

## University #1

### DRILLING PROCEDURE

**LOCATION:** Build 215' x 315' location with 6" compact caliche around substructure to rig specifications with 150' wide X 150' double horseshoe reserve and 6' X 6' X 6' cellar. Drill starter hole, mousehole and rathole. Set and cement 16" conductor approximately 100 ft.

**SURFACE HOLE:** 0-500' Note: Drill Hole to fit Casing ( 2 ft below GL)

MI & RU Patterson Rig Lay water line. GIH w/ 17h 1/2" bit on BHA #1. Drlg 17 1/2" Surface Hole to 500'. Take Totco survey's every TD'. Spud well with water and native mud utilizing +- 30 bbl or a larger tank for high viscosity (PHPA/Gel) premix sweeps every 150+-' for additional hole cleaning. Flush hole with 1 gallon of liquid polymer every 60'+-. Utilize all available solids control equipment. 22' prior to T.D. shut off water allow native mud to build to 32-34+- sec/qt viscosity. Flush hole with 75-100 bbls+- high viscosity, high yield, premix sweep's before to running casing to insure a clean well bore for running the casing string. Circulate the hole clean as possible prior to T.O.H. for surface casing. **Contact TRRC prior to spudding @ (432) 684-5581.**

<u>DEPTH</u>	<u>MUD WEIGHT</u>	<u>VISCOSITY</u>	<u>FLUID LOSS</u>
Spud	8.5- 8.6	30-32	No Control
450'	8.7- 8.8	30-32	No Control

#### **KEEP HOLE FULL AT ALL TIMES**

At TD circ. Clean, pump at least 1 ½ hole volumes and run Texas Pattern Guide shoe, 1-13 3/8" shoe joint, insert float, and remainder of 13 3/8" casing. Centralize 1st jt w/ lock ring in middle of jt and centralize next three collars. Thread lock guide shoe and insert float. Cement per following cement program. Displace w/ fresh water, **cement must circulate to surface**, 1" if necessary, W.O.C. 4 hrs., cut csg. off, weld on 13 3/8 X 13 3/8" 3M A Section. NU BOPE. Test BOPE (blinds, pipe & choke manifold to 3000#. Test annular to 1500#. **Note WOC 12 hours after plug bumps prior to drilling out. Notify TRRC 24 hour prior to cementing. Refer to detailed cementing and casing procedure within this prognosis. Notify Midland District office when ready to cement. Cement must have a**

**compressive strength of 1200 psi or above in 72 hrs. Centralizer are required at least every fourth joint by the TRCC**

**INTEMEDATE:** 12 1/4" hole, 9 5/8" casing set @ 5500' Cmt'd with 1913 sxs RU and test BOP (blinds and pipe rams), manifold and choke to 5000 psi. Test annular to 3000 psi. GIH w/ 12 1/4" bit on BHA #2. Drill cement w/fresh water. TIH washing as necessary to top of float collar. Test casing to 1000 psi. Drill float shoe and 10' of new formation. Circulate bottom up. Pull drill pipe into casing and test BOPE. **Close Hydrill** and test shoe to 12.5#/gal EMW 300 pisp pump pressure w/ 9.0#/gal mud. Drill 12 1/4" hole to 5500 ft.. RU and run fluid caliper to determine cement volume. Condition hole to run 9 5/8" casing. RIH w/ float shoe, 2 shoe jts., float collar and remaining casing. Centralize middle of shoe jt. and the next 4 collars. Centralize every collar throughout pay. Cement per following cement program. Displace w/ FW. N.D. BOP, set 80% of hookload on slips, cut csg. off and install 5M b Section

**PRODUCTION HOLE:** Dress off cement plug at 5500 ft . Test 9 5/8” casing to 1500 psig Drill float shoe and 10’ of new formation. Circulate bottom up. Pull drill pipe into casing and test BOPE. **Close Hydrill** and test shoe to 12.5#/gal EMW 300 pispg pump pressure w/ 9.0#/gal mud Drill out kickoff plug with fresh water circulation through the outer reserve pit. Mud up as per following mud program. Adjust mud as required for DST(s). Have test tank connected and lines tested prior to penetrating the Wolfcamp. At TD condition hole for logs & run per Geology. Condition hole to run 5 1/2” casing. RIH w/ float shoe, 2 shoe jts., float collar and remaining casing. Centralize middle of shoe jt. and the next 4 collars. Centralize every collar 200’ above, below and throughout pay(s). Cement per following cement program. Displace w/ FW. N.D. BOP, set 80% of hookload on slips, cut csg. off and install 11” 5M X 7 1/16”5M tubing spool. Release Rig.

### BIT PROGRAM

QUANTITY	SIZE	BIT TYPE
1	17 1/2	Retip
1	12 1/4	GT-1
1	12 1/4	HR-30C
1	8 3/4	HR44CH
2	8 3/4	HR55
3	8 3/4	HR44C

### CASING PROGRAM

O.D. In.	Dept h From	Dept h To	Leng th	Wt.	Grad e	Con n	API Burst	Ratin gs Collap se
13 3/8”	Surf.	500’	500’	54.5 #	J-55	STC	2730	1130
9 5/8”	surfa ce	5500	5500	40	N-80	LT& C	5750	3090
5 1/2	surfa ce	9600	9600	17	P-110	LT& C	10640	7387
5 1/2	9600	1420 0	4600	17	HCP-110	LT& C	10640	8557

<b>EXPECTED TOPS</b>	<b>DEPTH</b>	<b>EXPECTED TOPS</b>	<b>DEPTH</b>
Rustler	2,150	Wolfcamp	9,930'
Yates	3,277'	Lower Wolfcamp	10,886'
Queen	3,700'	Strawn	11,030'
San Andres	5,000	Mississippian	11,610
Tubb	7,330'	Woodford Shale	12,480'
Dean Sand	9,630'	Devonian	12,575'

