

MAVERICK OPERATING, LLC

Drilling Procedure

University Founders A25 # 2

SHL: 467' FNL & 617' FWL

Sec 25, Blk A, University Lands

Hudspeth County, Texas

Lat: N31° 56' 17.0977"

Long: W105° 48' 18.8177"

NAD27

Drilling Contractor	United Drilling Company	Rig: # 42
API No.	42-229-30280	Lease: University Lands
Drilling Permit	857471	GAU File No.
Usable Ground Water	0' – 1800'	
Surface Casing	13-3/8" 68# J55 BTC	3,000'
Intermediate Casing	9 5/8" 43.50# L80/HCL80 LTC	5,500'
Production Casing	5.5" 17# L80 LTC	MD– 8,500'

Contact	Position	Office	Cell	Email
Scott Kimbrough		432-682-2500		scott@mogc-kec.com
Butch Willis	VP Operations	432-682-2500	432-556-5165	butch@mogc-kec.com
Dean Johnson	Drilling Foreman		432-967-9267 956-754-0475	deanjohnson64@gmail.com

Vendors

<u>Service</u>	<u>Company</u>	<u>Primary Contact</u>	<u>Primary Phone</u>	<u>Email</u>	<u>Location</u>	<u>Notice Requirement</u>
Rig	United Drilling				Roswell NM	
Consultant		Dean Johnson				
Tool pusher	United Drilling					
BOP Testing	Monahans	Dispatcher	1-800-753-7558		Monahans	12hrs
Casing	Century Pipe				Midland	48hrs
Casing Accessories	Weatherford	Barry Conley	575-391-9811		Hobbs	
Casing Running Services	Byrd	Teddy	325-267-0050		San Angelo	
Cementing	Big E Services	Cody	432-634-4023		Midland	24hrs
Location	Kiehne Const					
Water Hauling	Truck					
Drilling Fluids	Midwestern Mud	Larry Wadzeck	432-559-1225			
Mud Logging			432-934-6900			1 Day
Casing clean & drift	Byrd	Teddy	325-267-0050			
Pit lining	Byrd	Teddy	325-267-0050			
TRRC	8A		432-684-5581			
Welder	Pro Welding	JR				
Sewer	Oil Patch		432-		Midland	
Communications	Powersat Comm		432-215-2746		Midland	
Trailers	Oil Patch		432-		Midland	
Generator	Oil Patch		325-			
Frac Tanks						
Wellhead	Performance	Aaron Harris	432-413-2075			
Wellhead Service	Performance	Aaron Harris	432-413-2075		Midland	
Wireline	Schlumberger		601-660-1545		Midland	

Project Discussion

This is a new well located in Hudspeth County, Texas. The well will be a 8,500' vertical well. Production section to be drilled with water base mud system. A 8-1/2" open hole drilled and 5.5" casing will be cemented. **THIS IS A TIGHT HOLE WELL. NO ONE IS TO ENTER THE WELLSITE WITHOUT CHECKING IN WITHOUT PERMISSION FROM WELLSITE SUPERVISORS.**

Drilling Plan Summary:

- The location will be located on the A 25 # 1H Pad with a small reserve pit and a 20" conductor installed at ground level. United Drilling Company rig # 42 will move in and rig up. We will rig up and drill 17-1/2" hole to 3,000' and set 13-3/8" csg and cement to surface. Probable 3 stage cement job. Loss circulation probable.
- Intermediate hole section will be 12-1/4" hole drilled to 6,000' +/- and 9-5/8" casing will be set cemented inside surface casing to 2,800'
- Production hole section will be 8-1/2" hole drilled to 8,500' +/- and 5-1/2" casing cemented 500' inside 9-5/8" casing.
- A water base mud system will be used to drill production section. A reserve pit system will be utilized throughout the entire process
- Three DST's could be run in the production section of this hole.

