



Kerite Completes Winter Installations of Underground Project On Time, On Budget, To Required Spec

Circuits Bring Power from Newly Constructed Substations to Expanding Oil Industry

The oil industry in northern Colorado has found some room to grow. As a result of that, refineries and processing plants are requiring a great deal of electricity to refine crude oil into usable products such as gasoline, diesel, heating oil and kerosene. To help meet this demand, electric utilities in the area are dramatically expanding their generation, transmission and distribution networks.

To power a new oil refinery recently built in Fort Lupton, and to facilitate the expansion of the oil industry in northern Colorado, area utility United Power Inc. had to construct two new substations that will augment the area's electrical transmission and distribution system. In working through the planning and design of the DelCamino and Davis substations, United Power identified the close proximity of the locations to an existing network of overhead distribution lines and 230 kV transmission lines. It was determined that installation of underground high-voltage transmission cable was the only way to extend circuits from the substations to the riser poles located off-site.

However, the team at United Power had never installed 69kV underground transmission lines and needed to find subcontractors that were extremely experienced with the process. So the utility turned to Anderson & Wood Construction Company and Kerite, because of their collective experience providing turnkey 46 to 138 kV cable solutions, particularly involving congested substation and underground applications.

As the challenging Colorado winter closed in, United Power worked quickly to install riser poles and underground duct banks needed for both substation installations. Then Anderson & Wood and Kerite took over.

Kerite brought to both installations the proven, high-quality 69 kV cable needed for the installation. This was the first time United Power had ever purchased cable directly from Kerite, previously working only through the company's network of distributors. The combined projects required almost 14,000 feet of 69 kV cable, and Kerite offered a cost- and time-saving advantage over other cable suppliers.

Both the DelCamino and Davis projects involved installation of single-conductor 69 kV solid dielectric power cable, 69 kV terminations, lightning arresters, ground continuity conductors, cable sheath bonding accessories, cable supports, clamps and other cable

accessories to make complete working underground 69 kV cable circuits. Kerite and Anderson & Wood worked together to complete all remaining aspects of the installation, from the cable pull to final testing.

Work on the DelCamino substation began as the chill winds and foul weather of the Colorado winter set in, with pull-through activities starting on December 15 and testing ending just one week later. On this project, the team's job was to pull a single electrical circuit made up of three cables through three underground (six-inch schedule 40 PVC conduit mated to five-inch high-density polyethylene pipe) duct banks and complete the substation and exit riser pole installations.

Using an aerial man-lift, the Kerite/Anderson & Wood crews drew the cable up a 55-foot riser pole located outside the substation and installed three terminations on the riser pole. The team then moved inside the substation to pull the cable up the riser structure and install six G&W 69 kV terminations, and all required grounding equipment. The team also performed final acceptance testing on behalf of United Power.

The Davis substation project was three times the size of DelCamino, involved three times as many terminations, had an extremely tight timeline and happened in the heart of February, the coldest and stormiest month in the Rocky Mountain region. The Davis installation began on February 3, 2015, and was completed on February 20, taking just 18 days to complete. This larger, more complex installation involved pulling three circuits consisting of nine cables through nine direct-buried underground duct banks made of the same materials as those at the DelCamino substation. There were three exits for the circuits on the Davis project: one located at the South Feeder and two located at the North Feeder – Feeders 1 and 2.



Having completed the underground cable pull, the Kerite and Anderson & Wood crews pulled the cable used for the first circuit that would exit at the South Feeder from ground level to the top of the riser structure inside the substation. The same process was repeated inside the substation for the two circuits that would exit at North Feeders 1 and 2. To complete the three circuits inside the substation, the team installed a total of 18 G&W, 69 kV terminations.

The crew continued the installation by pulling the cable up the three exit riser poles located at the South and North Feeders. The South Feeder pole required installation of three terminations, while the two North Feeder poles required a total of six terminations, installed concurrently.

Weather conditions were more extreme during the February project, and storms required crews to hang splice tents in order to finish installing terminations to meet the tight project deadline. Once installations were completed, the Kerite and Anderson & Wood crews installed all shield grounding equipment and performed final acceptance testing on behalf of United Power.

All work was completed as promised, on time and on budget, despite the frigid temperatures and stormy conditions.

“We’re very happy with the work that the Kerite team did for us on this project,” said Don McDaniel, general manager of transmission for United Power. “Their experience with complex underground installations like these facilitated the installations and allowed them to complete the projects on time and on budget, even when the weather didn’t cooperate.”

“Combined, these two projects were pretty complex because of the number of terminations that needed to be installed: 24 between the two of them,” continued McDaniel. “This feat is challenging in the warmer months and absolutely superhuman in the middle of winter; it was quite an accomplishment.”

