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PLUG AND ABANDONMENT PROCEDURE

HSR-REDMOND 12-21

- | Step | Description of Work |
|------|---|
| 1 | Provide 48 hr notice to COGCC prior to rig up per request on approved Form 6 (e.g. call field coordinator, submit Form 42, etc.). Call IOC (970-506-5980) at least 24 hr prior to rig move. Request they catch plunger, isolate production equipment and remove any automation prior to rig MIRU. |
| 2 | MIRU slickline services and pressure bomb services. Pull bumper spring, tag bottom, and run pressure bomb survey and obtain pressure gradient survey from surface to 7200' making gradient stops every 1000'. Forward pressure bomb results to Evans Engineering. RDMO pressure bomb services. RDMO slickline services and VES. |
| 3 | Prepare location for base beam equipped rig. Install perimeter fence as needed. |
| 4 | Check and record Bradenhead pressure. If Bradenhead valve is not accessible, re-plumb so that valve is above GL. |
| 5 | MIRU, kill as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt, LD. |
| 6 | POOH hole and SB tbq (216 jts landed at 7066'). |
| 7 | MIRU WL. RIH w/ gauge ring for 4-1/2" 11.6# csg to 6800'. |
| 8 | RIH and Set 4-1/2" CIBP at 6790'. PT csg and CIBP to 1000 psi for 15 minutes. RDMO WL. |
| 9 | Notify Cementers to be on call. |
| 10 | RIH with 2-3/8" tbq RIH while hydrotesting to 3000 psi and tag CIBP set at 6790'. Record tag depth and pick up 5'. |
| 11 | MIRU cementers. Pump Nio balanced casing plug: Pump 25 sks of Cement Blend: "G" w/ 20% silica flour, 0.4% CD -32, 0.4% ASA -301 and R-3 to achieve 2:30 pump time mixed at 15.8 ppg and 1.38 cuft/sk designed for coverage above CIBP from 6790' to 6400'. |
| 12 | PUH to 6100 and circulate hole clean with fresh water and biocide. POOH standing back. |
| 13 | MIRU WL. PU two 3-1/8" perf guns w/ 0.59" diam, 120 phasing and shoot 1' of squeeze holes at 4230' and 2' of squeeze holes at 3820'. RDMO WL. |
| 14 | PU 4-1/2" CICR on 2-3/8" tbq. RIH and Set CICR at 3850'. Establish circulation through sqz holes. |
| 15 | RU Cementers. Establish circulation, Pump Sussex Suicide plug: Pump 5 bbls fresh water followed by 20 bbls sodium metasilicate followed by 5 bbls fresh water ahead of cement: 165 sks (32 bbls) "G" w/ 0.25 pps cello flake, 0.4% CD-32, 0.4% ASA-301 with CaCl ₂ as necessary. Mixed at 15.8 ppg, 1.15 cuft/sack. Underdisplace by 3 bbls and unsting from CICR. Spot final 3 bbls on top of CICR and sqz holes. Volume based on 8-1/2" x 4-1/2" annulus with 20% excess from 4223' to 3823', and 4-1/2" casing from 4223' to 3660'. RD Cementers. |

- 16 PUH 10 stands and circulate hole clean with fresh water and biocide. POOH standing back.
- 17 MIRU WL. Crack coupling or jet cut 4-1/2" csg at 816'. Circulate approximately 120 bbls of fresh water and biocide to remove any gas from wellbore.
- 18 ND BOP and tubing head. Install a BOP on surface casing head with 4-1/2" pipe rams. Install 3000 psi ball valves on both casing head outlets. Install a choke or choke manifold on one outlet.
- 19 POOH and LD 4-1/2" csg. Remove the 4-1/2" pipe rams and Install 2-3/8" pipe rams.
- 20 RIH w/ 2-3/8" WS open ended ~100' past the 4-1/2" csg stub to 916'.
- 21 MIRU Cementers. Pump Fox Hills Balanced plug: Pump mud flush of 10 bbls SAPP followed by 20 bbls water ahead of 135 sx (32 bbls) Type III w/cello flake and CaCl₂ as deemed necessary, mixed at 1.33 cf per sack, 14.8 ppg. POH and WOC per cementing company recommendation. Plug size is based on 4-1/2" casing from 916' to 816' and 8" hole with 20% excess covering 816' to shoe of surface casing at 583' plus capacity of surface casing to 383'. PUH to 200' and Circulate out any excess cmt. TOH and WOC min of 4 hrs or per cement company recommendation.
- 22 RIH and tag top of plug. Plug needs to be tagged at 483' or shallower. POOH and LD 2-3/8" tbg.
- 23 RU wireline. Run and set CIBP in the 8 5/8", 24# surface casing at 80'. PT CIBP and surface casing to 1000 psi for 15 minutes. Assuming successful test, RD wireline. RDMO workover rig.
- 24 Instruct cementing and wireline contractors to e-mail copies of all job logs/job summaries to rscDJVendors@anadarko.com within 24 hrs of completion of the job.
- 25 Supervisor submit paper copies of all invoices, logs, and reports to Evans Specialist.
- 26 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 27 Excavate hole around surface casing enough to allow welder to cut casing minimum 5' below ground level.
- 28 Welder cut casing minimum 5' below ground level.
- 29 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 30 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 31 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
- 32 Back fill hole with fill. Clean location, level.
- 33 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed with existing gyro data.