

GERALD WARDELL GU #1 Remedial Cement, Replace Wellhead

- 1 Well does not have a gyro.
- 2 Call Foreman or Field Coordinator before rig up to isolate production equipment. Catch and remove plunger. Enter plunger into PLUNGER DATABASE. Call 24 hours prior to the rig moving onto location so that any automation equipment can be removed prior to the rig showing up. Install fence if needed. NOTE: Report surface casing pressure to engineer. If surface casing is not accessible at ground level, re-pipe so valve is at ground level.
- 3 Level location for base beam rig.
- 4 MIRU Cable to run gyro. RIH to retrieve production equipment. RIH and tag for fill; last tagged depth was 7,649' on 6/30/2011. Note tagged depth in OpenWells. Run gyro from SN (7536') to surface with stops every 100'. Forward gyro survey to Sabrina Frantz and invoices to Matt Agee. RDMO Cable.
- 5 Place cement services on "will call" when rig moves on location to rig up.
- 6 MIRU Workover (WO) Rig. Control well with biocide treated water. Nipple Down (ND) Wellhead (WH) and Nipple Up (NU) Blow Out Preventer Equipment (BOPE). Unseat landing joint and lay down (LD).
- 7 MIRU EMI services. EMI 2-3/8" TBG on TOOH and tally while standing back. Lay down joints with wall loss or penetrations > 35%. Replace bad joints as necessary. Note joint number and depth of bad tubing and create Production Equipment Failure Report in OpenWells. RDMO EMI services.
- 8 MIRU E-Line service Company
- 9 PU and RIH with Gauge ring and junk basket combo for (4-1/2", 10.5/11.6#, N-80/K-55) CSG. Run Gauge ring to 7,540', POOH.
- 10 PU 10,000 psi rated from above and below RBP (4-1-2", 10.5/11.6#, N-80/K-55) CSG and 2-3/8" TBG and set RBP @ 7,500'. DO NOT PULL OFF OF RBP. (NOTE: There is no CBL log for this well.)
- 11 With pup joint connected and pipe rams closed, pressure test RBP down annulus to 500psi using water w/ biocide for 15 min. If pressure test passes, proceed.
- 12 TOOH standing back 2-3/8" TBG.
- 13 MIRU wireline services.
- 14 PU and RIH with CCL-GR-CBL-VDL. Run from RBP to surface; or the top of cement. RDMO wireline. (Estimated TOC is 6,836' from calculations). IF TOC IS ABOVE 6,414' THAN REMEDIAL CEMENTING IS NOT NECESSARY.
- 15 TIH w/ 2-3/8" TBG and release RBP @ 7,500'.
- 16 TOOH with 2-3/8" TBG and RBP standing back 2-3/8" TBG, LD RBP.
- 17 **NOTE: ALL CEMENT VOLUMES/PERF DEPTHS BELOW WERE CALCULATED USING A TOC OF 6,840' IF THE CEMENT TOP FROM THE CBL IS SIGNIFICANTLY DIFFERENT THAN THIS CEMENT VOLUMES/PERF DEPTHS WILL NEED TO BE RE-CALCULATED**
- 18 RIH w/ 10,000 psi rated from above and below CIBP (4-1/2", 10.5/11.6#, N-80/K-55) and set CIBP at 6,840' (Tie into CBL from step 10). Pressure test CIBP and casing to 1,000 psi for 15 min. Note pass/fail in OpenWells.
- 19 PU & RIH with 3-1/8" guns and shoot squeeze holes at 6,800', then 6,380' (Tie CBL from step 10), using 3 SPF, 0.38" EHD, 33.65" penetration, 1' net, 6 total shots, 3 per perf depth. POOH with perf guns.

