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The Application of Combination Technology of Jet and Fracture in Mongolia Tamsag Oilfield

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Abstract
Mongolia Tamsag oilfield formation permeability is low, mainly, it's all wells need to fracture. Because using swabbing way to remove the fracturing residue can lead the shallow depth and intensity suction, small output of raffinate, slow drainage velocity, it will waste a lot of time. So these problems will lead to the residue cause secondary precipitation pollution for oil reservoir problems. However hydraulic pump quick return process is suitable for Mongolia Tamsag oilfield's requirements. Meanwhile Tamsag oilfield corollary use fractured jet pump, transduction pump leather, and optimistically choose packers of large drift diameter fracturing. Field application proves that this process can meet the requirements of timely return after fracturing. It not only decreases manual labor intensity, becoming more safe and reliable, but also has obvious advantage in quick withdraw and broken down which efficiently prevent the secondary formation pollution which meets production need.

Key words: Combined tubing string; Fractured jet pump; Large bore fracture packer

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INTRODUCTION
Mongolia Tamsag oilfield formation permeability is low, mainly, it's all wells need to fracture. In view of the shortcomings for the normal swabbing clean-up such as limited swabbing depth, low efficiency, more fracture fluid remnant, sluggish rate in clean up and more time consumption that could result in the second pollution[1]. The fast clean-up technology which accommodates the Tamsag oilfield has been developed and the fracture jet pump, transduction pump leather and optimized large bore fracture packer are also created. Field applications indicate that this technology could meet requirement for post fracture clean-up. It not only decrease manual labor intensity, becoming more safe and reliable, but also has obvious advantage in quick withdraw and broken down which efficiently prevent the secondary formation pollution which meets production need.

1. COMBINED TECH OF FRACTURE AND JET PUMPING

1.1 Technological Principle
Put horn mouth, large bore fracture packer (rotational setting), hydraulic anchor, safety joint, transduction pump leather, special bottom valve pump, fracturing pump barrel and φ73 thickened oil pipe on the downhole location of reservation. Then rotate the setting, adding pressure to test the setting, the packer is calibrated. Input the fracture liquid to the demanding formation for fracturing, ending blowout after fracturing. Put the bottom valve pump, add pressure, open the sliding sleeve, put the pump core to remove the liquid. When the liquid discharged is finished, we lift the tubing string. The construction is finished.

1.2 The Structure of Tubing String
Fracturing and hydraulic pump for rapid return pipe string: horn mouth + large bore fracture packer + hydraulic anchor + safety joint + transduction pump leather + special bottom valve pump + fracturing pump barrel + 27/8" TPTBG tubing hanger (as shown in Figure 1).

1.3 The Surface Flow System of Fast Clean-Up Technology

The ground power equipment adopts three plunger high-pressure power pump. After power liquid flowing out of the high-pressure pump, the liquid produces high power liquid, run into Christmas tree. The high-pressure power liquid mobilizes the jet pump work through oil tube. After formation fluid and power fluid mixture, the mixed liquor through oil casing annulus into the liquid storage tank (as shown in Figure 2).

