ROCKY MOUNTAIN OILFIELD TESTING CENTER

MECHANICAL SLIMHOLE TESTING SYSTEM (MSTS)
SLIMHOLE DRILL STEM TESTER

APRIL, 1995

FC9524/95DT4

MSTS Test in Casper Wyoming
April 19,1995

Background

MSTS EXP-2 was shipped back to SPT for modifications and re-testing. A 4-1/2" cased well at the Rocky Mountain Oilfield Testing Center (RMOTC) in Casper Wyoming was selected. The well conditions were:

	Casper Well
Deviation	0
Casing	4-1/2" 10.5#/ft
Test depth	5380 ft
BHT	NOT
Tubing	2-3/8" 4.7#/ft
Formation Fluid	Water & Oil
Kill Fluid	10#/gal brine

The MSTS was tested with a single 3.06" Dowell packer which was set at 5380 ft, approximately 80 off bottom. The test string was configured:

MSTS EXP-2 with
- Inflate recorder - HPR-D
- Formation Gage - HPR-D
- Single packer, Dowell 3.06
- TFV - 12 inch stroke no cam

900 ft of 2-3/8" 4.7 #/ft tubing (3000 #)
SLIPJOINT SLPJ-G with 5' of stroke

Test Procedure

The test procedure followed during the was the follow with notes from the test in brackets:

1. Kill well with brine, annulus level stabilized at 200 ft
2. RIH filling tubing through TTV
3. Position packer at 5380 ft
4. Record up and down weight. (Up 20,000 and Down 20,000)
5. Inflate with 700 psi and hold for 2 minutes.
6. Pull 3000# on the MSTS
7. Inflate to 1200 psi and hold 8 more minutes.
8. Pull 5000 # on the MSTS
9. Set down 5000 # and go to circulate position.
10. Cycle MSTS from Circulate to Shut-in to Flow positions and back to Circulate; mark pipe in each position.
11. Repeat step 10 and note if marking repeat (tubing marks were repeated).
12. Position MSTS in Circulate
13. Displace with N2 at 1100 psi.

14. Cycle MSTS from Circulate to Shut-in to Flow positions and back to Circulate; mark pipe in each position.
15. Repeat step 14 and note if marking repeat.
16. Shift MSTS to Shut-in and Bleed off N2 to 0 psi (additional steps were inserted here, reference (Sequence of Events for details).
17. Shift to flow and back to Shut-in. With unknown tubing fill which is a weight change, cycle tool to Flow and hold for 10 minutes.

18. After the 10 minutes, cycle tool to Shut-in.
19. Cycle tool to flow until fluid is at surface in tubing.
20. Reverse out fluid sample (formation fluid was bullheaded instead of reversing).
21. Cycle from Flow to Circulate, back to Flow and then back to Circulate.
22. Deflate and hold for 10 minutes
23. POOH and note if TFV empties the tubing

Results

The tool cycled a total of 19 times in 19 attempts to all the positions. 5000 pound pulls and 5000 pound set down weights were the force targetted to operated the MSTS. The weight indicator system used was TOTCO deadline hydraulic system which was very sluggish due the cold temperatures. Nitrogen was used to displace 3600 pounds of fluid in the tubing string. The weight change was noted by the free travel of the SLPJ-G and the surface weight was easily re-reference to operate the tool correctly. Each tool cycle was verified by pressuring up of tubing or monitoring pressure changes on tubing.

At the end of the test, the packer swabbed, creating a higher pressure above the packer and inflating the packer. The swabbing, inflated packer suddenly grabbed and the 20,000 pound weak point was pulled. The fish was retrieved on the first attempt with no more swabbing as a large flow passage is present after the weak point is pulled.