

## CASE STUDY

# FLEXIBLE, RESPONSIVE: VALVE REPAIR & REPLACEMENT ON LIVE HYDROCARBON SYSTEM //



A PLATFORM OPERATOR IN THE NORWEGIAN NORTH SEA HAD A PROBLEM WITH A PASSING VALVE RELATED TO THE SECOND STAGE SEPARATOR CONTAINING HYDROCARBONS AT 90 BAR (1300 PSI) AND 75 DEGREES C (165 DEGREES F).

FROM INITIAL ENQUIRY, IK-GROUP DESIGNED, ENGINEERED AND IMPLEMENTED A SOLUTION IN JUST EIGHT WEEKS, WITH NO LOSS OF PRODUCTIVE TIME. THE AOGV MECHANICAL ISOLATION TOOL WAS TESTED, CERTIFIED AND CE MARKED PRIOR TO MOBILISATION.

### THE SITUATION

With oil and gas prices buoyant, a solution was needed to allow production to continue - avoiding the major costs, risks and complex operations associated with a shutdown and draining of the inventory.

### WHAT WE DID - THE AOGV

Our patented AOGV is a unique mechanical isolation tool which can set and retract a blind spade in a pair of flanges on a pressurised process system. The blind spade or a combination of several spades in different locations can facilitate the replacement of valves and pumps, isolating a vessel temporarily for safe entry and bringing it back on-line whilst the main process is kept in continuous operation.

The AOGV facilitated intrusive maintenance on the passing valve by use of isolation spades set in between the valve and pipe spools leading to the second stage separator.

### CHALLENGES

- No usable isolation points near the valve in question.
- Unable to use bypass line due to passing valves.
- Crude oil line with high temperature and pressure.
- Avoid shutdown.

### RESULTS

- Short delivery time.
- Successful delivery of scope change.
- Zero non-production time.
- No LTIs.
- Estimated \$46m USD saving for the client.



*High precision 3D scan result.*

### **TESTING, PLANNING & PREPAIRING**

IK-Group conducted an on-site survey - including a high precision 3D scan – allowing us to create an AOGV which was 100% aligned to the flanged valve. With obstacles on both sides of the passing valve, the AOGV was specially-designed and manufactured to fit around a parallel 1” valve and blind flange on one side, in addition to a 6” valve located on the other side of the valve.

As the 6” cl900 line had a ring joint as sealing element, the AOGV was equipped with a bespoke removal tool. This enabled the ring joint to be removed from the ring joint groove without coming into contact with the groove itself, thus avoiding any damage to the sealing surface.

The AOGV was also equipped with a special insertion tool, enabling a new ring joint to be inserted into the groove when restoring the system, at the same time enabling the flanged connection to be compressed against the new ring joint whilst avoiding contact with the insertion tool.

Despite the system’s operational pressure not exceeding 89 bar throughout the operation, the AOGV was verified at 1,43 x design pressure (143 bar/2075 psi) prior to mobilisation, to ensure no leakages in the event of pressure build up

### **SITE OPERATION**

The AOGV’s isolation spades were set on each side of the leaking valve, creating a hydrocarbon- and pressure-freed valve cavity.

With the valve discovered to be in far worse condition than anticipated, IK-Group was tasked with creating a solution to completely remove the valve from the system and replace. Within seven days, we conceptualised, designed, manufactured and tested three bespoke isolation spades with integral bleed ports, to facilitate replacement of the passing valve from the line.

The three spades were installed upstream, downstream and on the valve itself, in a complex operation where cavities had to be hydrocarbon- and pressure-freed through the AOGV or the special isolation spades.

### **RESULTS**

The fundamental objective of the operation – to avoid any loss of production – was met, despite unforeseen challenges.

IK-Group provided the anticipated isolations to enable the initial in-situ repair of the passing valve. When the valve proved to be beyond repair, we acted with speed and flexibility to provide an additional solution which would safely remove and replace the valve, whilst normal production levels continued.

Without the AOGV, a shutdown would have been inevitable, even in the most straightforward of circumstances. The length of any shutdown and loss of production time would have increased significantly, when requirement to replace the valve became clear. By mitigating the initial requirement for an unplanned shutdown, the AOGV further assisted productivity by allowing a “hidden” issue to be solved whilst operations remained live.

Ultimately, use of the AOGV saved the operator an estimated 46million USD

- 🕒 • **Responsive: Short delivery time.**
- ✅ • **Flexible: Successfully addressed significant change of scope.**
- 🏆 • **Productive: Zero non-production time.**
- 👉 • **Safe: No LTIs.**
- 💰 • **Efficient: Estimated 46million USD saved.**



*Integrity clamp designed around the valve housing.*