



High voltage, underground solution at its best

Located in Miamisburg, OH, 12 miles south of the city of Dayton, the Dayton-Wright Brothers Airport is a mid-sized airport that primarily serves personal and corporate aircraft. It also serves as a reliever airport for Dayton International. When it was originally developed and built in the early 1950s, the runway and taxiway were built over the top of an underground cable circuit: circuit #13805.

Due to increased demand in the area and, quite simply, the age of the existing cable, Dayton Power & Light (DPL) needed to improve the circuit and enhance electrical service to the growing suburbs and local area businesses. Given the airport and the obvious restrictions on an overhead cable solution, the only reasonable path to take was to replace the existing, aging circuit with another underground solution.

Not necessarily the easy way

As much as replacing the existing underground circuit was deemed by DPL engineers as the way to go, this path was not without an array of challenges that DPL and its chosen solution provider would have to address and overcome.

DPL put out bids to new and existing suppliers and, given the complexity of the job, it was looking to have the project managed by a strong partner. Having had a good track record in working with Kerite Cable Services (KCS) in the past, DPL was interested in the total turnkey solution that Kerite was able to bring to the table for this high voltage, underground project.

Another key selling point for Kerite was the length of cable that DPL needed. At 2,150 circuit feet of 138kV, 2000 kcmil – well below the industry norms of 5,000+ feet for high voltage cable – DPL would have to spend a significant amount of money for excess cable that it

wouldn't use had it gone with a different supplier. With the KCS solution on the table, Kerite manufactured the exact cable length that DPL needed, which gave DPL a single-source solution and significant cost savings. To handle the excavation work on the ground, and given the complexities of the project, Kerite needed to work with someone it could trust. So it brought in an experienced partner, with whom it had worked on a number of other projects – Anderson & Wood Construction Company, a national utility contractor.

Out with the old; in with the new

The first step in the project was to remove the existing circuit, which consisted of a high-pressure, oil-filled 8" duct/pipe and three 1250 kcmil copper cables. Proper remediation techniques had to be implemented to minimize any impact on the environment and the surrounding watershed. The oil and oil reservoirs had to be pumped and transported to a waste disposal

facility, and the cable, piping, valves/devices, gas charging system, potheads and lightning arresters all had to be disposed of properly. The duct was then capped, to be available by DPL for future use.

Kerite and Anderson & Wood engineers then had to determine the ideal solution for running the circuit under the runway. One of the options considered was directional drilling, but the possibility of compromising the long-term integrity of the runway was a real concern. They ultimately chose a Jack and Bore trenchless system. Working from the bore pit (50' x 30' x 10') for running the boring machine, the 24" Jack and Bore with steel casing was dug under the runway, approximately 560 feet, and then again under the taxiway, another 140 feet. Once the bores were completed, 700 feet of conduit – consisting of four (4) 6" Schedule 40 PVC and one (1) 2" Schedule 40 PVC – was worked into the casing pipe of both bores.

On either end of the runway bore and the taxiway bore, directional trenches for the concrete duct banks were being dug – at both the east and west ends of the circuit as well as in-between the taxiway and runway. Digging and excavation were made that much more complicated by the amount of standing water due to heavy rains previous to and during the project. The swampy soil was saturated and the water levels very high, requiring trench boxes to ensure the safety of the workers, and ongoing pumping and removal of water throughout the project.

When the trenches were dug and the ducts put in place on either end of the bores, the conduits coming out of the 24" casing were then mated up to the standard duct bank. Once connected and secure, the entire duct bank was then encased in 3,000 psi concrete, and the conduits were proofed before the cable was pulled into the completed duct bank.

The cable reel, arriving in Miamisburg from the Kerite plant in Seymour, CT, required a 400-ton crane to lift it off the truck and to place it in to the substation, due to reel weight (27,000 pounds) and an extended pick-and-set distance. The attention to detail throughout



the excavation and installation process, with the teams working together to overcome obstacles and address any issues that came up, provided a cable pull with minimal tensions, resulting in a very successful and relatively easy pull process.

To tap off the project, KCS technicians installed six G&W PAT-140 wet-style polymer terminations – three within the east end substation and three within the west end substation. As part of the final termination process, KCS had to install fiber optic splice boxes for the fiber tubes within the cable. The fiber optics will be used for future temperature monitoring of the system, to feed back to DPL to ensure system efficiency and effectiveness long term.

As a final step in delivering a comprehensive solution to the customer, KCS implemented final acceptance testing on site, with a Hi-Potential DC Test @ 240kV. The cables easily passed the final test, the system was energized, and it is a circuit DPL customers can rely on for years to come.

Additional Challenges

Another layer of complexity that the Kerite and Anderson & Wood teams had to contend with was a natural gas main, one of the primary sources of natural gas to Ohio. Since the natural gas main intersected with the cable circuit just east of the runway, the team pulled permits to bore three feet under the 18", high-pressure gas line.

Over the course of the project, DPL, Kerite, and Anderson & Wood teams had to obtain daily clearance with airport security. Additionally, all equipment and construction crews had to maintain strict distance requirements to adhere to airport protocol. A 250-foot Runway Object Free Area (ROFA) had to be maintained at all times, to ensure the safety of the teams on the ground. They were also in constant communication with airport personnel, as the airport was open 24/7, and it did not shut down at any time during the installation project.

