

## State 4-16 – Bradenhead Procedure

- 1 Call Foreman or Lead Operator 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.
- 2 MIRU Slick line. Fish plunger if necessary and tag for PBTD (should be at **8118'**).
- 3 Prepare location for base beam rig.
- 4 Spot 12 jts of 2-3/8" 4.7# J-55 8RD EUE tbg.
- 5 Spot 6 2 7/8" 16# drill collars
- 6 MIRU WO rig. Kill well with fresh water with biocide. ND wellhead, NU BOPs.
- 7 Run two 2" or one 3" line(s) from starting head to return tanks. (Need to be able to circulate at 10 bbl/min).
- 8 PU 8-10' landing joint with TIW safety 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.
- 9 Unseat tbg hanger and LD tbg hanger and landing joint. Install rubber wiper in stripping head.
- 10 MIRU EMI equipment. TOO H with 2-3/8" tbg. EMI tbg while TOO H. 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.
- 11 MIRU wire line.
- 12 RIH with CCL/Gauge Ring to **7560'**. POOH with wire line.
- 13 RIH with wire line and 4.5" RBP (4.5" 11.6# I-80). Set RBP at +/- **7560'** (Collars at **7492'** and **7580'**). Dump bail 2 sx sand on top of RBP. RDMO wire line.
- 14 Pressure test RBP to 1,000 psi for 15 minutes. (Pressure test to make sure plug is set correctly)
- 15 PU and RIH with CCL and 3-1/8" perforating gun, 0.60" EHD charge, 3 spf 120 deg phasing. Perforate 4 1/2" csg @ +/- **1500'** avoiding any collars identified by CCL. POOH with wire line. RDMO wire line company.
- 16 MIRU Cement company. Establish circulation with 9.0 ppg drilling mud at 5 bbl/min or maximum rate achievable without breaking down formation.
- 17 Commence pumping cement job at pump rate of **5 bbl/min** (or max rate achievable) consisting 5 bbl fresh water, 20 bbl sodium meta silicate and 5 bbl fresh water; **35 bbl (130 sx) of Type III +** with CaCl<sub>2</sub> and 2 lb/sk PS Flake mixed at 14.0 ppg and 1.53 cuft/sk (Cement from **1500'** to **894'**). Drop wiper plug and Under displace by 1.5 bbl (21.8 bbl total, leave 100' of cement in csg. Do not over displace).
- 18 Break lines and clean up with fresh water. RDMO cement company.
- 19 NU tbg head and BOP.
- 20 Leave well shut in for 48 hours with 100 psi on it.
- 21 Circulate gas out of hole with fresh water with biocide.
- 22 PU 6 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 to +/- **1500'**.
- 23 TOO H with bit and SB tbg. LD collars.

- 24 MIRU wire line and run CCL-GR-CBL-VDL from 1600' to 100'. If cement is not above 894', contact engineering for further instructions. RDMO wire line.
- 25 Pressure test csg to 1,000 psig. If pressure does not hold, contact engineering for further support.
- 26 TIH with 2 3/8" tbg and retrieving head and tag sand above RBP at +/- 7560'. Circulate sand off RBP. Latch onto RBP and release RBP. TOOH standing back all 2 3/8" tbg and LD RBP.
- 27 TIH with 2-3/8" XN SN, and 2-3/8" 4.7# J55 EUE tbg. Hydro test tbg while TIH.
- 28 Land tbg @ +/- 7960' (1 jt above top Codell perf). Broach tbg to XN nipple.
- 29 ND BOP, NU master valve and hydrotest tubing head to 5,000 psi for 15 minutes.
- 30 RDMO WO rig.
- 31 Clean location and swab well back to production. Notify field foreman/field coordinator of finished work and turn well back over to production team.

Existing

KB=10'

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API #0512329118

8-5/8" 24#/ft J-55 STC  
12-1/4"

Surface casing 994

Fox Hills Base 613

894

TOC 3090

1500

Sussex Top	No perfs 4741
Shannon Base	No perfs BHP

Niobrara Top	7619-7870 7618
Codell Top	7990-8004 7989

4-1/2" 11.6 #/ft I-80 LTC

8118

Type III

Sh/Sx Cement

Wellbore Diameter (in) 8.25  
Hole/Csg Capacity (ft3/ft) 0.26  
Cement Coverage Height (ft) 606  
Cement Volume (ft3) 158  
20% Excess (ft3) 190  
Cement Vol (bbl) 35  
Sx 130

TFV (bbl) 23.31  
AFV (bbl) 21.76  
CIC (ft) 100  
Under Disp Vol (bbl) 1.55

Mud
Existing cement
Sand Plug
RBP
New Cement
Fresh Water w/ Bio

7560