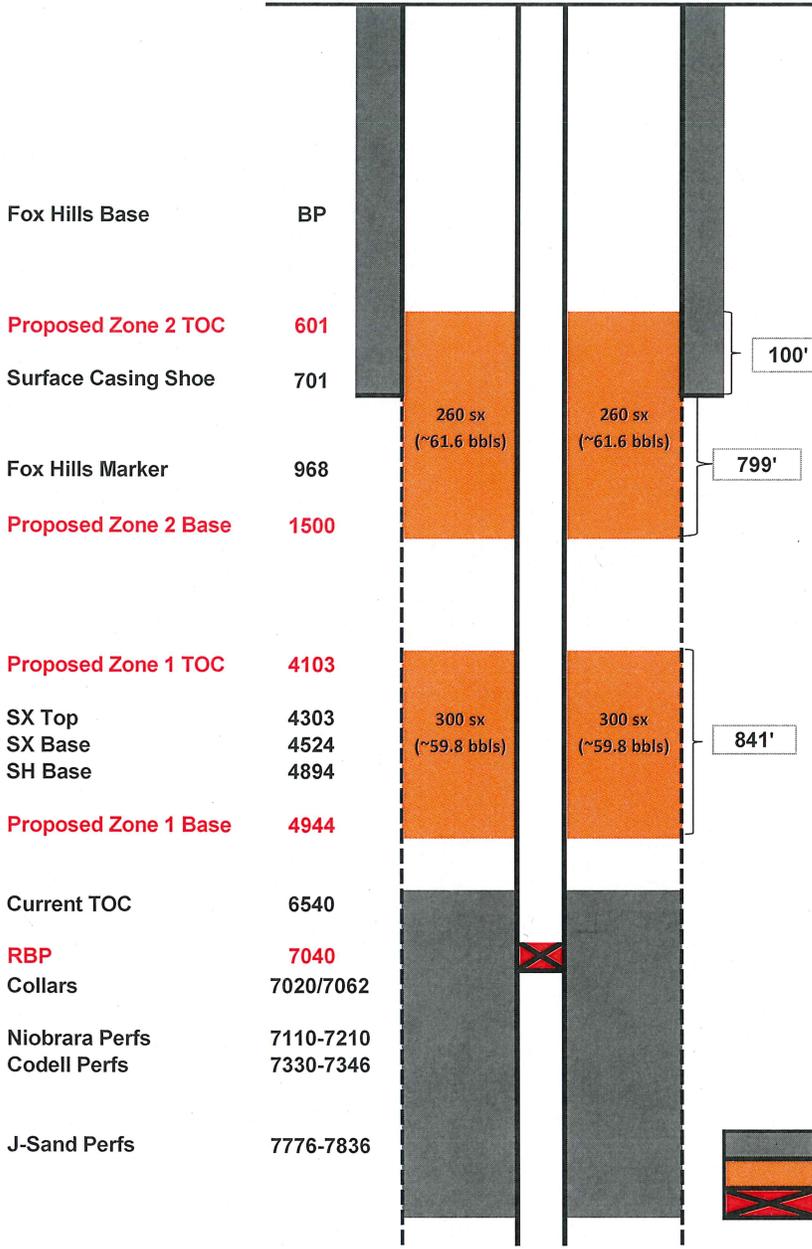


Shutt 9-18 Bradenhead Procedure

- 1 GYRO ran on 11/14/11. Sand cleanout needed prior to cement job.
- 2 Call Foreman or Lead Operator at least 24 hr prior to rig move. If not already completed, request that they isolate production equipment and remove any automation equipment prior to the rig showing up. Install perimeter fence as needed.
- 3 Slickline tagged and tested on 8/7/14 (after HZ fracs) and didn't find any fish. Plunger and bumper spring assembly may be stuck in sand.
- 4 Prepare location for base beam rig.
- 5 Spot a minimum of 25 jts of 2-3/8", 4.7#, J-55, EUE tbg for replacement and 190 jts 1-1/4", 2-33#/ft, J-55, 10rd IJ for sand cleanout and annular cement placement.
- 6 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.
- 7 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**. If tbg does not come free, notify engineer to discuss plan for moving forward.
- 8 Sand was last tagged at 6800' (642' above XN) on 8/13/2014. In order to avoid a wet trip, MIRU E-line, RIH with perf gun and shoot holes in 2-3/8" tbg at ~6800'. POOH with perf gun, RDMO E-line.
- 9 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.
- 10 PU and TIH with 15 jts 1-1/4" tbg, crossover, and ~236 jts 2-3/8" tbg (to ensure reaching PBMD). Tag fill and cleanout to PBMD at 7909'. Use bailer when needed. Make sure to circulate tbg clean at 7746' (1 jt above top J Sand perf) prior to cleaning past J Sand perfs. If circulation is lost near J Sand, contact engineer to discuss leaving J Sand under sand plug. POOH.
- 11 TIH with 2-3/8" tbg and 4.5" RBP. Set RBP @ +/-7040', (collars are at 7020' and 7062'). Pressure test RBP to 5000 psi. Spot 2sx of sand on top of RBP and TOO H.
- 12 Bleed off pressure. ND BOP's, ND wellhead, Un-land 4-1/2" casing, NU dual entry flange, NU BOP.
- 13 PU 1-1/4" 2.3#/ft J-55 10rd IJ tubing, and TIH outside 4-1/2" casing in open hole to ~5400'. Circulate with the rig pump while TIH to clean up the annulus. Use sweeps as necessary until clean returns are seen. Make sure no pressure is present on the bradenhead before moving on to the next step. If gas is detected, contact engineering to discuss a plan for moving forward.
- 14 Contact Imperial mud (min of 24hrs. in advance) to bring out 60bbbls of 10.0ppg mud. Pump 60bbbls of mud at 5400'. Leave 1-1/4" tbg full of mud to avoid a wet trip and PUH to 4944' to displace cement.
- 15 MIRU cement services (**Sanjel**). Circulate 10bbbls water, 20bbbls mud flush, 10bbbls water, 20bbbls SMS, and 5bbbls of water.
- 16 Mix and pump **300sx (~59.8bbbls)** of 14.6 ppg (1.12 cuft/sk) neat Class G cement and ¼ lb/sk Cello Flake. The cement is to be retarded for 120 °F and 6 hour pump time.
- 17 TOO H 40 joints to ~3700' and circulate 2 times the tubing volume of water or until clean returns are seen.
