

Category 2. Meeting the challenge of a difficult job – Specialty Contractor

Specialty Contractor: Sturgeon Electric Company, Inc.

Project Name: Climax Mine Property Discharge Water Treatment Plant

After having heard that their boots would need to be outfitted with tracking beacons in order for search & rescue teams to respond in the event of an avalanche, the crews would hug their loved ones a little tighter than usual before heading back up to Bartlett Mountain for an honest week's work. As for the estimating and management teams who were located comfortably away from the threat of an icy landslide, they would not see the project executed without enduring their own share of worries.

Difficult mountainous terrain. Frequent blizzard conditions. Remote, scarce accessibility. Even veteran estimators would be unsettled about calculating the true risk of such project attributes. Add to this a limited footprint for staging material, safety hazards inherent to working in a 100-year-old mine, and executing work under the scrutiny of frequent MSHA audits. Now you have a project that would dissuade many successful contractors from even pursuing the project. Finally, place the project atop the Continental Divide at an elevation of 10,300 feet, and add the threat of winter avalanche. Now, we're describing the challenging project known as the Property Discharge Water Treatment Plant (PDWTP) at Climax Mine in Lake County, Colorado.

Having been no stranger to difficult projects since its doors opened in 1912, the people of Sturgeon Electric Company understand that such challenges can be overcome with the right teams executing the right processes. These include a safety culture supported by company-wide buy-in, and making the most out of modern technological tools and applications. Emphasizing a primary initiative to deliver value to the customer and respecting the value of relationships, Sturgeon Electric strives to stand out as an industry leader in the modern age of electrical construction. With such principles at the core of the organization, Sturgeon Electric was able to pursue the two-year, PDWTP project with confidence. Upon being awarded the electrical subcontract from Moltz Construction, the 100-year-old electrical company began to help re-shape the future of the 100-year-old mine.

When prospectors seeking silver on Bartlett Mountain braved the cold and rough terrain during the great Silver Boom of the 1870's, instead of silver, they found a whitish-gray material that was, at the time, considered useless. Descending the mountain in disappointment, it would be almost two decades until a sudden worldwide demand for the prospectors' findings would thrust the local economy into high gear. Around the First World War, metallurgists discovered that adding molybdenum to steel imparted extra hardness and durability, while adding resistance to corrosion and high temperatures. After engineers discovered that the entire southwest side of Bartlett Mountain was rich in molybdenum ore, Climax Mine soon went roaring into production. Demand for the product peaked during World War I, when the US Army realized that the Germans were using it to increase the durability of their weapons and tanks. At one time boasting as the largest molybdenum mine on earth, almost 2 billion pounds of the material have been extracted to date. A sharp decline in the material's prices caused the mine to cease operations in 1995. It would be another 17 years until operations would resume in 2012, after an ambitious startup and environmental cleanup effort. Presently, the mine's life projection is estimated at just over 20 years, at current mining rates of 90,000 tons per day. As the operations team at Climax looks to the future, they are challenged by increasingly stringent environmental regulations. However, by implementing the addition of the Property Discharge Water Treatment Plant, they are empowered to meet or exceed the expectations and regulations currently before them. Sturgeon Electric played a key role in delivering this successful product to the customer. The industrial-scale, design-build project consisted of a new multi-building complex, housing components of a system designed to reduce or eliminate water contamination which can occur during the mining process. One of the main structures added is the Metals Process Building. This 30,000 square feet, 72 feet high building houses process tanks, equipment, and much of the water treatment infrastructure, also serving as year-round Operations & Maintenance facility. The Metals Filter Building houses massive sand filters and associated tanks and sumps, and occupies 28,000 square feet with a height of 45 feet. The Events Pond, which serves as the final site to capture overflows and off-specification water, will prevent unwanted discharges to Tenmile Creek. Able to treat as much as 14,000 gallons per minute, this new contamination management system provides an improved level of protection to Colorado residents and wildlife in the area, and affirms the mine's commitment to environmental responsibility.

The journey for Sturgeon Electric towards completion of the PDWTP project was a path with many unique obstacles. Crews quickly learned to adapt to the problems of wind and snowfall in the area after the first weekend snowstorm. So much snow fell between the end of the shift on Friday and the beginning of the shift on Monday that all of the equipment and material in the laydown yard seemed to have literally disappeared. As this created inefficiency and safety concerns, crews took to a meticulous system of material placement, snow-proof marking methods, and even mapping out the locations of materials and equipment in order to quickly locate and recover them. These processes greatly reduced the amount of labor required to continually move the snow in order to keep tabs on the material. Enough snow fell during the winter of 2012-2013 to cause an avalanche on February 14 at the Tucker Iron Mask slope. Although the avalanche turned over some heavy equipment and destroyed the incoming temporary overhead electrical lines, it occurred off-hours and thankfully no one was injured.

Confronting the imposing safety hazards, Sturgeon's field leaders actively engaged our crews in worksite analysis, detailed fall-hazard prevention and control due to installing cable tray nearly 70 feet in the air, and specialized safety and health training (including MSHA 32 certifications). Though it would seem impossible to have endured such conditions without a slip/trip/fall accident, Sturgeon Electric's crews were able to carry out the project without a single incident, and without sacrificing a day of scheduled work due to inclement weather.

As the first mobile workforce in Colorado to be awarded Star Status in the Voluntary Protection Program (governed by OSHA), Sturgeon's employees have become adept at engaging in best work practices and actively seeking ways to do things more safely, regardless of the task. Proof of this buy-in is evident in the fact that MSHA (a more demanding safety inspection entity than OSHA) initiated four separate safety compliance audits of Sturgeon Electric on the PDWTP project, without report of a single infraction.

The PDWTP project had a limited footprint for which to stage tools and equipment, so supervisors implemented a process that would allow for scheduled removal of tools and equipment in order to free up space and avoid unnecessary re-handling of excess tools and materials. This was accomplished by implementing detailed 3-week "look-ahead" schedules and coordinating with other trades as often as possible.

From the design standpoint, Sturgeon Electric was able to provide a significant savings to the owner by revising the design of the electrical lines passing through a 300-foot tunnel which extend below the two clarifiers. By switching the feeders from conduit installation to cable tray, significant installation time was reduced, and congested conditions within the tunnel were improved. Leaning on value-driven principles, Sturgeon was able to provide savings for the customer.

From the design phase through commissioning and start-up, the Sturgeon Electric team took advantage of modern electronic construction tools in order to deliver the project at optimal efficiency. Utilizing applications on the iPad, the team was able to shortcut inefficiencies that were commonplace only five years ago. Using a collaborative construction management application (BIM360), Sturgeon crews were able to document safety reports, track issues and execute the QAQC process while minimizing punch items. Keeping drawings in the GoodReader application, foremen were able to snapshot items for quick RFI's, and annotate redlines in real time. This eliminated the old, wasteful process of exchanging documents and information by hand between the field and the office trailers. As a result, additional value and cost savings were passed down to the customer.

Sturgeon Electric was proud to have partnered with Moltz Construction in delivering the PDWTP project successfully: Sturgeon worked nearly 62,000 man hours (spanning two years) without incident, zero snow days, and met schedule amidst multiple electrical revisions. Additionally, Sturgeon passed four MSHA inspections without citation and implemented creative work practices in order to create a safe work place. Sturgeon Electric believes this project merits consideration for the *AGC ACE Award - Meeting the challenge of a difficult job – Specialty Contractor*.











