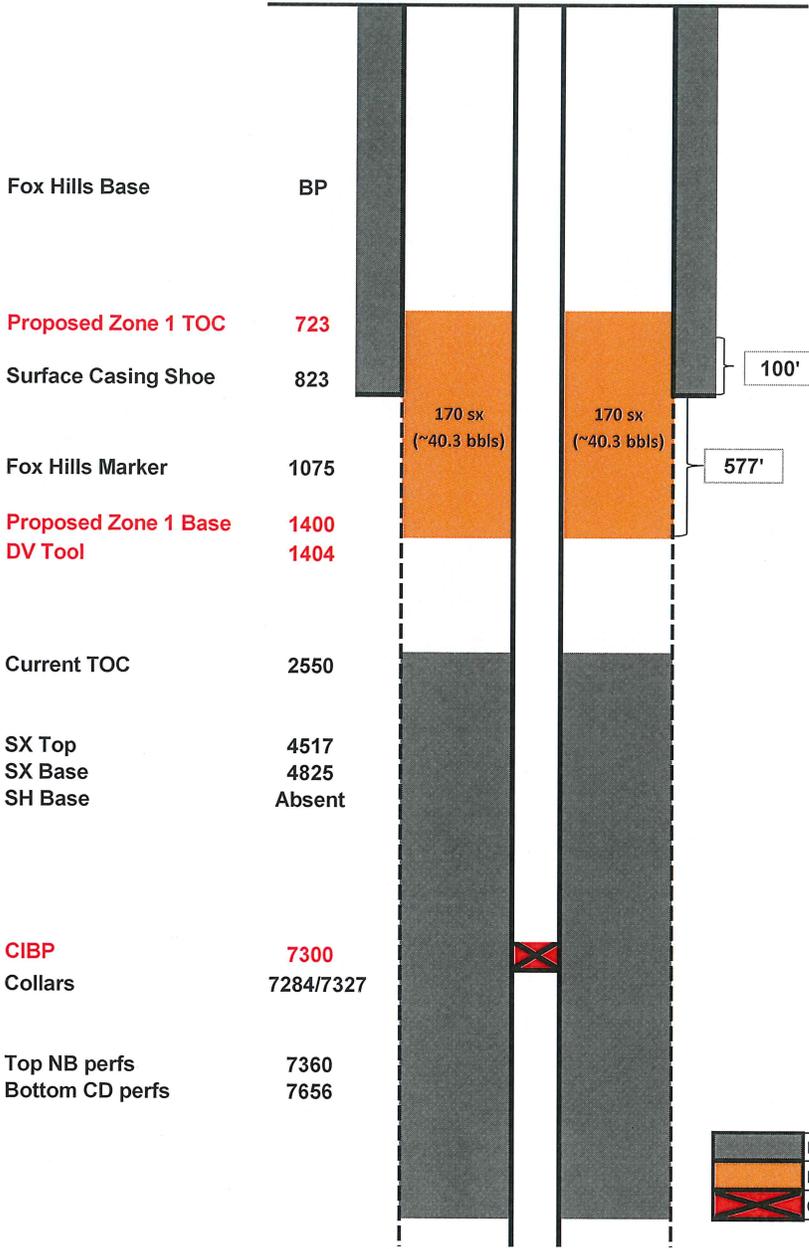


Graznak 35-11 – Bradenhead Procedure

- 1 No GYRO needed.
- 2 Call IOC (970-506-5980) at least 24 hr prior to rig move. If not already completed, request that they catch and remove plunger, isolate production equipment and remove any automation equipment prior to the rig showing up. Install perimeter fence as needed.
- 3 MIRU Slick line. Fish plunger if necessary and tag for PBTB (should be at 8215')
- 4 Prepare location for base beam rig.
- 5 Notify Sater Tool Services (STS) we will need 4.5" 11.6# I-80 stage collar.
- 6 Spot mud tank for 10.0 ppg drilling mud.
- 7 Spot 25 jts of 2-3/8" 4.7# J-55 8RD EUE tbg.
- 8 Spot 5 jts of 4 1/2" 11.6# I-80 csg.
- 9 Spot 4 2-7/8" 16# drill collars
- 10 MIRU WO rig. Kill well with fresh water with biocide. ND wellhead, NU BOPs.
- 11 Run two 2" lines from starting head to return tanks. (Need to be able to circulate at high rate).
- 12 PU 8-10' landing joint. TIW valve on top and screw into the tbg hanger. Back out the lock down pins and pull up on the tbg string to break any possible sand bridges. Do not exceed 80% of tubing tensile strength, or 57,384-lb.
- 13 Unseat tbg hanger and LD tbg hanger and landing joint. Install rubber wiper in stripping head.
- 14 MIRU EMI equipment. TOOH with 2-3/8" tbg. EMI tbg while TOOH. Lay down joints with wall loss or penetrations >35%. Replace joints as necessary. Keep yellow and blue band tubing. Note joint number and depth of tubing leak(s) on production equipment failure report in OpenWells. Clearly mark all junk (red band) tubing sent to yard.
