

Executive Summaries

2008-2009 Bursary Vacation Placements in Queensland

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STUDENT: Alina Bialkowski (QUT)
COMPANY: Maunsell Australia

Over the 2008/09 summer break, I had the opportunity to work within the Power and Energy group of Maunsell AECOM. During this time I worked on projects relevant to the protection and power system of the QR rail network.

One of the main projects I worked on was developing power model system which integrates the results of a train capacity simulator with power analysis software for static traction loads. This allows load flows and fault level studies to be performed with exact train locations and loads, providing an accurate and versatile model of the traction system, which will save time in future projects. In this process I learnt about traction configurations such as 50kV Autotransformer (AT), 25kV Booster Transformer (BT) and DC third rail systems.

Another major project I worked on was a protection coordination study for the QR Dalrymple Bay Coal Terminal feeder station. This involved calculating protection settings for all the relays including distance, overcurrent, undervoltage and differential protection, as well as calculating fault levels for every fault scenario.

Through these activities I learnt a great deal about modelling and protection of traction power systems, and feel that I have made a significant contribution to the projects. I have enjoyed the experience and look forward to further involvement in the industry in the near future.

STUDENT: Alexander Bletchly (CQU)
COMPANY: Queensland Alumina Limited



In 2008, I completed my third year of a Bachelor of Engineering (Co-op) / Diploma of Professional Practice at CQUniversity Australia in Rockhampton. During the 2008/09 Christmas vacation period (November through to February), I was fortunate enough to gain employment at Queensland Alumina Limited (QAL) in Gladstone. At Queensland Alumina Limited I worked for Geoff Rohde (Lead Equipment Reliability Engineer) and I was assigned to work with Calcination Area Mechanical Engineer, Jamie Overend.

The roles and responsibilities I have performed during my employment include: Lurgi Blower room clean air fan performance investigation, Calcination purge water consumption investigation, Tri-hydrate conveyor roller bearing thermography monitoring, Raw Materials pump audit, Clarification wash flocculant pump review and general day-to-day engineering work.

Queensland Alumina Limited offers training courses that provide their employees with the opportunity to continue their professional development. Over the past three (3) months I have participated in a number of training course including: Safety Showers, Asbestos Awareness, Heat Stress Awareness, Tropical Cyclone Procedure, Sun Protection, QSafe Observer, Electrical Awareness, Gas Awareness, Rules & Regulations and Queensland Construction Blue Card.

Working at Queensland Alumina Limited has exposed me to the large range of responsibilities imposed on Engineers. I believe that during this employment I have been able to learn and develop these skills. Thanks must be extended to all the members of staff at Queensland Alumina Limited for assisting me in my development.

STUDENT: **Brendan Boyd (UQ)**
COMPANY: CS Energy

Throughout my industry practice at CS Energy Ltd, my aim was to gain a better understanding of how a power generation company operates and how a power station is run. My bursary vacation placement, undertaken over the 2008/2009 semester break, has provided an invaluable extension to my knowledge of power generation and the electricity industry.

CS Energy Ltd is a Queensland Government-owned electricity generator with more than 580 employees, four power stations throughout Queensland and a generating capacity of 3,210 megawatts. CS Energy meets approximately 30 per cent of Queensland's electricity demand, using a mix of coal, natural gas, coal seam methane and landfill gas.

As a student engineer at CS Energy Ltd, I was given the opportunity to work both in the city at Corporate Office and at Swanbank Power Station. My role was to provide support to engineering staff and to determine solutions to arising issues.

I was given many challenging tasks to complete over my vacation practice including:

Corporate Office

Portfolio Services

- Researching transformer theory for report template
- Researching Australian Standards for cable separation distances for Callide A cabling
- Investigation of H₂ leaks on generator and generator coolers – Callide C3

Market Trading

- Redesign of the Market Trading spot price information screen

Major projects

- Investigation into new PLC purchase for Callide A
- Determining the switching needed for manual control of switchgear

Swanbank Power Station

Technical Services

- Designing and collecting data for a Swanbank B actuator database
- Battery replacement for 50V PACMS Backup bank
- Ash dam solar pumps investigation
- Urgent battery charger replacement for Berry's Lagoon pumping station

I was also given the opportunity to be involved with Swanbank B3 unit overhaul and to attend site visits of Callide and Kogan Creek Power Stations. These events were extremely beneficial, providing me a greater appreciation of the versatility and innovation in power generation.

STUDENT: Murray Chapman (QUT)
COMPANY: Powerlink Queensland



Between November 2008 and February 2009 I spent roughly 14 weeks working in the protection department of Powerlink Queensland's engineering team. I learnt a lot about power systems protection including protection for capacitor banks, bus zones and couplers, transformers and feeders.

I learnt about the major protection concepts behind these types of protection such as switch-on-to-fault handling, circuit breaker fail handling, load encroachment, residual compensation, power-swing-blocking and intertripping signalling. I was excited to apply my knowledge acquired from my studies to understand and ultimately implement these concepts to protect primary plant.

I benefited from working closely with a team of engineers in a professional environment; I learnt about Powerlink Queensland's business methodology, the level of learning and work involved in being an engineer and also how to play ping pong in your lunch break.

Upon completing my vacation work, I accepted an offer to undertake a final year thesis with Powerlink in the area of IEC 61850 – a new secondary systems communications protocol, which I now work on for roughly 20 hours per week. I also applied for, and have since accepted an offer for, a permanent graduate engineer position starting after the completion of my degree.

I thoroughly enjoyed my vacation work, and especially enjoyed working alongside other young engineers. I have made close friends with other students from Griffith, QUT and UQ as well as graduate engineers. I am enjoying my thesis work so far and keenly await my future on the graduate program with Powerlink Queensland.

My vacation work experience at Powerlink Queensland has given me technical knowledge and experience, professional work exposure, friendships, memories, contacts and a permanent graduate position; thank you to everybody who made this possible for me.



STUDENT: Marc Cochrane (CQU)
COMPANY: Tarong Energy

The purpose of the 2008-09 vacation placement report is to update all concerning parties of the content and quality of the work being carried out on my 2009 work experience period. The company for which this work experience period was carried out was at Tarong Energy, a Governmental company providing power to regional Queensland. The work experience's purpose was to help myself gain a greater understanding of electrical engineering and in particular power engineering. Power engineering is extremely important and in some instances vital to modern day society. The work experience has also helped to better improve my capabilities and understanding and will help to make a far easier and more effective transition into the work force post university.

Power Station Introduction:

An introduction and induction to the Tarong Power Station site, as well as an explanation on the operation of the equipment on site and the role that each device plays in the power generation process.

Nameplate Analysis:

Gathering of information and details for a number of the assets and machines located on the Tarong premises.

Tarong Power Station Overhaul Documentation:

Creation of documentation highlighting the key results for each overhaul completed since the opening of the power station.

SF6 Gas Analysis:

Assessment of the current SF6 levels on a number of circuit breakers located on site. Necessary documentation was created, highlighting the information and details of each circuit breaker.

Drawing Checks:

Performed drawing and site checks of existing projects to ensure the design communicated in drawings was a representation of the equipment and functioning in relation to the project.

