

**EOG RESOURCES, INC.**  
**ORRTANNA 20 FED NO. 702H**

**1. GEOLOGIC NAME OF SURFACE FORMATION:**

Permian

**2. ESTIMATED TOPS OF IMPORTANT GEOLOGICAL MARKERS:**

Rustler	783'
Top of Salt	1,138'
Base of Salt / Top Anhydrite	4,843'
Lamar	4,843'
Bell Canyon	4,883'
Cherry Canyon	5,763'
Brushy Canyon	7,573'
Bone Spring Lime	9,003'
1 <sup>st</sup> Bone Spring Sand	10,000'
2 <sup>nd</sup> Bone Spring Lime	10,360'
2 <sup>nd</sup> Bone Spring Sand	10,520'
3 <sup>rd</sup> Bone Spring Sand	11,650'
Wolfcamp	12,060'
TD	12,280'

**3. ESTIMATED DEPTHS OF ANTICIPATED FRESH WATER, OIL OR GAS:**

Upper Permian Sands	0- 400'	Fresh Water
Cherry Canyon	5,763'	Oil
Brushy Canyon	7,573'	Oil
1 <sup>st</sup> Bone Spring Sand	10,000'	Oil
2 <sup>nd</sup> Bone Spring Lime	10,360'	Oil
2 <sup>nd</sup> Bone Spring Sand	10,520'	Oil
3 <sup>rd</sup> Bone Spring Sand	11,650'	Oil
Wolfcamp	12,060'	Oil

No other Formations are expected to give up oil, gas or fresh water in measurable quantities. Surface fresh water sands will be protected by setting 10.75" casing at 875' and circulating cement back to surface.

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**4. CASING PROGRAM - NEW**

SEE COA

Hole Size	Interval	Csg OD	Weight	Grade	Conn	DF <sub>min</sub> Collapse	DF <sub>min</sub> Burst	DF <sub>min</sub> Tension
14.75"	0 - 875'	10.75"	40.5#	J55	STC	1.125	1.25	1.60
9.875"	0-8,000'	7.625"	29.7#	HCP-110	LTC	1.125	1.25	1.60
8.75"	8,000' - 10,900'	7.625"	29.7#	HCP-110	Ultra FJ	1.125	1.25	1.60
6.75"	0'-17,033'	5.5"	23#	HCP-110	ULT SFII	1.125	1.25	1.60

Variance is requested to wave the centralizer requirements for the 7-5/8" FJ casing in the 8-3/4" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 8-3/4" hole interval to maximize cement bond and zonal isolation. Centralizers will be placed in the 9-7/8" hole interval at least one every third joint.

Variance is also requested to wave any centralizer requirements for the 5-1/2" FJ casing in the 6-3/4" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 6-3/4" hole interval to maximize cement bond and zonal isolation.

**Cementing Program:**

Depth	No. Sacks	Wt. ppg	Yld Ft <sup>3</sup> /ft	Mix Water Gal/sk	Slurry Description
10-3/4" 875	325	13.5	1.73	9.13	Class C + 4.0% Bentonite + 0.6% CD-32 + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	200	14.8	1.34	6.34	Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate
7-5/8" 10,900'	750	9.0	2.50	9.06	Class C + 0.6% ASM-3 + 0.15% CDF-4P + 0.6% LTR + 0.5% SCA-6 + 0.13 pps LCL-11 + 0.13 pps LDP-c-0215
	500	12.5	1.71	9.06	Class C + 0.6% LTR + 0.5% SCA-6 + 0.6% ASM-3 + 0.15% CDF-4P + 0.13% LCL-11 + 0.13% LCF-7
	250	15.6	1.19	5.20	Class H + 0.2% ASM-3 + 0.3% SCA-6 + 0.65% LTR + 0.3% SPC-2
5-1/2" 17,033'	575	14.1	1.26	5.80	Class H + 0.1% C-20 + 0.05% CSA-1000 + 0.20% C-49 + 0.40% C-17

Note: Cement volumes based on bit size plus at least 25% excess in the open hole plus 10% excess in the cased-hole overlap section.