- 15 Cleanout if sand was tagged higher than 8215' in step 3.
- 16 TIH with 4.5" CIBP (4.5" 11.6# I-80). Set CIBP at +/- 7300' (collars at 7284' and 7327'). Pressure test CIBP to 2500 psi for 15 minutes. Spot 2 sx of sand on top of CIBP.
- 17 TOOH and SB tbg.
- 18 ND BOP. PU 4-1/2" landing joint. Unland 4.5" production csg and NU BOP to 8-5/8" surface casing and install 4-1/2" pipe rams.
- 19 MIRU wireline. RU lubricator and run CCL to find collar at or slightly below 1400'. POOH with CCL. Collar to be backed off of must be at or below 1400'. Adjust all volume calculations based on actual collar depth.
- 20 PU 4.5" csg with 17,500 lb. Torque csg in preparation for back off. Put marks on csg and work torque down slowly. Maximum torque is 2900 lb-ft, optimal is 2300 lb-ft.
- 21 RIH with stringshot. Apply left-hand torque to casing string and back csg off at collar located in step 19. If collar cannot be backed off, call engineering for further instructions.
- 22 MIRU laydown trailer and casing tongs. TOOH with 4-1/2" csg and LD csg. Replace bad joints as necessary.
- 23 PU and TIH with the following: Skirted screw-in sub, cement DV tool (stage cement collar) in closed position, and remaining 4 1/2" csg. Place bow spring centralizer around every connection from 3 jts above DV tool to 723'. Install a total of 13 centralizers.
- 24 Tie back onto 4-1/2" casing stub. Work torque down to collar at ~1400' as close to 2300 lb-ft as possible.

