CASE STUDY

elastimold™

Modular padmount switchgear fits the bill for facility expansion.

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A large commercial power user in the Colorado Rocky Mountains approached its serving electrical utility, Yampa Valley Electric Association (YVEA), with plans to expand its facilities. Upon review of the plans, YVEA engineers determined that the existing medium voltage electrical switchgear was inadequate for the proposed expansion and, in many respects, was approaching the end of serviceable life.

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01 Load-ways with Tru-Break switchgear modules and bus tap

Challenge
Since it was clear that the existing medium voltage gear needed to be replaced, this was a perfect opportunity for YVEA to redesign the system to enhance safety, reliability and redundancy while incorporating provisions for future expansion and ease of component replacement.

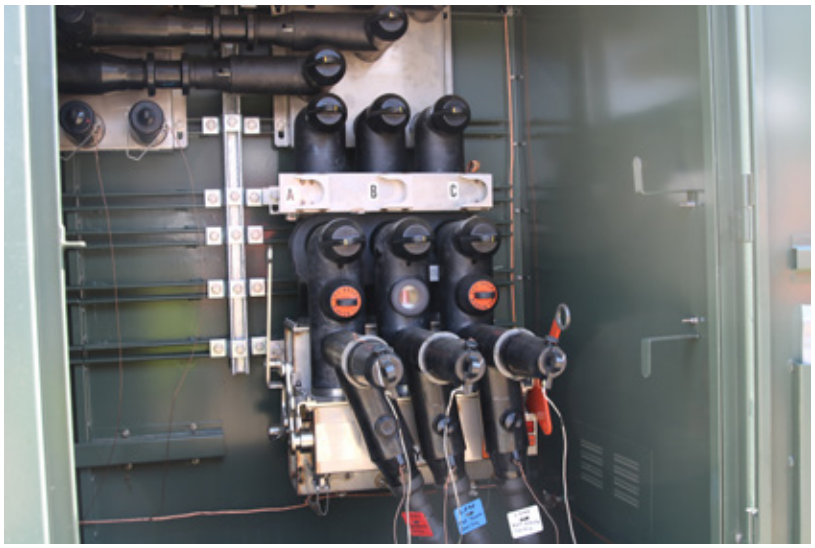
With these objectives in mind, they identified several requirements and desirable features for replacement gear, including:

- Visible-break/visible-open for personnel safety
- Automatic source-transfer capability for optimum reliability
- Modular construction that would accommodate provisions to add switches and fault interrupters as the multi-year expansion project progressed
- The ability to remove and replace individual switches/fault interrupters without the need to remove the entire switchgear assembly
- A “green” solution that did not use oil or gas for insulation or current interruption
- No requirement to de-rate for altitude
- Dead-front, fully sealed and submersible construction
- Simple, self-powered overcurrent controls

Solution
Using expertise gained in molding EPDM rubber into medium- and high-voltage cable accessories since the early 1960s, Elastimold introduced the industry’s first medium-voltage, solid-dielectric, load interrupter switch (MVS) in 1996. This was followed by the first medium-voltage, solid-dielectric, fault interrupter (MVI) introduced in 2000.

Since then, the Elastimold™ switchgear product line has been expanded to offer numerous multiway configurations, including the single- and double-side access padmount versions selected for this application. The gear is available with voltage ratings of 15, 27 and 38 kV and standard short circuit rating of 12.5 kA symmetrical (higher ratings available).

Elastimold modular padmount switchgear fits the bill for facility expansion.



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02 MVI with Tru-Break switchgear module

The Elastimold switchgear provides many features and benefits including:

- The Elastimold Tru-Break™ switchgear module provides clear visual verification of circuit isolation, offering an added level of safety to operating personnel.
- Fully integrated automatic source-transfer system using an SEL* 451 control, helping to provide very high levels of reliability by continuously monitoring preferred and alternate electrical sources and initiating a transfer upon loss of the active source.
- Offering an opportunity to defer capital expenditures, the switchgear can be configured with blank bus-tap positions to allow for the future installation of switches and/or fault interrupters without the need for factory field service technicians.
- Switches and interrupters are easily removed and installed in the field in the unlikely event of failure of an individual component.
- Molded EPDM rubber insulation with vacuum interrupters that do not use any oil or gas and, therefore, do not require monitoring of gas pressure or oil level or any special consideration for disposal at end of life.
- The Elastimold switchgear design is dead-front, shielded, sealed and does not use air for insulation, thus requires no de-rating for altitude.
- The Elastimold internal, self-powered electronic overcurrent controls are field programmable, allowing protection curve selection from a library of standard relay and fuse curves. Since the MVI is resettable, there is no need to stock replacement fuses.

