

Executive Summaries

2008-2009 Bursary Vacation Placements in Victoria

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STUDENT: Beata Khaidurova (Monash)
COMPANY: VENCORP (with time spent at NEMMCO)

As part of the API Bursary program, I completed 2 weeks of vacation work with VENCORP in Melbourne, which included a 2 day visit to the NEMMCO office. VENCORP deals with the planning and development of Victoria's electricity and gas networks, while NEMMCO manages the National Electricity Market (NEM). From the work, I hoped to gain a broader understanding of the power distribution system in Victoria and Australia, as the work I did last summer focused on a very specific part of the power industry. I also hoped to learn more about the types of projects I could be involved in at the completion of my degree.

On arrival at VENCORP, we received timetables, outlining the activities we would be involved in for the remainder of our stay, which I found helpful and informative. Along with some site visits to locations such as the Waubra wind farms and Loy Yang power station, much of the time was allocated to presentations describing the different parts of the company and the work they did. We were introduced to some of the simulation software used for planning both the electricity and gas networks, and to some of the mathematics behind the planning system. Also, the concept of Smart Metering was discussed, as well as some of the possible impacts that greener energy (particularly wind) will have on the electricity grid. Due to the relationship between VENCORP and NEMMCO, and the fact that they are merging later this year, we were lucky enough to also spend 2 days at NEMMCO. There we were given an overview of what NEMMCO did, the significance of the NEM, and found out how Australia's electricity network was quite unique in terms of the way the responsibilities were split between the various planning bodies.

I found the time spent at these companies well worth it, as I received an insight into the industry that I couldn't have experienced otherwise. Before my stay, I had only a little idea of what these companies did. If there was anything that could be improved, I would want to have had some more hands on activities, though I understand that this was limited both by the short time we had, and by our limited engineering knowledge as only 1st or 2nd year students. If it were possible, a longer vacation period would have allowed for the completion of some sort of projects that may have further increased our understanding of the industry.

Overall, it was a valuable experience, and the site visits in particular were very enjoyable. I definitely feel like I have learned a little more about the power industry by the time spent with both VENCORP and NEMMCO.



STUDENT: Callum Laurenson (Monash)
COMPANY: Wilson Transformer

My vacation work experience provider was Wilson's Transformer Company. Wilson's produces power transformers, and in the section of the company in which I was based, the transformers produced were mainly of high power ratings.

Wilson's is a privately owned company which has been run by the Wilson family since 1933. Its sales currently exceed 250 million annually which makes it large and long lasting for a privately owned company.

During the first few days of my vocational work experience with Wilson's the vacation students were taken on an in-depth factory tour, and shown how each stage of transformer manufacture was completed- from the building of the core to the winding of the copper. It was immediately clear that the factory process at Wilson's was very efficient: there was not much time wastage and everything seemed to be done with the least possible effort. It seemed to be a very safe factory environment.

After completing the factory tour we were shown the rest of the facilities, and then were given tutorials on transformer design. These were very useful as they gave us an insight of what is involved in the design of a large power transformer and why each component is necessary. I was assigned to a project with the transformer design team, working on the company's database for design and test data of transformers. While at first I was unsure of what I tasks were, my knowledge of Microsoft Access allowed me to implement an automatic rating system for the transformers based on the difference between the criterion that the transformer was designed for and the tested values that the transformer actually achieved. I also developed several ways of displaying the data, in graphs of difference distribution, and pie charts of ratings. I was then transferred to the services department where I continued working on database type projects, by designing a database to import data on vacuum containment of transformer shells, running calculations on the data, then graphing the pressure inside the transformer shell against time. I also included calculations for error and designed a test which checked for rapid pressure change rates and hence notify the user of the database of the times when it was most likely that there was a serious leak. A separate function which calculated the "leak rate" from the transformer shell was also added. This database, while not currently used, will be useful in the future when automatic vacuum logging becomes more common and is used in practice. After completing this I performed some research on the use of ultrasonic fault detection in transformers and as recommended a particular instrument for use by the services department. I also researched corrosive sulphur in transformers and designed a brochure for distribution to customers informing them of the risks and what testing options Wilson's could offer. This marked the end of my vacation work experience. I found that it was a very good learning experience, and felt that it gave me a far greater insight into the transformer industry.