Driving Directions:

University Founders A 25 # 2

LARGE LOADS (Permit loads)

From El Paso:

- Go east 20 miles on 62-180(Montana Ave) to Hueco Ranch Rd.
- Turn left and travel north on paved road for 2.3 miles to stop sign (3-way), continue straight traveling north for 9.9 miles (Texas/New Mexico border)
- Turn right to stay in Texas and follow ranch road along fence line traveling east for 5.1 miles to gate, open and close gates. **Gate combo 1951**
- Continue traveling east along the fence line for 2 miles, road will veer right and you will be traveling south.
- Travel south 3.5 miles on graded road, turn right on newly graded road,
- Travel 1.7 miles to gate (open and close), travel 0.5 miles to gate (open and close), travel 3 miles to T in road.
- Turn left travel 1.2 miles, then turn left and travel .5 miles to location

SMALL LOADS

- Sierra Blanca on I-10.
- Travel north on HWY 1111 for 41.5 miles to HWY 62/180.
- Turn left and travel west for 36.6 miles to Hueco Ranch road,
- Turn right and travel north on paved road for 2.3 miles to stop sign (3-way), continue straight traveling north for 9.9 miles (Texas/New Mexico border)
- Turn right to stay in Texas and follow ranch road along fence line traveling east for 5.1 miles to gate, open and close gates. **Gate combo 1951.**

- Continue traveling east along the fence line for 2 miles, road will veer right and you will be traveling south.
- Travel south 5.5 miles on graded road, to 3rd gate. Continue following road will turn right, continue to T turn right go up hill thru open gate past 4 silver tanks to gate. Go thru gate 6 miles turning left at rig sign 1 mile to rig.

Ranch Lease Rules

Following these Lease Rules is required of all employees, vendors and contractors of Maverick Operating, LLC (“Company”) entering the University Lease (“Lease”) on behalf of Company. Any violation may result in you being barred from future entry.

1. Company must grant permission to vendors and contractors to enter the lease prior to entry. Such permission, with targeted date(s), will typically be granted through a written work order or a verbal call out by a Company Representative.
2. Use only approved entrances and roadways for entering, traveling across and leaving the Lease.
3. Any exterior gates will be kept closed except during actual passage through it.
4. Any interior gate will be left in the same position (open or closed) as it was found.
5. No livestock will be allowed to pass through any gate opened.
6. No fence may be cut.
7. Maintain Lease in a neat, orderly and safe condition, free of litter and free of all objects not reasonably necessary to operations.
8. Nothing will be brought on or removed from the Lease except as directly necessary to conduct operations.
9. Observance of any indication of fire should be reported immediately to Company at 432-556-5165.
10. If hot work or open flame work is being conducted, proper precautions should be made including having a fire extinguisher readily available.
11. NO FIREARMS shall be brought on Lease (on a person or in a vehicle).
 - a. Anyone found in possession of firearms will be required to leave the Lease, and;
 - b. Will be Excluded from future access to the Lease.
12. All vehicles brought on to Lease shall be washed and cleaned in a manner used in the industry to control infestation or spreading of noxious vegetation such as but not limited to bitter weed.
13. Be aware of livestock and take all necessary action to protect their well-being.
14. Drive in a safe manner at all times and never exceed 25 MPH on any ranch or Lease road.

Location Preparation & MIRU

1. Lease road, location and reserve pit are built to accommodate United Drilling Rig #42. Mouse hole has been drilled and 20" conductor set at surface.
2. MIRU United Drilling rig #42:
 - A reserve pit mud system will be used for drilling operations.
 - Ensure that the crown sheave is prepared with appropriate Target Ring for PVT system and Pason monitoring system prior to raising the derrick.
 - Perform rig inspection and complete all required repairs prior to accepting rig as ready for operations.
 - Hold rig site pre-spud meeting to review well plan and discuss safety, operational and environmental issues with all appropriate personnel.
 - Post approved Drilling Permit and survey plats in dog house and supervisor trailer.
 - Assure proper bit breakers for all bits and all necessary WH adapters for BOP are located and available prior to spud.
3. MIRU Location trailers for personal including WIFI and communications.
4. Provide 24 hours notification to the Texas RRC District 8 office (432 / 684-5581) before each of these operations (a) spudding well and (b) running and cementing casing. If required, be prepared to provide the API number, hole size, casing depth, centralizer count, cementing company and directions to location. List the following on the Daily Drilling Report: (i) TRRC contact name. (ii) time & date of notification, and (iii) TRRC Job Number.
5. **PRIOR TO SPUD. Maverick REP REQUIRED TO GPS AND CONFIRM SHL. MAKE SURE SHL COORDINATES MATCH WITH PLAT.**
6. All DP, DC's, subs and crossovers must be inspected to Category III standards prior to commencement of operations – forward copy of these inspection results to Drlg Supt. Measure and caliper all DC's and BHA tools. Run bending strength ratio (BSR) calculation on DC's prior to picking these up to TIH; the minimum allowable BSR is 2.4 - remove failed collars from location. Agree on corrosion plan with drilling contractor.
7. Ensure drill string design provides a minimum over-pull of 100K at all times. Review drilling contractor's practice for proper connection doping and make-up torque on DP & DC's.
8. ***Review this procedure's Attachments: Drilling Mechanics, Casing, Mud and Cementing to help assure that these critical operations are properly planned, reported and documented.***
9. **Have wellhead sections delivered to location prior to spud.**
10. Install conductor and fill up line in bottom of cellar. Hook up flow line by-pass line to circulate reserve pit.
11. Install a quality PVT system that can be understood and used by Drillers and onsite Load pits with fresh water for cement plug drill out

