Breakers Key To Process Integrity

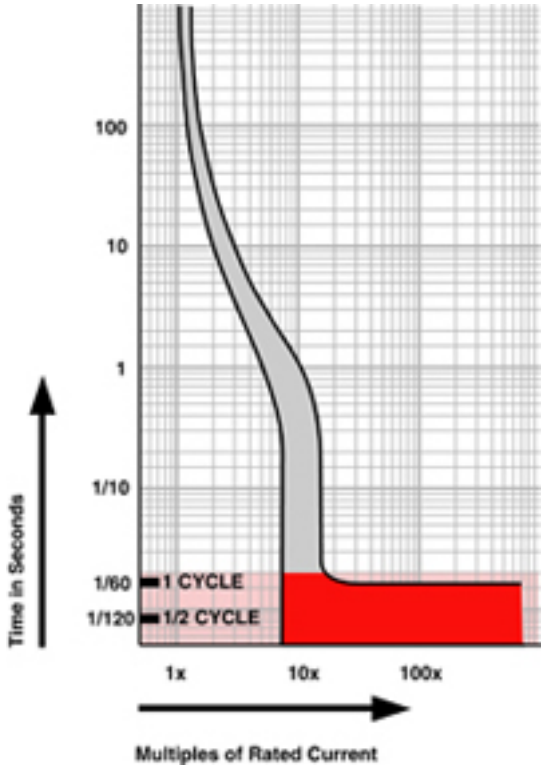

Figure 5

Circuit breakers must be properly maintained and applied in order to operate when called upon. Consider the following scenario: A circuit breaker is helping protect a flow pump and senses a fault downstream. If the electrical distribution system is selectively coordinated, the breaker in closest proximity to the problem on the circuit would trip, isolating the fault to the smallest area. From there, the balance of the plant’s power system could be utilized. But what if that breaker had not been maintained or the application was not updated, and the breaker doesn’t trip? An upstream breaker could isolate the fault, thereby shutting down a larger part of the system than required.

It could be a decade or more since the breaker settings were last inspected for proper application in the system. Ultimately, a circuit breaker is a single piece of equipment, and even if a facility has a top-notch maintenance program, it is important to ensure the breaker is applied with the necessary ratings to help protect the circuit. A processing facility may have undergone a coordination study, but if done years ago, it’s likely that the ratings and trip settings are no longer valid. For example, a breaker may have been rated at 22,000 AIR based on the study, but since then changes have been made to the electrical distribution system. Any change could contribute to higher AIR levels, resulting in an inappropriately sized breaker that no longer meets available fault levels. This maladjustment could have harsh consequences for the subprocess the breaker controls if the fault current increases beyond breaker capabilities.

Figure 6

An updated coordination study, along with a robust power metering and monitoring system, can assist facility managers in making better decisions regarding power usage. Continuous monitoring and study of the system's electrical performance can help prevent nuisance trips due to overload conditions, ensure proper sizing of breakers for fault protection and even detect an increase in harmonics on the line.

When warning signs are present, it's key for a facility manager to understand and document the nature of the issue. A series of power system studies may be necessary to ascertain where the problem lies in the system and how best to remedy it. These services are typically available from electrical equipment manufacturers' service divisions. But the most important thing for a facility manager to do is heed those warning signs. Processors' business models typically rely on volume, not profitability, and a plant that shuts down for a few minutes or a few months is in an unfavorable situation, but one that can be avoided.

Bill Stewart, Schneider Electric North America low-voltage power manager, has 22 years of experience with Schneider and 10 working with petrochemical customers.

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