Power Generation and Australian Standards:

Following of Australian Standards, to keep the best interest of the company/customer relationship at the core.

A greater understanding of engineering and power engineering was achieved throughout this placement, and it is much appreciated that such an opportunity can be provided to enhance skills and knowledge in this area.

STUDENT: David Edwards (UQ)
COMPANY: ENERGEX Ltd



The 2008-09 vacation placement report discusses my responsibilities whilst working at Energex, and the knowledge I gained there. I worked for the Asset Management Central West team, under Ravendra Nand: Senior Asset Engineer CBD. I helped to organise customer information to send to the Network Commercial Department, who would calculate the network charges for that customer, and create a construction and connection agreement for the customer to sign. I also helped to create models of the futures network using a program called DINIS, and used it to perform load flow analysis.

Working with the Network Commercial Department was a lengthy and difficult process. The required information from the customer which we did not have. Often the information we need may have to come from a number of sources: the developer, the builder, the electrical consultant, or any other party involved in the project. This is inconvenient to all parties, and introduces delays into our process.

To remove these delays, and to help the process flow more smoothly, a new form was created, and a timeline was drawn up detailing the typical process for a CBD project. The form will be sent to the customer early in the project, and would gather all of the information required by all departments involved. The timeline shows the major milestones for large projects in the CBD, with input from all of the departments involved in that process.

By using the form to gather all of the information early, delays and customer inconvenience can be avoided. The timeline has two main benefits: that customers will be able to see what is required from them and when, and that the departments in Energex have a better idea of what other departments are doing.



STUDENT: Benjamin Hall (UQ)
COMPANY: PB Power

During the 2008/2009 holiday period, I was given the opportunity to undertake practical engineering experience with PB Power in their Brisbane City office. PB Power operates as a group within the worldwide Parsons Brinckerhoff company. The Power group boasts expertise in gas turbines, combined-cycle gas turbines (CCGT's), coal, diesel, oil, biofuels, biomass, bagasse, woodwaste, waste to energy (WTE), geothermal, hydro, wind and solar technologies.

As a consultancy company, PB Power's industry involvement is within areas such as design, review, construction supervision and project management of infrastructure for power generation, transmission and distribution projects; feasibility studies; owner's engineer; and lender's engineer. Notable projects in which PB Power has been involved include acting as owner's engineer for CS Energy's Kogan Creek Power Station, a 750MW Supercritical Coal Fired Plant; and lender's engineer for the Nam Theun 2 Hydroelectric Project in Laos.

During my time within the Power group I gained experience in a number of aspects of consultancy work within the power industry. This experience ranged from preliminary design specification work to capital and operating expenditure estimates as well as feasibility studies.

STUDENT: Chris James (UQ)
COMPANY: Maunsell Australia

Over the summer holidays I worked at Maunsell AECOM for 11 weeks. I chose to work there because I hoped to be involved in engineering design work and to gain an idea of what it is like to work for a large engineering consulting company.

I worked in the electrical group of the Minerals and Industry division of Maunsell, which is situated at the Finchley St office in Milton. As I am studying Mechatronic Engineering at university, I hoped to learn skills which I could use in the electrical subjects I have coming up at university.

During my time at Maunsell AECOM I worked on projects such as the Gateway Upgrade Project, the Northern Expressway Project and the Ridgeways Deeps Project. I completed tasks such as checking cable schedules, inspecting equipment lists, producing installation drawings and creating commissioning documents. I spent a lot of time working with schematic diagrams and other drawings which gave me a good understanding of each project.

Working alongside engineers with a lot of experience at Maunsell AECOM was a great opportunity for me to improve my engineering skills and allowed me to experience working as an engineer. My vacation work at Maunsell AECOM provided me with knowledge that will be of benefit to my university study and my future career.

STUDENT: Stephen Vidas (QUT)
COMPANY: AREVA T&D



Over the 8-week period of my placement at AREVA T&D, several educational and practical outcomes were achieved. I was for the first time exposed to the manufacturing side of the Power Industry, and was able to observe the complexity of the manufacturing process, with a particular emphasis on testing. I was also witness to the challenges involved in organising a team and managing a project under tight time restrictions. This allowed me to advance both my technical knowledge, and also my knowledge of managerial and business processes. After this placement, I feel significantly more comfortable in a Power Engineering workplace because I am confident my knowledge has advanced beyond the basic level.

Within my unit at AREVA I was assigned a project requiring the design, assembly and testing of a 5kV Switching Box, the purpose of which was to assist in the automation of the Insulation Resistance Measurement test process. The Switching Box replaced the need for a technician to change connections throughout the testing process, freeing up their time for more productive activities. The Switching Box was designed to be used in conjunction with a portable Mega-ohmmeter and a Laptop.



STUDENT: Joshua Worley (CQU)
COMPANY: Stanwell Corporation

The 2008-09 vacation placement report sets out to summarize the work undertaken during a nine week work placement at Stanwell Power Station and evaluate the learning experiences it provided.

It starts by giving an introduction to the placement, outlining the objectives set out by both the student and employer at its initiation. It then continues on to provide background information on the employer, Stanwell Corporation and more specifically, Stanwell Power Station and the specific role the student played within the organization.


The bulk of the report discusses the major work components undertaken during the placement, evaluating the aim(s), methodology employed, problems encountered, results obtained and the final benefit to the student. At the time of writing there was still two weeks remaining in the placement and so this report is merely a summary and evaluation of the work completed thus far. The three main areas of work I was involved with was the tendering process for a major refurbishment project on site, condition monitoring of plant assets and an investigation into the reliability of a newly commissioned plant.

The tender process was a new experience for me and I learnt a great deal about how to establish and maintain an appropriate level of control over the outcome of the project through how documentation is written and what is provided to the tenders. Detailing specifics about what must be completed and even going into detail about how it must be done can help achieve this, as can providing numerous drawings, fabricated units for the job and company supervisors during the implementation stage of the project. Furthermore I learnt about some of the key aspects to consider when evaluating a tender submission and the weight each should carry depending on what work is involved in the job and its size. Things like previous experience in similar projects, personnel other material / equipment resources and their experience, policies on WHS and quality assurance, if there are any departures from the tender contract and how they propose to complete the scope of work.

I was involved quite regularly with the condition monitoring process on site, collecting and analysing vibration data and even conducting a root cause analysis on a Pump bearing fault. This allowed me to become familiar with the data collection units and techniques involved in collecting the raw data, the software used for analysing it and how to identify faults using both time domain and frequency domain analysis.

I also became familiar with concepts such as knowing exactly what is on the shaft so you can correctly determine and assign fault frequencies and the troubles in obtaining this data which can often only be overcome with building a good rapport with the maintenance crew, good communication and ensuring that your presence with the equipment is taken off line and striped so you can observe the condition of the components exactly as they are, grease and all. This can also assist in evaluating the fault and gaining feedback as visual, audible and other physical indications are priceless in fault analysis and can assist in pinpointing the root cause.