Surface Hole**17-1/2"****0' – 3,000' (Depth)****17-1/2" BHA**

- A. 17-1/2" PDC bit – Hughes -
- B. 1 – 8" DC
- C. 1 – 17-1/4" Stabilizer
- D. 1 – 8" DC
- E. 1 – 17-1/4" Stabilizer
- F. 1 – 8" DC
- G. Shock Sub -
- H. XO
- I. 8 – 6 1/2" DC
- J. Jars
- K. 6 - -1/2" DC'

1. Drill surface with fresh water circulating the reserve pit. Inclination surveys must be made beginning at 250' followed by survey every 500' to TD. This section will be drilled to 3,000' +/- . Loss circulation is expected by 1,100' with no chance of returns to TD. We will dry drill to TD. If hole problems are encountered, we will drop one of the stabilizers out of the string. Deviation is likely in this section of hole.
2. Report any deviation more than 2° to supervisors immediately.
3. Serious drag conditions may require a short trip to adequately prepare hole for casing. Drill hole to depth that fits casing tally and allows easy access to cementing head. **DO NOT EXCEED 3000' MD**
4. At TD circ circulate 2 btms up while rotating pipe 100-120 rpm. **POOH—if significant drag is encountered, return to btm and condition hole. POOH for casing running ops.**

While drilling ahead:

- Clean and drift surface 13-3/8" casing after delivery (ID 68.0# = 12.415").
 - Require cementer to do performance tests of its recommended slurries with samples of the actual mixing water – email results to Butch Willis (note: cementer must provide WOC time required for each slurry to attain 500 psi compressive strength).
 - Notify the Mud Log Service of the approximate date that mud logging services will be needed; plan on a two-man unit being fully operational by 3,000'.
5. ***Review this procedure's Attachments: Drilling Mechanics, Casing, Mud and Cementing to help assure that these critical operations are properly planned, reported and documented.***
 6. Rig up casing tools and run inspected (clean, visual, drift) 13-3/8" surface casing as follows (***confirm that float equipment is PDC drillable***): This will be a 3-stage cement job with two

DV/ECP set at intervals show below.

1	13-3/8" Float Shoe
1	13-3/8" 54.50# J55 BTC csg jt
1	13-3/8" Float Collar
1358'	13-3/8 54.50# J55 BTC casing

Make-up torques:

13-3/8" 68.0# J55 BTC: **make up to bury 1/2 ▲ on pin into box**

Thread-lock all connections on bottom two joints. Install approximately (19) centralizers as follows: (A) 15' above GS; (B) first connection above GS; (C) every other joint to surface, (D) **DV tool are required, one above and below the tool.** Install 13-3/8" cement basket @ 120' from surface.


