

## Chapman State 1

API 05-081-07015

### Proposed Plugging Procedure

1. Daily and prior to any change in job objective, a JSA must be filled out and records kept.
2. Move-in and spot a 200-bbl cement clean up tank or dig and fence off a lined 12' x 12' x 8' (L x W x D) pit.
3. Move-in and rig up a contract workover rig with pipe racks, catwalk, rig pump, and rig tank.
4. Move-in and spot one 400 bbl. tank and fill with fresh water.
5. Bleed-off any pressures to rig tank and kill well if necessary.
6. ND upper production tree exposing 7-1/16" 3K tubing head.
7. Install a 7-1/16" 3K x 7-1/16" 5K psi cross-over, and a hydraulically operated double gate BOP equipped with 2-3/8" pipe rams in the top gate and blind rams in the bottom gate. Hook up a flow line from the BOP to the rig tank. Function test both the blind and pipe rams.
8. Screw pup into hanger and un-screw landing bolts. Pick up on tubing and remove hanger.
9. RU tubing inspection service to scan tubing. POOH laying down tubing and sorting out yellow-band.
10. Order out additional 2-3/8" tubing as work-string. Load all junk tubing and haul back to Rock Springs yard.
11. RDMO inspection service when finished POOH.
12. Pick up a 4-3/4" bit and casing scraper dressed for 5-1/2" 17# casing.
13. RIH  $\pm$  6,670' and circulate until clean returns.
14. POOH standing back tubing. Lay down bit and scraper.

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

15. Pick up a cast iron cement retainer (CICR) dressed for 5-1/2", 17# casing and trip in hole on tubing. Set retainer @  $\pm$  6,650' ( $\pm$  50' above the top perforation).
16. Pressure test tubing and valve in CICR to 2,500 psi, pressure test casing to 500 psi.
  - MIT done in 2014 to verify casing integrity.
17. Shear out of retainer and circulate wellbore until clean returns.
18. Sting into CICR. Rig up cementers. Establish an injection rate and pressure through the CICR. ( If no injection rate can be established contact Engineering.) Shear out of CICR. Mix 150 sacks ( $\pm$  31 bbl of cement, 1.15 sx/cu ft cement yield) and displace to end of tubing. Note tubing volume @ 6,650' is  $\pm$  26 bbl and tubing/casing annular volume @ 6,650' is  $\pm$  118 bbl.
19. Sting into the retainer and squeeze the perforations with 140 sacks (  $\pm$  29 bbl, 1.15 sx/cu ft cement yield) of cement below the CICR.

20. Sting out and POOH slowly to 6,562'. Reverse out cement leaving 88' (10 sacks) of cement on top of the retainer.

**Spacer 1 (6,562' – 5,192')**

21. Mix and spot 9 ppg. Poz Gel from 6,562' to 5,192' ( ± 32 bbl).

22. POOH laying down to 5,192'.

**Plug 2 (balanced plug) Cement from 5,192' -5,016'**

23. Lay a 176' balanced cement plug from 5,192' to 5,016' with 20 sacks ( ± 4 bbl, 1.15 sx/cu ft cement yield).

24. POOH laying down to 5,016' and reverse out cement.

**Spacer 2 (5,016' – 2,016')**

25. Mix and spot 9 ppg Poz Gel from 5,016 to 2,016' ( ± 70 bbl).

26. POOH laying down tubing to 2,016'.

**Plug 3 (balanced plug) Cement from 2,016' -1,840'**

27. Lay a 176' balanced cement plug from 2,016' to 1,840' with 20 sacks ( ± 4 bbl, 1.15 sx/cu ft cement yield).

28. POOH laying down to 1,840' and reverse out cement.

**Spacer 3 (1,840' – 560')**

29. Mix and spot 9 ppg Poz Gel from 1,840 to 560' ( ± 30 bbl).

30. POOH laying down tubing to 560'.

**Plug 4 (balanced plug) Surface Casing Shoe and Surface Cement Plug from 550' – Surface**

31. RU wireline and RIH with a 1' - 2-3/4", 4 SPF, 90 degree phased gun. Perforate casing at 550'.

32. POOH with wireline and RDMO wireline equipment.

33. Pick up a cast iron cement retainer (CICR) dressed for 5-1/2", 17# casing and trip in hole on tubing. Set retainer @ ± 525' (± 25' above the perforated casing).

34. Pressure test tubing and valve in CICR to 500 psi, pressure test casing to 500 psi.

35. Shear out of retainer and circulate wellbore for clean returns.

36. Sting into CICR. Rig up cementers. Establish an injection rate and pressure through the CICR. ( If no injection rate can be established contact Engineering.) Shear out of CICR. Mix 165 sacks (± 33 bbl of cement, 1.15 sx/cu ft cement yield) and displace to end of tubing.

- Tubing volume @ 525' is ± 2 bbl.
- Volume below CICR to POZ spacer (525' – 560') is ± 1 bbl.
- Intermediate/surface casing annular volume at 600' is ± 21 bbl.
- Cement needed for squeeze = ± 25 bbl. Mixing 32 bbl will allow for 25% excess for casing and annular squeeze differences.

37. Sting into the retainer and squeeze the surface casing with 165 sacks ( ± 33 bbl, 1.15 sx/cu ft cement yield) of cement, circulating up the surface casing annulus. If needed mix and pump additional cement until good cement returns are observed at surface.

38. Sting out of the CICR and POOH slowly to 481'. Reverse out cement leaving 44' (5 sacks) of cement on top of the retainer.

#### **Plug 5 (balance plug) Surface Cement Plug**

39. Mix 55 sacks ( $\pm 11$  bbl of cement, 1.15 sx/cu ft cement yield) and displace to end of tubing.

- Tubing volume @ 481' is  $\pm 2$  bbl and tubing/casing annular volume is  $\pm 11$  bbl.

40. Lay a 481' balanced cement plug from 481' to surface' with 55 sacks of cement.

41. Pick up slowly and allow cement to drop out of tubing. Lay down remaining tubing.

- Once the tubing is removed from the surface plug, the cement level should drop  $\sim 35'$  due to tubing wall void.

42. ND BOPE and rig down equipment.

43. Excavate around wellhead and cut off wellhead 3' below ground level.

44. Top off 5-1/2" production casing. Top off 8-5/8" x 5-1/2" annulus as needed.

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

46. 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.

47. Reclaim location per State requirements.