Being responsible for a plant reliability investigation enabled me to further refine skills in investigation; retrieving as much information as possible, creating a list of possible causes and then forming methods to eliminate those possibilities and pin point the fundamental cause for the equipment failures. Retrieving information regarding equipment specifications, especially from manufacturers can be time consuming but is essential when conducting an analysis such as this, as is knowing all previous history (fault reports, modifications) which could have an impact. Writing test procedures which establish a controlled environment and



ensure accurate, reliable and consistent results is another critical skill required and then reviewing / analysing the results in an competent manner can help pin point the underlying cause for the unreliability.

I believe that this placement has allowed me to further develop my skills in terms of maintenance engineering and this is something that I wish to pursue further in my careers, especially in regards to condition monitoring techniques and root cause analysis of failures to assist in developing more effective and efficient maintenance programs.

STUDENT: Tian Yu Zhang (UQ)
COMPANY: ENERGEX Ltd



My 2008 vacation work placement took place at the network operations department at the ENERGEX Control Centre, Fortitude valley. During which I spent some time at the various work groups within the network operations planning department, these include data office, major projects coordinators and engineering support.

Through rotating between the different work groups I have gained an insight into the challenging issues of each work group and was able to get a grasp of the workflow process between the work groups and how they fit within the wider organisation.

For the majority of my placement, my role is to assist the staff at control centre in conducting network analysis such as contingency, load flow and paralleling studies.

Most of the training during my placement is done with coaching from colleagues. In addition, I have taken network operations training modules on voltage management, single phase voltage regulators, learnt how to calculate the various substation control system parameters, how to calculate various types of fault current using symmetrical components and briefly touched on some of the major complications of feeder paralleling through system modelling and case studies.

Overall I believe my experience at ENERGEX control centre has been a great learning experience. Although the placement was for a short time, I have learnt a great deal as it had built on my past experiences in distribution planning as well as switchgear protection, and many of the concept I have learnt in the past have been made much more meaningful.



STUDENT: Adrian Brown (CQU)
COMPANY: Ergon Energy

everything in our power

For the past 6 months I have been working at Ergon Energy's office on Richardson Road in Rockhampton. Of these six months, I have spent 5 in the power quality group as well as a four week period in field services.

In the Power quality group I have been able to work on a number of interesting and challenging projects including, but not limited to:

- Researching and updating Ergon's Network Performance Standard.
- Programming and configuring portable power quality meters
- Updating schematics within Ergon's network simulation software
- Monthly Reporting Tasks
- Ergon's Network Monitoring Program

Of these tasks, I have found the network monitoring program to be the most rewarding. I have been fortunate enough to see a start to the installation of over 1600 power quality meters across the state and have learnt a great deal, not only about monitoring of power quality within distribution networks, but also about the management of finances, people and resources within a project of this scale.

Whilst my time in the office has been highly beneficial to my professional development and I have been fortunate enough to work with a number of highly knowledgeable engineers, I was amazed by the amount that I took from only 4 weeks with field services. I found that I was able to spend time in a hands on environment and was able to get "up close and personal" with some of the things that I had only seen in text books before my placement. This has helped me immensely not only with my understanding of the practical side of engineering, but also my level enthusiasm towards my studies as a whole.

Overall, my time at Ergon Energy has definitely been the most interesting, rewarding and beneficial six months of my time as an engineering student. I have learnt more in this time than in the first two years of my studies and am very much looking forward to my next industry placement.



STUDENT: Leisa Cash (UQ)
COMPANY: United Group Infrastructure

My 2008/2009 summer work experience was carried out at the Spring Hill office of the Infrastructure division of United Group Limited. I was placed with the electrical engineering design team, exposing me to the low voltage design aspects of Powerlink transmission/distribution substations. My time was divided between adapting existing templates to new installations for substation refurbishments, allowing me to learn much about protection systems; checking the suitability of cable sizes; cross-referencing cable numbers to ensure accurate records and learning about the administration aspects of project bidding and development.

The Spring Hill Infrastructure group has completed 22 design and/or commission projects, totalling \$225M, and is currently developing 11 more, totalling over \$200M. This group of 60 people focuses purely on substations, particularly those belonging to Powerlink.

While I enjoyed my vacation placement, UGL is new to the API bursary and may benefit from some suggestions. To ensure the next group of undergraduates has an even more interesting experience, they could be switched from secondary systems to primary systems, halfway through their stay. Another option is to have them work onsite for the first four weeks, or for one day a week throughout their whole placement, so they may benefit from meeting and being taught by both tradespeople and engineers with practical experience.

The three months I have spent at UGL have greatly increased my knowledge of both electrical and power engineering. As a result of my experiences with adapting existing templates to new installations, checking cable sizes and administrative duties, I am now far more familiar with substation design projects, including the approach to designing a solution, the process of project bidding and the financial aspect of project development. I have thoroughly enjoyed this experience and found everyone to be incredibly helpful, knowledgeable and enthusiastic.

STUDENT: Lawrence Claire (QUT)
COMPANY: ENERGEX Ltd



The 2008-09 vacation placement report describes the experience of Lawrence Claire during his time as a vacation employment student at ENERGEX Ltd during the 2008/2009 summer holidays. The employment was gained through the Australian Power Institute Bursary Program. ENERGEX is a government owned corporation who manage the electricity distribution network in South East Queensland.

Lawrence worked within the Distribution Planning Department, who are responsible for the 11kV distribution network. They perform load flow analyses on the 11kV network to plan maintenance on existing feeders and carry out load forecasting to help plan where new feeders need to be built. Lawrence mainly worked on the DINIS Cleanse Project, in which he helped to keep the master model of the load flow analysis software DINIS up to date. This required him to evaluate whether a part of the 11kV network, whose cable type and current rating was uncertain, was critical to DINIS producing an accurate load flow analysis, and if so, authorise a site visit to confirm what the cable type was. He used his knowledge of electric circuits to help him make that evaluation. Lawrence had the opportunity to participate in these site visits, where he helped to judge the cable size of a stretch of conductor.

During this employment, Lawrence has gained a good general knowledge of the 11kV distribution network, including a deeper understanding of the different cable types and sizes used in the 11kV network, and other elements of the network such as transformers and voltage regulators. He also has gained a broader geographical knowledge of South East Queensland through planning all the required site visits.

This period of vacation employment has given Lawrence a substantially greater technical and professional knowledge of the electricity distribution industry.



STUDENT: Jerom Fox (QUT)
COMPANY: Tarong Energy

Over the 2008/2009 university vacation, I was employed by Tarong Energy Corporation as a student engineer at Tarong Power Station in Nanango. The program of work undertaken provided me with an understanding of many of the systems and processes involved in operating, maintaining and improving the station. This vacation placement report will give an overview of my placement, and detail some of the challenges experienced, the solution methodologies implemented, and the final results.

I was fortunate to be able to work with many different engineers and technicians over the placement period, and each provided me with different views and perspectives, as well giving variation in the types of projects I undertook. Perhaps the largest general problem I encountered was in fact these varied perspectives, which, when working through a project, necessitated much communication and liaising with everyone involved, to ensure the most effective resolution is reached from a holistic viewpoint. Projects such as an Australian Standards based safety audit of station crane maintenance platforms, design of an air-conditioning maintenance access platform, and an investigation into metal creep and oxidation in the boiler tubes all required significant interaction between several different departments within the corporation as an intrinsic part of the solution process.