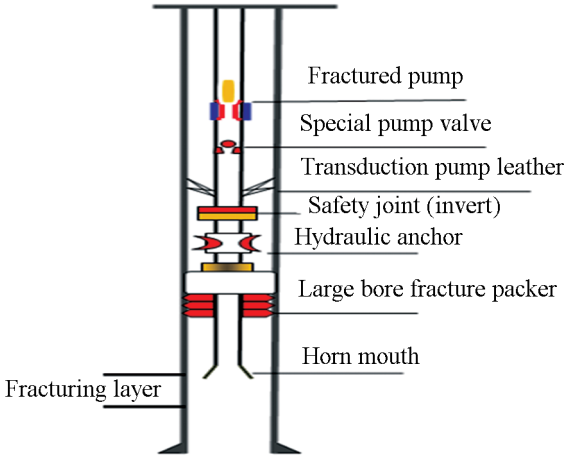


Figure 1
Fracture and Fast Clean-Up Technology String Diagram

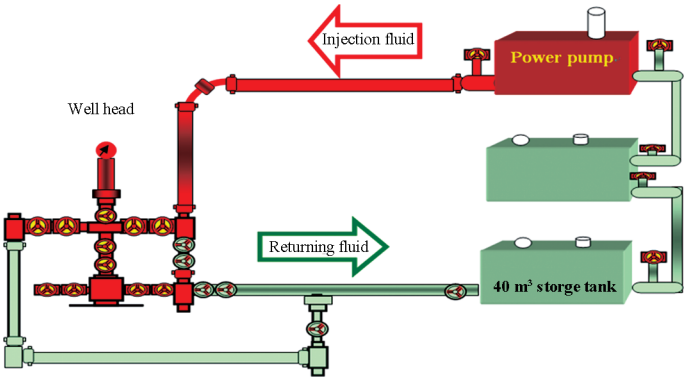


Figure 2
Fracturing and Fast Clean-Up Technology Surface Flow System Diagram

1.4 Characteristics of Tubing String

(a) The two work of fracturing and drainage can be completed simultaneously by a trip to work, which shortens the operation period and reduces the labor intensity of the workers in the field, and is safe and reliable.

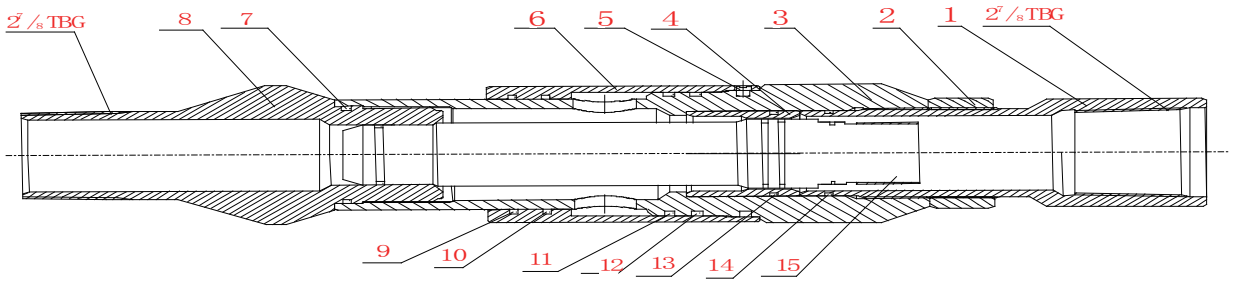
(b) The suction surface is deep, and the back row is in time to prevent the pollution caused by the two times of the fracturing fluid.

(c) Compared with the injection drainage pumping pump has blocking effect solution obviously, reflect the true formation production of the original appearance.

2. FRACTURED JET PUMP

2.1 Structure of Fractured Jet Pump

Structure of sliding-sleeve jet pump is shown in Figure 3.



1-Upper joint	2-Nut	3-Outlet fitting	4-Sealing bush	5-Pin
6-Sliding sleeve	7-Rubber sealing ring	8-Lower joint	9-Rubber sealing ring	10-Rubber sealing ring
11-Rubber sealing ring	12-Rubber sealing ring	13-Rubber sealing ring	14-Rubber sealing ring	15-Pump core

Figure 3
Diagram of Structure of Sliding-Sleeve Jet Pump

2.2 Characteristics of Sliding-Sleeve Jet Pump

(a) This pump without sliding sleeve is same as the normal jet pump, which can fininsh the drainage work. The pump is equipped with a sliding sleeve and can be combined with the acidification to make a pipe column, a pump is used for both purposes.

(b) The length of pump working barrel is 800 mm, which is shorter than the old long pump. And the sliding-sleeve jet pumps make the construction more convenient.

