------|--------------|--------------|--|
| Green River | 946 | 955 | Potentially Useable Water |
| A Groove | 1106 | 1119 | Potentially Useable Water |
| B Groove | 1291 | 1308 | Potentially Useable Water |
| Dissolution Surface | 1606 | 1630 | Possible Lost Circ Zone |
| Orange Marker | 2506 | 2551 | Potentially Useable Water |
| Wasatch | 2711 | 2761 | Potentially Useable Water |
| Top of "G" Sand | 5121 | 5226 | Possible Lost Circ Zone |
| Fort Union | 5451 | 5563 | Gas and Limited Use and Quality Water |
| Ohio Creek | 6811 | 6954 | Possible Lost Circ Zone |
| Mesaverde | 6811 | 6954 | Gas and Limited Use and Quality Water |
| Approx. Top Gas | 7901 | 8057 | Gas and Limited Use and Quality Water |
| Cameo Coals | 10251 | 10407 | Gas, Coal, and Limited Use and Quality Water |
| Rollins SS | 10831 | 10987 | Gas and Limited Use and Quality Water |
| Cozzette | 10981 | 11137 | Gas and Limited Use and Quality Water |
| Corcoran | 11201 | 11357 | Gas and Limited Use and Quality Water |
| Upper Sego | 11561 | 11717 | Gas and Limited Use and Quality Water |
| Lower Sego | 11861 | 12017 | Gas and Limited Use and Quality Water |
| TD | 11981 | 12137 | |

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: GR from TD to surface, DIL-SP and Neutron Density from TD to 100' inside surface casing

CASED HOLE LOGS: Specifics: Pulsed Neutron Log (e.g. RMTE, RPM, or RST)
Processing: Emulation Triple Combo Using OH logs and training well
Cement Evaluation: CBL

CSG & CEMENT PROGRAM: SHOE TEST REQUIRED

| | Csg Size (in) | Depth Set (ftd) | 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 | 89.5 | 89.5 | 30 | 243 | 212 | | | | | |
| Surface | 13.375 | 1406 | 1430 | 17.5 | N/A | N/A | N/A | 1093 | 2.34 | 467 | |
| Intermediate | 9.625 | 3211 | 3261 | 12.25 | 172 | 2.10 | 82 | 172 | 2.40 | 72 | |
| Liner or Production: | 4.5 | 11981 | 12137 | 8.75/7.875 | 1446 | 1.85 | 784 | 373 | 2.00 | 186 | |
| | | | | | Surface (sacks): 467 | | Intermediate (sacks): | 154 | Prod. (sacks): 970 | | |

ANTICIPATED PRESSURES (psi)

| MASP | Prod Csg Test Pressure | Anticipated BHP | Prod. Csg. Grade |
|-------|------------------------|--------------------|------------------|
| 2,935 | 8,500 | 5,571 | 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 | 3261 | WBM | 8.33-9.0 | 45-50 | 7-15 | Bentonite/PHPA |
| 3261 | 12137 | LSND | 8.7-10.0 | 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 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: Terra Energy Partners
Well Name & Number: RG 341-18-297
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 | 17.5 | 13.375 | 54.5 | J-55 | BTC | 0-1430 | 1,430 | 1,406 | 1130 | 2735 | 853,000 |
| Intermediate | 12.250 | 9.625 | 36.0 | J-55 | LTC | 0-3261 | 3,261 | 3,211 | 2,020 | 3,520 | 453,000 |
| Production | 8.750 | 4.500 | 11.6 | P-110 | DWC/C | 0-12137 | 12,137 | 11,981 | 8,860 | 12,150 | 417,000 |

| Surface Casing Shoe | Intermediate Casing Shoe | Production Casing Shoe |
|----------------------------------|------------------------------------|-------------------------------------|
| Max MW = 9.2 ppg HP = 673 psi | Max MW = 9.2 ppg HP = 1,536 psi | Max MW = 10.0 ppg HP = 6,230 psi |

True Vertical Depth = 11,981
Bottom Hole Pressure = 5,571
Pore Pressure Gradient = 0.465
Max. Sur. Pressure = 2,935
BOP Required = 3M
5M system will be used as per A

