

## Executive Summaries

### 2008-2009 Bursary Vacation Placements in South Australia

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**STUDENT:** Stefan Brown (UA)  
**COMPANY:** Electranet



During the summer break of my second year of a Bachelor of Engineering (Electrical and electronic) with Bachelor of Finance degree I completed approximately 11 weeks of work experience at Electranet. This opportunity was given to me through the Australian Power Institute Bursary program. Electranet own and operate the high voltage power transmission lines in South Australia, connecting the power generators to the ETSA distribution network and some direct connect customers. The following report will outline some of the work I undertook during this time and the experience I gained.

I worked mainly within the Network Portfolio Team of Electranet. My primary involvement within this division is outlined below:

- Auditing some communications systems that provide the protection systems for the transmission lines.
- Improving the communication of network portfolios business procedures and processes.
- Investigations into EMF measuring and mitigation techniques for transmission lines.
- Gaining knowledge of the elements involved in engineering project management.

Other experiences and things I contributed to include the following:

- Substation site visits to audit switching contractors.
- Systematic filing of substation construction documents.

I found the experiences of working for Electranet to be very beneficial and they have helped strengthen the interests in my future study and career within Power Engineering. I'm thankful for the company's time and expertise, both within the division I worked in and the broader staff. I look forward to working with them in the future.

**STUDENT:** Christopher Nugent (UA)  
**COMPANY:** ETSA Utilities

**ETSA Utilities**

I was employed as a work experience student at ETSA Utilities for 12 weeks, from 23rd November 2008 to 27th February 2009. During this time I worked in the Distribution Planning group, which is a part of DaNM (Demand and Network Management).

My goals in undertaking this work experience were to find out more about what life as a professional power engineer would be like by being a part of a working engineering group, and to add to my technical knowledge and experience of power engineering as a discipline.

During my time at ETSA Utilities I completed a number of typical tasks in the Distribution Planning group. I began by doing some feeder development plans for country substations; which included finding out how load could be transferred between adjacent radial 11kV feeders in contingency events, and using local growth estimates to estimate when a feeder or substation would become overloaded, so that an appropriate action could be planned to ensure this didn't happen. I also did some bus zone offloads for country and metro substations; finding out how to transfer load to adjacent feeders and substations so that a substation bus could be isolated for repairs or maintenance.

Later I worked on customer responses; when a customer requests to add load to the network, the effect of the load on the voltage level, harmonics, load balance, etc must be analysed and various factors must be considered to find the cost to the customer for the additional load. To find these things out I used augmentation calculators, which find the cost in \$/kVA of the installation, RAdial Load Flow analysis (RALF) macro, which models the effect of the load on the network, and PSSE modelling, which is like a RALF for a higher voltage level network (33kV as opposed to the 11kV feeder network).

I also completed substation access training and was taken on a substation visit to Murray Bridge North and South substations, mostly just to observe the equipment.

I made some calculator spreadsheets for the group using logical operations and dropdown boxes. For example one was for transformer impedances, useful for doing RALF's. The user enters the high voltage level, then low voltage level. Now, given the high and low voltage levels in the first two boxes, the third will let you choose from an appropriate range of transformer load sizes in kVA. The spreadsheet then displays R and X values corresponding to the transformer data. One of my biggest jobs was to make a spreadsheet macro which could allow using a substation load vs. date .csv data file to obtain corresponding temperature data and a graph with minimal user input. It works if there are gaps in the data and can handle anything from one to about thirty feeders. Currently it has a date range from Dec. 2007 to Dec. 2008, but more temperature data can easily be added later to make it more useful.

I did various other small tasks, including writing reports, preparing tables, making new databases to make it easier to obtain data, helping with High Voltage interruption summaries, writing other macros, and doing administrative tasks for the group such as collating and entering data into documents.

To summarise, I gained a great deal of knowledge from this experience and I certainly got to try a variety of tasks commonly undertaken in the job, so in this way I have achieved my aims.

**STUDENT:** Eric Parsonage (UA)  
**COMPANY:** AGL



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During the summer of 2008/2009 I took the opportunity of applying for work experience with AGL's Torrens Island Power Station.

The ten weeks were organised into a rotation from division to division within the organisation of the plant. For the first two weeks I was with Asset Engineering, then with Operations for a shift, then Maintenance, Conditions Monitoring and finally back with Asset Engineering.

My two stretches in Asset Engineering were spent performing in-depth thermodynamic analysis of power station systems, Simple structural design to standard of platforms, tender assessment, water quality testing, plant efficiency analysis, forensic engineering, and control system fault finding. My experiences in this division taught me the importance of even the most seemingly pointless things I had learnt at uni, and gave me an idea of the broad scope of knowledge required to work in the power industry.

My time in Operations was spent on a rotating 12 hour shift assisting operators with the day-to-day running of the plant.

Whilst with Maintenance, I was rotated through the three subdivisions of Fitting, Electrical and Instrumentation Maintenance, giving me an insight into the actual physical work that needs to be done to keep a plant of this scale in operation, whilst giving me knowledge in basic fabrication, circuit analysis and PLC programming.

My time within the Condition Monitoring group was spent condition monitoring of critical plant equipment and involved vibration monitoring, oil analysis and thermal imaging.

**STUDENT:** Andrew Barley (UA)  
**COMPANY:** Electranet



For four weeks in January/February 2009 I was employed as a vacation student at ElectraNet. I worked in the Network Portfolio Group, which is part of the Development & Projects sector of the company. ElectraNet is the High Voltage Electricity Transmission company in South Australia.

The employment was undertaken immediately after my 1st year of University so I had limited experience in electrical engineering methods. This made it difficult for me to achieve much on technical projects hence the bulk of my work was on smaller jobs. These included testing a new implementation of software used for developing workforce planning reports; and making alterations to various forms and procedure documents.

I was also involved in identifying appropriate locations for testing EMF levels around the location of a current ElectraNet project. I had a couple of days out on-site assisting in taking these measurements and later processed the data into spreadsheets.

I was taken on a site tour of the Para substation, one of the largest in South Australia. I was pleased to find I had at least a basic understanding of how almost all of the components (transformers, capacitor banks etc) in the system work together and the purpose of each component.

Throughout the four weeks I had many chances to meet with the graduate engineers in the company. Discussions with this group were most beneficial – as well as the chance to network, I gained valuable insight into structure of and opportunities within ElectraNet and the Power Industry in general.

**STUDENT:** Pippa Williams (UA)  
**COMPANY:** Electranet



During January and February 2009 I undertook 4 weeks work experience at ElectraNet Pty Ltd. This work experience placement was arranged as part of the Australian Power Institute Bursary Program. ElectraNet is responsible for the construction and maintenance of high voltage power lines in South Australia.

My work placement occurred in the Lines Engineering division, where I was working with engineers whose primary focus was the designing, building and upgrading of overhead and underground power cables, and the structures to support them.

I found the range of challenges faced in the engineering process quite interesting. Although being a first-year student meant that my prior experience was limited, I was able to contribute to and experience a range of projects including:

- Collating information from a range of sources to ensure that a proposed route for a new underground power line did not interact unfavourably with existing infrastructure. This also included recommending small route changes.
- Writing a line schedule outlining each of the supporting structures needed for a proposed overhead line, along with information about the environment that they would interact with, access routes and components needed.
- Visiting existing structures to assess the possibility to upgrade them to accommodate future load requirements.

During the four weeks I was able to work alongside engineers from a range of backgrounds with a range of experience bases, which was a very useful experience. The experience I gained helped to give me some insight into the power industry, and the opportunities available to young engineers.