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**5. MINIMUM SPECIFICATIONS FOR PRESSURE CONTROL:**

Variance is requested to use a co-flex line between the BOP and choke manifold (instead of using a 4" OD steel line).

SEE  
COA

The minimum blowout preventer equipment (BOPE) shown in Exhibit #1 will consist of a single ram, mud cross and double ram-type (10,000 psi WP) preventer and an annular preventer (5000-psi WP). Both units will be hydraulically operated and the ram-type will be equipped with blind rams on bottom and drill pipe rams on top. All BOPE will be tested in accordance with Onshore Oil & Gas order No. 2.

Before drilling out of the surface casing, the ram-type BOP and accessory equipment will be tested to 5000/ 250 psig and the annular preventer to 5000/ 250 psig. The surface casing will be tested to 1500 psi for 30 minutes.

Before drilling out of the intermediate casing, the ram-type BOP and accessory equipment will be tested to 5000/ 250 psig and the annular preventer to 5000/ 250 psig. The intermediate casing will be tested to 2000 psi for 30 minutes.

Pipe rams will be operationally checked each 24-hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets.

A hydraulically operated choke will be installed prior to drilling out of the intermediate casing shoe.

**6. TYPES AND CHARACTERISTICS OF THE PROPOSED MUD SYSTEM:**

During this procedure we plan to use a Closed-Loop System and haul contents to the required disposal.

The applicable depths and properties of the drilling fluid systems are as follows.

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0 - 875'	Fresh - Gel	8.6-8.8	28-34	N/c
875' - 10,900'	Brine	8.8-10.0	28-34	N/c
10,900' - 17,033' Lateral	Oil Base	10.0-11.5	58-68	3 - 6

An electronic pit volume totalizer (PVT) will be utilized on the circulating system, to monitor pit volume, flow rate, pump pressure and stroke rate.

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept at the wellsite at all times.

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**7. AUXILIARY WELL CONTROL AND MONITORING EQUIPMENT:**

- (A) A kelly cock will be kept in the drill string at all times.
- (B) A full opening drill pipe-stabbing valve (inside BOP) with proper drill pipe connections will be on the rig floor at all times.
- (C) H<sub>2</sub>S monitoring and detection equipment will be utilized from surface casing point to TD.

**8. LOGGING, TESTING AND CORING PROGRAM:**

Open-hole logs are not planned for this well.

GR-CCL Will be run in cased hole during completions phase of operations.

**9. ABNORMAL CONDITIONS, PRESSURES, TEMPERATURES AND POTENTIAL HAZARDS:**

The estimated bottom-hole temperature (BHT) at TD is 179 degrees F with an estimated maximum bottom-hole pressure (BHP) at TD of 7343 psig. No hydrogen sulfide or other hazardous gases or fluids have been encountered, reported or are known to exist at this depth in this area. Severe loss circulation is expected from 7,300' to Intermediate casing point.

