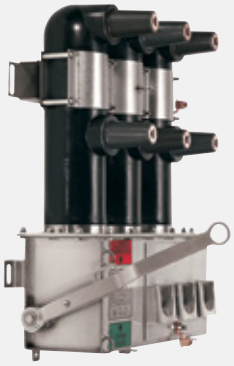
CASE STUDY

Conversion from oil-insulated to solid dielectric switchgear retrofit

elastimold™



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GreyStone Power Corporation, a large electrical cooperative in Georgia, was seeking an “oil-less” retrofit solution for their oil-insulated switchgear installed base to alleviate concerns of potential leaks.

Elastimold was one of the first manufacturers of a fully solid dielectric switchgear in the industry with manufacturing experience that dates back to the 1960s.

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01 3-Phase molded vacuum switch (MVS)

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02 3-Phase molded vacuum interrupter (MVI)

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03 Source side of existing oil-insulated switchgear

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04 Load side of existing oil-insulated switchgear

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05 Source side of new custom retrofit switchgear

Background
Electric utilities are constantly searching for alternatives to help reduce or eliminate the need for maintenance, while preserving or even upgrading the functionality of electrical equipment on their system. GreyStone Power Corporation, a large electrical cooperative in Georgia, was seeking an “oil-less” retrofit solution for their oil-insulated switchgear installed base to alleviate concerns of potential leaks, cost of maintenance and downtime inherent to owning oil-insulated padmounted switchgear.

In addition to transitioning to an “oil-less” solution, GreyStone Power Corporation preferred a switchgear solution that was easy to retrofit in the field using a minimum amount of labor. To accommodate this, the retrofit solution needed to fit onto the existing pad, have matching phase rotation and eliminate the need to splice or pull in new cable.

Furthermore, due to variances in GreyStone’s installed base, it was not uncommon for cable termination heights to differ from one installation to the next. GreyStone chose ABB’s Elastimold™ brand for their retrofit solution due to the flexibility of the modular Elastimold™ switchgear platform and the organization’s willingness to accommodate customer-specific requests.

Solution
ABB Installation Products’ solution was based on Elastimold™ switchgear that uses solid dielectric and vacuum technology. Elastimold was one of the first manufacturers of a fully solid dielectric switchgear in the industry with manufacturing experience that dates back to the 1960s. Elastimold has two main components that are the core of its switchgear product offering — the molded vacuum switch (MVS) and molded vacuum interrupter (MVI).

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06 Load side of new custom retrofit switchgear

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07 Removal of old switchgear

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08 Retrofitting new switchgear

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09 Complete install of Elastimold™ retrofit switchgear solution

Both devices are available with user-specified IEEE 386 underground interfaces such as 200 A loadbreak bushing wells and/or 600 A deadbreak bushings. Common switchgear configurations will typically use MVSs with 600 A on the source side for load switching. MVIs are more common on the load ways for fault interrupting and sectionalizing.

Using the modularity and operational flexibility of MVSs and MVIs, ABB's Elastimold engineers were able to construct a custom retrofit switchgear for GreyStone with a few added features. Due to the small and compact nature of MVSs and MVIs, Elastimold™ switchgear typically has a smaller overall footprint compared to other switchgear with different insulation technologies. However, for this project, the Elastimold design used a larger than standard cabinet to match the same dimensions as the original switchgear, allowing it to be placed onto the existing pad. Using cable bus, the Elastimold™ retrofit switchgear was able to replicate the original switchgear's phase rotation of ABC-CBA. Equipped with a custom frame, this allowed matching bushing height and phase spacing to avoid the need to splice in new cables or terminate new 200 A elbows and/or 600 A T-bodies. The custom mounting frame also allowed the switchgear the ability to raise or lower the bushing height by inches in 2-inch increments from the factory setting. As an additional benefit, it allowed this single retrofit design to accommodate multiple variances in bushing heights since GreyStone's installed base had multiple termination heights, which necessitated raising and lowering bushing height.

Overall results

The Elastimold solution fully met the customer's requirements and provided additional unrequested benefits. The load ways of the former oil-insulated switchgear relied on fuses for overcurrent protection. The new Elastimold™ switchgear solution uses two sets of three single-phase resettable MVIs equipped with a self-powered 380 control. The 380 control can be programmed to emulate different industry fuse and relay curves to add flexibility for system coordination, therefore eliminating the need for fuses and stocking replacement fuses. Furthermore, it increases system reliability since it takes less time to reset an MVI after a fault using a hot-stick compared to replacing a fuse. Lastly, the control also provides the ability to perform single-phase or three-phase tripping depending on the load requirements.

Overall, GreyStone Power Corporation was very satisfied with the Elastimold™ solid dielectric switchgear retrofit solution. With Elastimold™ switchgear's modular and flexible design, it took GreyStone approximately 2 hours for a complete retrofit rather than an estimated 8 hours from their experience with a non-custom "oil-less" solution. As they continue to replace the oil-insulated switchgear in their system, they are eliminating the possibility of potential leaks and the maintenance associated with owning oil-insulated switchgear. Since the successful completion of the initial project, GreyStone Power Corporation has plans to retrofit their remaining oil-insulated switchgear throughout their Georgia territory thanks to the innovative and effective solution from Elastimold.

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