

Case study | VLT® AQUA Drive FC 202 and VLT® HVAC Drive FC 102

Automatic Energy Optimization saves AEL Intelligent Blasting 500 kWh per hour

AEL (African Explosives Ltd.) Intelligent Blasting 720 Mtpd nitric acid plant saves 3.6 M Rand annually on operating costs, thanks to an upgrade from direct-on-line operation to VLT® drive control of electric pumps and motors.

More reliability whilst saving millions

The AEL Intelligent Blasting 720 Mtpd nitric acid plant in Johannesburg, South Africa supplies other AEL divisions serving mining operations with chemicals and explosives, nationally and internationally. The nitric acid plant has improved its reliability by upgrading the process water cooling system, and reduced energy consumption by 500 kWh hourly, in the process.

For many years, motors and pumps in the process cooling water (PCW) system operated direct-on-line. With the upgrade, AEL Intelligent Blasting

aimed to improve efficiency and reliability by introducing AC drive motor control. They chose VLT® AQUA Drive FC 202 and VLT® HVAC Drive FC 102 drives from Danfoss, based on their ability to ensure stable operation despite unreliable mains power supply. These drives offer Automatic Energy Optimization and kinetic back-up

features to support highly efficient and reliable plant operation.

During the upgrade, there was no disruption of operations as pre-installation of all equipment was performed with wires run to and from the MCC. The final connections were made during a planned shutdown for a catalyst change out.

"The drives were selected based on the kinetic back-up feature, which is valuable to us because of our unstable electricity supply and a lot of small voltage dips causing our facilities to trip out. With this feature we can keep the plant online without any issues, therefore saving millions."

Johan Engelbrecht, AEL Nitrates MV Electrical Engineer

18
months
payback time



The process cooling water (PCW) system now benefits from VLT® AQUA Drive controlling each of three cooling water pumps, and VLT® HVAC Drive controlling both the cooling tower fans.

Variable speed control with fast payback time

Since the upgrade, AEL Mining Services has been able to reduce the electricity consumption from the two fans by 200 kWh combined and by another 300 kWh on the motors.

The total savings on operating costs based on an average electricity charge of 85 c/kWh, are roughly $(200 + 300) \times 8560 \text{ hr} \times 0.85 = \text{R}3.6 \text{ mil}$

The remarkable payback time of only 18 months reflects the vast improvement in process cooling water efficiency enjoyed by AEL Intelligent Blasting.

“Because we linked everything to our distributed control system (DCS) we were able to use the drives to reach a nice sweet spot of running the pumps and fans on the cooling system so as not to drop efficiency or negatively impacting on plant production or quality but still maintaining an energy saving of around 360 kWh. The resultant payback period was about 18 months.”

Eben Jacobs, AEL Process and Control Engineer

Application	Motor sizes	Installed drives
Cooling water pumps	3 x 355 kW, 525 VAC	3 x VLT® AQUA Drive FC 202 P450K
Cooling tower fans	2 x 185 kW, 525 VAC	2 x VLT® HVAC Drive FC 102 N250K