

Two-Stage Cementing of a Multilateral Junction, After Floating-in the Casing - A Practical Solution SPE 143090 - Macae

Abstract

This paper presents a practical solution for successfully floating in the casing and performing second stage cementing of a multilateral junction. The drilling and completion objectives required a successful cement job on the 9-5/8 in (244 mm) x 10-3/4 in (273 mm) casing that would:

- Isolate the reservoir at the 9-5/8 in (244 mm) shoe.
- Isolate the multilateral junction and prevent hydrocarbons from entering the upper annulus during production.
- Provide support for the 9-5/8 in (244 mm) casing during exit window milling operations.

Due to the distance between the 9-5/8 in (244 mm) shoe and the multilateral junction point it was identified early in the planning stages that the chances of success for a single stage cement job completing these objectives was minimal.

With this in mind it was decided to perform the 9-5/8 in (244 mm) cementing in 2 stages. A multilateral well with a TAML Level 4 junction requires a cement sheath that provides 360 degrees of annular isolation. Full cement coverage also contributes to constructing a high-strength TAML Level 4 junction. Most junctions are placed at a depth which is considerably shallower than the motherbore casing shoe depth. Achieving full cement coverage at the junction depth may not be possible over long intervals. This scenario may require a secondary cement program. This is to ensure competent cement around the multilateral junction for support during the milling phase and isolation from the annulus in the event that a 360° phased perforation had to be performed on the whipstock.

Due to the trajectory of the wellbore it was necessary to float the casing in-hole using a “casing flotation technique.” Air was trapped inside the casing and the first stage cement job was performed as normal using a 2-plug operation. The second stage cement job was subsequently carried out through a locking Port Collar with Metal-to-Metal (MTM) seals.

This completion method was utilized in an Upper Captain Sand dual-lateral infill well in the North Sea. After the casing had been successfully run to depth and the first stage cement job completed, a Port Collar operating tool was deployed on drill pipe and the cementing Port Collar was opened allowing the second stage cement job to be carried out. After displacement of the cement the operating tool was picked up to close and lock the Port Collar. A successful pressure test across the Port Collar confirmed this. All objectives were met; a world first was achieved for this combined operation. Since this first well was completed several other wells have similarly been completed. As a further development to this, a number of operators have expressed the need to have the MTM cementing port collar qualified to meet the requirements of ISO/DIS13679.2, which defines various ‘connection application levels’ (CAL), with CAL III now being the most severe.

[Complete paper](#)