



## Hazardous leakage

The BP Chemicals site in Hull had for a long time suffered problems of leakage from its existing Girdlestone pumps. Although the exotic alloy pumps were reliable, the aqueous organic solution that was pumped at 150°C was very aggressive and tended to leak at the suction cover joint after a period of operation. As well as being a potential hazard this caused unplanned downtime for maintenance

BP approached the Original Equipment Manufacturer (OEM) for a solution but all that they could offer were direct replacement parts, thereby not resolving the root cause of the problem.

With the problem becoming more acute, BP approached Amarith to see if a solution could be found.

## Re-Engineering not Reverse Engineering

Amarinth already had experience in re-engineering components for Girdlestone pumps. Using powerful computer aided technologies such as 3D CAD, CFD and FEA, Amarith was cost effectively designing components that not only replaced the OEM ones, but actually improved on them.

Re-engineering is very different to the more well known reverse engineering which suffers from problems such as:

- Poor tolerance causing incorrect fit
- Inferior materials causing premature wear
- Warranty issues

As an example, an incorrect tolerance on a shaft can cause premature seal failure and so any savings gained from using a reverse engineered (or replicated) part are dwarfed by the unscheduled replacement of another part.

Amarinth, being an OEM in its own right, understood the importance of

correct fits and had re-engineered a number of parts for Girdlestone pumps, that improved on the design of the originals. Many of the Amarith staff previously worked for Girdlestone and so using the latest technology could design out flaws from parts that had been designed up to 30 years ago.

Following an audit of the Amarith operation, BP were fully convinced of its approach and decided to place an order for a re-engineering volute.

## A single integrated component

Amarinth proposed a single integrated component consisting of the volute and the suction cover. This was designed to be dimensionally interchangeable with the original components so that no modifications were needed to the pump or the pipework. This new component was up-rated from 16 bar to 20 bar in order to match the rating of the flange and was radiographed and die penetrant tested.

Since fitting the new component there have been no further problems. BP has benefited from a re-engineered component that actually costs less than the equivalent pair of OEM parts, has reduced unplanned maintenance and prevented any further unforeseen leakages. The life of its expensive exotic alloy pump has been significantly extended.

BP was so pleased with the performance of the new integrated volute and suction cover that it immediately ordered another for its standby pump. Amarith now supplies a range of spare parts to BP for many of its existing Girdlestone and Amarith pumps on site.



BP Chemicals in Hull, on the east coast of England, manufactures acetic acid, acetic anhydride, vinyl acetate monomer (VAM) and ethyl acetate (EtAc). Acetic acid is a key raw material in coatings, printing inks and adhesives and it is also used in purified terephthalic acid (PTA) for textiles, bottles, packaging and film products.

Hull is home to one of BP's main global research and technology centres and is the base for BP's global marine emergency response centre. The site has an annual production capacity of over 1 million tonnes and employs around 600 people.

*"We had a problem with an existing pump we wanted to use. I called Amarith to see if they could assist and after an in-depth review of the problem they were able to offer a superior alternative. The problem centred around a volute casing and removable suction cover. BP needed to pump some corrosive chemicals and could not afford any leakage. Amarith redesigned the two components into a single integrated volute and suction cover which was radiographed and dye tested thus providing no opportunity for any potential leakage or corrosion between the joint faces.."*

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