

West Farms 8-14A Bradenhead Procedure

- 1 Call Foreman or Lead Operator at least 24 hrs 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 slickline. Fish plunger from lubricator. RIH and pull the bumper spring and standing valve if necessary. RBIH with sinker bars and tag bottom. Report findings. PBDT should be at 7793'. RIH with GYRO, run GYRO from SN (+/- 7667') to surface making stops every 100'. RDMO slickline.
- 3 Prepare location for base beam rig.
- 4 Spot a minimum of 25 jts of 2-3/8", 4.7#, J-55, EUE tbg for replacement and 80 jts 1-1/4", 2-33#/ft, J-55, 10rd IJ for annular cement job.
- 5 MIRU WO rig and auxiliary equipment. Check pressures. Rig up 2" line from the casing head annulus to work tank. Kill well with fresh water. ND tree and adapter flange, NU BOP's.
- 6 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 tbg string to break any possible sand bridges, unseat landing joint and lay down. Do not exceed 80% of tubing tensile strength, or **57,380-lb**. Clean out as necessary to 7850'.
- 7 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. Note joint number and depth of tubing leak(s) on production equipment failure report in Open Wells. Clearly mark all junk (red band) tubing sent to yard.
- 8 TIH with 2-3/8" tbg and 4.5" RBP. Set RBP @ +/-6850', (collars are at 6828' and 6870'). Pressure test RBP to 5000 psi. Spot 2sx of sand on top of RBP and TOO H.
- 9 Bleed off pressure. ND BOP's, ND wellhead, Un-land 4 1/2" casing, NU dual entry flange, NU BOP.
- 10 PU 1-1/4" 2.3#/ft J-55 10rd IJ tubing, and TIH outside 4-1/2" casing in open hole to ~2500'. Circulate with freshwater treated with biocide to clean up annulus while TIH, circulate with rig pump until clean returns are seen.
- 11 Contact Imperial mud (min of 24hrs. in advance) to bring out 40bbbls of 10.0ppg mud, circulate the well with continuous sweeps of mud until well is completely dead and all gas is removed from annulus (shut in well for 1 hr to ensure no gas is present).
- 12 If gas is detected, contact engineering to discuss plan moving forward.
- 13 PUH to ~1400' to displace cement.
- 14 MIRU cement services. Prepare to cement. Mix and pump **210sx (~57bbbls)** of 14.0 ppg (1.53 cuft/sk) Type III and gas block additive. The cement to be retarded for 80 °F and 3 hour pump time.
- 15 TOO H ~38 joints to ~200' and reverse circulate 2 times the tubing volume of water or until clean returns are seen. TOO H with 1-1/4" tubing.
- 16 RDMO cementing company.

Run GYRO and Remediate Fox Hills with Annular Fill

Nio top: 6945'; TOC: 3846'; NPV: \$360M

Spud on 3/2/2003; Had instantaneous pressure of 184 psig on Form 17 and 120 gallons of condensate after 3 hrs Full Circle

- 17 ND BOP. ND dual entry flange and crossover. Pick up and land 4-1/2" casing in slips. NU 4-1/2" 5000 psi tubing head with 2-5000 psi valves (use new style flanged well head equipment if available). NU BOP's to tubing head.
- 18 Leave well shut in for ~36hrs.
- 19 MIRU wireline and run CCL-GR-CBL-VDL from 6850' to surface. Notify the Engineer of the top of cement. 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.
- 20 RDMO wireline.
- 21 PU and TIH with 2-3/8" tbg and retrieving head. Circulate sand off RBP at @ +/-6850'. TOOH with RBP and SB tbg.
- 22 TIH with 2-3/8" NC, 2-3/8" XN SN and 2-3/8" 4.7# J55 EUE tbg, circulate out fill if necessary to 7793'. Land tbg @ +/- 7250'.
- 23 Broach tubing to seating nipple. ND BOP's, NU master valve and tubing head adaptor. Hydrotest tubing head to 5000 psi for 15 minutes.
- 24 RDMO WO rig.
- 25 Clean location and swab well back to production. Notify field foreman/field coordinator of finished work and turn well back over to production team.

