

## PLUG AND ABANDONMENT PROCEDURE

### NELSON HAROLD UN A 1

- | Step | Description of Work   |
|------|---|
| 1    | Note: Production Casing = 4 1/2" OD, 11.6#/ft, K-55; Production Hole Drilled @ 7 7/8"; SX Sqz Holes: 4325'. 7647' of 2 3/8 " tbg in hole.   |
| 2    | 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 foreman or lead operator at least 24 hr prior to rig move. Request they catch and remove the plunger, isolate production equipment and remove any automation prior to rig showing up. Install perimeter fence as needed. |
| 3    | MIRU slickline services. Pull bumper spring and tag bottom. Run pressure bomb and obtain pressure gradient survey from surface to 7702' making gradient stops every 1000'. Forward pressure bomb results to Evans Engineering. RDMO slickline services.   |
| 4    | Notify IOC when rig mobilizes to location to generate workorder for flowline removal & one call for line locates.   |
| 5    | Check and report surface casing pressure. If surface casing is not accessible at ground level, re-plumb so valve is at ground level.  |
| 6    | Prepare location for base beam equipped rig. MI ~15 additional 2 3/8 " prod tbg jts.  |
| 7    | MIRU, kill as necessary using clean fresh water with biocide and circulate. ND WH. NU BOP. Unseat landing jt, LD.   |
| 8    | Notify cementers to be on call. Provide volumes listed below:   |
| 8.1  | Niobrara Suicide: 50 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 (11.2 bbls) (9 1/2 " + 20%)   |
| 8.2  | Sussex Casing Plug: 25 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 cf/sx (5 bbls) (inside 4 1/2" casing)   |
| 8.3  | SX Suicide: 250 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 cf/sx (48.2 bbls) (10 1/2 "+20% excess)  |
| 8.4  | Surface Suicide: 100 sx Type III CaCl <sub>2</sub> cement w/0.25 pps cello flake mixed at 14.8 ppg and 1.33 cf/sx (17.7 bbls) (70' inside 4 1/2" Prod Casing and 110' in 12 1/4" OH + 20% excess, and 7 bbls on top of CICR)  |
| 9    | TOOH 2 3/8 " production tubing. Stand Back.   |
| 10   | MIRU WL. RIH gauge ring for 4 1/2" 11.6#/ft casing to 7600'.  |
| 11   | RIH CIBP w/ WL. Set at 7600'. PU dump bailer, dump bail 2 sx class 'G' cement on CIBP. Do Not PT (note squeeze holes).  |
| 12   | PU 2 - 1' 3-1/8" perf guns with 3 spf, 0.5" dia 120° phasing. Shoot 1' of squeeze holes at 6700' and 6580'.   |
| 13   | PU CICR. RIH on wireline and set at 6610'. RD WL.   |
| 14   | RIH w/ stinger on 2 3/8 " tubing while hydrotesting to 3,000 psi.   |

- 15 RU Cementers. Pump Niobrara Suicide: 50 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 (11.2 bbls) (9 1/2 " + 20%) to place suicide squeeze between perfs. Underdisplace and sting out of CICR to leave 3 bbls on top of retainer.
- 16 PUH 6 stands. Circulate 90 bbls water containing biocide to clear tubing. P&LD tbg to 4294'.
- 17 RU Cementers. Pump Sussex Casing Plug: 25 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 cf/sx (5 bbls) (inside 4 1/2" casing) to place balanced plug from 4425' to 4294'.
- 18 PUH 4 stands. Circulate 60 bbls water containing biocide to clear tubing. TOOH & WOC 4 hrs. Tag Cement. If Cement is below 4294', call production engineer. Otherwise, P&LD tbg to 4294'. SB Remainder.
- 19 RUWL & PU 2 - 1' 3-1/8" perf guns with 3 spf, 0.5" dia 120° phasing. Shoot 1' of squeeze holes at 4294' and 3890'.
- 20 PU CICR. RIH on wireline and set at 3920'. RD WL.
- 21 RIH w/ stinger on 2 3/8 " tubing.
- 22 RU Cementers. Pump 5 bbl water w/ biocide, 20 bbl Sodium Metasilicate, and another 5 bbl spacer immediately preceding cement.
- 23 Pump SX Suicide: 250 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 cf/sx (48.2 bbls) (10 1/2 "+20% excess) to place suicide squeeze between perfs. Underdisplace and sting out of CICR to leave 3 bbls on top of retainer.
- 24 PUH 5 stands. Circulate 55 bbls water containing biocide to clear tubing. P&LD tbg to 695'. SB remainder.
- 25 RUWL & PU 2 - 1' 3-1/8" perf guns with 3 spf, 0.5" dia 120° phasing. Shoot 1' of squeeze holes at 695' and 585'.
- 26 PU CICR. RIH on wireline and set at 625'. RD WL.
- 27 RIH w/ stinger on 2 3/8 " tubing.
- 28 RU Cementers. Pump Surface Suicide: 100 sx Type III CaCl<sub>2</sub> cement w/0.25 pps cello flake mixed at 14.8 ppg and 1.33 cf/sx (17.7 bbls) (70' inside 4 1/2" Prod Casing and 110' in 12 1/4" OH + 20% excess, and 7 bbls on top of CICR) to place suicide squeeze between perfs. Pump all but 7 bbls. Sting out of CICR and spot 7 bbls on top of retainer.
- 29 TOOH circulating as necessary to clear tubing. WOC 4 hrs. Tag Cement. Cement top needs to be above 121'; Proceed if TOC is above 121'. Otherwise, call production engineer.
- 30 MIRU WL. RIH 4 1/2" CIBP to 121'. Set CIBP, and PT to 1000 psi for 15 min. If tests, RDMO WL and WO rig.
- 31 Instruct cementing and wireline contractors to e-mail copies of all job logs/job summaries and invoices to rscDJVendors@anadarko.com within 24 hrs of the completion of the job.
- 32 Supervisor submit paper copies of all invoices, logs, and reports to Joleen Kramer.
- 33 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 34 Excavate hole around surface casing enough to allow welder to cut 8 5/8" casing minimum 5' below ground level.
- 35 Welder cut 8 5/8" casing minimum 5' below ground level.

- 36 MIRU ready cement mixer. Use 4500 psi compressive strength cement, (NO gravel) fill stubout.
- 37 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 38 Properly abandon flowlines per Rule 1103.
- 39 Back fill hole with fill. Clean location, level.
- 40 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed. File electronic Form 42 once abandonment complete.