

PQCA NEWSLETTER

Issue 8 November 2016

Latest PQCA Proposal Issued

Continued innovation

Proposals for continuation of the PQCA for the 2016/2017 and 2017/2018 financial years have been issued to participants. These proposals seek to build on the solid foundation of the PQCA to date. Recent developments with smart metering have seen the numbers of sites contributed to the PQCA project skyrocket. This trend is expected to continue. The increase in site numbers increases the statistical confidence in the outcomes of the survey further adding value to participants. However, developing techniques that make best use of the data available and allow for easy visualisation continue to be a challenge for PQCA staff. Key focusses for the next two years include:

- Further development of algorithms relating disturbance levels to an economic impact. This feature has been included for voltage sags and reliability. It is hoped that an ASTP project which is currently underway to investigate the effect of voltage level on equipment life can be incorporated into the PQCA.
- Further development of the PQCA online platform. With the rapid increase in site numbers, techniques of visualising very large data sets are becoming vital. Enhancement and redevelopment of the PQCA Online platform is slated for the next 12 to 18 months. Once completed this update should improve the user experience and also allow increased flexibility of data visualisation.

PQA Farwell Long Serving Staff

The end of an era

PQA has recently farewelled two of its long-serving personnel, Vic Smith and John Weidemier who have retired.

Vic Smith: Vic was a cadet engineer with the Sydney County Council (now Ausgrid). Soon after graduation he was given leave to study at Manchester Institute of Science and Technology (UMIST). In 1985 he took a research position with the High Power Testing & Arc Studies Laboratory at Sydney University where he also took a PhD degree in HV circuit breakers.

In 1997 he joined the newly formed Integral Energy Power Quality Centre, now the Australian Power Quality and Reliability Centre, as a research engineer. In this position he was responsible for the day-to-day administration and operation of the centre, but he also took a prominent part in course & seminar development, consultancy and research. Some of the projects where he took on a key role are the operation of PQA, the production of Standards Australia's HB-264 (a guide to harmonic and flicker standards), the planning and operation of the international ICHQP conference at Wollongong in 2008 and the implementation of the well-regarded Master of Electrical Power Engineering course.

Over the last 20 years, the scope and size of the centre have increased and there have been several name changes in that time. There have been some changes in engineering staff and a

large turnover in research students. Vic has been the centre of stability in this time and an unflappable source of advice to us all. In retirement he has many projects he would like to address – reading, assisting at his local church, community work and travel among others!

John Weidemier: John has had a long career in the electricity industry and has been associated with what were once very notable organisations with a strong place in electrical engineering history. He started as a cadet engineer with Balmain Electric Light and Power in 1953 and stayed with them when they were absorbed into the Electricity Commission of NSW. He was mainly involved with power station development, including Vales Point. Following graduation, he went overseas under a traineeship program with Associated Electrical Industries (AEI) with time at British Thompson Houston and Metropolitan Vickers. Returning to Australia he then had 38 years with Pacific Power, mainly in site construction, being involved with Munmorah, Liddell, Wallerawang and Eraring power stations. He later became Executive Engineer with Pacific Power and then Executive Director of Pacific Power International.

Retiring from Pacific Power in 1994, John joined Illawarra Technology Corporation (ITC), the commercial arm of the University of Wollongong. With the initial role of General Manager of the Engineering Division, John liaised between university academics and industry in fostering consulting activities. One of his contacts was with then Assoc. Prof. Vic Gosbell of the Integral Power Quality Centre and led to the development of our first power quality survey activity in 2000. John left ITC for more private time but was retained on our technical board to help us in business development of the survey project. He intends to concentrate on sailing and the development of microcomputer aids for the sailing/racing fraternity.

John's role in ITC and afterwards with our technical board was essential for the concept and the business model of PQA to develop. We now have the largest PQ survey in the world, both in terms of the number of sites and the duration of the survey. The data collected has been a key driver in a number of developments in PQ management that have made Australia a leader in this field.

We wish both Vic and John every success in their retirement.

Continuation of Endeavour Energy Support for UOW Activities

UOW's longstanding relationship with the electricity industry continues on....

In June 2016, the agreement to continue to operate the Australian Power Quality and Reliability Centre (APQRC) was renewed with a funding allocation of nearly \$800,000 by Endeavour Energy. This renewal will take the UOW's unbroken relationship with Endeavour Energy to 23 years.

With the inception of this relationship in 1996, APQRC has been instrumental in supporting electrical power engineering education at the University, researched and developed the field of electrical power engineering and has become an internationally recognised centre of expertise, particularly in the area of power quality.

