

Engineer: Samantha Tran

Cell: 832-540-0209

REMEDIAL CEMENT PROCEDURE

WEISS 1-34 API# 05-123-10529

STEP DIRECTION

- 1 Well needs Niobrara/Fox Hills remedial cement, WH change, and packer.
- 2 Well has GYRO from 11/14/13 but requires another one. The most recent bradenhead report (03/28/16) shows 1 psi and no fluid produced.
- 3 Call foreman and/or field coordinator 24 hours before rig up to isolate any production equipment (remove plunger, wellhead automation, etc.). Prepare to move base beam rig onto location. Install perimeter fence if needed. Operations needs to bleed off the bradenhead pressure before the rig gets on location.
- 4 Check and record bradenhead pressure. If bradenhead valve is not accessible, re-plumb so that valve is above GL. Blow down bradenhead and re-check pressure the next day. Repeat until pressure stays at 0 psi.
- 5 OpenWells report from 07-19-2007 states "chased FFSV & plunger to 4500'. Set 2 stage SV @ 4249."
- 6 MIRU Slickline and VES. RIH to retrieve production equipment described above and tag for fill. Contact Engineering if tag is above 7766' and note tagged depth in OpenWells. Run GYRO from 7500' to 4000', making stops every 100'. RDMO Slickline and VES.
- 7 MIRU WO rig. Kill well as necessary with biocide treated fresh water. Spot in 25 jts of 2-3/8" 4.7# J-55 EUE tbgs. ND wellhead. NU BOP. Unland 2-3/8" tbgs and using landing joint and LD.
- 8 MIRU EMI services. EMI 2-3/8" tbgs while TOOH and tally while standing back. Do not exceed safety tensile load of 57,000 lbs. LD joints that have greater than 35% penetration or wall loss. Replace all joints that fail EMI testing. Document joint numbers and depth of bad tbgs and create a Production Equipment Failure report in OpenWells. RDMO EMI services.
- 9 PU and TIH with (4-1/2", 11.6#) bit and scraper on 2-3/8" tbgs to +/-7010'. TOOH and SB all 2-3/8" tbgs, LD bit and scraper.
- 10 PU and TIH with hydraulically set (4-1/2", 11.6#) CIBP and set at +/-7000'. Release tbgs from CIBP.
- 11 Load hole with biocide treated fresh water and circulate all gas from well. Pressure test CIBP and production casing to 1000 psi for 15 minutes. If pressure test passes proceed; otherwise contact Engineering.
- 12 TOOH and SB all 2-3/8" tbgs.
- 13 ND BOP and existing tbgs head off of 4-1/2" casing. Install new 5,000 psi flanged tbgs head complete with 5,000 psi casing valves and 8" Double X Heavy nipples. Be sure all wellhead equipment is rated to 5,000 psi and flanged. NU BOP.
- 14 MIRU WL. PU and RIH with two 1' 3-1/8" perf guns with 3 spf, 0.50" EHD, 120° phasing. Shoot 1' of squeeze holes at +/- 6800' and +/- 6500'. POOH and RDMO WL.
- 15 MIRU Hydrotester. PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbgs while hydrotesting to 3000 psi. Set CICR at 6530'. RDMO Hydrotester.
- 16 Establish circulation through squeeze holes with biocide treated fresh water and pump 200 bbls to clean up hole.
- 17 MIRU Cementers. Pump Niobrara Squeeze: Pump 10 bbls (min) pre-flush, followed by 5 bbls fresh water spacer. Pump 100 sx (151 cf) assuming 0.25 lb/sk polyflake 15.8 ppg & 1.51 cf/sk. Underdisplacement by 3 bbls. Volume is

FHM 797'; Sussex Top 4128'; Sussex Base 4367'; Shannon Base 4745'; Niobrara Top 6935'.