Well needs 5,000 psi rated wellhead, Remedial Cement above NB

Associated well: NBL MOSER H 27-79HN pad

Gyro ran: Well needs a gyro survey

TOC: UNKNOWN'; NB top: 6,814'

Shortest Distance: 1608'

NPV: \$67M; No known casing or bradenhead issues

Prep and Produce

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- 20 PU & RIH with CCL & CICR and set at 6,770'. RDMO E-Line service company. NOTE: CICR can be set on 2-3/8" TBG if desired.
- 21 MIRU Cementing Services. PU & RIH with CICR stinger on 2-3/8" TBG and sting into CICR at 6,770'.
- 22 Establish injection rate with water, keeping casing valve open for circulation. Once injection rate has been established, mix and pump 100 sks cement as follows: 29 bbl of cement (50/50 POZ "G" w/ 20% silica flour, 3% gel, 0.1% sodim metasilicate and 0.4% FL-52, Mixed at 13.5 ppf and 1.71 (yield) cuft/sk), displace with 25 bbl (leave approximately 1 bbl cement in tbg to be dumped on CICR while stinging out). Volumes calculated using 420' between 8.5" hole and 4-1/2" casing + 30% excess, with perfs @ 6,800' & 6,380' and CICR @ 6,770'
- 23 Sting out of CICR and dump remaining cement on CICR.
- 24 TOOH to have EOT at 5,380' (1,000' above top perf holes). Reverse circulate down csg and up tbg using biocide treated water, 2x tubing capacity and have clean returns (approximately 40 bbl if EOT is at 5,380').
- 25 TOOH with tbg, standing back, LD stinger.
- 26 ND BOP, ND existing tbg head off of 4-1/2" csg and install new WHI 5,000 psi flanged tubing head complete w/ 5,000 psi rated casing valves. Install 7-1/16", 5,000 psi tubing head adaptor w new 5,000 psi master valve w/ 2-3/8" 8rd threaded connection.
- 27 ND tubing head adaptor and master valve, NU BOP
- 28 PU and TIH w/ 2-3/8" open ended TBG. Land TBG 100' above TOC (~ 6,314' based on calculations)
- 29 ND BOP, NU WH
- 30 Install 2-3/8" pup joint above master valve. Pressure test TBG head from below TBG head through master valve w/ hydrotester to 5000psi.
- 31 RDMO WO Rig.
- 32 Secure WH. Make sure safety prep sign is hung on WH.
- 33 END OF SAFETY PREP PROCEDURE, STEPS BELOW ARE FOR UNPREPPING WELL AFTER ALL COMPLETION ACTIVITIES ARE COMPLETE WITHIN 2000' AND NOTIFICATION IS SENT TO UN-PREP THE WELL.
- 34 When notification is sent to un-prep well, MIRU slickline service company. RIH and tag for fill. Note tagged depth in Open Wells.
- 35 Prep location for base beam equipped workover rig.
- 36 MIRU workover rig. Check well for pressure. Blow down pressure as needed.
- 37 ND WH, NU BOP.
- 38 POOH with 2-3/8" open ended TBG.
- 39 PU & TIH with 3-7/8" bit (rock, blade, etc.) and 2-3/8" TBG. Drill out CICR and cement to below perf holes at 6,800'. NOTE: IF CEMENT IS ABOVE PERF HOLES AT 6,380', TEST SEPERATLEY FROM PERF HOLES AT 6,800'.
- 40 Pressure test perf holes to 500 psi for 15 min.
- 41 MIRU E-Line service company.

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- 42 PU and RIH w/ CCL-CBL-VDL tools and log from CIBP at 6,840' to surface. NOTE: TOC MUST BE ABOVE 6,414' (400' ABOVE TOP OF NIOBRARA FORMATION AT 6,814'). IF INSUFFICIENT CEMENT CONTACT EVANS FOR NEW PROCEDURE.
- 43 POOH, RDMO E-Line service company.
- 44 Drill out CIBP at 6,840' and push to bottom if necessary.
- 45 TOOH w/ 2-3/8" tbg and 3-7/8" bit, stand back tbg, LD bit
- 46 PU and RIH with 2-3/8" NC, 2-3/8" XN profile nipple (make sure nipple is properly input into Open Wells), and 2-3/8" TBG. Land tubing with EOT @ +/- 7,510' (1 joint above top J-sand perf)
- 47 ND BOP, NU WH, make sure all valves on TBG head are rated to 5,000 psi (2 csg valves, and master valve).
- 48 Install 2-3/8" pup joint above master valve. Pressure test TBG head from below TBG head through master valve w/ hydrotester to 5000psi.
- 49 RU rig lubricator. Broach TBG to SN. RD rig lubricator.
- 50 RDMO WO Rig
- 51 Return well to production team.

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