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PLUG AND ABANDONMENT PROCEDURE

WCL 4-1 (HSR)

Step	Description of Work
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| 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 Automation Removal Team at least 24 hr prior to rig move. Request they catch the plunger and isolate production equipment and remove any automation prior to rig MIRU. |
| 2 | MIRU slickline services. Pull bumper spring and tag bottom. RDMO slickline services. |
| 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 |
| 6 | POOH and stand back 2-1/16" tbg. (220 jts landed at 7230'). |
| 7 | PU scraper for 3-1/2" 7.7# casing and RIH to 7050'. POOH and LD scraper. |
| 8 | MIRU wireline. PU 3-1/2" CIBP RIH and set at +/- 7005'. POOH and RD wireline |
| 9 | Notify Cementers to be on call. |
| 10 | RIH with 2-1/16" tbg RIH while hydrotesting to 3000 psi and tag CIBP set at 7005'. Record tag depth. Circulate gas out of the hole from just above tag depth. |
| 11 | MIRU cementers. Pump Nio balanced casing plug: Pump 20 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 7005' to 6465'. |
| 12 | PUH 40 jts and circulate hole clean with fresh water and biocide. POOH standing back 130 jt. |
| 13 | MIRU WL. PU one 1', 2-1/2" perf gun w/ 0.49" diam, 120 phasing, 3 SPF and shoot 1' of squeeze holes at 4488'. RDMO WL. |
| 14 | Establish circulation down 3-1/2" casing through squeeze holes up 3-1/2" by 8-5/8" annulus to surface with water. If circulation is established, proceed to next step; otherwise contact engineering for revised procedure steps. |
| 15 | RU Cementers to 3-1/2" casing. Establish circulation, Pump Sussex plug: Pump 5 bbls fresh water followed by 20 bbls sodium metasilicate followed by 5 bbls fresh water ahead of cement: 200 sks (41 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. Drop wiper plug and displace to 4088' using 37.4 bbls of water . Volume based on 10" x 3-1/2" annulus with 20% excess from 4488' to 4088', and 3-1/2" casing from 4488' to 4088'. RD Cementers. |

- 16 RIH with 2-1/16" tbg to tag plug at +/- 4088. . If cement is not at or above 4088' contact engineer, otherwise proceed to next step. POOH standing back 32 jts.
- 17 MIRU WL. Crack coupling or jet cut 3-1/2" csg at 916'. 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 3-1/2" 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 3-1/2" csg. Remove the 3-1/2" pipe rams and Install 2-1/16" pipe rams.
- 20 RIH w/ 2-1/16" WS open ended ~100' past the 3-1/2" csg stub to 1016'.
- 21 MIRU Cementers. Pump Fox Hills Balanced plug: Pump mud flush of 10 bbls SAPP followed by 20 bbls water ahead of 160 sks (37.8 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 3-1/2" casing from 1016' to 916' and 9" hole with 40% excess covering 916' to shoe of surface casing at 712' plus capacity of surface casing to 512'. PUH to 200' and Circulate out any excess cmt. TOH and WOC per cement company recommendation.
- 22 RIH and tag top of plug. Plug needs to be tagged at 612' or shallower. POOH and LD 2-1/16" 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.