**10. ANTICIPATED STARTING DATE AND DURATION OF OPERATIONS:**

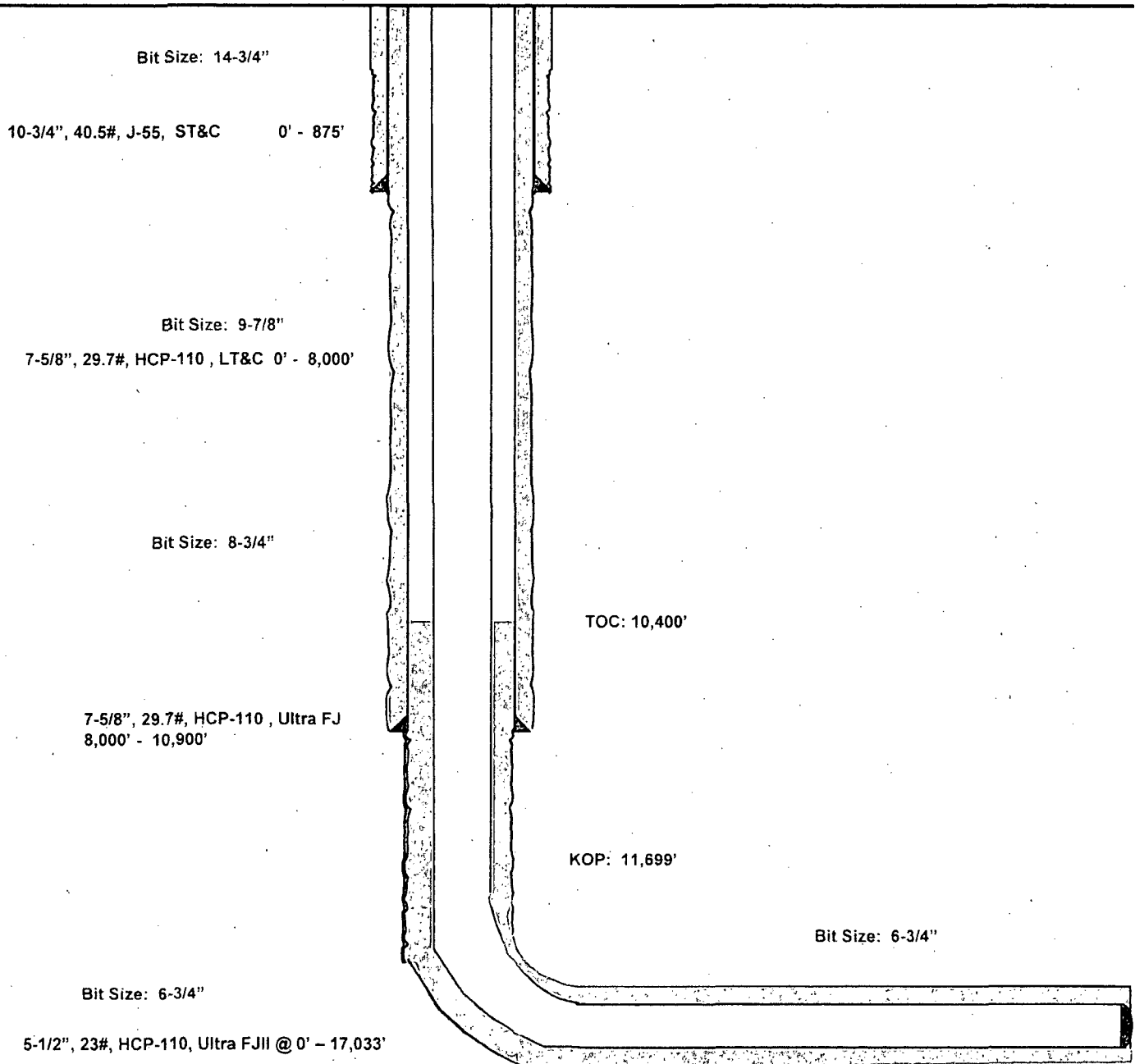
The drilling operation should be finished in approximately one month. If the well is productive, an additional 60-90 days will be required for completion and testing before a decision is made to install permanent facilities.

Orrtanna 20 Fed #702H

Lea County, New Mexico  
Proposed Wellbore  
Revised 3/29/16  
API: 30-025-42938

221' FSL  
995' FWL  
Section 20  
T-26-S, R-33-E

KB: 3,250'  
GL: 3,220'



Lateral: 17,033' MD, 12,280' TVD  
Upper Most Perf:  
330' FSL & 990' FWL Sec. 20  
Lower Most Perf:  
330' FNL & 990' FWL Sec. 20  
BH Location: 230' FNL & 990' FWL  
Section 20  
T-26-S, R-33-E

