

PLUG AND ABANDONMENT PROCEDURE

Engineer: David Dalton
Cell: 970-590-6245

NICHOLS 7-8A

- | 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 Automation Removal Group at least 24 hr prior to rig move. Request they isolate production equipment and remove any automation prior to rig MIRU. |
| 2 | MIRU slickline services. Pull bumper spring and tag bottom. Record tag depth and seating nipple depth. RDMO slick line. |
| 3 | Check and report surface casing pressure. If surface casing is not accessible at ground level, re-plumb so valve is at ground level. The last Form 17 test on 3/27/2015 recorded Bradenhead pressure of 131 psi, blown down to 35 psi and 90 gallons of water were produced. Blow down the Bradenhead and re-check pressure the next day. Repeat until pressure stays at 0 psi. Contact Evans Engineering if pressure does not blow down to 0 and stay at 0. |
| 4 | Prepare location for base beam equipped rig. Install perimeter fence as needed. |
| 5 | Arrange for 160 bbls of minimum 9.0 ppg mud to be delivered prior to setting the stub plug. Arrange for +- 600' of 2 3/8" tbg WS to be delivered to location for sand clean-out. |
| 6 | MIRU, kill well as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt. 232 jts 2 3/8" tbg are landed @ 7240'. |
| 7 | PU tag jts and lower tbg to tag sand plug last reported @ 7430'. |
| 8 | Establish circulation and clean out sand to 7670', which is 56' above the top J sand perf. |
| 9 | TOOH and stand back 6970' of 2 3/8" tbg. LD remainder |
| 10 | MIRU WL. PU and RIH 4 1/2", 11.6# CIBP and set at 7670' to abandon J sand perfs. |
| 11 | PU dump bailer and spot 2 sacks of cement on CIBP @ 7670'. |
| 12 | RIH 4 1/2" CIBP and set at 6970' to abandon Codell/Niobrara perfs. Pressure test plug and csg to 1000 psi for 15 minutes. |
| 13 | RIH 2 3/8" tbg open-ended to CIBP @ 6970'. Hydro-test tbg to 3000 psi. |
| 14 | RU cementers and place a balanced plug above CIBP from 6970' to 6540' as follows: 25 sx "Thermal 35" + 0.5% CFR-2 + 0.25% FMC, mixed at 15.6 ppg and 1.51 cuft/sk. (38 cuft of slurry). |
| 15 | Pull and LD tbg to ~6000' and reverse circulate clean w/fresh water treated with biocide. |
| 16 | TOH and LD tbg to place EOT @ 4560'. |
| 17 | RU cementers and place a balanced plug from 4560' to 4110' as follows: 35 sx class "G" w/ 0.5% CFR-2, 0.2% FMC, 0.5% LWA mixed at 15.8 ppg and 1.15 cf/sk. (40 cuft of slurry). |
| 18 | TOH to ~3000. Circulate water containing biocide to clear tubing and casing. WOC per cementing company recommendation. |
| 19 | Tag cement @ 4160' or shallower. If not, contact Evans Engineering. TOOH and stand back 1450' of tbg. |

- 20 RU WL. Cut casing at 1350'. Circulate bottoms up and continue circulating to remove any gas from wellbore. RDMO WL.
- 21 ND BOP and tubing head. 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.
- 22 TOOH and LD 4 1/2" casing. Change pipe rams to 2 3/8".
- 23 RIH with 2 3/8" tubing open-ended to 1450' (100' inside 4 1/2" stub).
- 24 Establish circulation with 9.0 ppg mud and get bottoms up to remove gas from annulus. NOTE: Due to history of bradenhead pressure, it is very important to get all gas out of the hole prior to cementing.
- 25 RU cementers. Pump 10 bbl SAPP (Sodium Acid Pyrophosphate) followed by 20 bbl (min.) fresh water spacer immediately preceding cement.
- 26 Pump balanced Stub Plug from 1450'-610': 320 sx Type III w/0 .25#/sk Polyflake + 0.5% CaCl₂ + 0.3% CFL-3 + 0.3% CFR-2 mixed at 14.8 ppg and 1.33 cf/sx (425 cuft of slurry). Cement volume based on 100' in 4 1/2" csg, 200' in 8 5/8" csg, and 540' in 9" OH + 40% excess. Caliper log used stops at 3900'.
- 27 TOOH. WOC per cementing company recommendation. Tag Cement. TOC should be at or above 710'. If not, consult Evans Engineering.
- 28 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.
- 29 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.
- 30 Supervisor submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
- 31 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 32 Excavate hole around surface casing enough to allow welder to cut 8 5/8" casing minimum 5' below ground level.
- 33 Welder cut 8 5/8" casing minimum 5' below ground level.
- 34 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 35 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 36 Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
- 37 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
- 38 Back fill hole with fill. Clean location, level.
- 39 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.