CVEA Plant Operators Reduce Costs On Reactor Foundation Repair

The CVEA Reactor at the Pump Station 11 Substation leaning from permafrost shifting its foundation.
Photo by Jimmy McDougald

For years CVEA has been battling permafrost issues on the distribution system, on the transmission line and, in this case, a reactor located at the Pump Station 11 Substation near Glennallen.

The reactor is a massive and very important asset to CVEA, weighing in at 69,300 pounds and responsible for balancing out reactive and capacitive load flows to maintain a stable system. Think of CVEA's overall system acting like a scale. When one side of the scale is more weighted, to get it to balance, you have to add more weight to the opposite side. CVEA's reactor functions in a similar fashion by adding reactive load to counteract the large capacitive load already inherent in the system. This keeps it in balance and allows for CVEA's generators to maintain a stable system voltage.

The reactor sits on a foundation made of pilings in the ground. Permafrost is moving these pilings and causing a problem. The foundation has shifted, causing the reactor to lean. Leaning is bad for mechanical equipment. If the reactor leaned enough, insulating oil inside could shift exposing internal working parts and causing extensive damage like overheating, arcs and possibly even an electrical breakdown.

This problem needed to be fixed and CVEA was looking for a permanent repair that would require only occasional maintenance. $150,000 was set aside in the 2010 budget for diagnosing the problem, engineering a solution, and hiring a contractor to perform the work.

CVEA worked with Keystone Engineering, out of Valdez, to come up with a cost effective solution to the problem. After careful consideration by Jimmy McDougald, CVEA Line Superintendent, and consultation with, Dan Dempsey, CVEA Chief Plant Operator of the diesel plants, and Mike Rego, CVEA Plant Operator, they determined that the CVEA Operators have the special skills required to do the work on the reactor themselves.

The plan was basically to install an adjustable, bolted connection between the top of the pilings, located underneath the reactor, and the reactor frame, allowing for spacer plates to be added that would level the reactor. This will also allow for additional spacer plates to be added or taken away from the bolted connection easily in the future, keeping the reactor level if more shifting occurs.

Dan and Mike set to work on the reactor, a difficult project due to the sheer weight of the asset. Several days later, they completed the project, and by using their knowledge and skills allowed CVEA to complete the project in-house for a fraction of the budgeted amount.

According to Jimmy, "CVEA is very happy to have completed this necessary repair safely and efficiently, utilizing the mechanical abilities and welding skills of our own plant guys. They handled the project like experts and did an excellent job of reducing project costs, thus saving the cooperative money." ■

Top Left: Using heavy duty jacks to jack up the reactor. Above: Dan Dempsey, Chief Plant Operator for the diesel plants, working on the underside of the reactor. Top Right: Completed Reactor Repair Project. Bottom Right: Plant Operator, Mike Rego, welding one of the components of the structure.
Photos by Jimmy McDougald