Replacing poles in rugged terrain

Late last year, North Island Energy distributor Powerco initiated a maintenance project on its 66kV lines that provide electricity to the popular Coromandel Peninsula.

As part of this, Powerco awarded Electrix the contract for the replacement of poles along the 40km line between Kopu and Coroglen. A straight forward project until one gains an understanding of the terrain involved. "The physical constraints were immense," explains Electrix Project Manager Mark Vincent. "The territory is basically straight up and down, largely inaccessible and a number of areas were solid rock." In addition much of the land was owned by the Department of Conservation and access tracks were virtually non-existent, requiring sensitive vegetation clearance.

Helicopters were therefore invaluable for the transport of crew and equipment. Mark says that a new K-Max helicopter with a lifting capacity of up to 2.8 tonnes and ultra-quiet operation proved itself on this project. However, due to stringent environmental constraints, large machinery or drilling rigs were not permissible on several sites. In those instances, the crew had to resort to shovels and small kango hammers to dig the 3-metre deep foundations – a physically extremely demanding exercise for the men involved.

The Electrix team went to great lengths to accommodate landowner requirements, and also worked very closely with the Department of Conservation and Edison Consulting on behalf of Powerco.

Edison's Aaron Coombes, who managed the project for Powerco, is very pleased with Electrix' performance. He was impressed with the team's expertise in helicopter work and cites Electrix' ability to effectively deal with unforeseen issues as particular strengths on this project. "It all went really well," he said. "We couldn't have asked for much more."

Australian asset maintenance with built-in efficiencies

In late 2007, Powercor and CitiPower awarded Electrix a major inspection and maintenance contract for its combined asset base in inner Melbourne and the western half of Victoria. Encompassing some 600,000 poles across a vast area, this contract was a significant milestone for Electrix, marking a continuation of a previous 10 year relationship for asset inspection services. It also presented tremendous new challenges for Electrix with an increased range of services and new technologies to be implemented.

Electrix' contract manager Barry Thebes explains that this contract transcends traditional maintenance outsourcing arrangements. "A key element is the clients' formalised expectation that we contribute to an innovative service delivery and drive efficiencies … and that means we can add real value," says Barry enthusiastically.

From the outset the dedicated 80-strong Electrix team stepped up to the mark. The team has successfully integrated new image capturing technology into the asset inspection process. "We are using wireless micro-cameras mounted onto 12-metre telescopic high voltage sticks, which allow us to inspect cross-arms from above and accurately assess these exposed areas for the first time," explains Barry. This is a huge advantage, and a quantum leap from the conventional ground based approach with binoculars.

Electrix is adding value through innovation as part of a substantial 3-year maintenance contract with two one-year extensions for Powercor and CitiPower.

Electrix is also further developing a number of other innovative initiatives such as a vehicle mounted mast fitted with a CCTV camera, for the inspection of ultra high poles. In addition the team is working on non-invasive testing of wooden poles.

For the first time the contract included a substantial maintenance element with a requirement to rectify specific defects on the network identified during the inspection phase. Essentially though, this AU$70m contract is a superb opportunity for Electrix to demonstrate its capabilities and its value as a maintenance partner. With the team almost seamlessly integrated into the client organisation and a strong contract performance to date, this relationship is likely to continue going from strength to strength.

electrix line

Winter 2009

Unprecedented times call for unprecendented actions

After an unprecedented heat wave across Victoria, horrendous bush fires ravaged several communities to the north and east of Melbourne creating an inferno of tragic dimensions. Among the crews that responded to this emergency were Electrix teams who put in superhuman efforts.

When a succession of days with record temperatures over 45°C brought Victoria to its knees, the electricity networks were unable to carry the additional load. As a result, transformers and other assets failed in large numbers and caused major power disruptions to thousands of network customers.

During the initial heat wave conditions, Electrix overhead line crews were called on to restore power. While the tar melted on the road, stoic field crews carried out physically demanding work under extremely challenging conditions with temperatures approaching 50°C.

