

Executive Summaries

2009-2010 Bursary Vacation Placements in 'VICTORIA'

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STUDENT: **Jean Marc Kee Mew (Monash)**

COMPANY: **SP AUSNET**

AIM:

To demonstrate my learning experience in and the knowledge acquired in working placement as part of the API bursary program.

OUTCOMES:

In my working placement in SP Ausnet, I was able to get a feel of working in an engineering designing environment. I learnt about secondary and primary components in the context of power transmission.

The theories I learnt in university were proven to be applicable in our daily life. I was introduced to the processes of designing and verification of designs. I realised that power engineering is a challenging job. The public demands effectiveness and quality at the cheapest price. Engineers who work in the public sector therefore, have to find the balance between efficiency, safety and innovation at minimum cost. The working culture widened my appreciation on integrity and collaboration among team member in the department. Working in SP AusNet made me feel comfortable and has motivated me in many ways to become a happy engineer.

There were a few challenges personally during my placement work. Sometimes the task given to me was a little abstract, and I had to refer to more documents and seek advice from colleagues who were very keen to help. Building trust and confidence was initially not easy; somehow the company invoked us to do some socialising activities that helped.



STUDENT: **Beata Khaidurova (Monash)**

COMPANY: **SP AUSNET**

As a part of my API bursary program, I was fortunate enough to be given the opportunity to complete 4 weeks of vacation work with SP-AusNet over January and February this year. This was an enriching experience, allowing me to see first hand several areas of the power industry. I was placed in 'Network Strategy and Development,' with Derek Postlethwaite as my supervisor. This area of the company plans and develops the electricity grid, calculating where the demand is, and the most efficient way of providing for that demand. During my time with SP-AusNet, I worked on 3 main projects, outlined below.

The first project I was assigned to was to develop a new format for a security risk assessment tool, that SP-AusNet use to assess the risks applying to each of their zone sub-stations and terminal stations. This tool helps to identify the areas most at risk of several key threats, to enable the companies to put their resources into the areas that need the most work.

The second project I was involved in was one to estimate the cost and time required to control the problem of tree branches encroaching into the space of powerlines. If these are not dealt with, they may fall and damage the powerlines, causing a disruption to the power supply and possible fire. Estimates had to be made as to the extent of the problem, to be used in a submission detailing the funding required to deal with them.

Thirdly, I helped to put together statistical models, which were used to perform accuracy checks on some forecasts that had been compiled, predicting the rate of rise of power use in certain areas of Victoria. These figures had been under dispute, and so a second round of modelling had to be done, comparing population growth to the power usage rises predicted.

The purpose of this report is to outline the experiences I had and what I learned about the power industry during my vacation work, and to provide feedback about my time with SP-AusNet.



STUDENT: **Manish Pahwa (Monash)**

COMPANY: **SP AUSNET**

Over the summer of 2010 I was employed by SP AUSNET PTY. LTD. as an intern in their Lines Development division. This was an invaluable experience which allowed me to experience real power engineering in practice and gave me a glimpse into the working of a large organization which will stand me in good stead for the future.

Over the course of this report some of the key challenges and learning opportunities that came my way during my work experience period at SP AusNet will be discussed. I will try and provide you with an impression of my opinion regarding the challenges faced by engineers at SP Ausnet and their wonderful skill and teamwork with which they overcame those issues. This internship has instilled in me certain positive value which I will mention in my report.

I would like to thank all the members of API who have merged together to provide me such a wonderful opportunity during my student life which many other students are not able to experience. I would especially like to thank SP AUSNET and their employees who made me feel comfortable during the period of my stay.

Special thanks to Prof. Akhtar Kalam and Mike Griffin for their tireless and endeavour which keeps this great program keep going.

STUDENT: **David John Van Bergen (Monash)**

COMPANY: **Siemens**

When completing a Bachelor of Engineering at Monash University students must undertake twelve weeks of vacation employment with an approved engineering company to gain a practical appreciation and understanding of the role that engineers play in industry. This report outlines my experiences and observations when employed at Siemens Ltd.

