



Subject



Petroleum Equipment and Services, Inc. (PESI), Anchorage, Alaska and Frontier Oil Tools (FOT), Houston, Texas safely and successfully designed, manufactured, and installed a novel 3-1/2" x 9-5/8" velocity completion solution in offshore Alaska.

Detailed Outline

An Alaskan operating company tasked PESI to deliver a unique velocity completion solution which would be run into 6-3/4" open hole through the 9-5/8" 53.5 lb./ft. casing exit.

The casing exit included a premium whipstock set inside the 9-5/8" 53.5 lb./ft. base casing and required cutting an 8-1/2" window to allow drilling of the 6-3/4" open hole to TD.

PESI approached FOT to discuss a request from the operator described above and to provide an appropriate solution. It was agreed that a combination of conventional 9-5/8" x 7" liner hanger and other downhole well completion components would create a unique completion solution needed to accomplish the following:

- Running 3-1/2" production liner through the 8-1/2" window into the 6-3/4" open hole to well TD providing a velocity string for enhanced production.**
- Cementing of the 3-1/2" liner/lower completion string.**
- Setting 9-5/8" cemented liner hanger inside the 9-5/8" 53.5# base casing above the whipstock/window exit, releasing from the liner hanger running tool, and setting the packer.**
- Running, spacing out and landing the upper completion while providing a continuous 3-1/2" 9.3 lb./ft. completion from the surface to TD.**

The proposed completion system was designed and presented to the operator's engineering team, and after reviewing technical and commercial proposals the decision was made to proceed with manufacturing.

Manufacturing, Assembly and Delivery to Remote Location

Two 3-1/2" x 9-5/8" systems, including support equipment, liner top packers with floating seal assemblies (FSA), and polish mills were ordered and completed in a required 16-week lead time. To simplify the well site operations and reduce operational risk, the liner hanger/packer, including lower polish bore, landing collar and associated crossovers and spacers were fully assembled at the FOT manufacturing facility in



Houston, Texas. The system running tools were fully assembled and pre-stabbed in Houston. Each individual system was independently placed into a wooden crate. Associated balls, darts, wipers and critical spares required for operation were boxed and placed in the crate. Floating seal assemblies were also boxed and placed in the crate. This resulted in each full system stored in one crate. Contingency equipment and polish mills were stored in a separate crate. Each crate was loaded into 50 ft long, steel, offshore basket to ensure protection from damage and weather elements during shipping from Texas to the operators' destination and storage in Alaska.

Field Installation

The field installation of the 3-1/2" x 9-5/8" velocity completion system was safely conducted in accordance with the operators designated well plan. Frontier Oil Tools service engineer was dispatched from FOT service base located in Houston, Texas to the well site offshore Alaska and worked with the operator's wellsite representatives and other site contractors to ensure the successful setting and cementing of the system. The lower completion was run in the hole, cemented and the liner hanger was installed per plan. The liner hanger running tool was pulled out of the hole and the upper completion was picked up, run in the hole, spaced out, landed into the tubing spool and successfully pressure tested, as planned.

Conclusions

Petroleum Equipment and Services, Inc. and Frontier Oil Tools designed, manufactured and delivered a novel, robust 3-1/2" x 9-5/8" velocity completion solution to an Alaskan oil and gas operator.

This special product delivery was very efficient. Engineering design and manufacturing were completed at the FOT, Houston facility and systems were fully assembled, crated and safely shipped to Alaska within 16 weeks of receipt of the purchase order.

The PESI/FOT team provided superb and innovative engineering, supply chain, logistics and operational performance.

Two complete systems, including running tools, were stabbed into 9-5/8" liner hangers and critical spare and contingency components were placed into a 50 ft long steel offshore transportation basket with a quality and safety in mind.

These unique systems were delivered to customer location (over 4,000 miles from the FOT manufacturing location) in excellent condition and ready to run in the wells (without a requirement to do any additional assembly or testing work in Alaska).



Personnel from both organizations were available for support to the operator throughout the process from the initiation of system design to completion of the well.

This novel completion solution is a combination of proven and dependable FOT Liner Hanger System and other well completion components creating a reliable velocity completion system designed for either mature or new wells.

The first 3-1/2" x 9-5/8" velocity completion solution was safely and successfully set and cemented, and the 3-1/2" upper completion was run in the hole, spaced-out, landed and pressure tested per operational plan.

This completion solution can be successfully applied in other oilfield regions utilizing various combinations of liner hanger systems and production completion sizes.



Photo 1

Liner Hanger Assemblies, Top View, Preparation for Shipping

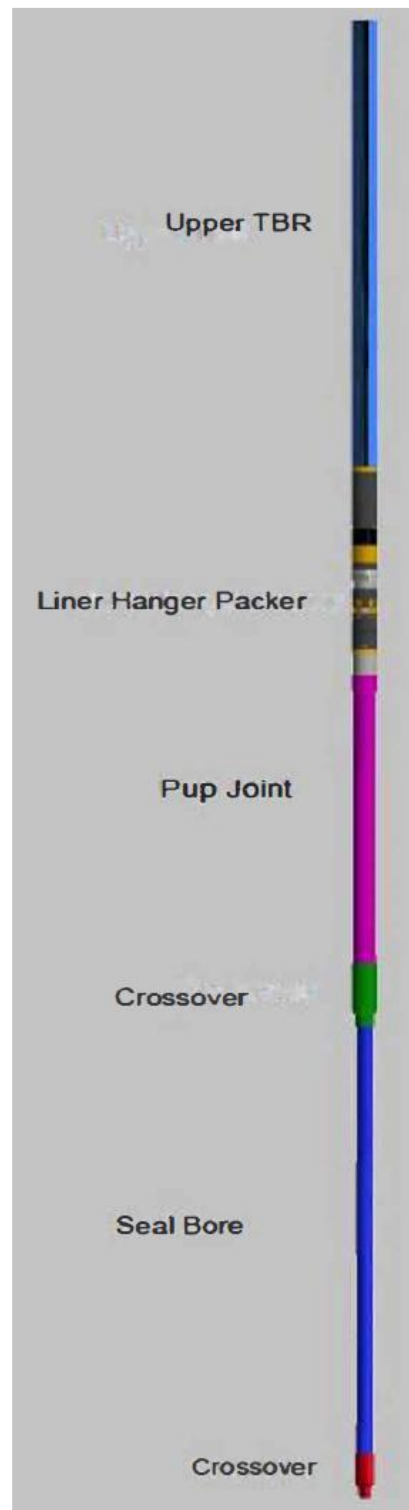


Figure 1

Liner Hanger/Packer System