Run GYRO and Remediate Fox Hills with Annular Fill

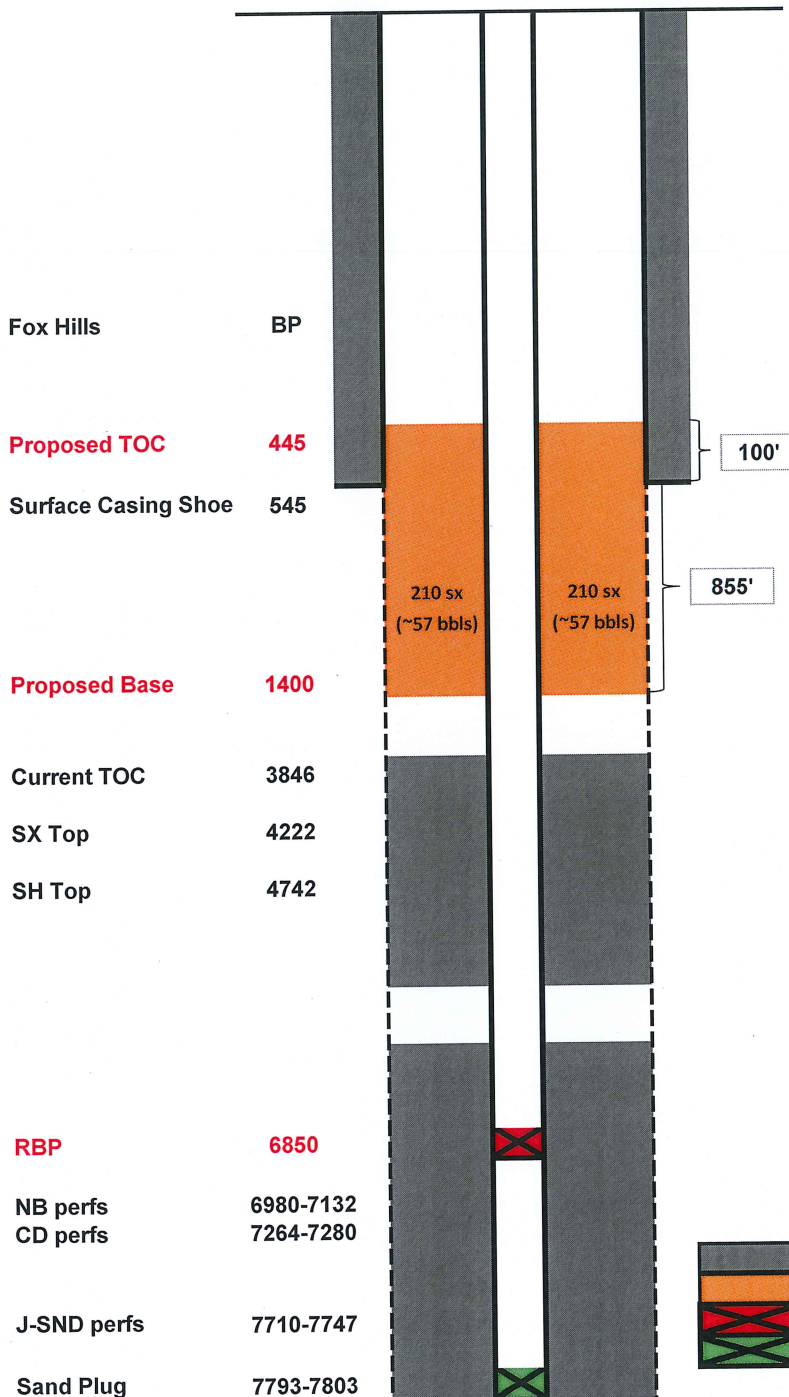
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Full Circle

West Farms 8-14A 05-123-21294 Proposed WBD (Annular Fill)

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
Between 8-5/8" Casing 24# and 3.5" casing	0.29076	ft ³ /ft
Between 8-5/8" Casing 24# and 3.5" casing	0.05178	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	0.0590	bbl/ft
10" Open hole and 4.5" casing	0.4350	ft ³ /ft
10" Open hole and 4.5" casing	0.0775	bbl/ft
10" Open hole and 3.5" casing	0.4786	ft ³ /ft
10" Open hole and 3.5" casing	0.0852	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 (zone 1, SX/SH) 15.8ppg	1.15	ft ³ /sk
Class Cement yield (zone 2, Fox Hills) 14ppg	1.53	ft ³ /sk

0.2 excess

Fox Hills			
$(0.2836 \times (1400 - 545)) / 1.53 \times 1.2$	=	190.2	sx
$(0.05051 \times (1400 - 545)) \times 1.2$	=	51.8	bbl
$(0.24715 \times (545 - 445)) / 1.53$	=	16.2	sx
$(0.04402 \times (545 - 445))$	=	4.4	bbl
Total	=	206.3324	~
	=	56.22526	~
		210	sx
		57	bbl

	Existing Cement
	Proposed Cement
	RBP
	Sand Plug