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- based on 270' below the CICR inside 4-1/2" production casing with no excess, 300' in the 4-1/2" annulus assuming 8" OH from caliper with 20% excess, and 190' on top of the CICR to cover top perms. RD Cementers.
- 18 Slowly pull out of the cement and PUH to 6000'. Reverse circulate to ensure no cement is left in the tbg.
 - 19 TOOH and SB all 2-3/8" tbg, LD stinger.
 - 20 MIRU WL. PU and RIH with one 1' 3-1/8" perf guns with 3 spf, 0.50" EHD, 120° phasing. Shoot 1' of squeeze holes at +/- 1000'. POOH and RDMO WL.
 - 21 PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg and set at +/-970'.
 - 22 Establish circulation through squeeze holes with biocide treated fresh water and pump a minimum of 100 bbls to clean up hole.
 - 23 MIRU Cementers. Pump Fox Hills Squeeze: Pump 10 bbls (min) pre-flush, followed by 5 bbls fresh water spacer. Pump 205 sx (308 cf) assuming 0.25 lb/sk polyflake 15.8 ppg & 1.50 cf/sk. Underdisplace by 1 bbl. Volume is based on 30' below the CICR inside 4-1/2" production casing with no excess, 650' in the 4-1/2" annulus assuming 7.88" bit size with 60% excess, and 60' on top of CICR. RDMO Cementers.
 - 24 Slowly pull out of the cement and PUH to 500'. Reverse circulate to ensure no cement is left in the tbg. WOC per cement company recommendation.
 - 25 TOOH and SB all 2-3/8" tbg, LD stinger.
 - 26 PU and TIH with appropriate bit size and drill collars on 2-3/8" tbg to TOC (+/-910').
 - 27 RU Power Swivel. Establish circulation with biocide treated fresh water. For the following pressure tests, contact Engineering if PT fails; otherwise proceed.
 - 28 Drill out all cement and CICR until bit falls free (+/-1000'). PT holes to 500 psi. Contact Engineering if cement returns above CICR is still green.
 - 29 Continue drilling to second CICR located at +/-6530'. PT top holes to 500 psi. Drill CICR and cement past lower perms located at +/-6800' and until bit falls free. PT to 500 psi to ensure all squeeze holes are sealed.
 - 30 TOOH and SB all 2-3/8" tbg, LD drill collars and bit.
 - 31 MIRU WL. Well needs CBL. Ensure hole is loaded with biocide treated fresh water and no gas is present. PU and RIH with CCL-GR-CBL-VDL. Run log from 7000' to surface and send results to Engineering. Report cement tops in OpenWells. RDMO WL.
 - 32 PU and TIH with appropriate bit size and drill collars on 2-3/8" tbg to CIBP at +/- 7000'.
 - 33 RU Power Swivel. Establish circulation with biocide treated fresh water. Drill CIBP and push to at least 7760'. RD Power Swivel.
 - 34 TOOH and SB 7657' of 2-3/8" tbg. LD remaining tbg, drill collars, and bit.
 - 35 MIRU Hydrotester. PU 2-3/8" NC, 2-3/8" XN nipple, 33 jts 2-3/8" 4.7# J-55 tbg, Arrowset AS-1X packer rated to 10,000 psi, and 210 jts of 2-3/8" 4.7# J-55 tbg to surface while hydrotesting to 6000 psi. Land EOT at +/- 7657' and the packer at +/- 6600'. RDMO Hydrotester.

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- 36 Load 2-3/8" x 4-1/2" annulus with packer fluid to ensure packer is properly set. Pressure test packer and backside to 500 psi.
- 37 RU rig lubricator. Broach tbg to XN nipple. RD rig lubricator.
- 38 ND BOP, NU 7-1/16" x 5,000 psi flanged tbg head adaptor with new 5,000 psi flanged master valve with flanged connection. Make sure all wellhead valves are rated to 5,000 psi.
- 39 Install 2-3/8" seating nipple above the master valve. Pressure test tbg head from below the tbg head through the master valve to 5,000 psi.
- 40 RDMO WO rig. Return well to Production team.

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