

# CurrentAffairs

News and views from Ergo Consulting Ltd

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## Protection versus Control

Recently I have come across a couple of instances where people have confused the functionality of control versus protection.

If we take the analogy of a car, the controls on a car consist of start/stop, accelerator, brake, gear shift/clutch, indicators, lights, wipers etc. Given these controls we can drive the car, but nothing stops us from driving irresponsibly – from speeding or crashing.

There are two forms of protection in a car, i.e. for:

- us, e.g. airbags, seatbelts
- the car, e.g. low oil, battery and fuel alarms.

These free us to focus on driving – we don't need to think about the 100's of things that can go wrong with the car. If there is a fault, a dashboard alarm will alert us to get it fixed. But we wouldn't want to drive (control) the car without knowing these automatic protections are in place.

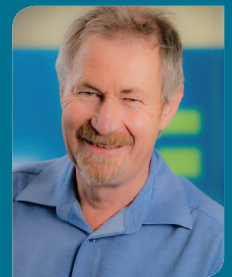
It is no different with HV networks. These can be complex

to both operate and protect. They require highly qualified operators but they are also highly protected. We assume that if we can operate the network, it will be safe to do so, i.e. it is not earthed or out of sync, there are no faults on the circuit, the CB is fully functional and the protection is operational.

While there are different philosophies around how much control an operator should have, (usually around earthing), few operators (or owners) would be happy to operate an HV switch without protection. The operator needs to operate responsibly, but the things that they cannot know are taken care of by the protection.

In an HV network, regardless of your control system, the protection relay must be reliable and operating before taking action.

Chris Turney *Director, Power Systems*



## Project picks

### Martinborough Transformer Replacement

Ergo has undertaken the design of a transformer replacement at Martinborough substation for Powerco. The project forms part of Powerco's maintenance plan and will ensure the ongoing reliability of the network in the Martinborough and Dyerville regions of the Wairarapa.



### Dominica Geothermal Development Company

Ergo has been appointed by the NZ Ministry of Foreign Affairs and Trade (MFAT) to provide the project management for this World Bank funded project to construct a new 7MW geothermal power plant in the south of Dominica, a Commonwealth country in the Caribbean. The new plant will replace existing diesel powered generation located in the north and south of the country which currently provides about 60-70% of Dominica's power demand. The net result will be a reduction in electricity tariffs and an improved economic outlook for the country. The aid package forms part of the NZ Government's programme to promote NZ engineering expertise as a centre of excellence for geothermal power plant design and construction.



## Extreme endurance in the Yukon

Regular readers of this newsletter will know that Richard Charles, one of our Technical Specialists, is into extreme endurance – big time. In February he took part in the Yukon Arctic Ultra (YAU) in Canada. Participants can tackle a distance of 100, 300 or 430 miles by bike, skis or on foot. Richard entered the 300 mile on foot event. The YAU is the world's coldest and toughest ultra-marathon and is held during the Canadian winter when temperatures can reach -50 degC. Entrants must be completely self-supported, with no outside assistance, carrying or pulling everything required to survive and sleeping in the open.

Richard is experienced but found YAU is on a different level. Very low temperatures and unusually high humidity made the going tough. After approx. 100 miles, Richard had to withdraw as he was having problems eating and drinking. Not giving your body sufficient liquid and fuel to create enough heat to stay warm causes real problems and will

likely lead to frostbite and hypothermia.

Of course, most people think Richard's crazy. But the way he sees it, it's all part of challenging yourself – in fact he thinks everyone else is crazy for not doing it. Richard will be back to the Yukon again next year.



## The SCADA's crashed again.....

The term SCADA is often used very casually to describe a complex monitoring system. This can cause misunderstandings when errors occur in the system, especially if faults are simply described as "the SCADA has crashed again". Maintenance staff may spend too much time looking at the wrong part of the system due to their interpretation of what the word SCADA means. As a result Ergo has been promoting a more layered description of all the components which make up a SCADA system. All these layers must be working together in order for the system to be a success.

**0 - Control Philosophy**  
System requirements, rules, objectives, KPI's

**1 - SCADA Software, Historian, Alarming**  
HMI screens, trending, alarm lists, alarm system

**2 - Network Backbone**  
Major communication paths, typically microwave

**3 - Radio Network**  
Local radio networks

**4 - Control Hardware / Code**

**5 - Physical wiring**

**6 - Operator procedures**

**7 - Documentation**

When viewed from this perspective it allows all stakeholders to focus on the specific areas of the system which need attention. It can also provide guidance when undertaking a SCADA system upgrade or replacement, because the success of a layer is only as good as the layer supporting it. Ergo has managed a number of successful SCADA system replacements for district councils using this approach. This is a top-down approach whereby the needs of the user are defined which then determines the design of the lower layers.

## New Staff

Ergo's expansion continues apace.

### Albert Le Roux Engineer – Power Systems

Albert joined Ergo in February, having migrated with his wife from South Africa where he has been involved in various substation projects. Albert's experience includes project management, detailed design and commissioning of protection and automation schemes. Albert enjoys hiking and DIY projects, so is already fitting in very well to life in NZ.



### Jack Stainton - Christchurch Office Graduate Engineer – Power Systems

Located in our new Christchurch office, Jack has experience in secondary design, switchgear retrofit projects and greenfield substation projects, having previously worked with Ergo in Auckland. Jack likes to work on vintage motorbikes and has been involved with rowing (as an athlete and coach) for over a decade.



### Matthew Watson Engineer – Control Systems

Matthew, who joins us from Ecodesign, is an electrical engineer with experience across the mining, manufacturing and water sectors. He has nine years' experience in the electrical industry, including time as a qualified electrician before graduating from the University of Canterbury. He spent three years with BHP Billiton as electrical engineer at an open cut coal mine in Australia. Matthew enjoys kayaking on the harbour and walking his dog along Muriwai beach.



### Ivan Nyo Engineer – Control Systems

Ivan is an electrical engineer with over five years' experience within the oil & gas industry which enables him to engage in electrical, control system and hazardous area design. He was previously with Aurecon in Wellington. He enjoys the outdoors and is usually found at the ski slopes or a mountain bike park.