However, the combination of prolonged extreme temperatures, near absent humidity, 100-km/h winds and vegetation dried by years of drought eventually culminated in the events that unfolded on Black Saturday 7th February. Fires with an unheard of scale, ferocity and speed, enveloped large parts of Victoria and overwhelmed the state's firefighting resources.

In the worst areas, the blaze destroyed everything in its path with a tragic loss of life and property. It left the power network with gaping holes; poles and lines strewn everywhere. Within two days of the initial fires, 40 Electrix staff joined a work crew of over 150 in the Whittlesea and Kinglake areas to support SP AusNet's restoration efforts. For the combined team of network owner employees and other contractors, the task at hand was initially to clear lines and poles from roads to provide access for emergency services to the affected areas. The conditions that all emergency response crews worked under, and the scenes they witnessed, were nothing short of harrowing.

Nevertheless, the teams just "got on with it". They worked tirelessly from dawn to dusk despite constant smoke, ash, dust, extreme temperatures and high winds. The emphasis on job safety took on a whole new dimension. Victoria State Manager, Peter Gersh, has nothing but praise for his team. "Electrix crews were responsible for building and rebuilding the main feeder that supplies the towns where the relief activities were underway … some 12 km all up," says Peter. "Almost unbelievably, the line was rebuilt within four days. Then we started rebuilding other parts of the network and connecting surviving homes. Within two weeks the team had supply restored to key areas … We are proud to have been able to assist in these difficult times."

He explains that it was a very emotional experience for everybody. Pictures and stories cannot adequately explain what it was like," he says. "You had to see it to believe it." His own home only narrowly escaped the path of the fire and he is mindful that many others weren't so lucky, noting "the tragedy has affected almost all our employees in one way or another".

While the worst network damage is now dealt with, Electrix teams will continue work in the area as part of their current contract with SP AusNet. For the next few months Electrix will provide new connections as the rebuilding of 800-odd homes in the area gets underway.

Water treatment plant receives upgrade

Watercare Services, Auckland's bulk water and wastewater service provider, operates six water treatment plants in the Auckland region. Among them is the Huia Water Treatment Plant, which treats around a quarter of the 370,000 cubic metres of water that Auckland uses on average every day.

When the plant's dosing control systems needed upgrading, Electrix won the tender for the electrical works associated with the installation of new systems, and, because the fully automated plant has to remain operational at all times, the new systems had to be installed and commissioned, before the old systems could be removed.

Kevin Graham, Electrical Services Regional Manager, explains that this was challenging due to space constraints. "There simply wasn't room for all the new equipment, so our team had to be very creative in their approach," he said. With great ingenuity they created a labyrinth of temporary supports for the old equipment and overcame the lack of elbowroom. Expertly integrating the routing of cables allowed two complete systems to be installed at the same time until the new controllers were fully commissioned and the old system could at last be safely removed.

As the project progressed very well, Watercare took the opportunity to also upgrade additional dosing systems and added them to the contract. These were broken into several stages to facilitate the installation and commissioning of the various dosing processes. The project was completed in December last year and handed over to the client team who was very pleased with the quality and the timeliness of the work.

Ripple plant upgrade

In the event of power shortages, power companies are often forced to reduce the load on the distribution system. Typically this involves switching off the power to domestic hot water cylinders during the night. This is made possible with the help of ripple control which involves signals being sent from ripple plants, which are located at certain sites on the network, to the household.

Powerco has ripple plants on its entire 33kV and 11kV network, and last year commissioned Electrix to upgrade aging ripple plants at Matatoki, Greerton and Tauranga.

Under project supervision of Brad Eyre, the team carried out comprehensive upgrade works including the installation of new coupling cells in the switchyard, temporary static frequency converter panels, EPL controllers, new SCADA panels, new local service transformers, and switchboards in control rooms. The team completed all testing and commissioning, and also decommissioned the existing equipment with the project completed in December 2008.

Specialist live line skills in hot demand

Electrix is renowned for its specialist expertise in helicopter assisted live-line work. It has been adapted for many applications, including the testing of transmission line joints, as was recently the case on one of the Otahuhu – Whakamaru lines south of Auckland.

