August 2010 Issue 5 PowerTalk is a publication from Beca Power

PowerTalk

Editorial

Ian McLelland

While the world economy is seeing the fragile beginnings of recovery after the recession, the Power Industry has remained reasonably buoyant throughout. Significant power sector investment is evident, particularly in transmission refurbishment as assets approach the end of their economic life, as well as new transmission and distribution assets to meet load growth. In newer sectors such as wind energy, increased activity is evident in system study work to integrate the new mix of generation into the networks of more conventional plant.

We are also seeing an increase in clients preparing for the next generation of technology as the industry moves towards full automation of substations using new communication standards. This will no doubt present challenges along the way for the whole industry as the conventional disciplines of Protection & Control, SCADA, Communications and IT come closer together.

Beca Power has experienced a period of strong growth over the past year, particularly in New Zealand and Australia. Our diverse client base has also continued to expand, with clients from the generation, transmission, distribution, industrial and commercial power sectors.

Along with our traditional power industry clientele, our engineers are thrilled to be part of the A$3.5 billion Victorian Desalination Project in Australia to produce drinking water from seawater. The plant will be one of the largest reverse-osmosis desalination plants in the world, capable of supplying up to 150 billion litres of water a year. Beca and Parsons Brinckerhoff have formed a joint venture to deliver engineering design services to Thiess Degrémont for this project.

To meet the growing demand for the Beca Power team's services, we are steadily increasing recruitment of skilled engineers to work in our main centres of Melbourne, Auckland, Wellington, Brisbane and Christchurch – and we expect to continue expanding for some time to come. While we are growing our business, we are focused on listening to our clients needs and targeting our growth towards delivering quality solutions on time.

By the time the next issue of Power Talk comes around we hope the world economy will have returned to more settled times. In the meanwhile Beca Power will be striving to provide you with the service you require in a safe and efficient manner.

Contents

Power Transmission

Delivering projects for South Australia

Mount Barker

Trans-Tasman team for Beca's first major South Australia transmission line project

ElectraNet Electricity Transmission (ElectraNet) commissioned Beca to produce a detailed design for the overhead transmission connection to the proposed Mount Barker South Substation. As the first major transmission line project for Beca in South Australia, this was a very important project for the Trans-Tasman Power team.

This project had many constraints. The original substation was located in the middle of a heavily congested residential area, so the aim of the project was to relocate it to the outskirts of this area so it could be expanded to meet demand. This required extensive consultation and the support of local authorities and residents for it to go ahead.

Although the conceptual design was done by a local consultant, the Beca team was proud to win the detailed design work and have the opportunity to demonstrate our capability in this region. The existing Mount Barker Substation will be dismantled and the 132 kV feeders diverted to the new location.

The proposed Mount Barker South 275/66 kV Substation is planned to be connected to the 275 kV network by 2011, with construction to be carried out in four stages. The final stage is not due for completion until 2041.

This project was a good example of the company's "One Beca" value as the Trans-Tasman Power teams worked seamlessly together to deliver the detailed design. Regular communication between the client in Australia and Beca in Wellington was vital, and has been key to the success of the project.

To quote ElectraNet, "the Beca consultancy service was excellent for the Mt Barker South project, especially considering it was their very first project. The design was delivered within time and budget constraints of the project." This strong relationship is highly valued by both parties, and the project has proved to be a promising start for Beca entering the Australian power market.

More information,
Contact: Maan Al-Asad
Email: maan.al-asad@beca.com
Telephone: +64 4 473 7551

Wind Power

A tribute to good relationships

West Wind wind farm

Successful West Wind commissioning

On 30 September 2009, the last of the 62 Wind Turbine Generators (WTGs) was commissioned and Meridian Energy's Project West Wind became the "West Wind" wind farm. The commissioning brought the construction phase of the works, which commenced in August 2007, to an end.

When the Wellington winds are just right, West Wind's 2.3 MW WTGs combine to produce approximately 143 MW of power - enough power for around 70,000 houses.

From the WTGs, the power is fed to a centrally located substation via 45km of underground cabling. From there it feeds the national grid through a 5km transmission line.

The project was not without its challenges. The steep, rugged terrain and the West Wind site location made gaining access to the site and each WTG difficult. The project team constructed 33km of access tracks, moved 1.8 million m³ of earth and constructed a 128m wharf to enable the project to reach its successful conclusion.

