# 1. GEOLOGIC NAME OF SURFACE FORMATION: Permian

# 2. ESTIMATED TOPS OF IMPORTANT GEOLOGICAL MARKERS:

880'
1,300'
4,993'
5,275'
5,300'
6,310'
9,165'
9,320'
10,375'
10,627'
10,600'

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

Water

Upper Permian Sands	0-400'	Fresh
Delaware	5,275'	Oil
Bell Canyon	5,300'	Oil
Cherry Canyon	6,310'	Oil
Brushy Canyon	9,165'	Oil
Bone Spring Lime	9,320'	Oil
Bone Spring 1 Sand	10,375'	Oil
Bone Spring 2 Lime	10,627'	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 13.375" casing at  $905^{-7}$  and circulating cement back to surface.

## 4. CASING PROGRAM - NEW

21	Hole Size	Interval	Csg OD	Weight	Grade	Conn	DF <sub>min</sub> Collapse	DF <sub>min</sub> Burst	DF <sub>min</sub> Tension
Sie (OA)	17.5"	$0 - 905^{50,20}$	13.375"	54.5#	J55	STC	1.125	1.25	1.60
0.0	12.25"	0-4000'	9.625"	40#	J55	LTC	1.125	1.25	1.60
•	12.25"	4000'-5150'	9.625"	40#	HCK55	LTC	1.125	1.25	1.60
	8.75"	0'-19,187'	5.500"	17#	HCP110	LTC	1.125	1.25	1.60

#### **Cementing Program:**

	No.	Wt.	Yld				
Depth	Sacks	lb/gal	Ft <sup>3</sup> /ft	Slurry Description			
905'	350	13.5	1.73	Lead: Class 'C' + 4.00% Bentonite + 0.40% CD-32 + 0.35%			
				R-3 + 0.25 lb/sk Cello Flake			
	200 ·	14.8	1.33	Tail: Class 'C' + 0.15% R-3			
5,150'	800	12.7	2.22	Lead: Class 'C' + 2.00% SMS + 10.00% Salt (10.331 lb/sk)			
				+ 1.00% R-3 + 0.25 lb/sk Cello Flake			
	200	14.8	1.33	Tail: Class 'C' + 0.60% FL-62 + 0.45% CD-32 + 0.10% SMS +			
				0.30% R-3			
BH Plug	100	18.0	0.90	Class H + 0.005 lbs/sx Static Free + 5% Salt + 1.2% CD31 +			
10,400'- 10,600'				0.005 gps FP-6L			
KO Plug	300	18.0	0.90	Class H + 0.005 lbs/sx Static Free + 5% Salt + 1.2% CD31 +			
600'				0.005 gps FP-6L			
19,187'	125	10.8	3.68	Lead 1: 60:40:0 Class 'C' + 15.00 lb/sk BA-90 + 4.00%			
				MPA-5 + 3.00% SMS + 5.00% A-10 + 1.00% BA-10A +			
				0.80% ASA-301 + 2.55% R-21 + 8.00 lb/sk LCM-1			
	400	11.8	2.38	Lead 2: 50:50:10 Class 'H' + 0.80% FL-52 + 0.30% ASA-			
	ſ			301 + 0.50% SMS + 2.00% Salt (2.215 lb/sk) + 0.10% R-21			
				+ 3.00 lb/sk LCM-1 + 0.25 lb/sk Cello Flake			
	2525	14.2	1.28	Tail: 50:50:2 Class 'H' + 0.65% FL-52 + 0.50% CD-32 +			
				0.40% SMS + 2.00% Salt (0.961 lb/sk)			

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.

#### 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).

The minimum blowout preventer equipment (BOPE) shown in Exhibit #1 will consist of a 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.

3000 psi BOPE is adequate for this application. Due to the 3000 psi BOPE requirement no FIT tests are planned.

Before drilling out of the surface casing, the ram-type BOP and accessory equipment will be tested to 2000/250 psig and the annular preventer to 2000/250 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 3000/ 250 psig and the annular preventer to 2500/ 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:

The applicable depths and properties of the drilling fluid systems are as follows. Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

Depth	Туре ,	Weight (ppg)	Viscosity	Water Loss	
0 - 905'	Fresh Water Gel	8.6-8.8	28-34	N/c	
.905' - 5,150'	Saturated Brine	10.0-10.2	28-34	N/c	
5,150'- 10,600' Pilot hole	Cut Brine	8.5-9.0	28-34	N/c	
KOP – 19,187' Lateral	· Cut Brine	8.5-9.3	28-34	N/c	

#### 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)  $H_2S$  monitoring and detection equipment will be utilized from surface casing point to TD.

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

Open-hole logging is anticipated in the 8-3/4" pilot hole section. The logging suites for this hole section are listed below:

NGT-CNL-LDT w/ Pe From TD to previous casing shoe: At casing pull GR – Neutron to surface.

HR Laterolog Array From TD to previous casing shoe.

FMI

Possible in the production hole

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

The estimated bottom hole temperature (BHT) at TD is 170 degrees F with an estimated maximum bottom-hole pressure (BHP) at TD of 4590 psig.

## **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 30-60 days will be required for completion and testing before a decision is made to install permanent facilities.