Case Study: Progressive Cavity Pump Protection

ONE SERIES
FIELD SAFETY SYSTEM

Industry
UPSTREAM OIL & GAS

CHALLENGE:

A large national oil company (NOC) had been using process transmitters containing an auxiliary digital contact for protection of their progressive cavity (PC) pumps.

The transmitter's 4-20 mA signal was an input into the Variable Frequency Drive (VFD) that controlled the PC pump. For safety reasons, the NOC required a redundant shutdown of the PC pump in the event an overpressure condition occurred that the VFD did not react to. However, the auxiliary contact in the transmitter needed both an external power supply and relay (housed in a separate enclosure – see Fig. 1) in order to perform the redundant shutdown. Neither the power supply or the relay were certified for SIL 2 applications and were prone to failure, risking damage to the pump or causing spurious trips and costly maintenance expense.

SOLUTION:

The NOC chose the ONE Series SIL 2 Safety Transmitter with Safety Relay Output (SRO) because it combined the 4-20 mA output that went to the VFD with an integral safety relay that could directly shut down the PC pump (see picture). With the analog signal connected to the VFD and the embedded logic solver and relay providing redundant safety shutdown of the PC pump, the external power supply, relay and added enclosure were eliminated. An additional digital signal could be inputted to the VFD to alert it in the event the pump was shut down (see Fig. 2).

The new control scheme provided simpler installation and programming at significantly reduced cost. Furthermore, the improvement in device reliability and diagnostic output of the SIL 2 certified device meant that the NOC could now calculate and achieve SIL 2 application protection.

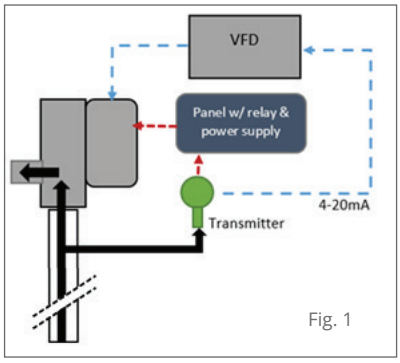

Fig. 1

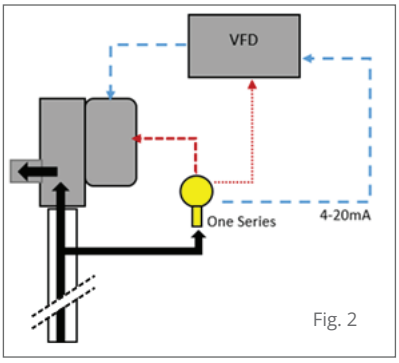

Fig. 2

Reduced cost

Simplified installation time

Improved reliability