DV TOOL IS REQUIRED --- SET @ 2,100' & 750'


7. Assure that casing is clear prior to cementing (at least two complete circulations). Secure casing for cementing operations. RU Trans-Tex **and review cementing plan with their supervisor – confirm that correct materials and volumes have been delivered--- notify Engineering of any discrepancies.** Test lines and pump to 3000 psi and circulate sufficient fluid volume to assure that casing is clear prior to starting cement - have cementer provide a dry sample of each cement blend and catch a wet sample of each slurry that is pumped.
8. **With casing setting 1' off bottom,** pump 20 bbl freshwater spacer and cement 20" casing with:

STAGE 1:

507 sx "C" + 1.5% CAS-2 + 1% CaCl2 + 1.5% pps Gel + .25#/sx CF
(13.8 #, 1.61 ft³/sx, 8.22 gal/sx).
 25% Excess

STAGE 2

900 sx "C" + 1.5% CAS-2 + 1% CaCl2 + 1.5% pps Gel + .25#/sx cello flake
(13.8 #, 1.61 ft³/sx, 8.22 gal/sx).
 25% Excess

STAGE 3

777 sx "C" + 1.5% CAS-2 + 1% CaCl2 + 1.5% pps Gel + .25#/sx cello flake
(13.8 #, 1.61 ft³/sx, 8.22 gal/sx). 100% Excess

This cement recommendation calculates to be approximately 25% excess ***but assumes that no lost circulation has occurred and lengthy circulation was not required in drilling or conditioning hole for casing; adjust cementing plan, including slurry volumes and lost circulation additives based on actual drilling conditions and adjusted if fluid caliper is ran.***

Displace plug with **FW**, limit maximum bump pressure to 500 psi.

DO NOT EXCEED CALCULATED DISPLACEMENT VOLUME BY MORE THAN 1 BBL. After displacing plug, release pressure and check float; if float is holding and cement has been successfully circulated, RD cementers. If float fails, leave cementing valve shut-in for 4 hours prior to commencing NU operations. **IF CEMENT DOES NOT CIRCULATE**, stay in contact with Drlg Supt. TRRC will be contacted to determine cementing options. If 1" top job is required, a temperature survey will be required 10 - 12 hours after cement was in-place.

Assure casing remains centered in rotary table during all cementing and WOC operations and if cement falls back after circulating with 1", plan to grout with redi-mix after NU BOP.

Prior to finalizing the cementing service order, discuss the cementing plan with Butch Willis regarding hole conditions, slurry design / volumes and procedures. Include the following data on the Daily Drilling Report: (1) volume and type of any pre-flush; (2) slurry volumes in sacks; (3) cement type, additives and concentrations; (4) weight and yield of each slurry; (5) estimated returns during job and number of sacks circulated – if not full circulation, estimate percentage returns and if circulation is lost, report at what point in the operations that the loss occurred; (6) type and volume of displacement fluid; (7) the pressure at which the plug was bumped; (8) the time when the plug was bumped and the operation completed.

Summarize the casing running and cementing operations and provide all required detail

9. Keep casing centered while WOC 4 hours. Cut off conductor and casing and re-confirm that wellhead measurements allow for "C" section to be at GL ('A' section top flange 52" below GL). Dress off casing stub and pre-heat head to API specifications. Once all is inspected and correct, welder can commence to weld the Casing Head to the Surface Casing as per API Welding Procedures (ID and OD weld). Weld on 13-5/8" 3K x 13-3/8" SOW. Once welding process is complete, test the weld connection with the available 1/2" NPT Test Port on the bottom of Casing Head - 600 psi (test to 80% of collapse psi). Hold test for a minimum of 5 minutes. Install 13-3/8" rotating head w/ annular diverter. **MACP 2000 psi must be posted in Drillers Cabin.**
10. Install choke manifold and test BOPE as listed below with rig pump to 1000 psi; bleed pressure to 250 psi and hold for low pressure test. Monitor pressure test on PASON screen and, if possible, print results for test documentation.
11. Using rig pumps test csg and annular to 1,000 psi

Intermediate Hole TD**12 1/4"****3,000' – 5,500'**

1. PU drill-out BHA - Rock Bit + BS + 3-8" DC + Xover + 9 – 6 1/2" DC. Clean and drift intermediate casing after delivery (9 5/8" 43.5# L80/HCL80 LTC ID = 8.755" API Drift = 8.599")
2. Drill out DV Tools. Tag cement. Test casing to 1500# on pump. Hold for 30 min w/o more than 10% drop over the time interval. Report any loss more than 10% to engineer. Drill out cement and floats.
3. Drill 10' new formation and do not conduct FIT
4. POOH LD BHA.
5. PU BHA as below. Required GPM for this section is 650 GPM @ 2,000 psig

