

**CATEGORY: Best Building Project – Specialty Contractor (\$6 - \$10 Million)**

**PROJECT NAME: University of Colorado Boulder Campus Utility System Upgrade**

**CONTRACTOR: Ludvik Electric Co., Nate Otterson – 303-781-9601**

The University of Colorado Boulder has long been a leader in both building efficiencies and aesthetics. This is accomplished by implementing strict design, campus standard along with numerous guidelines to insure that all new greenfield and remodel projects are constructed in a manner that optimizes the performance, while maintaining the architectural presence of this prestigious institution. Beginning in 2002, the owner understood the growth potential of the school, along with the subsequent demand on its aging facilities, and initiated a plan to expand its electrical and mechanical infrastructure to accommodate the expansion of the campus. With the construction of several new buildings, along with many more on the horizon, it was time to implement this upgrade beginning in 2012.

The Design Team of Lutz, Daily and Brain based out of Kansas City, MO teamed up with RMH Group out of Denver to perform the Electrical design on the project. JE Dunn Construction was chosen as the General Contractor for the project and after an intense selection process, Ludvik Electric was awarded the contract to perform the electrical installation.

The entire upgrade consisted of the remodel of a 105 year old plant on campus known as the West District Energy Plant (WDEP) and a new state-of-the-art 72,000 square foot facility known as the East District Energy Plant (EDEP). The scope of work consisted of a wide range of installations that included 13.8kV electrical distribution to Low Voltage controls, and accordingly Ludvik Electric was called to action as the “complete package” Contractor of choice.

The WDEP set forth with its own challenges immediately. With electrical equipment dating over 70 years old and a congested plant with numerous systems operating at full capacity, many precautions were required to be made in order to maintain the operational integrity of the plant. The first step was a detailed and systematic demolition process. With two antiquated Chillers scheduled to be removed and replaced with state of the art, high efficiency Chillers, an intense coordination effort amongst all trades took place throughout construction. This included the

removal of existing systems from overhead, removing the existing structure (the roof sections alone were removed eight times), adding additional structure, moving the two new Chillers into place and reinstalling everything. All of this had to take place with a large portion of the plant staying operational to serve the campus! To make this successful, Ludvik moved ahead simultaneously during this demo process by adding two new 13.8kV – 280/277V 1500 KVA transformers feeding two new 2000A Switchboards to provide power for the new Chillers. With a plant yard that has been operational and expanded numerous times throughout the years, finding space to fit this equipment required old equipment to be removed and re-installed along with finding innovative ways to transport the equipment into place horizontally since overhead was not an option. With the transformers weighing approximately 11,000 lbs, and sized at 6ft x 5ft and the Switchboards weighing approximately 2,400 lbs and sized at 6ft x 4ft, Ludvik's challenge was to not only find exact locations for this equipment, but to obtain the clearances for this equipment according to the National Electric Code. Once the gear was set, power had to be energized from existing switches within the facility dating over 70 years. Needless to say, given the operational plant/campus constraints, an intense Method of Procedure (MOP) effort was necessary not only by Ludvik Electric, but by the entire team to perform this tie-in over numerous shutdowns to insure the campus systems were not interrupted. Creative shift and after hours shutdowns took place to make this happen. When all was completed, the old Chillers were removed and the new Chillers were powered up without any disruptions to the campus. After the new gear was in place and operational, because of the tight schedule and power to existing equipment, additional shutdowns were scheduled and planned to transfer existing loads from existing equipment over to the new boards. Also taking place during this scheduling endeavor, was the removal and replacement of two MCC boards in the basement of the facility.

In parallel with this work, the team began construction on the new EDEP project. Because of the vast size of the campus and the need for redundant 13.8kV power fed from two different Boulder Substations, Ludvik coordinated and installed over 1,500' of new electrical ductbank along with temporarily switching over existing facilities to tie into the existing 13.8kV campus loop system. Numerous facilities were coordinated to switch over to the "B" loop while Ludvik removed a section of the "A" loop and tied the EDEP into that loop. It was not only critical to perform this work safely and in a timely manner, but because of the criticality of keeping the campus operational and "backed up" with both loops, the work needed to be performed expeditiously.

Due to access around campus being limited and student traffic daily, numerous safety precautions were implemented while manholes were installed and the new feeds were tied in. Two new Vista transfer switches were installed at the EDEP to allow for the feeds to be tied in and the loop to be reconnected and operational until the EDEP plant was complete.

Concurrent with this campus work was the communications tie-in to the campus-wide system. The team coordinated with campus activities and campus parking to perform numerous road closures and ensure that the campus remained operational and without disruptions to the day to day activities.

The EDEP is a new state-of-the-art distribution plant containing additional administration locations for campus employees, 2 new 1300 HP 4.16KV Chillers, 2 new Boilers, and a large Cooling Tower located on the roof all fed with redundant 4.16KV Transformers, paralleling 4160V switchgear and four separate 480V Switchboards. With this plant also being designed for future expansion, the team worked together on a coordinated 3D BIM model to not only insure installed systems were coordinated, but also that there was adequate space throughout to not only remove and replace existing gear in the instance of failure, but to allow for the future equipment to be transported into the facility and be installed safely without the existing equipment being disturbed. If only they would have thought of that 80 years ago at the WDEP!

The controls to all of the equipment in both plants was also performed by Ludvik. With portions of the team located throughout North America, an intense coordination took place for implementation of over 1,200 control points throughout both plants. Ludvik worked tirelessly with all other Subcontractors onsite along with the Owner and Design team to not only assist with the completion of this system but to start up and test the equipment to meet the demands that CU expects of their campus systems. This includes monitoring of all valves, motors, mechanical equipment, electrical switchgear, UPS systems along with tying it in with the WDEP so both plants can be monitored from the new Central Command Center located within the EDEP Administration space.

With the scope of work ranging from 13.8kV to controls coupled with the operational status of the plants, it was necessary for Ludvik Electric to implement a detailed Method of Procedure (MOP) process throughout construction. Our Electricians are not only factory trained and

certified to perform the various scopes of work specific to the equipment and materials utilized on the project, but are trained in all facets of electrical installations which resulted in our ability to service the ever evolving needs of the project while maintaining a high level of safety awareness. Daily Pre-Task plans were tied into the MOP and Scheduling process to insure that all workers were aware of the risks around them and trained to execute them with precision. With Ludvik's onsite management team, Corporate Safety Director, and Corporate Safety Culture 75,000 man hours of work was performed without a lost time incident!

With the remodel of the "new" WDEP along with the EDEP building, Colorado Universities campus utilities system is not only prepared for the expansion ahead, but is now equipped with a new facility (EDEP) that is designed to not only serve the current campus, but all campus expansions planned into the future. This project was truly a one of a kind experience for all that were part of the team! With the efficiencies of the new facilities, this project is pursuing LEED Gold certification and will be a model of efficiency for buildings of this capacity moving forward in the future!









