

NPR 11C-14

API: 05045238510000

Garfield County, CO

Location: Sec 15 T5S-96W

AFE #: 01-2018-409

Surface Csg Details: 9.625", 36.0#, J-55, Set at 2,390'

Prod Csg Details: 4.5", 11.60#, P-110, LTC

Orig KB Elev (ft): 6,459'

Gr Elev (ft): 6,429'

TD: 9,980'

PBTD: 9,933'

Top Of Marker Joint: 6,815'

OBJECTIVE - Perform remedial cement squeeze and set patch prior to frac.

Procedure

- 1 MIRU wireline unit (RMWS). Check production and surface casing pressures and record them. Confirm top of MesaVerde prior to perforating.
- 2 PU and RIH with a one foot, 3-1/8" casing guns loaded with 4 SPF (4 shots total), 90 degree phased, 0.4" or larger hole. Correlate to top of the short joint at 6,815' using SLB cased hole logs dated 12-13-2018. Perforate four holes from 8,000'-01'. POH.
- 3 RU flowlines to surface casing valve. Open surface casing to flowback tank. RU pump to 4-1/2" production casing valve, establish injection down the production casing and through the squeeze holes using 2% KCL water. Closely monitor all volumes pressure and rate builds/drops and any fluctuations along with any/all signs of returns up Bradenhead. Document all pressures, rates, and note any circulation. If circulation is established, continue to step 4. If circulation can not be established, review next steps with Denver office.
- 4 RIH with CICR on wireline and set at 7,900'. TOH. RDMO WLU.
- 5 MIRU WOU. Unload and tally 2-3/8", 5.95 ppf, L-80, PH6 work string. ND frac valve. NU 5k BOP and pressure test. TIH with cement retainer stinger and 2-3/8" tubing. RU Power Swivel and Sting into CR, then sting out. Close annulus and test to 1,000 psig. Sting in and test tubing/casing annulus to 1,000 psig. Establish injection down tbg, into squeeze perfs and record rates, pressure, and note circulation up surface casing.
- 6 MIRU BJ cementers. Establish circulation and pump as per the following schedule:
 - 40 bbls of spacer (Mud Flush)
 - 50.8 bbls of 13.5 ppg Class G Cement (1.5465 ft³/sk, 7.72 gals/sk)***See attached BJ Cement Proposal**
- 7 Displace tubing with 26.2 bbls of water, leaving 0.5 bbls in the tbg. Sting out of cement retainer, PU 30' and reverse circulate tbg clean. RDMO cementers and TOH laying down with tbg.
- 8 RU WLU. RIH with CBL/CCL. Correlate to SLB cased hole logs dated 12-13-2018. Run CBL from CICR to 2,300'. Review CBL with Denver office.
- 9 If CBL is within expected range (Est TOC ~7300'), MIRU Wireline to shoot next perfs
- 10 PU and RIH with a one foot, 3-1/8" casing guns loaded with 4 SPF (4 shots total), 90 degree phased, 0.4" or larger hole. Correlate to top of the short joint at 6,815' using SLB cased hole logs dated 12-13-2018. Perforate four holes from 6,800'-01'. POH.

- RU flowlines to surface casing valve. Open surface casing to flowback tank. RU pump to 4-1/2" production casing valve, establish injection down the production casing and through the squeeze holes using 2% KCL water. Closely monitor all volumes pressure and rate builds/drops and any fluctuations along with any/all signs of returns up Bradenhead. Document all pressures, rates, and note any circulation. If circulation is established, continue to next step. If circulation can not be established, review next steps with Denver office.
- 11
- 12 RIH with CICR on wireline and set at 6,700'. TOH. RDMO WLU.
- 13 RIH with cement retainer stinger and 2-3/8" tubing. RU Power Swivel and Sting into CR, then sting out. Close annulus and test to 1,000 psig. Sting in and test tubing/casing annulus to 1,000 psig. Establish injection down tbg, into squeeze perfs and record rates, pressure, and note circulation up surface casing.
- 14 MIRU BJ cementers. Establish circulation and pump as per the following schedule:
- 40 bbls of spacer (Mud Flush)
 - 50.8 bbls of 13.5 ppg Class G Cement (1.5465 ft³/sk, 7.72 gals/sk)
- *See attached BJ Cement Proposal***
- 15 Displace tubing with 22.1 bbls of water, leaving 0.5 bbls in the tbg. Sting out of cement retainer, PU 30' and reverse circulate tbg clean. RDMO cementers and TOH laying down with tbg.
- 16 RU WLU. RIH with CBL/CCL. Correlate to SLB cased hole logs dated 12-13-2018. Run CBL from CICR to 2,300'. Review CBL with Denver office. (Est TOC ~ 6,000', Est WMFK ~ 6,600')
- 17 MIRU WOU. Make up 3-7/8" SB Tricone bit. RIH and Tag cement retainer. RU Power Swivel, break circulation, and drill out CR and cement. Continue to RIH to PBTD. Circulate well clean. TOH with tbg. LD BHA.

****Casing Patch Procedure to follow to patch perf holes***