For over 135 years, Siemens has been providing innovative technology-based solutions in the areas of water, energy, environment, healthcare, productivity, mobility, safety and security. Through these eight solution areas, Siemens is meeting the demands placed on businesses by the four global megatrends – climate change, demographic change, globalisation and urbanisation. They have locations right across the country with their Australian head office located in Bayswater. I was employed in the Energy Sector at the Bayswater headquarters, more specifically in the engineering team of the Power Transmission and Power Distribution Divisions as an Intern Engineer from 1/02/10 – 26/02/10 (four weeks).

The history of Siemens, their major divisions and a brief range of their products and services will be covered in this report along with the tasks and projects I had completed during my employment. This will be followed by an evaluation of my experiences at Siemens.



STUDENT: **Shalom Backus (Monash)**

COMPANY: **SP AUSNET**

Commencing my work placement with SP AusNet the 27th of January 2010, I was given the opportunity to spend nearly four-weeks learning the role engineers play in the transmission and distribution of energy as well as develop an appreciation for SP AusNet's vital contribution to the Victorian power industry. The purpose of this report is to give a factual record of my time spent with SP AusNet and outline the scope of my learning. Also to note personal perspectives of the organisation and its offerings as a potential employer for future graduates moving into the power industry.

As a major service provider in Victoria's energy sector, SP AusNet has its own unique challenges that it faces which are not limited to the scope of engineering principles. From strategic network development to emergency response capabilities; from asset maintenance and assessment to field works management, SP AusNet's engineers are constantly finding better ways to do things. It was in the Field Services department that I spent most of time, getting a hands-on experience of the role project engineers play in the power industry. Coming from a Mechanical engineering background I was also briefed on the company's gas distribution network and was afforded the opportunity to visit Loy Yang power station in the state's south-east.

A great deal of my time was spent assessing and reporting on a project management system. Whilst the remainder of time was interspersed with work site attendance where I learned from company personnel and was encouraged to share views on the project challenges being faced.

The experience of project engineering gained was by far the most rewarding element of my stay. In addition to the willingness of SP AusNet's employees to share their experience and knowledge, my time at the company was made more than satisfactory.



STUDENT: Andrew Holt (RMIT)

COMPANY: Australian Energy Market Operator (AEMO)

As part of my API Bursary award, I was given the opportunity of three weeks vacation work with Australian Energy Market Operator (AEMO). AEMO has been through merging of a number of gas and electricity organizations, namely, NEMMCO, VENCORP, ESIPC, REMCO, GMC and GRMO.

With my placement at AEMO, I hoped that I would gain the relevant knowledge and have first hand experience of what is happening in the power industry. As a future electrical engineer, acquiring this knowledge and expertise in the electrical engineering field would prepare me to meet the challenges that the industry is bound to offer. Though the period of three weeks is quite short, considering the magnitude of the work involved, my short stint with AEMO has given me a fundamental knowledge and understanding of the power industry.

At AEMO I was assigned to Transmission Services, working for System Performance Division. During this period, I was privileged to visit a few sites, such as Waubra Wind Farm, South Morang Terminal Station as well as Newport Power Station. These visits helped me get an insight into generation, transmission and distribution of power, what many people don't see but take for granted. Visit to these sites enabled me in my mind to see how theory is applied in actual practice and how power, as a commodity, affects our lives so dramatically that we cannot live without it. With the population increasing in Australia, there will be pressure for additional power generation, or alternatively, optimising power with solar panels that the government is encouraging in current times, to conserve energy.

As part of my work placement, on the final day, I had to make a presentation to AEMO's Transmission and Services and Planning Groups, on my experiences at AEMO and the tasks that I had undertaken. This helped me gain confidence and improve my presentation skills.

Overall, my experience at AEMO was most valuable, showed me how complex the power industry is, and what to expect as an incumbent electrical engineer. The staff were very professional and helpful and went out of their way to make my Summer Placement an enjoyable and rewarding experience.



