

OCCIDENTAL PETROLEUM CORPORATION

Please contact your area engineer with any questions concerning this procedure.

4/15/2024

PLUG and ABANDONMENT PROCEDURE

HOWARD 1-27

API: 05-123-22659

**Step Description**

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| 1 | Review Previous Open Wells Reports/Well History. If you have questions or concerns, contact Foreman/Engineer. |
| 2 | COA: Provide 48 hour notice to Colorado ECMC prior to rig up per request on approved Form 6 (e.g. call field coordinator, submit Form 42, etc.). |
| 3 | Notify Automation Removal Group at least 24 hours prior to rig move. Request they catch and remove plunger, isolate production equipment, and remove any automation prior to rig MIRU. |
| 4 | MIRU Slickline. Pull production equipment and tag bottom. Record tag depth, casing/tubing pressures and fluid level in Open Wells. Gyro was run on 09/18/12. RDMO Slickline. |
| 5 | Prepare location for base beam equipped rig. Install perimeter fence as needed. |
| 6 | COA: Verify Form 17 (State Bradenhead Test) has been run within 60 days of RU. |
| 7 | Refer to the Rockies Well Services Guidelines document whenever rigging up BOP and WL, or whenever tripping in or out of the well. Consult with Foreman/Engineer before deviating from these guidelines. All cement jobs (excluding injections squeezes) must be pumped at 4-6 BPM. All cement plugs pumped through tubing must use the Diverter tool. Final top-out can be pumped between 2-4 BPM. |
| 8 | Upon RU, check and record bradenhead pressure. If bradenhead valve is not accessible, re-plumb so that valve is above GL. Blow down bradenhead and leave open during working hours. Re-check pressure each day and input value in the "Casing press." box in Open Wells. |
| 9 | MIRU WO rig. Verify BOP and wellhead rating, inspect for appropriate API standards, pressure test BOP. Kill well as necessary using biocide treated fresh water. ND WH. NU BOP. Unland tbg. **Barrier Management** Fluid will be the only barrier while NU BOP. Stop and review JSA. |
| 10 | TOOH and SB 7264' of 2-3/8" tbg. LD remaining 2-3/8" tbg. |
| 11 | MIRU WL. PU and RIH with (4-1/2", 11.6#) gauge ring to 8090'. POOH. |
| 12 | PU and RIH with (4-1/2", 11.6#) CIBP and set at +/- 8080' (no CCL coverage here). POOH. RIH and dump 2 sx cement on CIBP. POOH. |
| 13 | Niobrara Injection Squeeze |
| 14 | PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 7264'. |
| 15 | Establish an injection rate with treated water. Record rate and pressure results and report them to the Foreman/Engineer. Plugging orders may change based on results. When 1 bpm is achieved, record pressure and successful test has been completed. |
| 16 | Note: Do not exceed 40 bbls of cement on injection squeezes. |
| 17 | MIRU cementers. Pump Niobrara Injection Squeeze: 105 sx (28.5 bbl or 160 cf) of the Niobrara Cement blend: Class G with 0.4% B547 Gas Block (Latex) and 0.4% D255 FLA (Fluid Loss) and 35% D066 Silica Flour and 0.2% D800 (Retardant) and 0.3% D065 (Dispersant). Underdisplace by 2 bbls. Volume is based on 30' in the casing below the CICR, cement squeezed into formation, and 124' on top of the CICR. Collect wet and dry samples of cement to be left on rig. RDMO cementers. |
| 18 | Pull out of cement. TOOH, SB 4635' of 2-3/8" tbg. LD remaining tbg. |
| 19 | Sussex Injection Squeeze |
| 20 | Ensure hole has been circulated clean to remove gas interference. Run CCL/GR/CBL/VDL log from +/- 5000' to surface to confirm squeeze location. Future operations may change depending on CBL results. |
| 21 | Forward logs to engineering and in addition to the normal handling of logs/job summaries, email copies of all cement job logs/job summaries and invoices to DJVendors@oxy.com within 24 hours of job completion. Note that squeeze hole locations and cement volumes may vary depending on CBL results. |
| 22 | PU and RIH with one 4', 3-1/8" deep penetrating perf gun with 4 spf. Shoot squeeze holes at 4665'. POOH. RDMO WL. |
| 23 | PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 4635'. |

