



Engineering  
*GREAT Solutions*

## Competitor pump recycle valve at FPSO replaced by IMI CCI

### The challenge

A Floating Production Storage and Offloading (FPSO) unit in Europe had three competitor valves with axial trims installed as the pump recycle valves on a seawater injection system. These valves were experiencing cavitation related erosion and vibration issues affecting the performance of the injection water system. The installed valves had a six stage axial design trim, 1.5" stroke, operating with a diaphragm actuator to handle fluid condition at 270 bar inlet pressure and atmospheric outlet pressure. The pump recycle valves are used to maintain minimum flow through the sea water injection pump for pump protection at start-up and shut-down, load balancing modulation during different phases of operation, and tight shut-off when flow is not required.

The installed trims work well at full stroke

but suffer at lower lift due to an insufficient number of pressure reducing stages needed to handle the high-pressure differentials. Multiple upgrade solutions by the valve manufacturer, including upgrading of the actuator to a piston type did not address the trim erosion. The FPSO contacted IMI CCI to resolve the pending problems with the pump recycle valves.

### The solution

The valve in this application needed to handle high pressure drops, possible presence of solids, high saline content with specific gravity as high as 1.15 times water, and low flow conditions. The existing valve with six stage trim was subjected to over 60 m/s trim exit velocity, 3x more than the ISA recommended 23 m/s trim exit velocity. After detailed evaluation of the customer needs, actual operating conditions and the existing valve problems, the IMI CCI team

proposed a proven DRAG® valve solution. The solution has a trim with 18 discreet pressure reducing stages to reduce trim exit velocity to less than 23 m/s. A combination of super duplex body with full surface Stellite 6 overlay and Alloy 718 trim material was selected to handle the saline content of the water and eliminate any corrosion issues. A pneumatic piston actuator with high seat loading was also offered to meet the repeatable Class V tight shut-off requirement.

The total solution incorporating the DRAG® technology, appropriate material for fluid compatibility and actuation system enabled IMI CCI to resolve a long pending performance issue and improve pump efficiency.



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