Another problem encountered regularly throughout my placement was in understanding the documentation systems of the corporation and reaching proficiency in the use of them. Tarong Power Station was constructed in the early 1980's, and the corporation has had different filing and documentation systems and procedures implemented over the course of its history. Searching for drawings, documents or files from different stages in the plants history can therefore be difficult, and can cause relatively small tasks to become much more difficult.

I had an extremely enjoyable time working at Tarong Power Station. I worked with many engineers on projects and smaller tasks, and was constantly challenged in my undertakings. Tarong has an excellent culture in the workplace which allowed me to be comfortable in my role as a student engineer; it has a massive strength in its employees, who make it an enjoyable place to work.

STUDENT: Jack Grummitt (QUT)
COMPANY: Queensland Gas Company – BG Group



Over the summer of 2008-2009, I undertook a vocational placement at QGC – a BG Group business. This company is a leading Australian coal seam gas producer, operating out of the Surat Basin. QGC currently supplies the domestic market, with plans to enter the international market with its two train LNG project.

At QGC, I took on the position of a Surface Facilities Engineering Technical Assistant, as part of the production team. This placement was based in the Brisbane office, but also involved several trips to site, located west of Chinchilla. During my placement I worked as part of the QGC production team, an extensive group comprised of a multitude of professions, working in cohesion with the sole goal of optimising production.

The role saw me perform a multitude of tasks, assisting the engineers in their duties and gaining an in-depth understanding of the plant and its operation. The tasks I performed during the placement were numerous and varied, including, but not limited to:

- SCADA Trend Analysis
- Facilities Documentation
- Plant fault finding
- Plant alarm efficiency analysis
- Visio PFD's of Facilities
- P&ID analysis
- Implementation of an CMMS (Computerised Maintenance Management System)
- Metering verification
- Reviewing QGC practises against BG standards and guidelines

The placement was thoroughly productive and enjoyable. I gained a copious amount of knowledge in relation to the gas industry, and additionally have had an opportunity to learn about management and organisational practices within a young company and see them change as it rapidly increases in size.



STUDENT: Guang Guan (UQ)
COMPANY: Ergon Energy

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The 2008-09 vacation placement report outlines the professional practice experience I undertook for a three month duration in the 08/09 summer vacation period. I had the pleasure to work for Ergon Energy in their far north office located in Cairns.

I was assigned to the Network Generation team, in particular investigating alternative technologies for their isolated power stations. My role allowed me to be exposed to many different alternate and renewable technologies ranging from hydrogen fuel cells to geothermal power stations. I dealt with a wide variety of project types ranging from conducting experimentation and testing, undertaking feasibility studies and preparing a cost analysis.

I feel the placement has been extremely beneficial because of its exposure to many different and varied technologies. I was able to use the knowledge acquired in thermodynamics, fluid mechanics and heat transfer in many practical applications. In addition to this I was also exposed to the limits and possibilities of renewable energy sources in the power industry now and in the future.

STUDENT: Deanna Hood (QUT)
COMPANY: ENERGEX Ltd



Over the three-month course of employment at ENERGEX's city office, my technical understanding of a wide range of aspects of and relating to the power industry has increased.

The position in the Network Performance division was as a project officer in the Demand Management department.

My main task over the course of employment was construction of an industry report entitled 'Small Scale Photovoltaic Generation Metering and its Effect on the ENERGEX Network.'

This report investigated:

- solar photovoltaics (PV) and the impact on the network to date with the current net metering scheme,
- international experience in the PV industry with respect to metering schemes and other incentives,
- anticipation of the effect a gross metering scheme would have on ENERGEX's network, and
- forecasting the impact on ENERGEX's network in the future.

My research, report writing, organisational and long-term planning skills have benefited immensely from the position and consequently I feel better equipped to undertake further study and employment in the engineering profession.

I would like to extend my sincerest gratitude to the Australian Power Institute Committee and Partners and ENERGEX for the opportunity presented over the 2008-09 summer in the Vacation Engineering Student Program.



STUDENT: Ryan Kirkman (UQ)
COMPANY: Ergon Energy

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The purpose of the 2008-09 vacation placement report is to document my time at Ergon Energy, and make note of the valuable learning and industry experiences working at one of the leading power distribution companies in Australia afforded me. In the wet tropics of Far North Queensland I would engage in a wide range activities including drafting power network simulation diagrams, using network simulation diagrams to model the flow of power in radial and meshed feeder networks, perform studies based on the flow of power in these networks, and look at the possibility of automating the drafting of network simulation diagrams to name just a few of the more interesting projects I was involved with.

The main purpose of my time at Ergon Energy was to model the distribution network in the Kamerunga region of Cairns, and investigate the effects on the network during peak load periods in summer. These investigations would be used to help deal with any possible future occurrences of such summer peak demand periods, ensuring customers experience as little downtime as possible. The outcome of the modelling and investigation tasks undertaken was a more geographically and electrically accurate model of a complex meshed feeder network in the Kamerunga region that will be useful in reducing customer outages in the event of maximum demands during peak summer periods.



STUDENT: Thomas Passaris (CQU)
COMPANY: Stanwell Corporation Ltd

My work experience for the 2008/2009 vacation period was undertaken at Stanwell Power Station, as part of my Co-op placement which is part of my electrical engineering degree at CQUniversity. I worked in the Asset Management Team which looked at the plant from a long term perspective and evaluated which parts of the station may need repair or maintenance; rather than replacement. The team also looks at feasibility for the installation of equipment in the plant.

In the first weeks of the placement I went through various training and inductions from which I could access the plant in a safe manner, took numerous site tours to better understand the plant and its layout which were conducted by engineers and tradesmen.

While working at Stanwell Power Station I completed an Arc Flash Protection Product Investigation. In this report I evaluated various arc flash protection systems which were available on the market. They are a method of keeping switchboards safe for workers and eliminate possibility of damaged equipment. In completing the report I developed knowledge in arc flash and switchboard operation which was a new experience for me.

I also was able to implement the installation of an Alarm Timer which gives a five second test signal throughout the station as a way of ensuring the system functions correctly and was wired to also give a test page to Plant Technician (PT) paging devices which are known for random failure. The old timer would go out of time very easily and was not an effective means of giving an accurate test signal. There were some issues with the installation and I developed skills in being able to implement work under short time periods with limited resources.

I also completed various pieces of work for people whenever they needed a helping hand in finding a piece of information about plant equipment, and also had the opportunity to sit in on plant maintenance and testing of equipment. It was great to take part in both technical and practical pieces of work.

My experience at Stanwell Power Station has been a great one thus far, and I am looking forward to the next five months on my Co-op placement where I can continue my knowledge development of the plant. I have been able to expand my knowledge technically but feel as though I have matured as an electrical engineer during my time at Stanwell Power Station.

STUDENT: Alexandra Price (UQ)
COMPANY: Powerlink Queensland



During my five week employment with Powerlink, I undertook numerous different tasks in the substation electrical design division.

