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ABB ELDS designs world-first solution for major platinum miner

When a consulting engineering company approached ABB about a specific problem that its platinum mining client was experiencing at its smelter facility in the North West, it was an opportunity for the technology provider to showcase its innovation and adaptability in responding to specific customer requirements. “There was nuisance tripping of the furnace due to an assumed earth fault caused by an unbalanced inrush current on the transformer,” explains **Jan van Zyl**, Engineering Manager at ABB.

The solution devised was based on using the on-point switch capability of the Switchsync® PWC600. This relay is designed for single-pole operated circuit breakers, controlling each pole to close and/or open at the optimal point on the wave where inrush currents and flux generation is the lowest for the switched load.

It features unprecedented flexibility for switching various loads with diverse configurations and comprehensive monitoring functionality to track circuit breaker behaviour and handling multiple loads connected to the same breaker. For power transformers, PWC600 can estimate the residual fluxes in the core to minimise energisation transients under all switching scenarios. It compensates for variations in environmental factors and drifts in circuit breaker properties.

The solution ultimately resulted in a significant reduction of downtime and production losses for the platinum miner. “The main focus of the client was to increase the efficiency of the furnace by removing all of this nuisance downtime, thereby boosting its profitability by a considerable margin,” says van Zyl.

**Fanie Delport**, Sales Specialist at ABB, says that this specific solution has now been applied to three different furnace applications for the client. The first (12 kV or 17.5 kV) has already been commissioned, while a second slag cleaning application is being finalised. The third 33 kV solution is just pending the final installation of panels. “We have provided three different solutions for three different areas of the plant,” explains Delport.

The facility was decommissioned in line with the platinum miner’s furnace rebuild programme. While the furnace was being upgraded, it was decided to refurbish the substation as well. In parallel with this programme, two substations at Polokwane were also refurbished. “Obviously, the furnace rebuild had a tight timeframe, and we had to carry out a lot of work during that limited period. We had one service team on-site that were running all three of these installations simultaneously,” says Delport.

Commenting on the technology applied for this solution, Delport says the PWC600 was designed originally for capacitive back switching. Prior to it being upgraded to switch single phase transformers or power transformers, ABB was already using it for this application.

A third-party engineering house was appointed to carry out the initial investigation on the relay and the intended application, whereafter it was integrated success with ABB’s VD4 breakers. Two different solutions were applied, namely a VD4 P standard uniform breaker and a VD4 AF furnace-specific breaker used on the 33 kV application.

“Just to get to where we are now was quite a challenge,” says van Zyl. “This is the first time that this combination of products has been used for this particular solution.” Various global ABB Product Managers were also involved. “We shared our design and information so ABB globally could understand what we were doing and how we were applying it.”

Apart from resolving the issue of nuisance tripping, another major benefit is increased life expectancy of the equipment. “This is a solution that 100% suits the customer’s specific requirements. It is a real testament to the flexibility of ABB in being able to assist our customers. There was a lot of upfront investigation and alignment with the customer, ABB and the EPC contractor that worked on the project,” stresses Delport.

“The plant personnel are getting used to the solution and are extremely happy with its performance to date. They are relying quite heavily on the functionality it is providing.” The solution is now even being rolled out generally at another industrial company in Zimbabwe looking for the same level of technical capability. “A lot of furnace operations are now being built around what we have achieved here,” says Delport.

Van Zyl concludes: “We not only have to keep up with technology but also with our customers’ requirements, who are keen to see what kinds of solutions we can out on the table for them. While a consulting engineer, various subcontractors and the global ABB engineering team were all involved, at the end of the say it was ABB ELDS in South Africa that pulled all this together successfully.”

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