Bottom Hole Temperature = 230 degrees Fahrenheit

| Casing Safety Factors | | | |
|-----------------------|--------------------------------------|---|----------------------|
| Surface Casing | Pb = 3.48 Pc = 1.68 Sj = 10.95 | Min = 1.100 Min = 1.125 Min = 1.500 | Pass Pass Pass |
| Intermediate Casing | Pb = 1.20 Pc = 1.31 Sj = 3.86 | Min = 1.100 Min = 1.125 Min = 1.500 | Pass Pass Pass |
| Production Casing | Pb = 4.14 Pc = 1.42 Sj = 2.96 | Min = 1.100 Min = 1.125 Min = 1.500 | Pass Pass Pass |

Cement Design Calculations

Estimating Cement for Ryan Gulch Wells (Permitting purpose only)

| Critical Depths - Permitting Purposes Only | |
|--|----------------|
| Casing/Formation | Measured Depth |
| Surface Casing | 1,430 ft |
| Intermediate Casing | 3,261 ft |
| Top of Mesaverde | 6,954 ft |
| Top of Gas | 8,057 ft |
| Total Depth | 12,137 ft |

| Production Cement Tops (Permitting Purposes Only) | |
|---|----------------------|
| Cement Slurry | TOC - Measured Depth |
| Scavenger | 3,061 ft |
| Lead | 6,754 ft |
| Tail | 7,857 ft |

| Surface Cement | Lead |
|--|---------|
| Cement Tops | Surface |
| Volume, bbls | 177 |
| Annular vol w/ excess, ft ³ | 1093 |
| Volume, sacks | 467 |
| Slurry Weight, ppg | 12.3 |
| Slurry Yield, ft ³ /sk | 2.340 |
| Mixwater, gal/sk | 13.40 |
| Annular Capacity (BB1) | 0.1237 |
| Annular Capacity (CF) | 0.6947 |
| Excess | 0.1 |
| Total Sacks | 467 |
| Total Cubic Ft. | 1,093 |

| Intermediate Cement | Lead | Tail |
|--|--------|--------|
| Cement Tops | 2,261 | 2,761 |
| Volume, bbls | 28 | 28 |
| Annular vol w/ excess, ft ³ | 172 | 172 |
| Volume, sacks | 72 | 82 |
| Slurry Weight, ppg | 12.3 | 12.8 |
| Slurry Yield, ft ³ /sk | 2.400 | 2.100 |
| Mixwater, gal/sk | 13.30 | 11.30 |
| Annular Capacity (BB1) | 0.0558 | 0.0558 |
| Annular Capacity (CF) | 0.3132 | 0.3132 |
| Excess | 0.1 | 0.1 |
| Total Sacks = | 154 | |
| Total Cubic Ft. = | 345 | |

| Production Cement | Scavenger | Lead |
|---------------------------------------|-----------|--------|
| Cement Tops | 3,061 | 6754 |
| Volume, bbls | 202 | 60 |
| Annular vol w/excess, ft ³ | 1,248 | 373 |
| Volume, sacks | 406 | 186 |
| Slurry Weight, ppg | 11.0 | 12.7 |
| Slurry Yield, ft ³ /sk | 3.074 | 1.999 |
| Mixwater, gal/sk | 18.830 | 11.000 |
| Annular Capacity (BB1) | 0.0547 | 0.0547 |
| Annular Capacity (CF) | 0.3072 | 0.3072 |
| Excess | 0.1 | 0.1 |
| Total Sacks = | | |
| Total Cubic Ft. = | | |

NOTES:

Surface Casing 17-1/2" hole to TD - Cement to surface.
54.5# 13-3/8" J-55, BTC surface casing will be ran.
10% excess is included in calculations.
Normal Surface excess is 40% over gauge hole
Normal Intermediate excess is 50% over gauge hole
Normal Production excess is 45% over gauge hole.