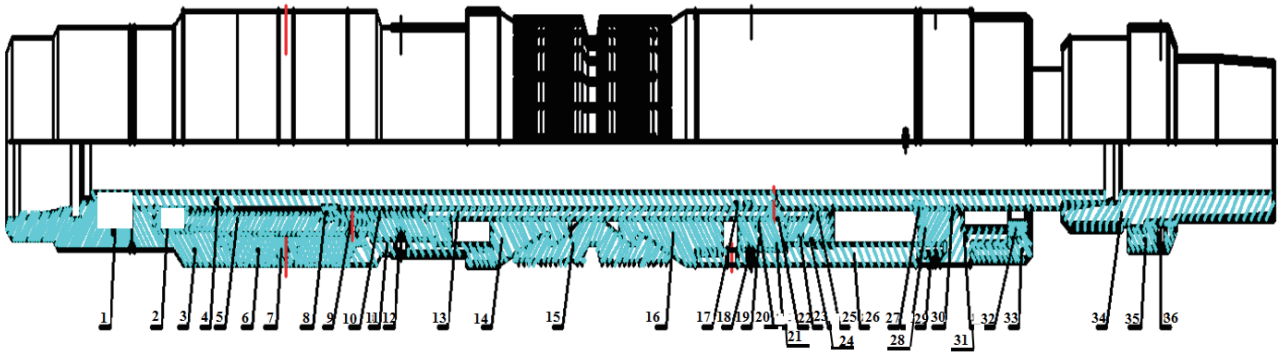
(c) The total length of pump core is 1,069 mm, greatly improved the performance of the pump.

(d) The pump body is flexible to use, and the lower part of the pump body can be hung with a pressure gauge.

(e) Drainage mode of sliding-sleeve jet pumps adopt positive cycle, and the dynamic fluid flow from the oil tubing. When adjust the jet pump, reversing circulation pump core can wash out work, therefore sliding-sleeve jet pump has the advantages of simple operation, convenient lifting pump.

3. HYDRAULIC PACKER

3.1 Structure of Hydraulic Packer



1-Joint 11-Lower rubber cylinder seat 21-Shear piston; 2-O type aprons 12-Shear pin I 22-O type aprons; 3-O type aprons 13-Control sleeve 23-Lock block; 4-Upper rubber cylinder seat 14-Lock block set 24-O type aprons; 5-Outer central tube 15-Upper cone 25-Piston; 6-Rubber cylinder 16-Slip 26-Connection sleeve; 7-Separation ring 17-Lower taper 27-Bock; 8-Inner pressure center tube 18-O type aprons 28-Pressure ring; 9-Lock ring I 19-Shear pin 29-Shear ring; 10-Lock set 20-O type aprons 30-Lock ring II

Figure 4
Structure of Hydraulic Packer

3.2 Characteristics of Sliding-Sleeve Jet Pump

(a) Compared with the mechanical hydraulic packer, setting the packer in the deep well packer is more convenient.

(b) Unsealed by lifting pipe string way step by step, which makes releasing more safe.

(c) The developed hydraulic packer can meet the requirements of the combination of acidification and drainage.

4. FIELD APPLICATION

Tower 21-7-2 well is an evaluation well. Drilling end on June 8, 2009, and finish drilling depth is 2,100.0 m. The well is drilled with a depth of 2,076.18 m, and its maximum deviation angle of 3.0°. Using suction drainage production, because of heavy oil, the pump is blocked in the shaft, so production is difficult on July 25, 2009 (Figure 5 tower 21-7-2 wells discharge curve curve on the left).

