

## Plug and Abandonment Procedure

### API No. 05-081-06026

### Plugging Procedure

1. Move in and rig up a contract workover rig with pipe racks, catwalk, rig pump, rig tank and cement returns tank.
2. Move in and spot one 400 bbl tank and fill with fresh water.
3. Unload and rack 2-3/8" 4.7#, L-80 work string for use during P&A operations.
4. Lay flow lines from the wellhead to the rig tank.
5. Check and record tubing pressure and casing pressure. Bleed-off any pressures to rig tank.
6. Pump fresh water down the tubing to kill the well.
7. Remove upper wellhead and install cross-over spool to adapt to BOPE. Install a 7-1/16" 5000 psi hydraulically operated double gate BOP equipped with 2-3/8" pipe rams in the top gate and blind rams in the bottom gate. Function test both the blind and pipe rams. Hook up a flow line from the BOP to the rig tank.
  - NOTE: Tubing spool is a NSCo. 10" Ser. 900 x 6" Ser. 1500.
  - Ring gasket is a R46 type.
8. Pick up and un-land hanger. POOH laying down tubing.
9. Install thread protector and ready tubing for shipping. Ship all J-55 tubing back to Rock Springs for re-use or scrap, depending on warehouse needs.
10. Pick up a 4-3/4" bit and scraper dressed for 5-1/2" 17# Casing.
11. TIH with bit and scraper to 6,800'.
12. POOH standing back tubing. Lay down bit and scraper.

#### **Plug 1 (Squeeze Fort Union perforations) Cement yield assumed for all plugs is 1.15 ft<sup>3</sup>/sk.**

13. Pick up a cast iron cement retainer (CICR) dressed for 5-1/2", 17# casing and trip in hole on tubing. Set retainer @ 6,780' (50' above the Fort Union top perforation).
14. Pressure test tubing and valve in CICR to 2,500 psi, swab over valves and pressure test casing to 500 psi.
  - NOTE: If casing will not test, casing holes will be located after the Fort Union has been squeezed.
15. Shear out of retainer and circulate an annular hole volume of fresh water, 132 bbl.
16. Sting into CICR. Rig up cementers and establish an injection rate and pressure through the CICR. Shear out of CICR. Mix 150 sacks (31 bbls) of cement and displace to end of tubing. Note tubing volume @ 6,870' is 40 bbls.
17. Sting into the retainer and squeeze the perforations with 140 sacks (29 bbl.) of cement below the CICR.

18. Shear out of CICR and leave 10 sacks of cement on top of CICR. POOH slowly 6,692 and reverse out remaining cement. Reverse circulate until clean returns at tank.

**Spacer 1 (6,692' – 5,588')**

19. Mix and spot 9 ppg. Poz Gel from 6,692' to 5,588' (26 bbls).

20. POOH Laying Down to 5,588'.

**Plug 2 (balanced plug). Cement across cement top @ 5,500'**

21. Lay a 176' balanced cement plug from 5,588' to 5,412' with 20 sacks of cement (4.1 bbl).

22. POOH laying down to 5,412' and reverse out cement.

**Spacer 2 (5,412'–2,412')**

23. Mix and spot 9 ppg Poz Gel from 5,412' to 2,412' (70 bbls).

24. POOH laying down to 2,412'.

**Plug 3 (balanced plug).**

25. Lay a 176' balanced cement plug from 2,412' to 2,236' with 20 sacks of cement (4.1 bbl).

26. POOH laying down to 2,236' and reverse out cement.

**Spacer 3 (2,236'–378')**

27. Mix and spot 9 ppg Poz Gel from 2,236' to 378' (43 bbls).

28. POOH laying down to surface.

**Plug 5 (surface plug in the 5-1/2" casing and the 5-1/2"x 10-3/4" annulus.)**

29. Rig up Wireline RIH with a "1' by 2-3/4" by 4 shot per foot at 90 deg phasing", and perforate casing @ 378' (50 ft below casing shoe). POOH with WL and RD same.

30. Shut blind rams and attempt to circulate down 5-1/2" casing, and up 10-3/4" annulus. If circulation is established, circulate 1-1/2 times hole volume to clean up 10-3/4" annulus. Annular volume from 378' to surface is 26 bbls. 1-1/2 times annular volume is 54 bbls.

31. Mix and pump 175 sacks (36 bbls) of cement to surface. If no cement to surface continue to mix and pump cement to surface.

- 10-3/4" x 5-1/2" annular volume at depth is 27 bbls.
- 5-1/2" volume at depth is 9 bbls.

32. Nipple down the BOP and remove the tubing spool.

33. Rig down and move off all rig and rental equipment.

34. Cut off casing head 3' below ground level.

35. Install a regulation dry hole marker on casing stub. Note the GPS coordinates of the wellbore location for future reference.

36. Backfill around the dry hole marker and carefully remove liner and all its contents to be disposed of. Photo document removal from the cement pit prior to backfilling.

37. Reclaim location per Federal and State requirements.