

## PLUG AND ABANDONMENT PROCEDURE

### LEMONS X 6-5

- | 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 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. 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. NDWH NUBOP. Unseat landing jt, LD.   |
| 6    | Notify cementers to be on call. Provide volumes listed below:  |
| 6.1  | "Niobrara Plug: 20 sx (28 cu-ft) "G" w/silica flour, 0.4% CD-32, 0.4% ASA-301 and R-3 to achieve 2:30 pump time. Mix at 15.8 ppg and 1.38 cuft/sk. Cement volume based on 700' 2 7/8" casing, no excess.   |
| 6.2  | "Sussex Squeeze Plug: 360 sx (414 cu-ft) "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. Cement volume based on 650' in 2 7/8" casing, and 650' in 10" OH annulus with 20% excess. Caliper on file.  |
| 6.3  | Stub Plug: 480 sx (638 cu-ft) Type III w/ cello flake and CaCl <sub>2</sub> as necessary, mixed at 14.8 ppg and 1.33 cuft/sk. Cement volume based on 100' in 2 7/8" casing with no excess, 725' assuming 10" OH with 40% excess, and 225' in 8 5/8" casing with no excess.                                   |
| 7    | P&SB 1.66" OD production tubing (231 jts landed at 7358').   |
| 8    | MIRU WL. RIH gauge ring for 2 7/8" 6.5# casing to 7370'. POOH.   |
| 9    | PU 2 7/8" 6.5# CIBP and RIH w/ WL. Set at +/- 7300'. Pressure test at 1000 psi.  |
| 10   | RIH with 1.66" OD production tubing to +/- 7300'. Hydrotest tubing to 3000 psi while RIH.  |
| 11   | RU Cementers. Pump Niobrara plug: 20 sx (28 cu-ft) "G" w/silica flour, 0.4% CD-32, 0.4% ASA-301 and R-3 to achieve 2:30 pump time. Mix at 15.8 ppg and 1.38 cuft/sk. Plug to cover 7300'-6600'. RD cementers.  |
| 12   | POH 21 stands to ~6000'. Circulate with water and biocide to displace cement and clear tubing. TOOH.   |
| 13   | MIRU WL. PU one 2 1/8" RTG loaded with 6 shots, 0.23" diameter EHD. Shoot squeeze holes at 4850'. RDMO WL.   |
| 14   | Establish circulation down 2 7/8" production casing and out 8 5/8" surface casing. Note rate, pressure and circulation.  |
| 15   | RU cementers. Precede cement with 5 bbl of water; 20 bbl of sodium metasilicate; 5 bbl water.  |
| 16   | Pump Sussex squeeze plug: 360 sx (414 cu-ft) "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 to squeeze cement into annulus and place in casing from 4850' to 4200'. Follow w/wiper plug and displace to 4200'. WOC per cement company's recommendation.            |
| 17   | RIH with 1.66" OD tubing. Tag top of plug at 4200' or shallower. If not, consult Evans Engineering.  |

- 18 RU WL. Shoot off casing at 1500'. RD WL.
- 19 Use 2 7/8" casing as work string. Circulate with water and biocide to remove any gas.
- 20 NDBOP, NDTH.
- 21 NUBOP on casing head with 2 7/8" pipe rams.
- 22 RU Cementers. Precede cement with 10 bbl SAPP and a 20 bbl (min) freshwater spacer.
- 23 Pump Stub Plug: 480 sx (638 cu-ft) Type III w/ cello flake and CaCl<sub>2</sub> as necessary, mixed at 14.8 ppg and 1.33 cu-ft/sk. Plug to cover 1500'-775' in 10" OH with 40% excess, and 775'-550' in 8 5/8" casing.
- 24 POH to 250' and circulate with water and biocide to displace cement and clear tubing.
- 25 TOOH. WOC per company recommendation. Tag cement at 580' or shallower. If not, consult with Evans Engineering.
- 26 MIRU WL. RIH 8 5/8" 24# CIBP to 80'. Set and PT to 1000 psi for 15 minutes. 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 casing minimum 5' below ground level.
- 31 Welder cut 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.

Engineer: Jade Patterson  
Cell: 509-307-7514