The Centre has a world-class research laboratory in the University's SMART Infrastructure Facility that enables it to provide research and development that will underpin developments related to future electricity networks.

This long-standing relationship has provided extensive, ongoing benefits to the electricity industry and its customers in the management and compliance of their electricity networks.

Future networks will have large volumes of domestic customer-owned energy generating sources and energy storage systems, such as batteries, and hence there are new challenges that need to be tackled by the electricity network owners and operators. APQRC will continue to work with the broader electricity industry to help solve some of the associated problems.

The funding is also a boost for the APQRC's efforts to engage in the professional development of electrical power engineers and technical staff, as well as supporting the training and education of undergraduate students who have a desire to take up a career in electrical power engineering.

As part of the latest agreement, some of the funding will be used to employ a full-time senior academic in the School of Electrical, Computer and Telecommunications Engineering as well as provide a scholarship aimed at encouraging high-calibre electrical engineering students to undertake postgraduate studies leading to careers in power engineering.

NZ EECON Wrap

Taking proactive PQ monitoring across the ditch

Sean Elphick presented a paper at the New Zealand EEA conference held in Wellington 22 – 24 June 2016. The work presented was a summary of the small scale monitoring that has been undertaken in conjunction with Professor Neville Watson from the University of Canterbury. The monitoring campaign that formed the basis of the paper was similar in nature to the toe-in-the-water exercise that preceded the launch of the PQA project. Up to eight sites were selected

for monitoring for nine Lines Companies. Monitoring was made of voltage, unbalance, harmonics and flicker using University of Wollongong PQ instrumentation. In many cases, this was an introduction to proactive PQ monitoring for many of these small Lines Companies. The paper was well received with the audience directing a number of questions to the author.

Of interest when comparing collected data to the Australian experience is the fact that there are high levels of voltage non-compliance present on New Zealand distribution networks. Similarly to Australia this non-compliance is due to voltages at the upper end of the range. New Zealand also appears to have higher levels of voltage THD than Australia.

The abstract of the paper is reproduced below:

Abstract

Since 2011, the University of Canterbury in conjunction with the University of Wollongong has been conducting small scale proactive power quality (PQ) monitoring of electricity distribution companies throughout New Zealand (NZ). The monitoring campaign involved selection of a small number of sites within each distributor. Monitoring has been conducted at both low and medium voltage and sites were monitored for periods of one to two weeks. The overall aims of the monitoring campaign were as follows:

- *To obtain a snapshot of PQ levels throughout NZ*
- *To identify if there are PQ disturbances which are problematic to a number of NZ electricity distributors*
- *To familiarise NZ electricity distributors with proactive PQ monitoring processes and methodologies*

The disturbances which were monitored were steady-state voltage magnitude, voltage unbalance, flicker (where instrumentation was capable) and voltage harmonics. Voltage sag data was also captured but the monitoring periods were too short for this data to be of use.

This paper describes the methodology adopted for the project and while the monitoring is not comprehensive, it does provide some insight into the power quality disturbances which may be of concern in NZ. Indicative results of the monitoring campaign are also discussed and while the sample of sites is small, LV voltage levels appear to be a disturbance of concern with a significant number of sites exceeding the upper voltage limit of 230 V + 6% (243.8 V).

Modular Master of Electrical Power Engineering/Graduate Certificate in Electrical Power Engineering program at UOW

Tailored higher degree course for industry professionals

The modular Master of Electrical Power Engineering/Graduate Certificate in Electrical Power Engineering is a program delivered by industry experts. Delivered in three day intensive blocks, the course is specifically tailored to suit the needs of full time professionals working in the electricity supply and utilisation industry. Since the commencement of the program in 2011, it has attracted many engineering professionals from the industry who have benefitted from the knowledge of the lecturers who are mainly from the industry. The program is also now available in distance mode.

Modules on offer in 2017 are:

- Distribution System Reliability

- Electricity Market Structures and Demand Side Integration
- Power System Protection and Communication
- Substation Design

Please contact Ms Raina Lewis on 02 4221 3335 or email rdennis@uow.edu.au for preliminary details. You may also contact the program coordinator, Professor Sarath Perera on 02 4221 3405 or email Sarath@uow.edu.au for program details.

Upcoming Courses

Advanced Power Quality 3 – 4 November 2016

For information on upcoming training courses visit www.elec.uow.edu.au/apqrc/training.

Have you considered our Master of Electrical Power Engineering Course? Click [here](#) for more information.

Looking for Further Information?

If you would like more information on any of the articles published in this newsletter please contact Sean Elphick at the University of Wollongong on 02 42214737 or sean_elphick@uow.edu.au.