

Innovative Pumps at the heart of Africa

MechChem Africa visits the Wadeville manufacturing facilities of APE Pumps and talks to Richard Harper and Norman Kroukamp about the refurbishment of concrete volute pumps at Lethabo Power Station and the company's growing reach in Africa.

The work we recently completed for the Lethabo Power Station in the Free State has been very exciting for us," begins Harper. "This involved the removal of all six of our CW concrete volute vertical end-suction pumps from the pump well, the replacement and fitting of new wear rings onto the concrete volute floor and the inspection, repair and reassembly of the pumps at our Wadeville facility," he adds.

"These APE pumps were initially installed back in 1981 to supply cooling water to the two water towers that cool Lethabo's boiler feed water – and this is their first refurbishment. We are also the pump supplier for the cooling towers at Arnot, Kriel, Duvha, Grootvlei, Hendrina and Komati Power Stations," continues Kroukamp. These power stations typically have two cooling towers each serviced by six 1.6 m diameter CW pumps installed in a ring in a flooded well," Harper says.

Describing the role of the pumps, Kroukamp says that once the steam produced by the power stations boiler had passed through the turbines, it needs to be condensed and cooled. At these power stations, this is done by passing the hot boiler feed water through heat exchangers in a wet cooling tower. "Using our CW pumps, cooling water is pumped into the tower and sprayed onto the heat exchangers from above. When it comes into contact with the hot fins of the heat exchanger below, this water evaporates, extracting the heat from the boiler feed water," Kroukamp explains.

The cooling water required is pumped from a process water dam into a circular well containing a ring of six concrete volume pumps. "The cooling towers use huge amounts of water so at any time at least four of these pumps will be in operation, each supplying up to 7 350 l/s of water at a pressure of 116 kPa, with two additional pumps installed for redundancy, ready to be switched on in the event of a failure," he tells *MechChem Africa*, adding that the pumps run at 216 rpm, drawing 1.875 MW (2 515 hp) of power from a 6.6 kV electrical supply.

The original design used in this application came from Allen Gwynne in the UK.



Above: An APE 1200 MF vertical turbine pump.

Left: A row of recently completed split-case pumps at APE Pumps' Wadeville manufacturing facility.

in the white metal bearing and thrust assemblies, so these were stripped down in our factory and refurbished. The journal and thrust-bearing pads were all re-polished, reassembled and then we took the pump assemblies back to site and dropped them into the volutes.

"Having started the work during December of 2017, we were finished by April 2018, well before the end of the official half-shutdown at Lethabo. All the pumps are now installed and running efficiently to specifications and we are now finalising work on the power station's spare unit," says Kroukamp.

Harper continues: "Previously, we manufactured three replacement impellers for Kriel and we are currently replacing Arnot impellers that experienced cavitation caused by running them in an inadequately flooded well with reduced suction pressure (NPSH).

"We have also completed similar refurbishments for Camden, Hendrina, Duvha, Komati and Grootvlei, and we are currently actively involved with Kriel power station," he says, adding that work on pumps for the second Lethabo cooling tower is planned for the 2019 shutdown.

Enhancing APE's reach in Africa

APE Pumps is now 66 years old, having started out as a Dowson and Dobson company and the local supplier for Amalgamated Power Engineering from Bedford in the UK. "We are well known for our 6- to 42-inch vertical turbine range, but our roots also include multistage high lift pumps and split-case pumps for bulk water transport," notes Harper.

"Then, due to a buy-out of Byron Jackson,



An APE split-case pump for bulk water transport. Right: One of the six APE CW concrete volute vertical end-suction pumps on its way back to the Lethabo Power Station in the Free State.



If required, APE Pumps also has the capability to make engineering design and pattern changes prior to casting.

we inherited an API 610 high-pressure pump range for the petrochemical industry, which gave us a foothold into local companies such as PetroSA and Sasol," he notes. "We currently offer API 610 8th edition versions of these pumps and we are currently working on modifying these designs to comply with the 10th edition of the API 610 standard," he adds.

In recent years, however, APE Pumps has become part of the India-based WPIL pump group, which has its roots as Worthington Pumps India. "WPIL now owns APE Pumps, Mather+Platt, PSV Zambia and also includes Gruppo Aturia and Rutschi pumps, both from Europe, which means that we can offer over 250 pump products, including clearwater and slurry pumps, single stage and horizontally multistage and split-case pumps, API 610 petro chemical pumps, Viking gear pumps for viscous substances such as peanut butter, grade 5A stainless steel super duplex pumps for seawater and chlorine applications, and many more," Harper notes.

The future is here

To cope with the complexity involved in selecting suitable pump from this vast range, APE Pumps is currently setting up a web-based pump selection program to help selected clients to identify best-suited options in the fastest possible time. "This program will soon be available to selected clients to enable us to supply and manufacture efficient pumps

with the lowest possible cost of ownership to meet the specific needs of client applications.

"Our aim is to significantly increase our penetration into Africa and the Middle East. Notable references already include the supply and spares contracts for the biggest pumps we have ever built locally, the 1200 MF vertical turbine APE pump, which we supplied to a client in the Middle East for desalination. The supply was supported by an America-based project management company and included the motor sets – 1 300 kW, 420 rpm, 14 pole electric motors.

The combination of the two systems was 20 m in total length, weighed more than 36 t, and delivered at a duty of 3 800 l/s into a 20 m head.

Other project successes include: stainless steel grade 5A super-duplex pumps supplied to an abalone farm in Gansbaai; and the turnkey high-pressure pumping solution supplied to the Blantyre Water Board in Malawi, which is pumping drinking water from the water treatment plant 26 km into distribution centre reservoirs and then a further 13 km into Blantyre," Harper tells *MechChem Africa*.

"We believe our innovative design and manufacturing capabilities place us at the heart of Africa, with turnkey solutions for mining, water and wastewater facilities, power generation, and for Africa's burgeoning oil and gas and petrochemical industries," Harper concludes. □