The secret to the projects success was the "best for project" attitude that was fostered throughout, along with the good relationships between those involved. Real benefits were realised on the project by Beca personnel spending time on site with the contractors carrying out the work. These contractors included Transfield Services (Substation Electrical), Higgins (Lead Civil), Blackley Construction (Cable Installation) and many others. This collaborative process led to tailoring of the design so that it better fit the contractors' individual methods; and resulted in a more efficient result for the client.

West Wind is the third wind farm that Meridian Energy has constructed and also the third wind farm where Beca provided Meridian with a large spectrum of design and management services. Meridian and Transpower used these services in various aspects of the project including the substation, cable reticulation, transmission line, access tracks and the wharf.

More Information,
Contact: Duncan Macdonald
Email: duncan.macdonald@beca.com
Telephone: +64 4 496 2524

Lightning protection modelling reduces guesswork

A lightning strike inside a substation can have widespread effects on electricity networks and can pose a significant risk to operators.

To prevent lightning strikes hitting sensitive electrical equipment, most substations employ a combination of lightning masts and overhead earth wires. Their purpose is to carry the huge current produced from a lightning strike down to ground without affecting the surrounding switchyard.

While lightning protection is in place in most switchyards around the world, it can be difficult to determine exactly how effective it is. The unpredictable nature of lightning makes it a particularly difficult risk to mitigate, and in-depth analysis is often required to ensure that this risk is minimised.

Consequently, Beca Power has developed in-house software to assist in the design of substation lightning protection systems. The tool can produce accurate models of the coverage that lightning masts and earth wires provide and can clearly show where inadequacies exist.

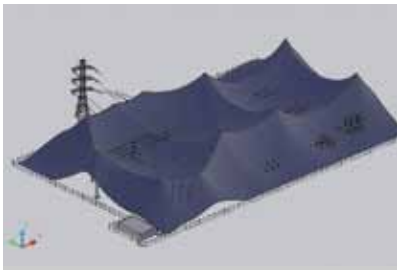
The tool is based on the Rolling Sphere method, which involves rolling an imaginary sphere of a given radius up and over lightning masts, earth wires and other grounded metallic objects that can provide lightning protection. Equipment is said to be protected if it remains under the curved surface of the sphere. In the adjacent figure, it looks as though a large canvas has been thrown over the substation. This canvas represents the limit of the lightning protection – everything under it is at low risk of a lightning strike, while anything that pokes through it is at a much higher risk.

Beca's Lightning Protection Modelling tool can bring greater security to substations, reducing risks of outages and equipment damage. By taking the guesswork out of lightning protection, Beca can produce substation designs that are safe and robust.

More Information,
Contact: Stephen Salmon
Email: stephen.salmon@beca.com
Telephone: +64 9 300 9665

Software

Bringing security to substations



Te Mihi Lightning Protection

Joint Site Safety Tour

Beca Power recently participated in a joint site safety tour of Transpower's new 220 kV substation at Drury, south of Auckland, prior to the official livening of the station which took place successfully on 14th April 2010. This substation is part of an ongoing plan to reinforce power supplies in the Auckland area and is clearly visible from SH1 to the south of Auckland.

Together with the Transpower Project Manager and the construction contractor, Beca Power's Job Manager and lead designer, Kevin Friesen, and Beca Industrial Business Group Director, Bryce Whitcher, carried out a safety tour of the site.

According to Bryce, the standard of housekeeping and the commitment to safe working practices he had seen on the site was "very impressive".

"These safety tours are an excellent way of sharing experiences and demonstrating Beca's commitment to developing a leading safety culture," he said.

The Beca Power team is keen to explore opportunities with clients to participate in more safety initiatives such as joint safety tours. Job Director Ian McLelland says safety is the first item discussed with job managers during regular job reviews. "Our aim is zero harm in all that we do and that everybody returns home safely at the end of each day.

We are eager to hear from clients who have ideas on how to promote a culture of health and safety so that we can continuously improve our safety focus and initiatives."

More Information,
Contact: Ian McLelland
Email: ian.mclelland@beca.com
Telephone: +64 9 300 9624

Health and Safety

Creating a leading safety culture in all we do

Playing it safe at Drury

Transpower's Drury substation

Movers and Shakers


Tom Buzink


Stephen Alderton


Vicki Mijatovic


Jason Hall


Alex Aramakutu

Beca Power has recently experienced considerable growth, gathering skilled people together from different backgrounds and experiences. This development has resulted in existing staff moving into key roles, like Andre van Zyl and Kevin Friesen taking over the Secondary Team Leader roles in the Auckland Power team. Coupled with the valuable additions to the team profiled below, we are even better positioned to deliver efficient, client-focussed consultancy services.

