SEEPEX.
An Ingersoll Rand Business

TWO IN ONE – A SURE THING

APPLICATION DETAILS

- Emptying a 6m deep open drains tank and transporting the water-hydrocarbon solution to the water-oil separation facility

KEY SPECIFICATIONS

- CAN design with two suction connections
- Low shear avoids oil emulsification
- Pump capable of handling liquids with high gas fractions
- 53B mechanical seal system
- ATEX CE EX II 2G IIB T3 X certified

BACKGROUND

The Buzzard oil field, which is approx. 100 kilometers northeast of Aberdeen, was discovered in 2001. Every day, 150,000 barrels of crude oil are transported by the Forties Main Oil Line (MOL) to the refinery of a global oil and energy company on the east coast of Scotland. However, the oil from Buzzard field contains mercaptan, which is a major challenge for pipelines and discharge systems, especially when maintenance is required. Mercaptan, also known as thiol, is a chemical and toxic compound with a penetrating smell.

TASK AND TARGET

This project identified two challenges. Firstly, to enable maintenance of the main oil line, it had to be drained of crude oil which contained up to 15 % entrained gas. This resulted in extreme process conditions with a very low NPSHa of 0.5m under which many pump technologies would be unable to either operate or operate reliably without damage caused by cavitation.

The existing NPSHa is defined by the pump installation. and can be calculated with factors e.g.: vapor pressure and density, pressure in the inlet cross-section of the system, geodetic level and loss level. Every pump has an NPSHr (required) figure which will depend on the pump type and factors such as speed. For the pump to function, NPSHr must be less than NPSHa. One characteristic of the pc pump is its very low NPSHr figure.

COST SAVINGS

REDUCED INVESTMENT COSTS

NO UNPLANNED MAINTENANCE COSTS

SEEPEX PRODUCTS

- Pump Range BE CAN design

The second application involved emptying a 6m deep open drains tank containing various hydrocarbons and water which had to be pumped to oil water separation equipment. The choice of pump was of the utmost importance to ensure that the pumping action would not emulsify the oil and affect the separation process.

SOLUTION

Rather than addressing the challenge with a two-pump solution, SEEPEX experts proposed an innovative single pump solution which involved a vertically mounted BE pump installed in a can. The can depth was designed to enable the pump to overcome the low NPSHa.

The can was fitted with two suction connections. The first was connected to the main oil line and the second to the open drains tank. Both suction pipes were fitted with individual isolation valves which allow operators to use the single pump to either drain the main oil line or pump out the open drains tank. This provided the flexibility of being able to operate each part of the system independently and allowed the pump to be removed vertically from the can for optimized maintenance.

The progressive cavity pump is ideal for handling shear-sensitive products with high gas fractions. The selected pump could therefore transfer oily water mixtures without shearing the oil droplet and simplify oil water separation.

In addition, the pump was fitted with a 53B mechanical seal system to ensure product containment and avoid leakage to the environment due to the hazardous nature of the hydrocarbon mixture being pumped.

“In 2021, some 15 years later, the pumps are still in operation and have not been removed for any maintenance. A true verification of application understanding and the engineering power of SEEPEX solutions.”
Peter McGarian, SEEPEX UK Managing Director.

BENEFITS

- Reduced investment: 1 pump for 2 applications
- Zero maintenance in 15 years