

## CASE STUDY

# Hydraulic Re-rate for Crude Oil Transfer Pump (COTP)

The platform named Kinabalu A was operated by Shell Malaysia for more than 25 years. The concession expired and the platform was handed over to PETRONAS as an asset owner which subsequently appointed Talisman Malaysia Limited as an operator. Situated at East Malaysia Sabah, production from Kinabalu averaged 7 mboe/d in 2014. In 2015, the company planned to continue progressing the Kinabalu redevelopment project. One of the sanctions that were needed to suit the new requirements was an upgrade of the crude oil transfer pump through Sulzer.



Pump as received from the customer

### The challenge

1) The pump required to operate at three different duty points in order to avoid a bottleneck. The rated flow was set at 200 m<sup>3</sup>/h with a minimum flow of 80 m<sup>3</sup>/h. Three different duties as below:

| Duty  | Operating flow rate   | Head  |
|-------|-----------------------|-------|
| No. 1 | 112 m <sup>3</sup> /h | 157 m |
| No. 2 | 152 m <sup>3</sup> /h | 148 m |
| No. 3 | 200 m <sup>3</sup> /h | 147 m |

Existing duty at 406.8 m<sup>3</sup>/h = 336.7 m

- 2) Variable Frequency Drive (VFD) is not preferred by the customer due to limited space at the platform. The retrofit solution shall fit into the fixed speed drive.
- 3) Sand carry over is high. The pump mean time between repair was at 6-8 months.
- 4) Replacement of the rotor and installation at site had to be done during a limited time window of a 30 days platform shutdown.
- 5) Performance test required for confirming the duty change.

### The solution

- 1) Sulzer provided state-of-the-art hydraulic expertise to offer the customer the best solution. A new rotor was supplied to meet the new duty.
- 2) The major problem on three different duty points was resolved by throttling the discharge valve.
- 3) Special SUMEPUMP™ coating was used in all wetted parts.
- 4) Rotor exchanges were done one after another due to limited time frame.
- 5) Sulzer Singapore works with a local test bed company to satisfy the customer's requirement on testing.

### Customer benefit

- 1) The cost effective solution included changing the rotor design while using existing pump casing, motor, seal plan, and piping arrangement. No hot work (welding, grind cutting etc.) was required at site.
- 2) Most of the spares are interchangeable before and after the retrofit, except the impeller. The available inventory stock can be utilized for future maintenance.
- 3) The existing general arrangement was maintained.

### The Sulzer difference

Sulzer is capable of providing hydraulic solutions to any kind of pumps. With more than 180 years of experience, we know how to provide our customer with a cost-effective solution that fits its needs.



Pump casing concentricity check



Bearing housing concentricity check

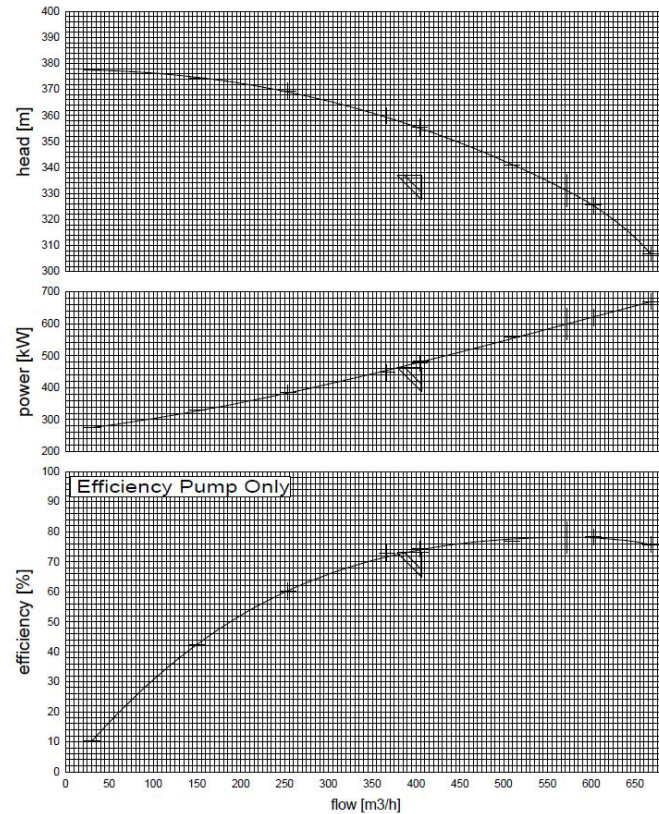


New designed impellers

## Product data

### Pump curve before retrofit:

Original curve was at 406.8 m<sup>3</sup>/h, 336.7 m head with power rating of 463 kW. Efficiency at the rated point is 73%.



### Pump curve after retrofit:

The new retrofit curve is at 200 m<sup>3</sup>/h; 157 m head with a power rating of 140 kW. Efficiency at the rated point is 49%. The other operating flows are at 112 m<sup>3</sup>/h; 157 m head and 152 m<sup>3</sup>/h; 148 m head can be achieved by throttling the discharge valve. Minimum continuous flow is at 80 m<sup>3</sup>/h. The customer will install an LCV (Liquid Control Valve) at the discharge to throttle the pressure between 147 m head to 157 m head.

## Contact

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## Applicable markets

Oil and gas

## Applicable products

Radially split between bearing single stage pump (BB2 type)