12-1/4" BHA

- A. 12 1/4" - Hughes – DB507X
 - B. 8" Mud Motor w/ 11.75" Stab @ 1.75 bent housing
 - C. 12" Nortrack Stab
 - D. 3 – 8" DC
 - E. Xover Sub
 - F. 8 – 6 1/2" DC
 - G. Jars
 - H. 6 – 6-1/2" DC
 - I. 4 1/2" 16.6# G-105 DP
6. Drill intermediate hole with water-based fluid. We will be using 650 GPM @ 2,000 psig. Confirm at RU that all modifications for operations have been completed. Inclination surveys every 500' Max to TD. If inclination exceeds 2.0° then shorten survey to every 250'. If loss zones are encountered which flow at rate that would not clean hole, switch over to **Contingency Mud Program**. POOH and BHA. Contact Butch Willis for BHA and bit selection. If total lost circulation is encountered, dry drill to TD (i.e.pour the water to the hole). **WE WILL NOT SHORT SET CASING**.
 7. Serious drag conditions may require a short trip to adequately prepare hole for casing. Drill hole to depth that fits casing tally and allows easy access to cementing head. **DO NOT EXCEED 6000' MD**
 8. At TD, circ two (2) hole volumes.
 9. Rig up PU / LD machine while circulating. Finish strapping out of hole with drilling assembly and LD all BHA tools.
 10. Rig up casing tools and run inspected (clean, visual, drift) 9- 5/8" surface casing as follows:

1	9 5/8" PDC Drillable Float Shoe
1	9 5/8" 43.5# HCL80 jt casing
1	9 5/8" PDC Drillable Float Collar
5,458'	9 5/8" 43.5# HCL80 jt casing
1	9 5/8" 43.5# L80 DV Tool (set @ 2900+-') – IF REQUIRED
2400'	9 5/8" 43.5# L80 jt casing

Make up torques:

9 5/8" 43.5# L80/HCL80 LTC: Minimum 6100 ft-lbs, Optimum 8130 ft-lbs, Maximum 10,160 ft-lbs

Threadlock or strap-weld all connections on bottom two joints. Install centralizers as follows: **(A)** middle of shoe joint; **(B)** first connection above float collar; **(D)** one above and below the DV tool **(E)** every other joint to surface.



11. Assure that casing is clear prior to cementing (at least two complete circulations). Secure casing for cementing operations. RU O-Tex and **and review cementing plan with their supervisor – confirm that correct materials and volumes have been delivered --- notify Engineering of any discrepancies.** Test lines and pump sufficient fluid volume to assure that casing is clear prior to starting cement - have cementer provide a dry sample of cement blend and catch a wet sample of mixed slurry.
12. With casing setting 1' off bottom, pump 20 bbl Gel spacer and cement 9-5/8" casing with:

STAGE 1:

960 sx 36/65 Poz:C + 4% gel + 5% Salt + .4% CFL - 1 + .25 #/sx Cello Flake + 0.2% CFR - 1 + .4% CR-1
(13.6 #, 1.56 ft³/sx, 7.66 gal/sx).
30% Excess

This cement recommendation calculates to be approximately **30%** excess **but assumes that no lost circulation has occurred and lengthy circulation was not required in drilling or conditioning hole for casing; adjust cementing plan, including slurry volumes and lost circulation additives based on actual drilling conditions and adjusted if fluid caliper is run.**

Displace plug with **FW**, limit maximum bump pressure to 500 psi

DO NOT EXCEED CALCULATED DISPLACEMENT VOLUME BY MORE THAN 1 BBL. After displacing plug, release pressure and check float; if float is holding and cement has been successfully circulated, RD cementers. If float fails, leave cementing valve shut-in for 4 hours prior to commencing NU operations. **Est TOC CEMENT @ 2,800'.**

Assure casing remains centered in rotary table during all cementing and WOC operations.