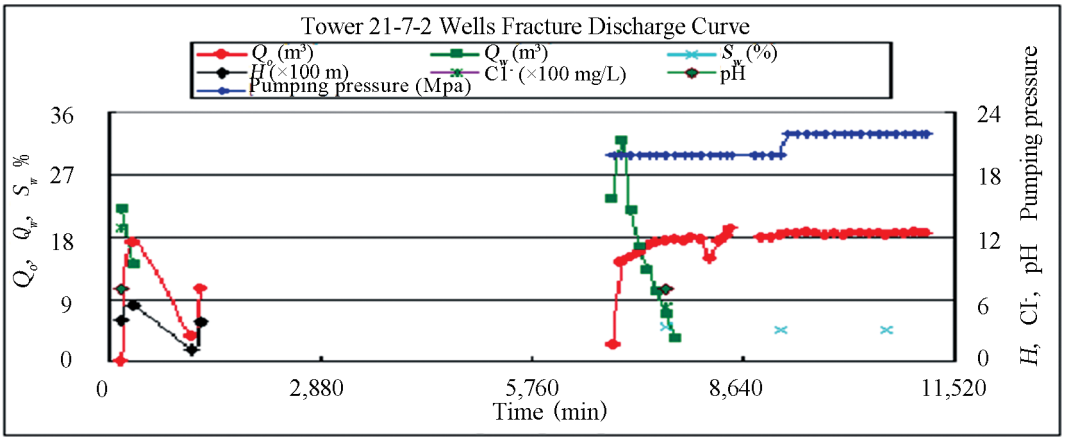


Figure 5
Tower 21-7-2 Wells Discharge Curve

On July 31, 2009, the use of hydraulic jet pump for the production process, the power fluid using hot water, the working pressure of the pump is 20~22 Mpa. After the core components of the underground hydraulic pump are matched with the computer, combined with the data of the tower 21-7-2 well depth, the viscosity and the predicted output. The pump is hung, and a large nozzle is adopted. Drainage and production lasted 4 days, and this well produces 18 m^3 crude oil every day. Finally, the well productivity and pressure data are obtained accurately (Figure 6 tower 21-7-2 well flow pressure curve).

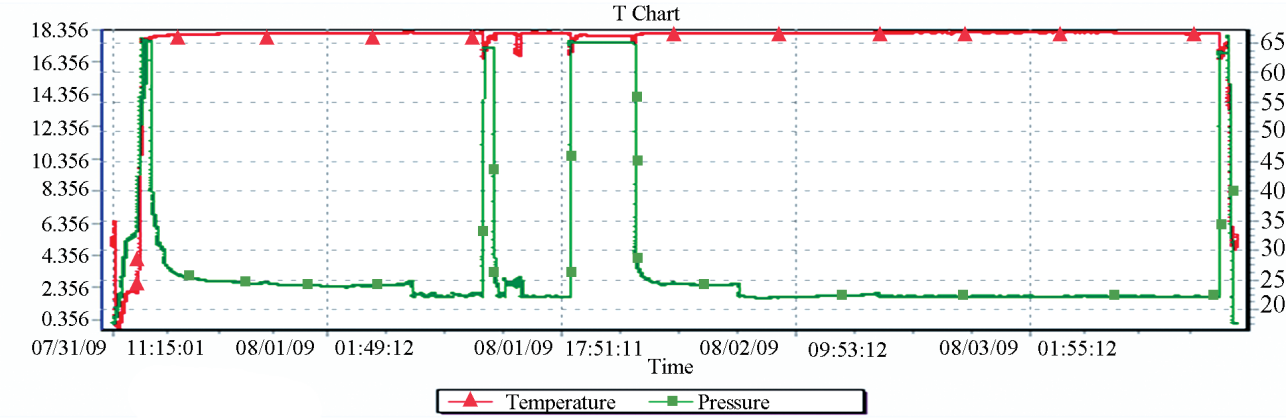


Figure 6
Tower 21-7-2 Well Flow Pressure Curve

CONCLUSION

The fast clean-up technology which accommodates the Tamsag oilfield has been developed and the fracture jet pump, transduction pump leather and optimized large bore fracture packer are also created. Field applications indicate that this technology could meet requirement for post fracture clean-up. It not only decrease manual labor intensity, becoming more safe and reliable, but also has obvious advantage in quick withdraw and broken down which efficiently prevent the secondary formation pollution which meets production need.

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