NPR 23C-3 596

API: 5045239970000	**Orig KB Elev (ft):**	**8,361'**
Garfield County, CO	**Gr Elev (ft):**	**8,331'**
Location: Sec 3 T5S-96W	**TD:**	**11,430'**
AFE #: 01-2018-769	**PBTD:**	**11,337'**
Surface Csg Details: 9.625'', 36.0#, J-55, Set at 2,990'		
Prod Csg Details: 4.5'', 11.60#, P-110, LTC	**Top Of Marker Joint:**	**6,890'**

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.

2 RU 5k lubricator. PU and RIH with a one foot, 3-1/8" casing gun loaded with 4 SPF (4 shots total), 90 degree phased, 0.4" or larger hole. Correlate to top of the short joint at 6,890' using SLB cased hole logs dated 3-9-2019. Perforate four holes from 7,800'-01'. Monitor production and surface casing for influx or pressure changes after perforating. POH.

3 RU flowlines to surface casing valve. Open surface casing to flowback tank. RU pump to 4-1/2" production casing valve. Top off production casing with clean produced water and note how many bbls was required to do so. Establish injection down the production casing and through the squeeze holes. Establish a steady rate of 2.5-4.0 bpm, and then continue to pump an additional 50 bbls. Closely monitor all volumes, pressures, and rate builds/drops and any fluctuations along with any/all signs of returns up Bradenhead. Document all pressures, rates, and note any circulation. Record ISIP, 5 min, 10 min, and 15 min pressures. RDMO WLU.

4 MIRU WOU. Unload and tally 2-3/8", 4.7 ppf, L-80, EUE work string. ND frac valve. NU 5k BOP and pressure test. TIH with CICR on 2-3/8" tubing. Set CICR at 7,700'. Sting out of CR. 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. Record rates, pressure, and note circulation up surface casing.

5 MIRU BJ cementers. Establish circulation and pump as per the following schedule:

- 40 bbls of spacer (Mud Flush)
- 25.7 bbls of 13.5 ppg Class G Cement (1.5012 ft3/sk, 7.26 gals/sk, 96 sx)
- 25.7 bbls of 13.5 ppg Class G Cement (1.5006 ft3/sk, 7.26 gals/sk, 96 sx)

*** See attached BJ Cementing Services proposal**

6 Displace tubing with 29.3 bbls of water, leaving 0.5 bbls of cement in the tbg. Sting out of cement retainer, PU 30' and reverse circulate tbg clean. RDMO cementers. SDFN.

7 TOH with 2-3/8" tubing. 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 laying down with tbg. LD BHA. RDMO WOU.

8 RU WLU. RIH with CBL/CCL. Correlate to SLB cased hole logs dated 3-9-2019. Run CBL from 8,800' to 2,500'. Review CBL with Denver and Parachute office. (Est TOC ~ 7,050', Top of Ohio Creek ~ 7,879')

Casing Patch - Provided by Mohawk. Patch length and depth will be determined once adequate remedial cement is in place. Patch will be tested to 8,000 psig.

Prepared by: Mike Mengers