

LOGAN CITY LIGHT AND POWER

CHALLENGE

Reconfigure a substation into a ring bus design with fittings to accommodate a new transformer, replace copper bus and complete the installation within 60 days.

SOLUTION

Install the ring bus substation design using AFL's Swage Aluminum Bus Accessories which install in minutes rather than hours, do not require the use of a welder and can be installed in inclement weather—even sub-zero temperatures—thus preventing costly installation shutdowns.

RESULTS

Reconstructed the substation, installed the new transformer and connected all the fittings in 28 days.

Increased the capacity from 20 to 40 MVA to manage the power load in the substation area for 40 to 50 years.

Created opportunity to upgrade other substations in area by allowing offloading power to this substation.

► CHALLENGE

Logan City, Utah, is located about 82 miles north of Salt Lake City with nearly 50,000 residents plus 28,800 students attending Utah State University. A locally-owned public utility, Logan City Light and Power (LCL&P) has one of the lowest system interruption rates in the western states. With nine linemen and four substation technicians, LCL&P performs all their own transmission and substation design, construction, installation and maintains their entire electric utility system in-house.

LCL&P has six distribution substations and one transmission substation. One of their distribution substations had two power transformers inside the lattice structure that were going bad—one actually tested bad and was starting to fail and the other transformer was considerably old. In early 2014, LCL&P bid out for a new transformer which takes about a year to build and deliver. It was scheduled for delivery in January 2015.

The new transformer would not fit into the area where the old transformers were located. LCL&P completely redesigned the substation configuration in-house and created a ring bus design to accommodate the new transformer. The team determined

which fittings were required and the angles needed to support the new design which featured a 4-inch bus on the 12.47 kV distribution side and 2-inch bus on the 46 kV transmission side.

LCL&P faced two big challenges—timing in taking it off-line and putting it back on-line. This substation had to be off-line and the power offloaded to another substation while work began on the upgrade. So there was a tight window of 60 days in which to complete the work and get the substation back on-line. They needed a solution that allowed them to quickly construct the ring bus design to install the new transformer.

Many utilities face the issue of copper theft and Logan City Light and Power was no exception. While constructing another substation two years ago, thieves stole \$25,000 worth of copper wire. A solution was needed to prevent this problem in the future. Removing the visible temptation stops copper theft.



► SOLUTION

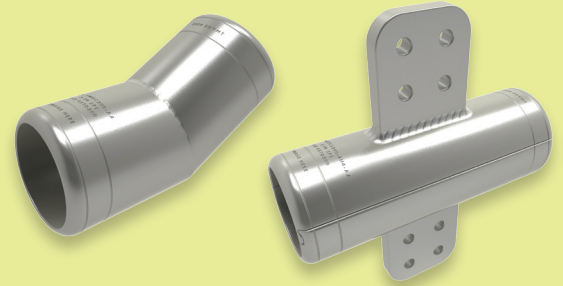
LCL&P bid out the substation fittings to Graybar, a distributor of high quality electrical, communications and data networking products. Also an authorized distributor of AFL products, Graybar specified AFL's aluminum bolted bus pipes, welded fittings, and a complete line of Swage bus accessories including terminal taps, expansion terminals, couplers, external end caps, elbows and tee connectors. AFL is the only manufacturer that can supply all types of substation fittings with competitive pricing and excellent delivery.

Ranging from 230 kV to 500 kV, AFL's Swage Bus Accessories use a compression technology process called "swaging" that enables installation of aluminum bus accessories without the need of a welder. These Swage products allow an electric utility to install the accessories faster and more efficiently with lower installation costs over the welding process. Since installation is complete in minutes rather than hours, Swage products can be installed in inclement weather—even sub-zero temperatures—thus preventing costly installation shutdowns.

LCL&P installed all of the Swage Bus terminal taps, expansion terminals, couplers, external end caps, elbows and tee connectors. AFL designed these accessories to carry the full current of the bus pipe using Swage Technology. Integral to

AFL COMPONENTS USED:

- ▶ Bolted Bus Pipes
- ▶ Swage Bus Taps, Couplers, External End Caps, Elbows and Tees
- ▶ Welded fittings
- ▶ Swage Press Assembly, Press Head and Dies



the bus pipes but don't carry full current, end caps minimize electrostatic losses and prevent nesting of birds; bus supports connect bus bar to insulators on 3-inch, 5-inch and 7-inch bolt circles. Some Bus Supports use Swage Technology for installation while others are bolted.

To make the compression possible, AFL's solution features its Swage 65 Ton Press Assembly, a portable construction and maintenance tool designed to Swage bus accessories onto a bus pipe. The power unit works with one to four inch head assemblies and features interchangeable press heads and dies.

▶ RESULT

Logan City Light and Power beat their 60-day deadline window and reconstructed the substation, installed the new transformer and connected all the bolted fittings and Swage Bus accessories in 28 days. In all, LCL&P removed all old copper bus at the substation and replaced it with four-inch aluminum bus fittings within the lattice structure and the new ring bus.

With an increased capacity from 20 MVA to 40 MVA, LCL&P doubled the size of the new transformer which allows them to manage the power load in that substation area for 40 to 50 years. Additionally, this higher-capacity substation will allow LCL&P to upgrade other substations and offload their power to this one. LCL&P has a summer peak of 97 MW of power demand with a hydro-power generation facility in the canyon, a small solar generation site on the west side of Logan City, 15 MW of gas-powered back-up generator and other allocations of power they pull off the grid.

"All of the Swage parts fit together perfectly and we 'swaged' everything in just four days. Each time we made a crimp, the bus would become more rigid, it went fast without any problems. AFL's Swage products made it simple for us to do the work."

– Stephen Crosby, Distribution Manager
Logan City Light and Power



▶ ABOUT AFL

AFL is an industry-leading provider of products and services to the electric utility, broadband, communications, enterprise and factory markets as well as the emerging markets of oil and gas, mining, nuclear, avionics, renewables and transportation. The company's diverse product portfolio includes fiber optic cable, transmission and substation accessories, outside plant equipment, connectors, fusion splicers, test equipment and training. AFL's service portfolio includes market-leading positions with the foremost communications companies supporting inside plant central office, EF&I, outside plant, enterprise and wireless areas.

Founded in 1984, AFL is proud to offer engineering expertise, exceptional products and reliable service that help our customers improve their critical and electrical infrastructure. AFL has operations in the U.S., Mexico, Canada, Europe, Asia and Australia. The company is headquartered in Spartanburg, SC and is a wholly owned subsidiary of Fujikura Ltd. of Japan. For more information, visit www.AFLglobal.com.