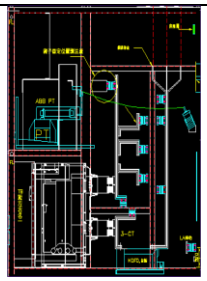
Catastrophic Failure Prevention Using Predictive Maintenance



The Challenge

A large petrochemical plant uses distributed substations throughout the site to control the heavy equipment used in production. The site is about 8km wide and 24km long, with many isolated substations networked together. The customer had recently experienced a critical switchgear failure that caused huge production losses and wanted to ensure that those incidents did not happen in the future.

The Opportunity

The site operations team wanted to monitor the thermal behavior of each medium-voltage circuit breaker in as many substations as possible. They wanted the ability to monitor each breaker in a substation locally and remotely on a continuous, real-time basis. Additionally, they wanted to do those same functions remotely from a central control room.

System Details

The customer installed an IntelliSAW IS485 Temperature Monitoring system nine points on each breaker in each substation. Additionally, they installed a custom gateway in each substation that aggregates the data from each breaker, stores the data for historical analysis and forwards information as needed to the central control room. Provisions were made for a local human-machine interface so local maintenance staff can examine the state of the entire substation and can drill down to each contact on each breaker, if necessary. Local and global alarms were provided, as well as historical records of monitor point temperatures.

The Result

During routine operations, in one substation, the gateway system provided a local and global alert that one phase of a particular breaker was running more than 10°C hotter than the other phases on the same side of the breaker. The temperature of the hot-spot was well below the standard high-temperature safety alarm set for that unit, but clearly, something was wrong with that particular circuit breaker. However, that unit was involved in critical production operations, so the site staff made the decision to continue running that unit until such time as it could be de-energized for examination. The necessary shut-down was implemented several weeks later when a lull in production was normally scheduled. After de-energizing the unit, an insulator was found to be cracked and was replaced. After repair, the breaker was re-energized and put back into production. This unit was carefully monitored for a period of time after repair and all points being monitored were found to be within 10°C of each other. A catastrophic failure was prevented with no impact on production.