STUDENT: **Genevieve Beart (Melbourne)**

COMPANY: **Australian Energy Market Operator (AEMO)**

The Australian Energy Market Operator (AEMO) is a largely government owned organisation primarily concerned with overseeing and planning the Australian energy network and market, including both gas and electricity. Within AEMO my time was divided between Planning, where I worked in the Network Models group, and Transmission Services where I worked in System Performance and the Connections and Procurement group. This report details my time at AEMO including specific information on the projects I undertook and how they were of benefit to me as an API bursary holder.

From my experience at AEMO I have gained an appreciation of the complexity of the national electricity grid and what is required in order to plan and model future network scenarios. The main projects I worked on at AEMO included: the development and testing of generic wind farms model for use in PSS E (Power System Simulator) 32 for fault studies and for future comparison against existing wind farm models; the production of weekly Supply/Demand Balances to assess the adequacy of power supply in Victoria and South Australia; an investigation into the power factor obligations of Portland Alcoa and Fosterville Terminal Station and whether or not these stations were in breach of their obligations; and the assessment of a future transmission network constraint as a contribution to AEMO's Annual Planning Report for 2010.

These projects, along with others that I worked on whilst at AEMO, shared some common ground. Firstly, and importantly, the output of each of these projects was valuable to AEMO as a company and not simply work for the sake of it. Secondly, each of the projects I worked on during my time developed important engineering skills: communication skills were developed through writing numerous reports and presenting my work to supervisors throughout my vacation placement; and my ability to abstract and simplify problems was improved through modelling work where it was necessary to make assumptions about the electricity grid and simplify it in order to be able to concentrate on certain relevant areas of the network.

Overall, my vacation placement at AEMO was an exceptionally positive experience where I was able to get an understanding of the kind of work power engineers do on a day-to-day basis, complete important projects that were relevant to both my skill level and interests, and work with many like-minded individuals.



STUDENT: **Nada Kalam (Melbourne)**

COMPANY: **Australian Energy Market Operator (AEMO)**

This report details the work done by Nada Kalam at the Australian Energy Market Operator (AEMO). The placement was done through the Australian Power Institute (API), and lasted a duration of 3 months (30/11/2009 – 26/02/2010).

Projects were given from three different groups of the organisation - the Network Modelling group, and both the Network Planning and Transmission Services group. One month was spent in Network Models, completing assessments on wind farms and wind farm models using PSS/E as a software tool. An assessment of a 3rd order synchronous generator model was also completed. This report will highlight the projects completed with AEMO. It will outline the expectations and relate this to the outcome of the 3 month experience.

Being able to understand, analyse, model and mitigate power system stability and control problems seemed foreign to me as I had not completed any power engineering subjects. Through my time with AEMO, I learnt the importance of these problems in terms of planning, design, and the way modern systems are operated.

The greatest challenge I faced was due to my limited understanding of electrical networks. With each project or task given, I would learn key concepts and skills from the basics. Initially, this seemed daunting, but as the days progressed, I realised how beneficial this method was for me. I learnt in a practical manner, and was able to get a greater understanding of the electricity grid.

Being able to work for a company like AEMO so early on in my degree was extremely rewarding. I consider myself very lucky to be given such an opportunity to learn while actively being involved in the project work of the company.



STUDENT: Mehmet Arsalan (RMIT)

COMPANY: Wilson Transformer Company (WTC)

The purpose of this report was to reflect on the learning experience and knowledge gained from the work placement as a part of the API bursary program in the summer of 2009. This report outlines the duties and projects that were completed in order to highlight the learning experience. The main project involves the statistical analysis of the no load losses of the guaranteed values compared to the tested values.

The report draws attention to the fact that the management at Wilson Transformer Company (WTC) was not interested in benefiting from our employment rather helping us benefit from their knowledge of the power industry. However after the completion of my project I believe WTC have benefited from our employment. I understand that the power industry is very broad and although the manufacture of transformers is a highly specialized field, it is only a small part of this industry.