Casing Design Calculations

| Surface Casing - 54.5# | Intermediate Casing - 36# |
|--|--|
| <p>Burst</p> <p>Bottom Hole Pressure = TVD * Pore Pressure Gradient = 3211 * 0.465 = 1493.115 psi</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD) = 1493.115 - (0.22 * 3211) = 786.695 psi</p> <p>Pb = Casing Burst Rating / Pburst = 2735 / 786.695 = 3.48</p> <p>Pb ≥ 1.1 3.48 ≥ 1.1</p> <p>Collapse</p> <p>If: Max MW * Setting TVD * 0.052 ≥ Pore Pressure Gradient * Setting TVD 9.2 * 1406 * 0.052 ≥ 0.465 * 1406 672.6304 ≥ 653.79</p> <p>Pcollapse = Max MW * Setting TVD * 0.052 = 672.6304 psi</p> <p>Else: Pcollapse = Pore Pressure Gradient * Setting TVD = 653.79 psi Pcollapse = 672.6304 psi</p> <p>Pc = Casing Collapse Rating / Pcollapse = 1130 / 672.6304 = 1.68</p> <p>Pc ≥ 1.125 1.68 ≥ 1.125</p> <p>Tensile</p> <p>Tension = (Weight1 * Length1) = (54.5 * 1430) = 77935 lbs</p> <p>Sj = Casing Tension Rating / Tension = 853000 / 77935 = 10.95</p> <p>Sj ≥ 1.5 10.95 ≥ 1.5</p> | <p>Burst</p> <p>Bottom Hole Pressure = TVD * Pore Pressure Gradient = 11981 * 0.465 = 5571.2 psi</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD) = 5571.165 - (0.22 * 11981) = 2935.3 psi</p> <p>Pb = Casing Burst Rating / Pburst = 3520 / 2935.345 = 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 9.2 * 3211 * 0.052 ≥ 0.465 * 3211 1536.1 ≥ 1493.115</p> <p>Pcollapse = Max MW * Setting TVD * 0.052 = 1536.1 psi</p> <p>Else: Pcollapse = Pore Pressure Gradient * Setting TVD = 1493.1 psi Pcollapse = 1536.1 psi</p> <p>Pc = Casing Collapse Rating / Pcollapse = 2020 / 1536.1424 = 1.31</p> <p>Pc ≥ 1.125 1.31 ≥ 1.125</p> <p>Tensile</p> <p>Tension = (Weight1 * Length1) = (36 * 3261) = 117396 lbs</p> <p>Sj = Casing Tension Rating / Tension = 453000 / 117396 = 3.86</p> <p>Sj ≥ 1.5 3.86 ≥ 1.5</p> |
| | <p>Production Casing</p> <p>Burst</p> <p>Bottom Hole Pressure = TVD * Pore Pressure Gradient = 11981 * 0.465 = 5571.2 psi</p> <p>Pburst = Bottom Hole Pressure - (0.22 * TVD) = 5571.165 - (0.22 * 11981) = 2935.3 psi</p> <p>Pb = Casing Burst Rating / Pburst = 12150 / 2935.345 = 4.14</p> <p>Pb ≥ 1.1 4.14 ≥ 1.1</p> <p>Collapse</p> <p>If: Max MW * Setting TVD * 0.052 ≥ Pore Pressure Gradient * Setting TVD 10 * 11981 * 0.052 ≥ 0.465 * 11981 6230.1 ≥ 5571.165</p> <p>Pcollapse = Max MW * Setting TVD * 0.052 = 6230.1 psi</p> <p>Else: Pcollapse = Pore Pressure Gradient * Setting TVD = 5571.2 psi</p> <p>Pcollapse = 6230.1 psi</p> <p>Pc = Casing Collapse Rating / Pcollapse = 8860 / 6230.12 = 1.42</p> <p>Pc ≥ 1.125 1.42 ≥ 1.125</p> <p>Tensile</p> <p>Tension = Weight * Length = 11.6 * 12137 = 140789 lbs</p> <p>Sj = Casing Tension Rating / Tension = 417000 / 140789.2 = 2.96</p> <p>Sj ≥ 1.5 2.96 ≥ 1.5</p> |