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| 24 | Establish an injection rate with treated water. Record rate and pressure results and report them to the Foreman/Engineer. Plugging orders may change based on results. When 1 bpm is achieved, record pressure and successful test has been completed. |
| 25 | If gas is present, consider swabbing and venting before pumping injection squeeze. |
| 26 | Note: Do not exceed 40 bbls of cement on injection squeezes. |
| 27 | MIRU cementers. Pump Sussex Squeeze: 100 sx (21.2 bbl or 119 cf) of the Sussex AGM: Class G with 0.4% B547 Gas Block (Latex) and 2% D053 Expansion (Gyp) and 0.25% D255 FLA (Fluid Loss) 0.3% D065 (Dispersant). Underdisplace by 1 bbls. Volume is based on 30' in the casing below the CICR, cement squeezed into formation, and 60' on top of the CICR. Collect wet and dry samples of cement to be left on rig. RDMO Cementers. |
| 28 | TOOH and SB ' of 2-3/8" tbg. LD stinger, and remaining tbg. |
| 29 | Lower AGM Circulation Squeeze |
| 30 | MIRU WL. PU and RIH with one 4', 3-1/8" perf gun with 4 spf. Shoot 16 squeeze holes at 2645'. RDMO WL. |
| 31 | Initiate circulation at low rate monitoring returns for fluid. Add mud thinner to hydrate/clean mud. Slowly increase circulation rate to 4-6 BPM using mud thinner and gel polymer sweeps as needed. |
| 32 | Pump 35 bbls of 160F HSF (0.5 gals/bbl or 1.5 lbs/bbl) and let soak for ~2 hours. |
| 33 | Continue circulating at 4-6 BPM if possible. If returns show hydrocarbons or a 1 hr build-up shows pressure, swab and vent well and clean open tank. Circulate clean fluid before pumping cement. |
| 34 | MIRU cementers. Pump Squeeze: 160 sx (34.5 bbl or 194 cf) of the Lower AGM blend: Class G with 0.4% B547 Gas Block (Latex) and 1% S001 CC (Calcium Chloride) and 4% D053 Expansion (Gyp) down the casing. Volume is based on 500' in the casing-hole annulus with 30% excess, and 500' in the casing. Displace cement with Water to 2145'. Collect wet and dry samples of cement to be left on rig. RDMO Cementers. |
| 35 | Leave valves open for 10 minutes to allow cement to balance between the production and surface casing. If 2 bbls or more of displacement fluid flows back through the production casing, shut in well to ensure TOC remains at a workable depth. |
| 36 | COA: If there is evidence of pressure or fluid migration, contact Engineering as there will need to be additional remediation attempts before the SC shoe plug. |
| 37 | TIH with 2-3/8" tubing and tag cement top to verify TOC inside production casing. TOOH and SB 1945' of tubing. |
| 38 | SC Shoe Plug |
| 39 | MIRU WL. RIH and jet cut 4-1/2", 11.6# casing at 1945'. RDMO WL. |
| 40 | Attempt to establish circulation with biocide treated fresh water. |
| 41 | ND BOP. ND TH. Un-land casing. Rig max pull shall be 100,000#. Max pull over string weight shall be 50,000#. If unable to unland, contact Foreman/Engineer. **Barrier Management** Fluid will be the only barrier while unlanding casing. Stop and review JSA. |
| 42 | Install BOP on casing head with 4-1/2", 11.6# pipe rams. **Barrier Management** Fluid will be the only barrier while NU BOP. Stop and review JSA. |
| 43 | TOOH and LD all 4-1/2", 11.6# casing. Remove 4-1/2", 11.6# pipe rams and install 2-3/8" pipe rams. |
| 44 | TIH with diverter tool on 2-3/8" tubing to 1945'. Establish circulation to surface with biocide treated fresh water. |
| 45 | Initiate circulation at low rate monitoring returns for fluid. Add mud thinner to hydrate/clean mud. Slowly increase circulation rate to 4-6 BPM using mud thinner and gel polymer sweeps as needed. |
| 46 | Pump 88 bbls of 160F HSF (0.5 gals/bbl or 1.5 lbs/bbl) and let soak for ~2 hours. |
| 47 | Continue circulating at 4-6 BPM if possible. If returns show hydrocarbons or a 1 hr build-up shows pressure, swab and vent well and clean open tank. Circulate clean fluid before pumping cement. |
| 48 | COA: Verify and document that all pressure and fluid migration has been eliminated prior to placing the SC shoe plug at 1945'. If there is evidence of pressure or fluid migration, contact Engineering. |
| 49 | MIRU cementers. Pump 10 bbls (min) of pre-flush, followed by 5 bbls fresh water spacer. Pump Surface Casing Shoe Plug: Pump 405 sx (87.3 bbl or 490 cf) of the Upper AGM blend: Class G with 0.4% B547 Gas Block (Latex) and 1.5% S001 CC (Calcium Chloride) and 4% D053 Expansion (Gyp). Volume is based on 869' in 7.875" bit size open hole with 30% excess factor. 301' in the 8-5/8", 24# surface casing with no excess. The plug is designed to cover 1945'-775'. Plug length exceeds 500'. Consult with Foreman or Engineer on splitting up the plug. Collect wet and dry samples of cement to be left on rig. RDMO Cementers. Notify engineering if circulation is ever lost during job. |