Tom Buzink, who has recently joined the Auckland team as a SCADA/Comms Engineer, brings wide exposure to projects ranging from high-level architectural design, to configuration and programming of hardware devices. Previously with Vector Ltd, Tom has gracefully moved into the key role of leading the Auckland SCADA team.

Stephen Alderton has recently joined Beca Power in Melbourne as a Power Engineer, coming from his previous role with Hydro Tasmania. Stephen brings experience in protection system design and protection settings, ranging across generation, transmission, and distribution projects for a variety of clients. This includes a period spent overseas providing electrical design services to Scottish Power in the United Kingdom. Currently he is involved in the Victorian Desalination Project, undertaking secondary system design and protection settings.

Vicki Mijatovic has moved her previous role at CitiPower/Powercor to join the Melbourne Power team as a Senior Protection Engineer. Vicki brings a wealth of experience in developing technical standards, system planning and protection & control. She is currently involved in a number of SP AusNet Projects, including development of 500kV Circuit Breaker Management Standard schemes.

Jason Hall, like many Kiwi imports, hails from the UK where he worked as a design and commissioning engineer, specialising in HVDC/SVC control systems. Since joining the Christchurch Power team, Jason has been leading projects for several clients in the power sector. His experience in working on transmission and distribution projects in the UK and India has also stood him in good stead in tackling new and exciting challenges since his move to New Zealand.

Alex Aramakutu has recently joined the Power team in Wellington as a Project Manager. Her role within the Power team complements the existing technical expertise and aims to improve quality, client communications and timeliness of deliverables. Alex relishes her mandate to 'make our clients happy' and effectively handle challenging tasks.

Secondment provides valuable insight

Ken Chin, a senior engineering consultant from SP AusNet, has been spending some time on secondment in Beca's Melbourne office to assist in the delivery of the SP AusNet project X941, involving the replacement of the HYTS-APD2 Line protection at Heywood terminal station.

According to Beca Technical Director Ian Christmas, the two month secondment aimed to assist the companies in understanding the challenges associated with projects from both perspectives, and enabled them to work more closely together. It also allowed Ken to gain different consulting experience, and give him a broader experience base to assist him in his work at SP AusNet.

During his time with Beca Ken has been involved in all aspects of the Beca design process including project management, design lead, protection settings and assisting with the secondary design.

Ken said he enjoyed his time as Beca and has gained valuable insight into the way the Beca team works. "While assisting the Beca project manager, I've learnt more about Beca's quality system. I'm impressed with the system, and its effect on trying to minimise re-work and maintain high quality designs for clients".

He also said he was impressed with the "commitment to the job and the willingness of Beca staff to help". He appreciates the challenges associated with delivering on time and has been impressed with Beca's commitment to project deadlines. "This experience has reinforced the importance of setting realistic delivery dates from both the client and the consultant's perspective," he said.

Beca has also gained a great deal from the experience of having Ken in the team. According to Ian Christmas, the team has been able to learn more about the client's perspective and drivers and how we can better serve our clients. "We have been able to better understand the tools and systems used by SP AusNet to be able to better deliver projects in the future. Ken has provided some valuable feedback from an outsider's perspective that we are able to carry forward onto future projects", he said.

The Beca team in Melbourne wishes Ken all the best as he returns to SP AusNet.

For more information, or to discuss potential secondment options, please contact Ian Christmas.

Email: ian.christmas@beca.com

Telephone: +61 7 3117 6307

Beca

Power

Do we have your correct details?
Contact us at **power@beca.com**

New Zealand
Auckland
Wellington
New Plymouth
Christchurch
Tauranga
Hamilton
Dunedin

Australia
Brisbane
Melbourne
Sydney
Wollongong

Indonesia
Jakarta

Chile
Santiego

China
Beijing
Shanghai
Suzhou

Myanmar
Yangon

Singapore

United Arab Emirates
Dubai

* The Legal entity that Beca Power trades through is Beca Carter Hollings & Ferner Ltd in New Zealand, and Beca Pty Ltd in Australia.