

## PLUG AND ABANDONMENT PROCEDURE

Harold R. Mixon Gas Unit #2

Step Description of Work

Note: Production Casing = 4 1/2" OD, 11.6#/ft, K-55; Production Hole Drilled @ 7 7/8";

- 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 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.
- 2 MIRU slickline services and VES. Pull bumper spring, tag bottom, and run survey from 7820' to surface with stops every 100'. Forward gyro survey data and invoices to tech (currently Sabrina Frantz). RDMO slickline services and VES.
- 3 Notify IOC when rig mobilizes to location to generate workorder for flowline removal & one call for line locates.
- 4 Prepare location for base beam equipped rig. MI ~15 additional 2 3/8 " prod tbg jts.
- 5 MIRU, kill as necessary using clean fresh water with biocide and circulate. ND WH. NU BOP. Unseat landing jt, LD.
- 6 Notify cementers to be on call. Provide volumes listed below:
  - 6\_1 Niobrara Suicide: 160 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 (43.7 bbls) (9 1/4 " + 20% Caliper Log in file)
  - 6\_2 SX Suicide: 410 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 (80.7 bbls) (11 " +20% Caliper Log in file)
  - 6\_3 Stub Plug: 540 sx Type III CaCl<sub>2</sub> cement w/ 0.25 pps cello flake mixed at 14.0 ppg and 1.53 cf/sx (146.4 bbls) (100' in 4 1/2" prod casing, 752' in 12 1/4" OH + 20% Caliper Log, and 208' in 8 5/8" surface casing)
- 7 TOOH 2 3/8 " production tubing. Stand Back.
- 8 MIRU WL. RIH gauge ring for 4 1/2" 11.6#/ft casing to 7915'.
- 9 RIH CIBP w/ WL. Set at 7820'. PU dump bailer, dump bail 2 sx class 'G' cement on CIBP. PT Casing to 1000 psi.
- 10 Run CBL from CIBP to Surface. Send results to Mark.Hinaman@anadarko.com immediately. RDWL.

- 11 PU 2 - 1' 3-1/8" perf guns with 3 spf, 0.5" dia 120° phasing. Shoot 1' of squeeze holes at 7240' and 6760'. Adjust perf heights according to cement location on CBL. Desired bottom perf is 20' above TOC; Desired top perf is 400' above 7168' (Niobrara Top).
- 12 PU CICR. RIH and set at 6790'+/-20' pending collar locator on CBL. RD WL.
- 13 RIH w/ 2 3/8 " tubing while hydrotesting to 3,000 psi.
- 14 RU Cementers. Pump Niobrara Suicide: 160 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 (43.7 bbls) (9 1/4 " + 20% Caliper Log in file) to place suicide squeeze between perfs. Underdisplace and sting out of CICR to leave 3 bbls on top of retainer.
- 15 PUH 6 stands. Circulate 95 bbls water containing biocide to clear tubing.
- 16 Place 9.0 ppg mud containing biocide from 6600' to 4840' (~29 bbls). TOO H & WOC 4 hrs.
- 17 RUWL & PU 2 - 1' 3-1/8" perf guns with 3 spf, 0.5" dia 120° phasing. Shoot 1' of squeeze holes at 4840' and 4230'.
- 18 PU CICR. RIH and set at approximately 30' below the top perf pending collar locator on CBL. RD WL.
- 19 RIH w/ 2 3/8 " tubing.
- 20 RU Cementers. Pump 5 bbl water w/ biocide, 20 bbl Sodium Metasilicate, and another 5 bbl spacer immediately preceding cement.
- 21 Pump SX Suicide: 410 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 (80.7 bbls) (11 " +20% Caliper Log in file) to place suicide squeeze between perfs. Underdisplace and sting out of CICR to leave 3 bbls on top of retainer.
- 22 PUH 5 stands. Circulate 60 bbls water containing biocide to clear tubing.
- 23 Place 9.0 ppg mud containing biocide from 4080' to 1520' (~41 bbls). TOO H & WOC 4 hrs.
- 24 RU WL. Crack coupling or shoot off casing at or below 1420'. RDMO WL. Circulate a full circulation with water containing biocide to remove any gas.
- 25 NDBOP, NDTH.
- 26 Install BOP on casing head with 4 1/2" pipe rams.
- 27 TOO H with 4 1/2" casing, LD.
- 28 RIH with 2 3/8 " tubing to 1520'.

- 29 RU Cementers. Spot Stub Plug: 540 sx Type III CaCl<sub>2</sub> cement w/ 0.25 pps cello flake mixed at 14.0 ppg and 1.53 cf/sx (146.4 bbls) (100' in 4 1/2" prod casing, 752' in 12 1/4" OH + 20% Caliper Log, and 208' in 8 5/8" surface casing).
- 30 Circulate 5 bbls water containing biocide to clear tubing.
- 31 TOOH. WOC 4 hrs. Tag Cement. Cement top needs to be above 568'; Proceed assuming TOC is above 568'. Otherwise, call production engineer.
- 32 MIRU WL. RIH 8 5/8" CIBP to 100'. Set, PT to 1000 psi for 15 min. If tests, RDMO WL and WO rig.
- 33 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.
- 34 Supervisor submit paper copies of all invoices, logs, and reports to Joleen Kramer.
- 35 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 36 Excavate hole around surface casing enough to allow welder to cut 8 5/8" casing minimum 5' below ground level.
- 37 Welder cut 8 5/8" casing minimum 5' below ground level.
- 38 MIRU ready cement mixer. Use 4500 psi compressive strength cement, (NO gravel) fill stubout.
- 39 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 40 Properly abandon flowlines per Rule 1103.
- 41 Back fill hole with fill. Clean location, level.
- 42 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed. File electronic Form 42 once abandonment complete.