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| 50 | COA: If cement was not circulated to surface, then WOC 4 hours. Tag TOC. TOC must be 1026' or shallower. If tag is too deep or there is evidence of pressure or fluid migration, contact Engineering. |
| 51 | Pull out of cement. TOOH to 370'. Forward circulate tbg clean with fresh water. TOOH & SB 300' of tubing. WOC 4 hours. |
| 52 | Note: Plug can be tagged after a 4 hour WOC, but must have a 6 hour WOC prior to pressure testing. |
| 53 | ND 7-1/16" BOP. NU 9" or 11" BOP. RIH with bit and scraper. Clean csg and tag TOC. Circulate Clean. POOH. PT casing to 500 psi. Contact engineering if test fails. |
| 54 | Surface Plug |
| 55 | MIRU WL. PU and RIH with (8-5/8", 24#) CIBP and set at 300'. POOH. RDMO WL. |
| 56 | TIH with diverter tool on 2-3/8" tubing to 300'. Either swab well down or use rig air to remove water from well. (Note: Do not exceed 175 psi if using rig air). If either methods cannot be performed, contact engineering to discuss excess cement volume for top out plug. |
| 57 | DO NOT PUMP WATER AHEAD OF CEMENT. MIRU Cementers. Pump Surface Plug: Pump 90 sx (19.4 bbl or 109 cf) of the Surface AGM blend: Class G with 0.4% B547 Gas Block (Latex) and 2% S001 CC (Calcium Chloride) and 4% D053 Expansion (Gyp). Volume based on 300' inside 8-5/8", 24# surface casing with no excess. Cement will be from 300' to surface. Verify and document cement to surface. Collect wet and dry samples of cement to be left on rig. |
| 58 | TOOH and remove diverter tool. Insert ~5' of 2-3/8" Tbg. Circulate FW to clean Csg & Csg Valves. LD final joint of 2-3/8" Tbg. RDMO cementers. ND BOP. Install night cap. RDMO WO rig. |
| 59 | Instruct cementing, tools and wireline contractors to e-mail copies of all job logs/job summaries to rscDJVendors@oxy.com within 24 hours of completion of the job. |
| 60 | Supervisor submit paper copies of all invoices, logs, and reports to Well Services Engineering Specialist. |
| 61 | Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines. |
| 62 | Excavate hole around surface casing enough to allow welder to cut casing a minimum 5' below ground level. |
| 63 | Welder cut casing minimum 5' below ground level. |
| 64 | Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number. |
| 65 | Obtain GPS location data as per ECMC Rule 215 and provide to GPS Teams page and Oxy GIS database. |
| 66 | Properly abandon flow lines per Rule 1105. File electronic Form 42 and/or Form 44 once abandonment is complete. |
| 67 | Back fill hole with fill. Clean location, and level. |
| 68 | Submit Form 6 Subsequent Report to ECMC ensuring to provide 'As performed' WBD identifying operations completed. |