- 25 Land 4.5" csg in 8-5/8" starting head in tension.
- 26 Cut 4-1/2" csg per operator recommendations. ND BOP. Install bell nipple if necessary.
- 27 Pack off 4 1/2" csg and install compression nut.
- 28 MIRU cementing equipment. Drop shifting dart and RU cementing head to 4 1/2" csg. Wait 5 minutes for dart to fall and pressure up to 1500 psi to shift DV tool.
- 29 Circulate 65 bbl of 10.0 ppg drilling mud at maximum rate achievable and then mix cement.
- 30 Commence pumping cement job consisting of 30 bbl fresh water flush; 40.3 bbl (170 sx) of Type III and 1/4 lb/sk Cello Flake mixed at 14.8 ppg and 1.33 cuft/sk blended for a 2 hr pump time at 80 °F (Cement from 1400' to 723'). Note: Check volumes based on actual DV Tool placement.
- 31 Drop wiper plug and spot 1 bbl cement on top of plug. Displace with 21 bbl fresh water. Note: Check displacement volumes based on actual DV Tool placement.
- 32 Break lines and clean up with fresh water. Reconnect lines to cementing head.
- 33 Bump plug and pressure up to 1500 psig to close DV tool.
- 34 Check for flow back to make sure stage collar is holding. ND cementing head.
- 35 RMDO cement company.
- 36 NU tbg head and BOP.
- 37 Leave well shut in overnight.
- 38 PU 4 2-7/8" 16# drill collars with 3-7/8" bit/mill and TIH with 2-3/8" tbg and crossover. Rig up power swivel and mill DV cementing tool @ +/- 1400'. Should encounter ~64 feet of cement. TOOH with 2-3/8" tbg and 3-7/8" bit/mill and SB tbg and LD collars.
- 39 MIRU wire line and run CCL-GR-CBL-VDL-Sector Map from 2700' to surface. If cement is not above 723', contact engineering for further instructions. In addition to normal handling of logs/job summaries, email copies of all cement job logs/job summaries and invoices to rscDJVendors@anadarko.com within 24 hours of the completion of the job. RDMO wire line.
- 40 Pressure test stage collar to 2,500 psi for 15 minutes.
- 41 PU 3-7/8" bit/mill and TIH with 2-3/8" tbg and crossover. Rig up power swivel and mill out CIBP @ +/- 7300'.
- 42 TOOH with bit and SB tbg.
- 43 Cleanout if sand was tagged higher than 8215' in step 3.
- 44 TIH with 2-3/8" XN SN and 2-3/8" 4.7# J55 EUE tbg. Land tbg @ +/- 7604' (1 jt above top Codell perf).
- 45 ND BOP and NU master valve and tubing head adaptor. Broach tbg to XN nipple. Hydrotest tubing head to 5000 psi for 15 minutes.
- 46 RMDO WO rig.
- 47 Clean location and swab well back to production. Notify IOC of finished work and turn well back over to production team.

Graznak 35-11 05-123-29594 Proposed WBD (Bradenhead)
 12-1/4" Surface Hole
 7-7/8" Prod Hole



Between 8-5/8" Casing 24# and 4.5" casing	0.24715	ft ³ /ft
Between 8-5/8" Casing 24# and 4.5" casing	0.04402	bbl/ft
7 7/8" Open hole and 4.5" casing	0.2278	ft ³ /ft
7 7/8" Open hole and 4.5" casing	0.0406	bbl/ft
8" Open hole and 4.5" casing	0.2386	ft ³ /ft
8" Open hole and 4.5" casing	0.0425	bbl/ft
8.5" Open hole and 4.5" casing	0.2836	ft ³ /ft
8.5" Open hole and 4.5" casing	0.05051	bbl/ft
9" Open hole and 4.5" casing	0.3313	ft ³ /ft
9" Open hole and 4.5" casing	0.059	bbl/ft
10" Open hole and 4.5" casing	0.435	ft ³ /ft
10" Open hole and 4.5" casing	0.0775	bbl/ft
10.5" Open hole and 4.5" casing	0.4909	ft ³ /ft
10.5" Open hole and 4.5" casing	0.0874	bbl/ft
11" Open hole and 4.5" casing	0.5495	ft ³ /ft
11" Open hole and 4.5" casing	0.0979	bbl/ft
11.5" Open hole and 4.5" casing	0.6108	ft ³ /ft
11.5" Open hole and 4.5" casing	0.1088	bbl/ft
12.5" Open hole and 4.5" casing	0.7417	ft ³ /ft
12.5" Open hole and 4.5" casing	0.1321	bbl/ft
Class Cement yield (SX/SH) 15.8ppg	1.15	ft ³ /sk
Class Cement yield (Fox Hills) 14.8ppg	1.33	ft ³ /sk

0.2 excess

Zone 1 (Fox Hills)

$(0.2836 * (1400 - 823)) / 1.33 * 1.2 = 147.6 \text{ sx}$

$(0.24715 * (823 - 723)) / 1.33 = 18.6 \text{ sx}$

Total 166.2 sx ~ **170 sx**

$(0.05051 * (1400 - 823)) * 1.2 = 35.0 \text{ bbls}$

$(0.04402 * (823 - 723)) = 4.4 \text{ bbls}$

Total 39.4 bbls ~ **40.3 bbls**

*DV tool must be deeper than 1400'

	Existing Cement
	Proposed Cement
	CIBP