



Cable failures can cause plant outages

Most industrial plants utilize medium voltage cables to distribute power between the substations, machine control centers and large motors. These cables are insulated by cross-linked polyethylene or ethylene propylene rubber and have operated reliably for years. Many plants have never experienced a medium voltage cable failure and are not prepared for one if it occurs. When a cable fails, a major unit or the complete plant can be shut down until a replacement cable is installed. It can take a week or more to find the right cable, get it shipped, install it and restart the unit.

Medium voltage cables fail because of a process called water treeing. Molecular moisture from the atmosphere, soil or standing water diffuses into the cable insulation. Over time, microvoids are formed, which grow into tree-like structures. When these voids reduce the effective amount of insulation too much, the cable faults and a unit outage occurs.

More than 25 years ago, Dow Corning developed a process called cable rejuvenation. This process injects silicone fluid down the strands of the cable. This

fluid diffuses into the insulation from the inside. As it moves through the insulation, it reacts with the water molecules initially eliminating them, and then for the next 40 years, substantially retards new water molecules from entering the insulation. By filling the existing voids and removing the water in the insulation, the dielectric strength of the cable is restored to like-new condition in a short period of time. As long as water is not present in the cable insulation, little insulation damage occurs. The rejuvenation process can extend the life of 20- to 50-year-old cables another 40 years from the point of rejuvenation.

Since this process was developed, more than 100 million feet of medium voltage cable has been successfully rejuvenated. Of all the cables that have been rejuvenated, less than 1 percent has failed! This rejuvenated population includes many cables that had failed in the past and been spliced, and also cables that had failed just before being rejuvenated.

Once medium voltage cables are more than 20 years old, they might fail at any

time. Typically, however, they last 30 years or more. Cables in warmer climates, cables with higher loads and cables that run at higher electrical stress fail sooner than cables that run at 5 kilovolts in colder climates with low loads.

The rejuvenation process is simple. Cables are de-energized, the connectors on each end are replaced and rejuvenation fluid is pumped through the cable strands until it comes out the other end. The fluid is sealed inside the cable, new electrical terminations kits are put on each end of the cable and the cable is re-energized. The complete process takes about two to four hours for typical-length plant cables. Multiple cables can be injected at the same time. Craftwork on each end of the cable is typically the pacing factor. In any case, cable rejuvenation normally takes less than one-third of the time of cable replacement, which gets your unit back on line more quickly. No large equipment or cable reels are required.

Cable rejuvenation is a cost-effective way to provide "insurance" against plant shutdowns. When your plant cables pass the 25- or 30-year mark, you have to

invest to prevent failures and plant outages. For about one-sixth to one-third of the cost of cable replacement, medium voltage cables can be rejuvenated to last another 40 years.

Vendors that provide this service offer 40-year warranties, making cable rejuvenation a risk-free decision. This compares with new cables that typically come with only a one-year warranty.

Plant management professionals charged with minimizing outages and eliminating the costs of lost production are using cable rejuvenation on a proactive basis to eliminate one asset category from the failure mix. Because we all have busy schedules, finding solutions that remove potential problems from our daily lives is the best investment decision we can make. Investigate the age of the medium voltage cables in your plant today, determine your level of risk tolerance and take action.

For more information, contact Richard Brinton at (206) 355-2727, email rich.brinton@novinium.com or visit www.novinium.com/info/industrial.

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