Retrofitted multistage trim quickly resolves choke vibration challenge to maximize production with minimal downtime

Case study facts

Location: Offshore Trinidad

Customer: Confidential

Challenge

An operator offshore Trinidad purchased a 15,000-psi MPC60T choke for a new production platform. Part of NOV's line of MPC (Maximum Performance Cage) chokes, the MPC60T is a large bore choke with a single-stage, plug-and-cage trim that delivers high flow capacity with lower pressure differentials.

The customer successfully deployed the MPC60T in several previous offshore application. But in this new field operation, the customer quickly observed high differential pressures across the choke and higher-than-expected flow rates from the well, which resulted in serious noise and vibration issues in the choke. The operator shut in the well to prevent vibration-induced damage to the piping, valves, and other equipment on the platform.

The operator could not afford the time and cost of waiting for an entirely new choke body to be designed, forged, and delivered. To minimize downtime and get the well back into production quickly, the operator asked NOV to develop a retrofit solution for the vibration problem.

Solution

After reviewing all flow data, NOV choke experts recommended installing a multistage trim in place of the existing single-stage, plug-and-cage trim. A multistage trim uses an internal labyrinth flow path to lower the pressure drop in a stepwise manner across several stages. Compared to the sharp pressure drop in a single-stage trim, the multistage pressure drop helps reduce velocities and noise levels in the choke.

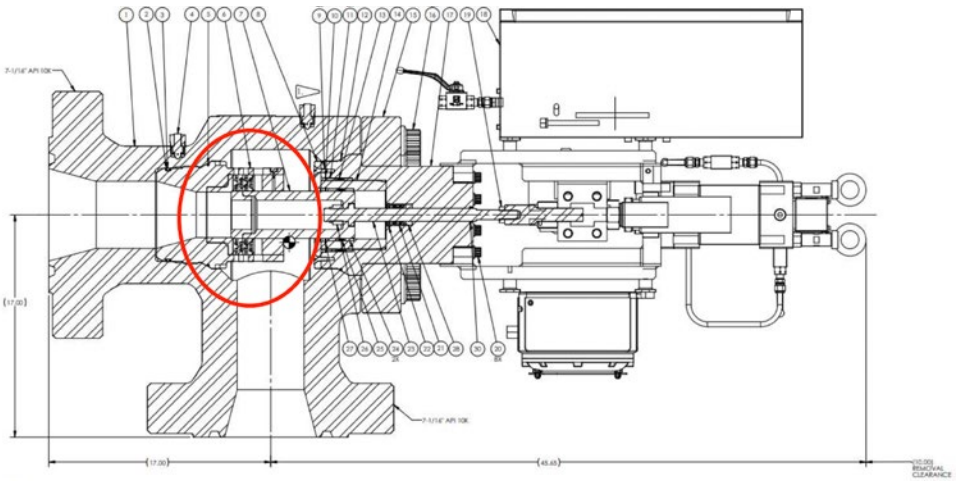
NOV's existing multistage trims were designed for the CVCMPB choke models. A multistage trim did not exist for the MPC60T. To avoid the time and expense of designing and manufacturing a CVCMPB choke for the platform, NOV's engineering group focused on designing a multistage trim that would fit into the existing choke body.

Results

NOV's choke experts designed a retrofit multistage trim in just a few days, and built and installed it into the MPC60T choke within just a few weeks. The operator immediately observed a significant reduction in vibration and noise levels and no further risk of damage to the platform's production system.

After the well settled into a steady-state flow a few weeks later, NOV replaced the multistage trim in the MPC60T with the single-stage trim. The larger orifice of the single-stage trim boosted the production capacity from the well while lowering the platform's operating costs.

The operator decided to install MPC60T chokes with multistage trim for the startup stage of its next series of offshore wells. After several weeks of vibration-free operation, the multistage trim was again switched out for the single-stage trim—with minimal downtime, no operational issues, and optimized production rates.



OV's retrofitted multistage trim quickly resolved high-risk vibrations in the existing MPC60T choke with minimal downtime.