Prior to finalizing the cementing service order, discuss the cementing plan with Engineer regarding hole conditions, slurry design / volumes and procedures. Include the following data on the Daily Drilling Report: (1) volume and type of any pre-flush; (2) slurry volumes in sacks; (3) cement type, additives and concentrations; (4) weight and yield of each slurry; (5) estimated returns during job and number of sacks circulated – if not full circulation, estimate percentage returns and if circulation is lost, report at what point in the operations that the loss occurred; (6) type and volume of displacement fluid; (7) the pressure at which the plug was bumped; (8) the time when the plug was bumped and the operation completed.

Summarize the casing running and cementing operations and provide all required detail

13. Keep casing centered while WOC 4 hours. Cut off casing and re-confirm that wellhead measurements allow for “C” section to be at GL. Dress off casing stub. Flange up 9 5/8” SOW x 11” 5K wellhead. Test WH w/ appropriate plug (Supplied by Performance).
14. Install 11” - 5M **SRRAG** BOP plus rotating head. **MACP 4600# must be posted in dog house.**
15. Install choke manifold and test BOPE as listed below with rig pump to 1000 psi; bleed pressure to 250 psi and hold for low pressure test. Monitor pressure test on PETRON screen and, if possible, print results for test documentation. Functionally test pipe rams daily, annular weekly and blind rams on each trip out of hole

Item	Low Pressure (PSI)	High Pressure (PSI)	Test Time (Minutes)
Annular	250	2500	10
Rams	250	5000	10
U/L Kelly Valves	250	5000	10
Choke Manifold	250	5000	10
Standpipe	250	5000	10

Production Section

8 1/2"

5500' – 8,500' TD(MD)

1. PU drillout BHA - Rock Bit + BS + 14 – 6 1/2" DC.
2. Drill out DV Tool if run. Tag cement. Test casing to 1500# on pump. Hold for 30 min w/o more than 10% drop over the time interval. Report any loss more than 10% to engineer. Drill out cement and floats.
3. Drill 10' new formation and do not conduct FIT.
4. POOH LD BHA.
5. PU BHA as below. Required GPM for this section is 500 GPM @ 2,000 psig

8 1/2" BHA

- A. 8 1/2" bit – PDC DB506X
- B. 6 1/2" 4:5_7.0 Mtr (w/ 1.50° FBH, .5 rpg) STB
- C. FS
- D. STB
- E. 6 1/2" NMDC (MWD)
- F. 6 1/2" NMDC (30')
- G. 8 - 6 1/2" DC
- H. Jars
- I. 3 - 6 1/2" DC
- J. 4 1/2" 16.6# G-105 DP

ALL MOTORS ARE TO BE FIXED BEND UNLESS APPROVED BY Butch Willis

Motor Housing Stabilizer Specs

Integral Blade (no sleeve) w/ flow by area 25% of hole area as a minimum – have DD calculate
5 Blade, 1/4" under-gauge
Straight Blade – "daylight rule"
Gauge length <40% hole size (3.5" MAX for 8 3/4" hole) – have DD measure
Blade Taper 30° - have DD measure

6. P/U 6 1/2" 4:5_7.0 Motor stage, steerable assembly (FBH set @ 1.50°, .5 rpg), Aim MWD guidance + 8 3/4" PDC bit to 5510'.
7. Drill ahead to 8,500' TD. Take surveys every 90'. Keep inclination <2°.
8. DST's could be taken during this interval. 5-1/2" casing may be run.
9. At TD,

HOLE CLEANING

- circ **3 btms up while rotating @ 90 – 100 rpms.**
- Mud 6 rpm reading needs to be 8-10.
- Flowrate 450 – 500 gpm.

1. POOH standing back DP. Additional wiper trips may be required prior to RSWC/ or FMI.

While drilling ahead:

- Conduct weekly well control drills for all crews and document these on the Daily Drilling Report and electronically with the rig monitoring system or notes on the IADC sheets.

2. RU Schlumberger. Log well as follows:

PEX-Triple Combo/CMR	TD – Interm Csg
FMI	TD – 5500'
Sonic Scanner	TD – 5500'
RSWC Cores	Geol depth selection

Number of runs to be determined by SLB. Wiper trips between runs/cores may be required.

3. RD SLB. RIH w/ Bit + DP and circ btms up. POOH & LD BHA
4. ND all BOPE and install top hat.
5. Release all rental equipment and track removal of same.
6. Clean pits and release rig.