## CEMENT PROGRAM

**Surface:** Lead: Class "C" + 2% CaCl<sub>2</sub>

Casing Size	Depth From	To	Hole Size	% Excess	# Sacks	Weight PPG	Yield Cu-Ft/Sx	Compressive 12 Hour	Strength 24 Hour
13 3/8"	Surf.	500'	17 1/2"	100	400	14.8	1.35	750	1870

### 13 3/8" SURFACE CASING AND CEMENT Procedure

1. Visual inspect, drift, and clean casing threads on rack.
2. R/U P/U Machine and R/U Casing tools.
3. Run 13 3/8" casing as follows: 13 3/8" Texas Pattern Guide Shoe, 1-jt of casing, insert float, and remainder of casing. Centralize 1<sup>st</sup> jt w/lock ring in middle of jt and centralized next three collars. **Threadlock guide shoe and insert float.** Condition and circulate mud. Circulate two hole volumes. **(maintain movement on pipe while circulating.)**
4. Cement as per cement recommendations. Displace cement with Fresh Water. Cement must be circulated to surface. Pump and displace cement at 6-8 BPM Record observed returns in report. Bump plug and w/**500 psi** over pump pressure. Hold pressure for 10 min. and make sure float equipment is holding. **WOC. 12 hours.**
5.
  - a. If no cement returns:  
GIH 50' below GL w/ 1" in 16"x9 5/8" annulus. Spot 50 sacks/cmt. P/U to GL. Wash out with fresh water.
6. Land 13 3/8" casing wellhead top at 1' below ground level or Cut off 13 3/8" casing and weld on 13 3/8"x 3m S.O.W. A-Section. Test weld to 80% of casing collapse.
7. N/U BOP's and test to 250 psi low and 3000 psi high. Test Hydrill to 250 psi low and 3000 psi high. Test choke manifold to 250 psi low and 3000 psi high.

**NOTE: WOC 12 hours** after plug bumps prior to drilling out

## CEMENT PROGRAM

**Intermediate:**      Lead: Class H + 2% CaCl<sub>2</sub>

Casing Size	Depth From	To	Hole Size	% Excess	# Sacks	Weight PPG	Yield Cu-Ft/Sx	Compressive 12 Hour	Strength 24 Hour
9 5/8"	Surf.	5500'	12 1/4"	50	1913	14.8	1.35	750	1870

### Intermediate 9 5/8" SURFACE CASING AND CEMENT Procedure

8. Visual inspect, drift, and clean casing threads on rack.
9. R/U P/U Machine and R/U Casing tools.
10. Run 9 5/8" casing as follows: 9 5/8" Texas Pattern Guide Shoe, 1-jt of casing, insert float, and remainder of casing. Centralize 1<sup>st</sup> jt w/lock ring in middle of jt and centralized next three collars. **Threadlock guide shoe and insert float.** Condition and circulate mud. Circulate two hole volumes. **(maintain movement on pipe while circulating.)**
11. Cement as per cement recommendations. Displace cement with Fresh Water. Cement must be circulated to surface. Pump and displace cement at 6-8 BPM Record observed returns in report. Bump plug and w/**500 psi** over pump pressure. Hold pressure for 10 min. and make sure float equipment is holding. **WOC.** 4- hours.
12.        a. If no cement returns:  
                     GIH 50' below GL w/ 1" in 16" x 9 5/8" annulus. Spot 50 sacks/cmt. P/U to GL. Wash out with fresh water.
13. Land 9 5/8' casing wellhead top at below ground level or set slips and weld on 9 5/8" x 5m S.O.W. B-Section. Test weld to 80% of casing collapse.
14. N/U BOP's and test to 250 psi low and 5000 psi high. Test Hydrill to 250 psi low and 5000 psi high. Test choke manifold to 250 psi low and 5000 psi high.  
                     **NOTE: WOC 12 hours** after plug bumps prior to drilling out

**PRODUCTION:** Lead Slurry – 50/50 Poz, Class H

**Cement in 2 stages with DV tool set @ 10000 (Lower stage will approximately 400 sxs Upper Stage will approximately 400 sxs)**

Casing	Depth		Hole	%	#	Weight	Yield	Compressive	Strength
Size	From	To	Size	Excess	Sacks	PPG	Cu-Ft/Sx	12 Hour	24 Hour
5 1/2"	1450	9500'	8 3/4"	20	1055	14.8	1.35	750	1870

1. Visual inspect, drift, and clean casing threads on rack.
  - i. **NOTE:** RRC is to be notified prior to running casing & cementing.
2. R/U P/U Machine and R/U Casing tools.
3. Run 5 1/2" casing as follows: 5 1/2" float shoe, 1-jt casing, float collar, and remaining 5 1/2" casing. **NOTE:** Centralizers middle of shoe jt, and every other casing collar run in hole on first 10 jts. Threadlock float equipment.
4. Circulate and condition hole two to three times hole volume. (Check cutting coming across shaker.) **R&R pipe while circulating.**
5. Cement as per cement recommendations reciprocating pipe. Displace w/Fresh Water. Bump plug w/**500 psi** over pump pressure. Hold pressure for 10 min, and make sure float equipment is holding. (If not hold pressure.) **WOC** 4 – hours.

Set 80% of hookload on slips and make rough cut on 5 1/2" casing. Make finish cut on 5 1/2" casing.  
N/U Tubinghead 11"x 3m x 7 1/16" 5m B-Section