There were a few problems that were encountered during my employment within the testing department at WTC. One of the main problems was that the data used for the statistical analysis was misleading as there were duplications and incorrect entries. In order to overcome this problem the data of 730 transformers were cross checked with hard copy reports to ensure there were no mistakes. There was some difficulty in preparing a no load loss testing procedure of a transformer as I wasn't able to see one being tested for no load loss. However, with the help of the test managers and testing personnel I was able to prepare a procedure. In the completion of the project it was found that the company was experiencing intangible losses due to high guaranteed values. It was recommended to the management team that in order to minimize intangible losses (in terms of dollars) the design department needs to be more confident with the calculated values and propose a guaranteed value according to it.



STUDENT: Shaun Pereira (RMIT)

COMPANY: Wilson Transformer Company (WTC)

Over the period of Feb 1st-Feb 26th 2010, work experience was undertaken at Wilson Transformer Company (WTC), arranged by the Australian Power Institute (API). Wilson Transformer Company specialises in the design, manufacture and testing of power transformers.

As part of the work placement comprehensive induction session was undertaken by API students, with site tours, informal talks with staff and more formal instructional sessions on transformer theory as well as general electrical engineering knowledge.

The bulk of the work placement was with Dynamic Ratings (DR), a subsidiary company of WTC that designs and commissions transformer control, and monitoring and communication devices. A series of small projects were undertaken. The first was to compile and analyse transformer data logs to determine a set of optimal parameters to be used in predictive equations in DR devices. These predictive equations allowed the DR unit to extrapolate life expectancy control cooling. The optimization process resulted in a set of parameters that closely match the desired results. For a practical task, four voltages to current converter circuits were also designed and built to be used in the hardware testing of DR products by simulating current signals. The final task involved writing a Linux script to automatically gather and record data from the various hardware modules within the DR control devices.

Overall, the work experience placement at Wilson Transformer Company was a valuable and highly educational. The opportunity to see and experience real engineering at work, applying theory and good practice, is one that all students should experience as it brings together all the aspects of formal education and more. Witnessing some of the many facets of power engineering granted me more respect for the specialists in the transformer manufacture industry; without them the electrified world we have today would be fundamentally different.



STUDENT: **Nicholas Venables (Melbourne)**

COMPANY: **Australian Energy Market Operator (AEMO)**

My vacation placement took place with the Australian Energy Market Operator in February 2010 for a period of three weeks. AEMO is responsible for a range of short and long term tasks and projects aiming for positive outcomes relating to the safety, price, quality, reliability and security of Australia's energy supply.

I was placed in the Network Models group, which is a part of the company's planning department. All of the members of the Network Models group I was involved with are electrical engineers. Their role is to model future energy network scenarios based on the current grid infrastructure and planned developments for a particular time frame.

The purpose of the following report is to provide information on the projects I participated in during my time at AEMO. It presents most of the information of the reports I made at AEMO in a comparably brief form. The report also states what roles the company plays in the power industry and how I found the experience overall.

I am just starting the third year of my course and I am yet to take any power specific subjects at university. This was also my first real engineering work experience placement. I was given the task of undertaking dynamic simulations of the responses of power, reactive power and voltage of a wind farm system for a range of disturbances in the program PSS/E. I also had a project to compare the way wind farm systems were modelled for two different simulations of the energy network for Tasmania, Victoria, New South Wales, South Australia and Queensland.

At first these projects appeared very daunting as I had little idea of the terminologies and concepts required for the work. Through the help of my supervisors and the operation manual I came to terms with the program (PSS/E) operations needed to perform the required tasks.

Through this experience I gained a much greater depth of knowledge of the power industry thanks to AEMO and found it very rewarding to be involved in some real project work. It has given me a much clearer idea of what it is to be a professional engineer which makes me even more motivated to work hard at university. It was very enjoyable to gain knowledge of the power industry that I could have never gained from reading a book.