# PERFORMANCE DATA

TMK UP ULTRA™ FJ  
Technical Data Sheet

7.625 in

29.70 lbs/ft

P110 HC - EVRAZ

## Tubular Parameters:

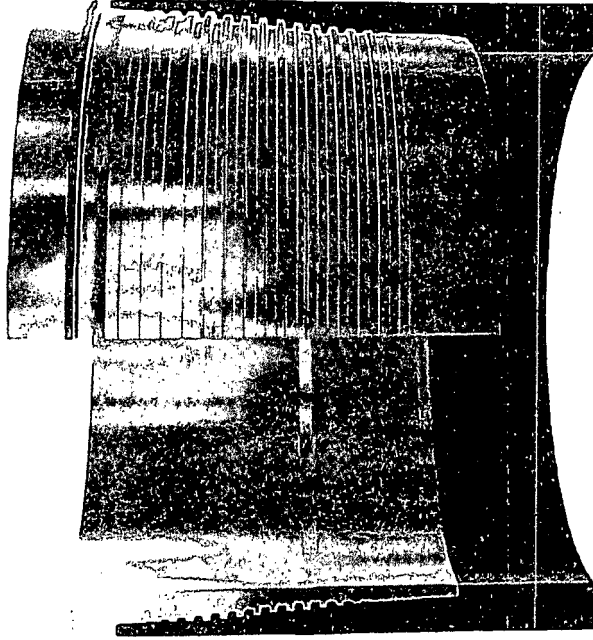
Size	7.625	in	Minimum Yield	110,000	psi
Nominal Weight	29.70	lbs/ft	Minimum Tensile	125,000	psi
Grade	10 HC - EVRAZ				
PE Weight	29.04	lbs/ft	Yield Load	939,000	lbs
Wall Thickness	0.375	in	Tensile Load	1,067,000	lbs
Nominal ID	6.875	in	Min. Internal Yield Pressure	9,420	psi
Drift Diameter	6.750	in	Collapse Pressure	7,610	psi
Nom. Pipe Body Area	8.541	in <sup>2</sup>			

## Connection Parameters

Connection OD	7.625	in
Connection ID	6.881	in
Make-Up Loss	4.022	in
Critical Section Area	5.316	in <sup>2</sup>
Tension Efficiency	62.2	%
Compression Efficiency	62.2	%
Yield Load in Tension	584,000	lbs
Min. Internal Yield Pressure	9,470	psi
Collapse Pressure	7,610	psi
Uniaxial Bending	41	% / 100 ft

## Make-Up Torques

Min. Make-Up Torque	17,700	ft-lbs
Opt. Make-Up Torque	19,700	ft-lbs
Max. Make-Up Torque	21,700	ft-lbs
Yield Torque	31,500	ft-lbs



# PREMIUM CONNECTIONS PERFORMANCE DATA

Size **5.500** NomWt **23.0** Grade **P-110 HC**

TMK UP ULTRA™  
SFII  
Technical Data Sheet

5.500in 23.0lbs/ft P-110 HC

Tubular Parameters				Minimum Yield			
Size	5.500	in	lbs/ft	Minimum Tensile	110,000	psi	psi
Nominal Weight	23.0			Yield Load	125,000	psi	psi
Grade	P-110 HC			Tensile Load	828,000	lbs	lbs
PE Weight	22.54			Min. Internal Yield Pressure	14,500	psi	psi
Wall Thickness	0.415			Collapse Pressure	15,110	psi	psi
Nominal ID	4.670						
Drift Diameter	4.545						
Norm. Pipe Body Area	6.630						

Connection Parameters			
Connection OD	5.726	in	
Connection ID	4.626	in	
Make - Up Loss	5.653	in	
Critical Section Area	5.817	in²	
Efficiency - Tension	85%	%	
Efficiency - Compression	73%	%	
Yield Load in Tension	621,000	lbs	
Min. Internal Yield Pressure	14,500	psi	
Collapse Pressure	15,110	psi	
Uniaxial Bending	78	° / 100 ft	

Make-Up Torques	
Min. Make-Up Torque	15,500 ft-lbs
Optimum Make-Up Torque	16,300 ft-lbs
Max. Make-Up Torque	18,700 ft-lbs
Yield Torque	24,800 ft-lbs