As part of Transpower's preparations for the Tactical Thermal Upgrade, the grid owner initiated the testing of the circuits to ensure that they can safely carry the planned additional load. And because joints are the most likely point of weakness in a conductor, these have to be carefully tested. This is most efficiently and effectively carried out by a linesman, suspended on a 30-metre-rope from a helicopter, taking resistance readings that are logged and processed by the team's engineer back in the helicopter.

Testing live lines while being suspended from a hovering helicopter is a specialist skill that few linesmen are qualified for.

Project manager Richard Morley points out that safety is obviously of utmost concern on such projects. However his team is also focused on providing accurate results for the client while minimising the disruption for landowners. "We are aware of the potential for livestock disturbance and have a dedicated ground team that works closely with landowners," said Richard. Thanks to detailed planning and careful execution, there were no incidents or complaints as part of this project. The transmission line staff worked with two helicopter crews and tested some 1500 joints over a one week period. The project was completed on schedule and resulted in positive feedback from Transpower.

World-class addition at Auckland Airport

When the first Airbus A380 made its long-awaited touchdown in Auckland earlier this year, the Auckland International Airport also got the opportunity to show-case the extension to its international terminal, a new pier.

Built specifically to accommodate the new generation of aircraft, the new pier allows the airport to handle more aircraft and offers world-class facilities for travelers.

Among the delivery team was Electrix.Under project management by Des Howard, the team carried out the high-voltage work on the new pier, providing a new 11kV power ring, and installing a new switchboard as well as one 1000 kVA transformer, two new Ring Main Units (RMU's) and two 750 kVA transformers.

The team completed the project without any hiccups and ahead of time despite a complex cable pull. Des Howard explains that 210 metres of HV cable had to be pulled from an outside stand, across an air bridge, into underground ducting, back up and across a further air bridge, to connect to the RMU in the next stand. However, thanks to a very experienced team, all aspects of the project went strictly according to plan, which ultimately contributed towards the overall project success by Hawkins Construction.

Photo courtesy of Auckland International Airport

Upgrading Benmore

Meridian Energy's Benmore power station, New Zealand's second largest hydro station, is currently undergoing a major lifecycle refurbishment programme. As part of this, Electrix was commissioned for a local service upgrade to deliver extensive safety improvements and strengthen the distribution supplies.

The team has replaced the station's 3.3kV protection relays, installed 42 new distribution boards, four 415V switchboards, made improvements to the 11kV system and carried out a host of ancillary work.

Electrix supervisor Michael Casey and his team worked very closely with station owner Meridian Energy to ensure that client needs were addressed in all aspects of the project.

Despite a very tight schedule and a staggered delivery of new equipment, the Electrix team worked with great attention to detail. It was critical to avoid any disruption to the station, which had to remain operational throughout the project - not least because of the seasonally increased demand for power.

There was no leeway for errors of any kind. When the team worked on the switchboards that control the generators, for instance, "it was mission critical all the way," says Michael. "Everybody was completely focused to avoid any disruption to the generation."

The project achieved great health and safety records and excellent project outcomes. Electrix has also secured another project at the Benmore station – the 16kV Grid Injection Point Project which will see three single-phase transformers being replaced by one three-phase transformer.

Protecting and connecting Maraetai's powerhouses

The Waikato River Hydro System is among the world's most efficient. Mighty River Power harnesses its power with nine hydro stations - among them is the 360MW capacity Maraetai hydro plant.

Like any generating asset, Maraetai with its two power houses is subject to ongoing maintenance. Recently this involved the replacement of two unit (station generator and transformer) protection schemes.

As recognised experts in hydro protection upgrades - and veritable Maraetai veterans - Electrix was once again invited by Mighty River Power to carry out this important upgrade project. Up to six Electrix staff replaced old protection relays and installed associated cabling and wiring, all within the scheduled 4-week outage.

In addition to the protection upgrade, Electrix was also tasked with the installation of a 600-metre fibre-optic link between the station's two power houses to allow remote engineering access. Project Manager Damian Bilbe explains that the project called for blown fibre technology which relies on the flow of compressed air to ease the fibre through pre-installed ducts. Additional cables can then be easily 'blown' within spare ducts, as and when required.

The project was commissioned mid April and has been completed on time and within budget.