

## PLUG AND ABANDONMENT PROCEDURE

### BARCLAY L 2-10JI

- | 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 and remove plunger, isolate production equipment and remove any automation prior to rig MIRU.                              |
| 2    | MIRU slickline services. Pull bumper spring and tag bottom. Run a Gyro directional survey from the SN to surface with 100' stations. Forward results to Sabrina Frantz in Evans Engineering.  |
| 3    | Run a pressure bomb and obtain a pressure gradient survey from mid-perf of J sand (7842') to surface with 1000' stops. Forward results to Evans Engineering. RDMO slickline services.   |
| 4    | Check and report surface casing pressure. If surface casing is not accessible at ground level, re-plumb so valve is at ground level.  |
| 5    | Prepare location for base beam equipped rig. Install perimeter fence as needed.   |
| 6    | MIRU, kill as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt, LD.   |
| 7    | TOOH and SB 6600' of 2 3/8" production tubing. LD remainder (239 jts landed @7792').  |
| 8    | MIRU WL. RIH w/ gauge ring for 4 1/2" 11.6# casing to 7800'. PU and RIH 4 1/2" CIBP. Set at 7750' to abandon J sand perfs. Pressure test csg and CIBP to 1000 psi for 15 minutes.   |
| 9    | PU dump bailer and spot 2 sx cement on CIBP @ 7750'.  |
| 10   | PU 2 - 1' 3-1/8" perf guns with 3 spf, 0.5" dia 120° phasing. Shoot 1' of squeeze holes at 6920' and 6500'. RDWL  |
| 11   | PU CICR on 2 3/8" tbg. RIH to 6530' while hydro-testing tbg to 3000 psi. Set CICR @ 6530'.  |
| 12   | RU Cementers. Pump Niobrara Suicide job : 120 sx 50/50 Poz "G" w/ 20% silica flour, 3% gel, 0.1% sodium metasilicate and 0.4% FL-52 mixed at 13.5 ppg and 1.71 cf/sk (205 cuft of slurry). Underdisplace and sting out of CICR to leave 3 bbls cmt on top of retainer. Volume based on 8.5" hole size w/ 20% excess. Caliper log on file. |
| 13   | POH 10 stands and circulate tbg clean using fresh water treated with biocide. POH standing back 4100' of tbg.   |
| 14   | RUWL. PU 2 - 1' 3-1/8" perf guns with 3 spf, 0.5" dia 120° phasing. Shoot 1' of squeeze holes at 4500' and 4050'. RDWL.   |
| 15   | PU CICR on 2 3/8" tbg. RIH and set CICR at 4080'.   |
| 16   | RU Cementers. Pump 5 bbl water w/ biocide, 20 bbl Sodium Metasilicate, and another 5 bbl spacer immediately preceding cement.   |
| 17   | Pump Sussex Suicide job: 170 sx class "G", w/0.25 pps cello flake, 0.4% CD-32, 0.4% ASA-301 mixed at 15.8 ppg and 1.15 cuft/sk (196 cuft of slurry) to place cement between perfs.  |

- Underdisplace and sting out of CICR to leave 3 bbls cement on top of retainer. Cement volume based on 9 1/2" hole with 20% excess. Caliper log on file.
- 18 POH 10 stands. Circulate water containing biocide to clear tubing. POH standing back ~1270' of tbg.
  - 19 RU WL. Crack coupling or cut casing at 1170'. RDMO WL. Circulate bottoms up and continue circulating to remove any gas from wellbore.
  - 20 ND BOP and wellhead. Install 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.
  - 21 TOOH and LD 1160' of 4 1/2" casing.
  - 22 RIH with 2 3/8" tubing open-ended to 1270' (100' inside 4 1/2" stub).
  - 23 RU cementers. Pump 10 bbl SAPP (Sodium Acid Pyrophosphate) followed by 20 bbl (min.) fresh water spacer immediately preceding cement.
  - 24 Pump balanced Stub Plug from 1270' to 420' : 350 sx Type III w/0 .25#/sk cello flake and CaCl<sub>2</sub> as deemed necessary mixed at 14.8 ppg and 1.33 cf/sk (466 cuft of slurry). Cement volume based on 100' in 4 1/2" csg, 226' in 8 5/8" csg, and 544' in 9 1/2" OH + 40% excess.
  - 25 TOOH. WOC per cementing company recommendation. Tag Cement. TOC should be at or above 526'. If not, consult Evans Engineering.
  - 26 MIRU WL. RIH 8 5/8" CIBP to 80'. Set and PT to 1000 psi for 15 min. If tests, RDMO WL and WO rig.
  - 27 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.
  - 28 Supervisor submit paper copies of all invoices, logs, and reports to Joleen Kramer.
  - 29 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
  - 30 Excavate hole around surface casing enough to allow welder to cut 8 5/8" casing minimum 5' below ground level.
  - 31 Welder cut 8 5/8" casing minimum 5' below ground level.
  - 32 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
  - 33 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
  - 34 Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
  - 35 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
  - 36 Back fill hole with fill. Clean location, level.
  - 37 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.

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