My first task was to determine the radius of curvature of a spacer and analyse the voltage at which corona effects start to occur. I then determined the potential gradient of an open isolator using electromagnetic equations. I gathered, tabulated and graphed HV and TV winding resistances for a transformer. One of my principle tasks was to design and analysed lightning protection schemes for two substations using modelling software. I also communicated with representatives from manufacturing companies as part on an investigation into two shunt reactor faults compiling my findings into a report. My final task was to compile a database of substation pollution ratings.

My office based work was supplemented with two field trips to AIS and GIS substations and a trip to AREVA to observe a transformer being constructed.



STUDENT: Damian Rua (UQ)
COMPANY: Stanwell Corporation Ltd

My work experience for the 2008/2009 vacation period was undertaken at Stanwell Power Station, which involved 12 weeks of predominantly control systems engineering in Central Queensland. Throughout this placement I undertook rigorous plant familiarisation training, summarised a lot of control logic sequences for a training module, created a reference document for a conveyor indexing system and extracted data from the Human Machine Interface (HMI), amongst other smaller jobs.

The first couple of weeks were spent in safety training presentations, reading plant familiarisation documentation, touring the station with various engineers, talking with staff about station equipment and learning the Siemens control system. In conjunction with reading technical information, touring the site and conversing with engineers proved to be the most efficient way to learn both the broad and detailed workings of the power station.

Whilst at Stanwell Power Station, my main job was to summarise numerous control logic sequences to be used in a plant technician training module. These start-up and shutdown sequences included:

- Coal receipt, bunkering and feeding.
- Induced draft and forced draft fans.
- Main flame igniters.
- Mill warm-up, mill motor and mill master.

I found the main flame igniter logic to be the most interesting, as by this stage in the placement I was quite familiar with interpreting Siemens logic.

One of my smaller jobs was to create a reference that documented the indexing system for the conveyors that directly feed the boiler bunkers. Another small job I had was to extract data from the HMI and analyse the performance change after a multi-million dollar maintenance operation to the mills.

Working at Stanwell Power Station was a very valuable experience not only for the technical knowledge gained, but also for the opportunity it gave me to move out of home and experience the power engineering lifestyle. After being at Stanwell Power Station, I am looking forward to finishing my degree and working full-time in the industry for several years before returning to university part-time to complete post-graduate studies in power engineering.



STUDENT: Matthew Sands (QUT)
COMPANY: PB Power

I was extremely fortunate to conduct my work experience for the 2008/2009 summer break at the leading engineering consulting firm Parsons Brinckerhoff Pty Ltd (PB) in their Brisbane office. PB is a participating company of the Power Engineering & Bursary of the Australian Power Institute.

PB is an international consulting engineering firm which specializes in the provision of comprehensive services for all types of infrastructure projects including projects related to power generation and supply, buildings, transportation and telecommunications. PB provides a range of services such as: design work, construction, construction management, feasibility studies related to viability of projects, and can provide comprehensive services throughout the life of a project including implementation and maintenance advice.

During my placement at PB I was exceptionally privileged to have been involved in the broader development of significant technologies and projects within the power industry. During my time at PB I was involved in two significant projects, namely:

- Geothermal hot fractured rocks power generation which represents the diversification of power generation into so-called renewable 'clean and green' power; and
- Integrated gasification combined cycle power stations a technology which enables the capturing and sequestration of up to 90% of the carbon dioxide. Thereby, reducing green house gas emissions from traditional power sources such as coal.

As a result of the work undertaken at PB I was exposed to and involved in 'cutting edge' projects which are being developed as solutions to the world-wide problems associated with climate change. Through working on these projects I gained a further understanding of the vital role engineers' play in addressing climate change issues and developing future viable solutions to address this global problem. Due to the interesting work I performed and the importance of the development of the technologies represented in these projects my desire to pursue a career in the power industry has been cemented.

By working at PB I gained an insight into how engineering consulting firms operate and in particular how they support the development of significant projects within the power industry. Importantly through my work I gained a real appreciation of what is involved in a feasibility study with particular emphasis on the compilation of costs associated with design, construction and implementation of large scale projects. I was able to see how important these costs are to the overall capital expenditure and economic viability of a project.

The work at PB provided me with an opportunity to apply and refine skills learnt from my university studies to real projects in the workforce. The skills and areas of knowledge which I was able to apply and refine included, but were not limited to:

- Design and project development;
- Research skills and methodologies;
- Application of mechanics, materials and fundamentals of electrical engineering;
- Communication skills;
- Fluid mechanics and thermodynamics.



STUDENT: Joshua Venton (CQU)
COMPANY: Tarong Energy

During the 2008/09 summer holidays I gained vacation work at Tarong North Power Station. Tarong North is a 445MW single unit coal fired power station which uses a supercritical boiler design making it one of Australia's most efficient power stations. During my time at Tarong North, I worked in the Asset Management department and also spent a couple of weeks in the workshop with the electricians.

My time in the workshop helped me to gain a better practical understanding of the operation of the plant while my time in the asset management department helped to improve my engineering and technical knowledge. I also got to experience a plant outage which allowed me to look at parts of plant which I wouldn't normally have gotten the opportunity to see. The tasks that I were given to complete helped me to become more familiar with the operation of the plant in general as well in some more specific areas. I also learnt how the control system worked through my involvement in creating and investigating several logic designs.

Overall my time at Tarong North Power Station was highly beneficial to the development of my engineering skills and knowledge, particularly in power engineering.

STUDENT: Jessica Wrigley (UQ)
COMPANY: AREVA T&D



Over the period from the 1/12/2008 to 6/02/2009 I was fortunate enough to spend my Student Vacation Work at Areva T&D in Rocklea. Areva is a huge power systems company with headquarters in Paris, France.

During my time at Areva T&D, I was located in the Services business unit (ASB). ASB handles all orders from transformer clients, whether it be new transformers or servicing old ones and just recently medium and high voltage switchgear. My project for the summer had two parts to it. Firstly, I was to research the fundamental tests for a transformer in order to write a Practical Testing guide for new employees and technicians. I specifically focused on the tests for Ratio, Insulation Resistance, Dielectric Loss Angle and Capacitance and also Winding Resistance. The guide informed the reader of purpose and background knowledge, methodology and acceptance criteria for each specific test. Winding Resistance was especially interesting and particularly to be studied in detail for an extension for my project, so an extra focus into this test was completed. I looked at Winding Resistance test results, analysing the patterns that the various problems created and hence how it affected the data. I was also lucky enough to be involved in experiencing the entire process of transformer fault finding in a transformer.

Secondly, I produced a second practical guide. This guide was to be a 'visual diary' of the transformer construction process. I completed tours of the factory, where I was able to learn the in depth techniques and methods of windings, core building, phase assembly, testing all the way through to the final erection on site, on the way, taking pictures and finally compiling them into a visual construction guide.

Throughout writing and researching for these guides I was also exposed to the contracts and project management side of the Services business unit. Through this I was able to compile various Site Files, Contracts Files, Works orders and logistics to facilitate work.

In addition to my given tasks, I also was fortunate enough to learn more about transformer oil testing, and was able to spend time in the oil testing labs. This was especially interesting in that it showed that transformers are a multidisciplinary area incorporating not only electrical and mechanical engineering but also a reasonable amount of chemical engineering.