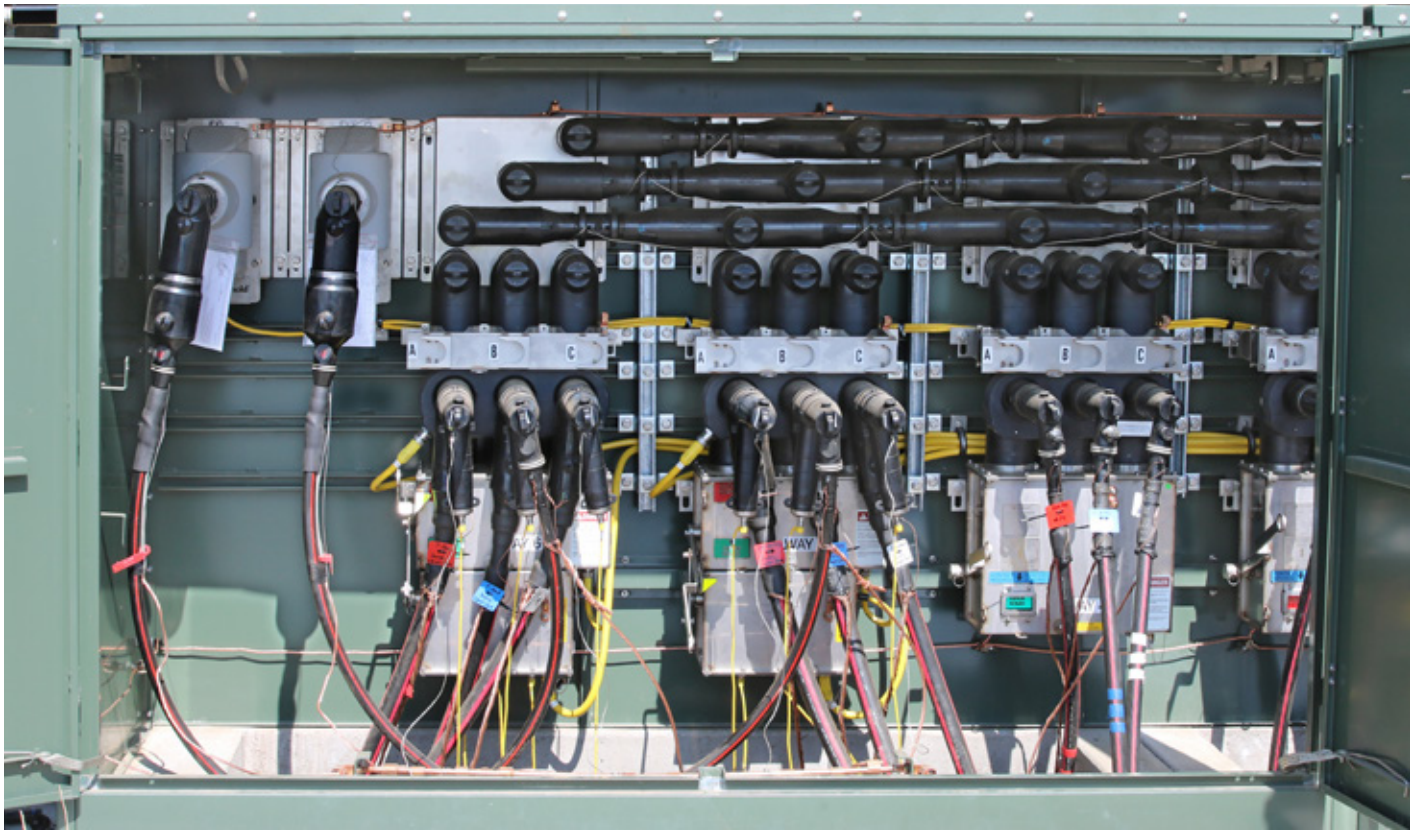
The Elastimold switchgear appeared to satisfy most, if not all, of YVEA's stated requirements and desires, and so the utility collaborated with the ABB Installation Products sales agent, inside and outside application engineering and product management team to identify and structure the specific configurations for their application.

After much consultation and discussion, the following 15 kV class, 12.5 kA symmetrical short circuit rated switchgear assemblies were configured:

Switchgear no. 1

- Ways 1 and 2 — 3-phase MVI with Elastimold internal control, 600 A interfaces and Tru-Break switchgear module.
- Ways 3 and 4 — 3-phase MVI with Elastimold internal control and 200 A interfaces.
- Ways 5 and 6 — Automatic source-transfer system with (2) 3-phase MVS with SEL 451 control, 12–24 V DC motor operators, (6) 1000:1 CTs, (6) voltage sensors and (2) control power PTs (one connected to each source).

*SEL is a trademark of Schweitzer Engineering Laboratories, Inc.



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03 Motor-operated source-ways and solid-dielectric PTs

Switchgear no. 2
- Ways 1 and 3 — 3-phase MVI with Elastimold internal control, 600 A interfaces and Tru-Break switchgear module.
- Ways 2, 4 and 6 — Bus tap only for future installation of single- or 3-phase switch/interrupter, 600 A interfaces.
- Way 5 — 3-phase MVS with 120 V AC motor and motor control, 600 A interfaces.

Switchgear no. 3
- Ways 1 and 3 — 3-phase MVI with Elastimold internal control, 600 A interfaces and Tru-Break switchgear module.
- Ways 2 and 6 — Bus tap only for future installation of single- or 3-phase switch/interrupter, 600 A interfaces.
- Way 4 — 3-phase MVI with Elastimold internal control and 200 A interfaces.
- Way 5 — 3-phase MVS with 120 V AC motor and motor control, 600 A interfaces.

Switchgear no. 4
- Ways 1 and 2 — Automatic source-transfer system with (2) 3-phase MVS with SEL 451 control, 12–24 V DC motor operators, (6) 1000:1 CTs, (6) voltage sensors and (2) control power PTs (one connected to each source).
- Way 3 — Bus tap with 600 A interfaces.

Switchgear no.5
- Way 1 — Bus tap only for future installation of single- or 3-phase switch/interrupter, 600 A interfaces.
- Ways 2–5 — 3-phase MVI with Elastimold internal control and 200 A interfaces.
- Way 7 — Bus tap only with 600 A interfaces.

Outcome

The assembled and tested switchgear assemblies were provided from the Elastimold manufacturing facility in Hackettstown, New Jersey, and were installed, tested and placed into service within the utility's established deadline.

In addition to the required basic functionality of the gear to provide electrical service to the expanded facility, YVEA and their customer benefit from Elastimold switchgear's field-proven EPDM molded rubber insulation and vacuum switching and interruption technologies.

The switches and interrupters provide a dead-front, fully sealed and submersible solution that does not rely on oil, gas or air for insulation or interruption, resulting in long-life, maintenance-free operation.

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