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Running a completion assembly with frac sleeves on tubing

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The article dwells on the technology of running a completion assembly with frac sleeves on tubing. The technology is mainly aimed at reducing the well construction time as well as the workload on workover crews.

Keywords: well construction, technology for running a completion assembly with frac sleeves on tubing, hydraulic fracturing sleeves, tubing, evaluation of the efficiency of running a completion assembly on tubing, bringing a well into production

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Introduction

Today, one of the essential challenges facing the well construction industry is to reduce the time-to-first production while ensuring that the completion is reliable. When conducting multi-stage hydraulic fracturing (MSF), a special stinger is installed to enable hydraulic fracturing jobs at the well completion stage. This significantly extends the well construction time [1]. For this reason, there is a growing need for developing and implementing new technologies and innovative solutions aimed at optimizing the well construction process while reducing the time required to start production [2]. The purpose of this paper is to provide rationale for and evaluate the effectiveness of the technology of running an uncemented well completion with 114 mm frac sleeves on a 114 mm tubing, which would enable hydraulic fracturing jobs without additional RIH/POOH operations.

Materials and techniques

In the course of preparation for the project, in order to reduce well construction time, it was proposed to evaluate the possibility of running uncemented liners with frac sleeves on 114 mm tubing. After the completion equipment is run in the hole and activated, the drilling crew leaves the well site and a frac fleet is deployed [3]. Therefore, there is no need to mobilize a workover crew that performed preparatory work for hydraulic fracturing (ran and set the stinger).

In the course of the project, a new type of uncemented liner hanger was designed and manufactured. This hanger is equipped with a specially designed running tool that simultaneously functions as a stinger and enables release from the hanger with a subsequent re-entry while restoring the sealing integrity of the assembly.

The liner hanger design also has upper hold-down slips that prevent the upward movement of the hanger during hydraulic fracturing jobs. In addition, this hanger model has two release mechanisms–mechanical and hydraulic–which is necessary for tripping the liner given the tubing cannot be rotated [4].

All the equipment used in the project passed bench tests, as well as quality control and validation procedures, which eventually confirmed its operability and suitability for use.

Results

The pilot project was performed at one of the wells in a Western Siberian field.

The sequence of the completion equipment RIH operations:

- make-up and RIH of the MSF completion with a diameter of 114 mm (8 stages) on tubing;
- activation of the liner tools;
- hydraulic release of the running tool;
- activation of the upper packer;
- pressure test of the liner together with the production string;
- setting the running tool into the polished bore receptacle of the packer hanger;
- adjustment of the sealing tool, installation of the adapter spool and the oil-filled gate valve (frac valve);
- well pressure test (casing inner space and annulus);
- departure of the drilling crew;
- deployment of the frac fleet;
- hydraulic fracturing jobs;
- the running tool unset;
- the RIH of the ESP and well commissioning.

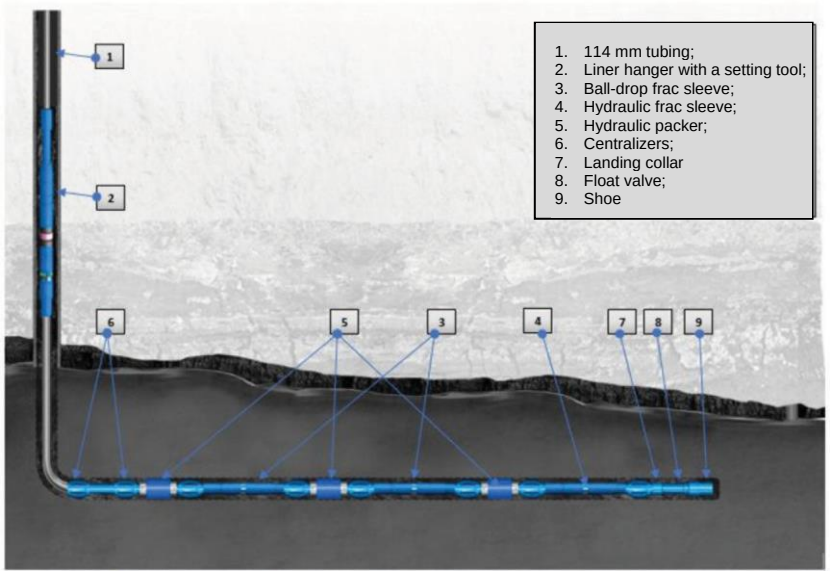

Fig. 1. Completion assembly with frac sleeves on tubing

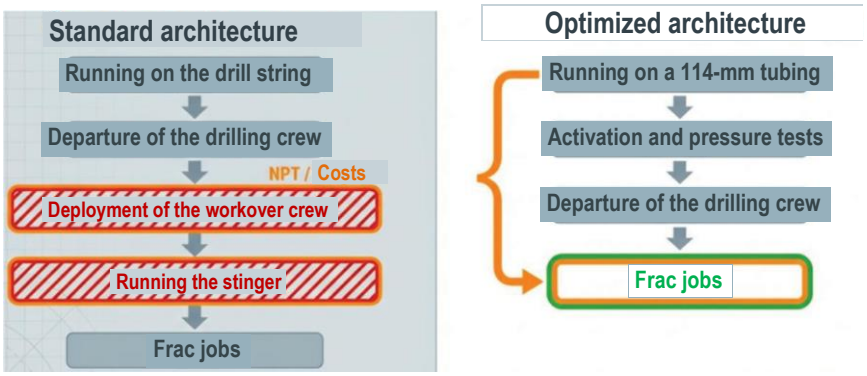

Fig. 2. Altered well construction architecture

Discussion

The pilot project outcomes confirmed the possibility of reducing the well construction time by abandoning the setting jobs earlier performed from the workover rig. This reduces the need for the workover crew services, which is especially important in the conditions of autonomous wells.
The results of the pilot project confirm the feasibility of running the completion assembly on a 114 mm tubing.
The findings obtained demonstrate significant potential for the application of this technology in similar wells, especially in autonomous drilling projects.

Conclusion

The technology of running a completion assembly on tubing enables:

1. Achieving a shorter time-to-first production while it takes an average of 4 days for the workover crew to set the stringer.
2. Reducing the workload on the workover crews. This is especially relevant for autonomous oil fields, where a shortage of workover crews is observed.
3. Reducing the costs for the workover crew operations by an average of 1.7 million rubles region-wise.
4. The results of the conducted pilot work confirm the expediency of further implementation and scaling of this technology.

Reference literature

1. Gilaev G.G. Hydraulic fracturing in vertical and horizontal wells: a teaching guide / G.G. Gilaev, V.A. Olkhovskaya, V.M. Khafizov. – St. Petersburg: Lan Publ., 2025.
2. Bolychev E.A. Well Drilling and Completion Technologies: Accessing Reserves in Real Practice / E.A. Bolychev, A.M. Nuykin, E.Ya. Muslimov, E.M. Makarov, E.V. Kiselev, O.A. Koltypin // *Scientific and Technical Bulletin of NK Rosneft OJSC* – 2014. – No. 2. – Pp. 3–11.
3. Podgornov V.M. Well completion. In 2 parts. Part 1: Well Casing and Cementing: textbook for universities / V.M. Podgornov. – Moscow: MAKS Press Publ., 2008.
4. RD 39-0147014-217-86. Operating instructions for tubing. – Kuibyshev, 1987. – URL: Available at: https://meganorm.ru/Data2/1/4294846/4294846474.htm.