STUDENT: Kieran Wynn (UQ)
COMPANY: ABB Australia

The 2008-09 vacation placement report explains what I have achieved and demonstrates what I have learned from working with ABB over my summer vacation placement. I undertook 3 months work experience with ABB Australia at its Darra manufacturing facility. The primary focus of this site is the manufacture of small distribution transformers used throughout Eastern Australia by a number of utilities, supply authorities and electrical engineering companies.

I was placed in the process improvement and quality department, responsible for ensuring efficiency of manufacturing processes and quality of products. Over my placement period I carried out a number of small projects with this aim in mind.

I helped quantify the wastage of a particularly high grade of steel used extensively throughout the factory, and suggested ways in which this wastage could be reduced. I then performed an experiment to collect enough data to be able to optimize the amount of this steel included within the finished transformer to minimize labour requirements and cost of production.

As part of a project to upgrade factory information systems and product identification, I built up a map of the information flow of the entire factory to identify priority areas for action in simplifying and unifying the exchange of information between areas and departments involved in the production of transformers at the site.

I also developed and practiced core engineering skills such as project planning via A3 reports, process mapping with flowcharts, problem solving and process improvement techniques as well as how to efficiently communicate and collaborate with colleagues both in and out of the meeting room.

I developed my people skills by interacting closely with operators in the factory. By discussing their daily jobs with them, I was given insight into the subtleties of the production processes, and could then bear this in mind when analyzing the process at a higher level.

STUDENT: Edward Burstinghaus (UQ)
COMPANY: United Group Infrastructure

During the summer break this year I undertook a work placement with United Group Brisbane as part of my bursary program, organised by the Australian Power Institute.

In my vacation work as an apprentice electrical engineer I was taught a great deal about the theory behind substation grounding systems and the criteria they must meet in order to effectively ensure the safe operation of the substation equipment, and most importantly the safety of personnel and the general public. I was taught how to use CDEGS (Current Distribution, Electromagnetic Fields, Grounding and Soil Structure Analysis), a software package which can be used to design and simulate the performance of substation grounding systems during a fault scenario. I was also involved in the testing of the grounding systems of three 'brownfield' substations; Southpine substation, Pandoin substation outside of Rockhampton and Bolingbroke substation outside of Mackay. I performed and assisted in the performance of grounding system tests including current distribution measurements, touch and step voltage measurements and the fall of potential test. Environmental hazards were encountered on one of the sites which made establishing an earth injection point difficult. This challenge was overcome by relocating the earth injection point to a significant distance from away from the substation in another direction which was free from environmental hazards. On another site a structure outside of the substation yard was found to have an unsafe prospective touch voltage.

I also learnt more about the topics of three phase power and its transmission and distribution, symmetrical and asymmetrical components for analysing the behaviour of electrical systems during a fault and power system protection.



STUDENT: Kerry Clarkson (QUT)
COMPANY: Powerlink Queensland

My vacation employment was at Powerlink Queensland in the substations plant strategies team under David Gibbs. I met with David and he introduced me to the rest of the team including another vacation student Glen Mcalister.

We were taken aside by David and given a pool of tasks we could draw from during our time with Powerlink Queensland. Some of the tasks were simple and some of them were challenging. I was both excited and apprehensive about working full time again as I have been experiencing health issues for many years.

Glen and I were able to choose three tasks to being with and I chose the CT near miss list, the Oil sample database task and conservator oil volume task. I chose these tasks because each one would equip me with basic knowledge and skills of the in house database systems to tackle more complicated tasks.

The first task I chose to work on was the oil sample database. Amra (another engineer in the team) explained that she had been keeping all the data that the oil lab sends our team in a series of excel sheets. She asked me to gather the information clean it up and put it into a database. I did this using access.

The second task I tackled was the Conservator oil volume task. David explained to me that some of Powerlink Queensland's transformers have had sulphurous oil put into them which can cause the copper windings to corrode. It was my job to find out the volumes of oil in each transformer's conservator so we could introduce pasivator into the transformers to inhibit the sulphur. This task bloomed into various other tasks and I also had the privilege of attending meetings about this unfortunate phenomenon.

From there I was thrown into a number of tasks that I have outlined in the report.

I found my experiences at Powerlink Queensland to be an excellent driving force in motivating me to finish and excel in my studies. The team I worked with guided and helped me develop skills that I will be able to apply in further endeavours. Also the knowledge I have gained whilst working at Powerlink Queensland will serve as an excellent foundation for further skills and studies.

STUDENT: Matthew Dagg (QUT)
COMPANY: AREVA T&D



During my vacation placement at Areva T&D Rocklea I was able to develop important skill sets and gained valuable knowledge and practical experience in the power industry. This was accomplished whilst also benefiting the host company through the completion of several minor projects and a single major project during my time in the Switchgear business unit of Areva T&D.

The major project undertaken entailed the optimisation of the OX36 circuit breakers production line to double its weekly capacity. To accomplish this task firstly research was done into the already implemented production line through available documentation and discussion with employees working within and closely with the OX36 production line. The major problems inherent in the current production line were then identified based on the information gathered from other employees and methods were identified to both fix these problems and to further increase production efficiency. A new layout was then generated using the identified methods and verified by the leading hand of the OX36 section.

However, due to the minimal budget of the project the new layout had to utilise only the equipment currently available in the section, which limited the amount of optimisation which could be achieved. For this reason a set of recommendations were also put forward, which included design modifications to equipment currently used, the purchase of additional equipment specifically designed for the section and a completely redesigned product flow. These recommendations were made with the help of Chris Gough, an Areva T&D employee very experienced in the area of product line optimisation, and would allow the capacity of the line to be increased further, if it is required.



**QUEENSLAND ALUMINA
LIMITED**

STUDENT: Pavan Denduluri (QUT)
COMPANY: Queensland Alumina Limited

The purpose of the 2008-09 vacation placement report was to detail my vacation placement during the summer of 2008. As a part of The Australian Power Institute (API) Vacation Placement program, I am required to undertake vacation placement with one of the bursary partners. My vacation employment for the summer of 2008/2009 was at Queensland Alumina Limited (QAL), an alumina refinery in Gladstone. QAL is one of the largest producers of Alumina in the world with an output of around 4 million tonnes per year. The Bayer process onsite processes bauxite, mined in Weipa to produce Alumina which is the primary ingredient of smeltered aluminium.

My vacation work experience at QAL has provided me with an insight into operations and engineering in a large scale industrial plant as well as gaining valuable experience in interpersonal skills.

During the course of my employment, I was assigned three projects namely, the Programmable Logic Controller (PLC) point audit, the conveyor upgrade and the oxalate projects. The conveyor upgrade and oxalate projects in particular, required me to come up with a design to be implemented for construction. These projects had been undertaken at the plant for the first time and along the way there were a number of key challenges that needed to be addressed. I found that the key components that were helpful in addressing these challenges were initiative, perseverance and communication.

My vacation work at QAL has been both enjoyable and beneficial. I had set out to meet certain initial expectations and after my three month stint I can confidently say that I had come out as a more developed individual.