- 18 PUH to 1500'. Mix and pump **260sx (~61.6bbbls)** of 14.8 ppg (1.33 cuft/sk) Type III and ¼ lb/sk Cello Flake. The cement is to be retarded for 80 °F and 3 hour pump time.
- 19 TOO H 32 joints to ~400' and circulate 2 times the tubing volume of water or until clean returns are seen. TOO H with 1-1/4" tubing.
- 20 RDMO cementing company.
- 21 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. Make sure all valves and nipples are rated to 5000 psi.
- 22 Leave well shut in for ~36hrs.
 - 23 MIRU wireline and run CCL-GR-CBL-VDL from 6600' to surface. Verify new cement coverage with Evans Engineering. Design is for coverage from ~4944' to 4103' and ~1500' to 601'. 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.
 - 24 RDMO wireline.
 - 25 PU and TIH with 2-3/8" tbg and retrieving head. Circulate sand off RBP at @ +/-7040'. TOOH with RBP and SB tbg.
 - 26 TIH with 1-1/4" NC, 9 jts 1-1/4" tbg, crossover, XN at ~7441', and 2-3/8" 4.7# J55 EUE tbg to surface (~236 jts).
 - 27 Broach tubing to seating nipple. ND BOP's, NU master valve and tubing head adaptor. Hydrotest tubing head to 5000 psi for 15 minutes.
 - 28 RDMO WO rig.
 - 29 Clean location and swab well back to production. Notify Field Foreman/Field Coordinator of finished work and turn well back over to production team.

Shutt 9-18 05-123-21403 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	bbbl/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	bbbl/ft
8" Open hole and 4.5" casing	0.2386	ft ³ /ft
8" Open hole and 4.5" casing	0.0425	bbbl/ft
8.5" Open hole and 4.5" casing	0.2836	ft ³ /ft
8.5" Open hole and 4.5" casing	0.05051	bbbl/ft
9" Open hole and 4.5" casing	0.3313	ft ³ /ft
9" Open hole and 4.5" casing	0.0590	bbbl/ft
9.5" Open hole and 4.5" casing	0.3818	ft ³ /ft
9.5" Open hole and 4.5" casing	0.0680	bbbl/ft
10" Open hole and 4.5" casing	0.435	ft ³ /ft
10" Open hole and 4.5" casing	0.0775	bbbl/ft
11" Open hole and 4.5" casing	0.5495	ft ³ /ft
11" Open hole and 4.5" casing	0.0979	bbbl/ft
11.5" Open hole and 4.5" casing	0.6108	ft ³ /ft
11.5" Open hole and 4.5" casing	0.1088	bbbl/ft
12.0" Open hole and 4.5" casing	0.6749	ft ³ /ft
12.0" Open hole and 4.5" casing	0.1202	bbbl/ft
Class Cement yield (zone 1, SX/SH) 14.6ppg	1.12	ft ³ /sk
Class Cement yield (zone 2, Fox Hills) 14.8ppg	1.33	ft ³ /sk

Caliper looks like ~9" near Zone 1
 No caliper at Zone 2

0.2 excess

Zone 2 (Fox Hills)			
$(0.3313 \times (1500 - 701)) / 1.33 \times 1.2$	=	238.8	sx
$(0.24715 \times (701 - 601)) / 1.33$	=	18.6	sx
Total		257.4	sx
	~	260	sx
$(0.059 \times (1500 - 701)) \times 1.2$	=	56.6	bbbl
$(0.04402 \times (701 - 601))$	=	4.4	bbbl
Total		61	bbbls
	~	61.6	bbbls

Zone 1 (SX/SH)			
$(0.3313 \times (4944 - 4103)) / 1.12 \times 1.2$	=	298.5	sx
$(0.059 \times (4944 - 4103)) \times 1.2$	=	59.5	bbbls
	~	300	sx
	~	59.8	bbbls

	Existing Cement
	Proposed Cement
	RBP