STUDENT: Alexander Hugall (UQ)
COMPANY: PB Power

Over the 2008/2009 summer break I undertook full-time professional engineering practice within the Power group of Parsons Brinckerhoff Australia, facilitated by the bursary program of the Power Engineering Alliance (now the Australian Power Institute). The purpose of the 2008-09 vacation placement report is to provide me with the opportunity to describe the benefits of my experiences whilst on professional engineering practice and to show that I have acquired knowledge and experience in the written communication of technical ideas.

Having only completed the first year of my engineering degree, I came into this placement with low expectations as to the amount of work I would be able to do for the company, but I found this not to be the case. I was quite involved in the projects that I worked on, not always in a technical capacity, and my technical involvement was not always of the greatest difficulty, but the involvement itself provided me with invaluable experience.

Working within the power industry, I found a complexity that the normal person most probably would never see. It amazed me as to the scale of works and the necessity for complete diligence in design as to ensure not only the proper operation of the industry, but also to try to allow for possible future demand and problems.

One striking feature of my experience is that in discussions with my friends within my engineering course, is that most of the people I spoke to about my placement, their first question was "So what exactly does an engineer do?". This question is something that I can now answer, something that my placement not only showed me, but allowed me to be a part of. It isn't surprising the number of people who after their first year of an engineering degree are still unsure as to where it will lead them when they complete their degree, but it seems that it is necessary for students to do some professional engineering practice to provide them with answers and to give their course some relevance.



STUDENT: Roland Jarrett (CQU)
COMPANY: Ergon Energy

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The Lines Standards section of Energy Services in Ergon Energy had previously developed a suite of Microsoft Excel spreadsheets to assist staff working on the structural design of Overhead LV, 11kV, 22kV and 33kV Distribution lines. The spreadsheets were used to determine pole loads, conductor tensions, sag and phase clearances etc. It was my task during this vacation placement to work on the adaptation of these spreadsheets to 66kV Sub-Transmission line designs.

The work called upon existing programming skills from my I.T. background, and drew upon my learning in the fields of statics and dynamics. Although my chosen discipline was electrical engineering and there was only a minor amount of electrical work involved in my duties, the work was still valuable as it highlighted the need for me to have a broad range of skills and to be flexible enough to carry out tasks that are not necessarily within the band of my chosen specialisation.

One challenge I faced was that some of the formulas and equations used in the Distribution spreadsheets were not, on first appearance, exactly as per ENA C(b)1–2006 Guidelines and not formally documented. The work required me to communicate with the authors of the Distribution sheets and other engineers so I could get a better understanding of the derivation of these variations from first principals, and thus understand how they were to be incorporated into the Sub-Transmission design sheets.

While working towards the goal of completing the spreadsheets, I was given the opportunity to sit in on presentations about gas switches, sectionalisers, and ACRs (automatic circuit reclosers), and to investigate and compile a technical summary on Meggar insulation testers. I also met engineers from the Power Quality, Planning and Protection sections of Energy Services and had a chance to find out a little of what their roles and responsibilities were within Ergon Energy.

Working for Ergon Energy on this placement gave me an indication that my decision to return to study and make a career change at the mid point of my working life was a good one. There will be many interesting and rewarding areas of Electrical Engineering for me to work in, and ample opportunity to do work that really matters to myself, my employer, the customer and potentially the community at large.



STUDENT: Shane Jenkin (JCU)
COMPANY: Tarong Energy

During the vacation work period I have enjoyed observing the various engineering feats for coal-fired power generation and the effort going into maintenance, whilst minimising costs associated with the running of the plant such as overhaul costs associated with contractors' facilities.

The most outstanding costs to Tarong power station, I noted, was both the high maintenance to the twenty-four coal pulverisers, six for each steam turbine unit, and the costs associated with turbine outages/overhauls.

My main focus, during vacation work, was design tasks given to me in preparation for a High Pressure Turbine and Intermediate Pressure Turbine overhaul.

Solid Edge and Space Gas software, used for designing and structural testing and analysis of steel members and produce fabrication drawings, allowed myself the designer, to create and alter designs improving structural integrity and reducing costs associated with pricing and fabrication of certain steel types such as using lighter, more efficient steel members. This technique used wisely improved efficiencies and reduced costs to Tarong Energy Corporation from reduced costs in fabrication to optimising structures reducing the amount of steel purchased.

The limited operating licence of three persons for both programs, Solid Edge and Space Gas at Tarong, may require an open access student licence that will greatly improve student/beginner operator experience and competency during training and/or vacation work.

A notable mention that needs to be articulated is house keeping of the Tarong power plant which maintains such a high degree of cleanliness site wide. As I have been employed for a number of years in a trade at various sites, Tarong distinguished itself as the most well presented coal-fired power station visited.

STUDENT: Harrison Lee (QUT)
COMPANY: CS Energy

From November 2008 to January 2009, I participated in an 8-week work experience program organised by the Australia Power Institute at CS Energy, Swanbank Power Station.

During this 8-week work placement, I was placed in the maintenance department as a temporary employed vocational student under the supervision of Mr Don Ivory, a mechanical maintenance specialist who provided tremendous help and guidance.

I was assigned to several projects and tasks. These activities include:

- Develop and construct a database containing relevant information of E station valves
- Investigate B station Ash Plant vacuum losses
- Compose B station Ash Plant status report
- Compose Cooling Water Make Up pump repair specification
- Compose B station protective coating technical specification
- Update Hydraulic rams registry

These activities have exposed me to various situations and enriched my experience which I believe not only enhanced my study from Queensland University of Technology, but also inspired further career motivation. From this work placement, I also developed greater technical knowledge, better work ethic, problem solving skills, time management and personal confidence. I also realised that I needed further improvements in area such as attention to detail. Overall the work experience has been reassuring to the career path as a power engineer.

STUDENT: Tianya Li (QUT)
COMPANY: ENERGEX Ltd



Through the API Power Engineering Bursary Program, I was fortunate to gain work experience with ENERGEX over the 08/09 summer vacation as a first year electrical engineering student. Appointed as a Project Officer, I was positioned in Planning and Design Department within Energy Delivery Division.

With the aim to give me broad exposure to the power industry, my placement was divided between two sections: Central West Distribution Planning and Design and Major Projects Transmission Mains Design. My role was to learn about work practices of ENERGEX through observing, listening, asking questions and completing tasks.

In the first section, I was involved in four projects consisting of a link pillar installation, two transformer upgrades, and an overhead mains upgrade while undertaking small tasks such as recording survey results. In the second section, I was primarily responsible for designing underground cable for a capacitor bank installation project, updating cable records and recreating a conductor load table. Throughout my placement, my experience was enriched with numerous practical site visits and diverse meetings.

From those activities, I gained experience in areas such as planning, estimating, drafting, material requisitioning and project coordination. Knowing that my projects solved real-world problems and improved life of others, I obtained much job satisfaction and appreciated the essential role of the power industry in modern society.

In general, my first exposure to the power industry was an eye-opening, practical and rewarding experience. I gained much knowledge of the distribution, sub-transmission and storm response aspects of the industry as well as the inner workings of a large government-owned company. I obtained understanding of the responsibilities and significance of engineers, technical officers and surveyors and the importance of teamwork, communication and problem solving skills. This experience instigated purpose for my university studies and reinforced my choice of career as a power engineer.



STUDENT: Steven Lowry (CQU)
COMPANY: Stanwell Corporation

Stanwell Power Station (SPS) has three communication links that transfer data between SPS and both Powerlink and the National Electricity Market Management Corporation (NEMMCO). The Control Indicate and Telemeter (CONITEL) protocol is used for this data transfer. Each link consists of a dual redundant Master Transfer Unit (MTU) and Remote Transfer Unit (RTU) connected via a modem. One of these links is used for data transfer from Powerlink to SPS. The second link transfers data from SPS to Powerlink. The third link is dedicated to data transfer between SPS and NEMMCO. This link is referred to as the Automatic Generation Control (AGC) link.

The need for this project arose from limited knowledge of and the type of information sent and received across the AGC link. Much of the information sent across the AGC link has been identified as redundant and non-essential to the day to day trading activities of SPS. The purpose of project was to learn more about the operation of the CONITEL communications system and catalogue all incoming and outgoing CONITEL signals.

Due to time and resource constraints, the project was not completed, however the work that was completed over the 12 week period laid a very sound base of knowledge from which future vacation students could complete the project objectives. Despite not having the project completed, all relevant stakeholders were satisfied with the work completed during the 12 week period.

STUDENT: Dylan McVeigh (QUT)
COMPANY: ENERGEX Ltd



During Semester 2 of my first year at university at Queensland University of Technology, I took the opportunity to apply for the PEA Bursary Program, now named API Bursary Program. This application was successful and led to the opportunity to work for various companies during each Summer Vacation Period whilst studying at university. This is currently my first Vacation Work Experience which I have undertaken and is at ENERGEX during the 2008/2009 vacation period.

ENERGEX is a distribution utility supplying electricity to customers in the South East Queensland (SEQ) area. I was placed in the main office building in the CBD and undertook roles involving the construction of models for optimisation of costing in developing areas. I was part of the Network Performance Reporting division whom I worked with four others.

The experience which I have gained during this Vacation Employment has been valuable and has taught me a great deal about many aspects of the SEQ area and the distribution of power. Other worthwhile experiences include interacting with other Vacation Students and Graduates who are part of ENERGEX's Graduate Recruitment Program. I thoroughly look forward to my next Vacation Experience as if it is anything like this one, shall be another valuable experience.



STUDENT: Benjamin Moore (JCU)
COMPANY: Ergon Energy

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During my placement with Ergon Energy I have worked on the Solar Cities project which is based on Magnetic Island. I have been required to process and analyse data that has been collected from residents on Magnetic Island and present it graphically. I have also used Excel and other office applications like Microsoft Access to create queries to search through databases to find residents that fall under different categories. I have used AutoCAD to produce maps of the island to clearly show which houses have Solar Panels on their roofs, which have been assessed etc. so the distribution of these premises can be easily seen.

Although primarily based in an office, I have been given the chance to spend time on the island which has helped me see first hand, all of the ways in which the team is helping to reduce energy usage on the island. As well as that, I have had the chance to see very new technology pioneered, to help reduce the heavy load on the electricity network during the peak energy usage period.

The following report shows in further detail, my experiences working for Ergon Energy on the Solar Cities project.

STUDENT: Timothy Nakhla (UQ)
COMPANY: Connell Wagner

The 2008-09 vacation placement report is a summary of my vacation experience over the 2008/9 summer break at the consultancy firm, Connell Wagner. I was placed in the Transmission and Distribution division under the Energy market. The types of work conducted in this division were: network planning, network protection, industrial substation design, network analysis and network concept design.

The majority of my time was spent assisting Alan Buttery (Experienced Engineer) in the field of network protection. The main project that I worked on was the setting of all protection relays for a new substation soon to be commissioned. I learnt about the use of relays, circuit breakers and the importance of the current transformer in this process. I learnt about the different protection elements and the importance of grading with upstream devices. I set all of the 11kV relays and several of the 132kV protection devices at this substation. I used several software packages to model the electrical network and produce fault reports. I attended meetings with the asset owner for approval of the settings and experienced the consultant/client relationship. I then used my newly found knowledge on two different industrial projects and witnessed the similarities between industrial and transmission/distribution protection schemes.

I thoroughly enjoyed my time at Connell Wagner. I am now interested to further my knowledge of power systems protection. During my brief stay I saw how valuable the consultant is in the power engineering industry.

STUDENT: Harry Willis (UQ)
COMPANY: Powerlink Queensland



The purpose of the 2008-09 vacation placement report is to demonstrate the learning that I undertook during my summer vacation employment with Powerlink Queensland in the Network field Services – Lines Field Projects business team. During my time in Network Field Services (NFS) I gained knowledge in the areas of high voltage overhead Transmission Line design, transmission line maintenance, electromagnetic induction, power system operation, power system protection and earthing.

The nature of the work that my business unit was involved in was predominantly field-based, and as such I spent a lot of time learning on-site. I went on site visits around one to two times per week, and spent the rest of the time in the office either learning from available literature, having discussions with my supervisor, attending meetings, or carrying out tasks with a variety of people from Electrical Engineers, Project managers, Engineering Officers and Lines-people.

During my time in NFS Lines I completed a preliminary scope-and-estimate for an insulator replacement project on one of Powerlink's 275kV transmission lines, feeder 8818 which connects Blackwall and Rocklea substations via West Darra substation. The polymer insulated section of the line (Rocklea to Karana Downs) needed a full insulator replacement due to deterioration caused by weathering and in some cases, arc flashes from faults.

My supervisor at Powerlink (Rick Leadbetter) also held a position in the Transmission Line Design team (TLD) in the Engineering Project Delivery business unit. This gave me exposure to transmission line design, engineering drawing and the mechanical and structural aspects of overhead line design. I found it interesting to observe the many aspects of designing transmission lines during the time I spent in TLD.

My time at Powerlink was enjoyable, educational, and beneficial to my future career as a Power Engineer. Working with a large number of people was beneficial for myself, and allowed me to gain a broad experience of Powerlink and their role in the Electricity supply industry. Working with Powerlink has given me reassurance that there are rewarding Engineering careers available in the Electric Power Industry.

STUDENT: David Winsor (UQ)
COMPANY: John Holland Power



POWER

During my 2008/2009 university summer break I commenced my first vacation placement with John Holland Power (JHP). I was assigned as a student electrical engineer and was based in the John Holland Group's (JH) Brisbane office.

JH is one of Australia's largest construction companies and has sub-groups specialising in several different fields of construction. JHP currently has several transmission line projects underway and starting in the near future. My job entailed contributing towards numerous aspects of management as well as overseeing and performing engineering tasks. The main project that I worked on was the PAC project at Nebo for Powerlink Queensland, which comprised of several 275kV transmission lines being constructed from the Nebo substation to various locations up to 152 km away.

From my first vacation placement I hoped to gain a basic understanding of what is expected from engineers, learn about the power industry and get an understanding of how a large company is structured and operated. I was offered several opportunities (including a site visit) and I feel that I accomplished all my goals for my placement as well as learning a lot about engineering duties, the power industry, management roles and business relations.