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STUDENT: David Van Bergen (Monash)
COMPANY: ABB

The vacation employment I undertook from December 2008 – February 2009 was with the Power Systems Division of ABB, located in Lilydale. More specifically I was in the Substation Protection division which designs systems to monitor and control the real time status of a substation, alerting the operator when any potential fault is detected in the network, then taking the appropriate measures to ensure that no damage is caused to the system. Needless to say a lot was learned during my stay. From the understanding of how the system works, the theory behind the devices being used, carrying out meggar and point-to-point testing on the completed cubicles, right through to the creation of wiring and terminal tables and how to design a simple system using the functional specifications. The list could go on and on. Office camaraderie was high and you could see that they were friends outside of work with such an environment proving to be extremely beneficial and productive.

Some of the power engineering challenges that arose include designing systems that meet the tailored needs of customers and the type of protection that would best suit their operations. Sometimes what is required may not be available so the role of the power engineer is to explore the potential of finding a suitable solution then applying it to the project in order to solve the problem. Not every design is the same so being able to solve one of these problems would be a very satisfying and rewarding task.

Understanding the role that power engineers play in industry is not an easy thing to do unless you are out there working and learning which is why the experience is just so invaluable. By seeing first hand and being involved in engineering work, a greater sense of purpose is given as well as what to look forward to when the time comes to enter the industry. While university is good there is nothing that can replace going out and experiencing something for yourself as well as learning along the way which what made my time with ABB all the more rewarding.

Being at ABB was a very positive experience and I was very impressed with their professionalism, organisation and openness. The staff were very friendly and would always come past to have a chat and to see if I needed any help. Being able to spend time on a wide range of tasks not only broadened my knowledge and appreciation of what was being done but led to a greater understanding of the various roles that power engineers played in the division. This is everything that one could have hoped to get out of the vacation employment program. I am very thankful to ABB for all they have done for me and the other API students and can only wish them all the success that hard work deserves.



STUDENT: Natascia Grasso (VU)
COMPANY: Wilson Transformer

My four-week vacation placement was with Wilson Transformer Company (WTC). WTC dedicated company resources to ensure the four students including myself acquired adequate knowledge of its business and its role in the power industry. WTC provided an exceptionally well organized program and delivered an overview of the four week placement to students prior to starting with the company. Staff at WTC ensured I was equipped with safety boots and clothing upon the beginning of the program. Their approachable and professional nature along with a proven well organized program more than met my initial expectations.

The first couple of days of the program consisted of factory tours of the manufacturing of power transformers. The tours included viewing of the internal and external formation of the transformer. Staff provided us with extensive information during the tours. Tutorials conducted by the Quality and Technical Test Manager, Chris Odendaal, provided me with theoretical knowledge of transformer fundamentals and were complimented by further tours in the manufacturing plant.

The first week also included an information session with General Manager Malcolm Stewart. Malcolm spoke about the history and future of WTC, including the challenges the company faces. These challenges included supply demand, AU Dollar constraints and shortage of engineers in the industry. This gave me a thorough understanding of the role WTC plays within the power industry as a whole. Fellow students and I were then designated to separate areas of the business to be involved in project work. I was initially designated with the engineering design team. My few days in this section enabled me to view and understand transformer drawings from an electrical engineers perspective. This involved making use of AutoCAD. The project allocated for this section was database related. The design team required a program in Microsoft Access to compare calculated and tested values on individual transformers and then produce graphs accordingly.

The remainder of my time was spent in the testing department. This involved reviewing tests being conducted on transformers and then updating test procedures upon completion of the test. The test procedure which my fellow student and I successfully completed was the insulation resistance test. Spending time within this department I also became familiar with the different types of tests required for transformers along with the importance of these tests. This gave me the opportunity to practice completing professional engineering documentation and improved my writing and editing skills. An oral presentation was delivered by each student in the final week to summarize our experience. This assisted in improving my oral presentation skills.

Overall my experience with WTC was extremely beneficial. I gained an abundance of knowledge from several staff members and was also treated as though I was part of the team at WTC. The experience gave me an insight and greater understanding not only of how transformers are manufactured but also why and how transformers work.



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STUDENT: Shalom Backus (Monash)
COMPANY: ABB

I was under the employ of ABB Australia from the 1st of December 2008 to the 30th of January 2009, a period riddled with experiences and successes. Whilst my area of placement was not specific to power engineering, exposure to the products and services that the business unit delivered led me to an appreciation of the many links that make up the Power industry. This vocation experience provided me with an insight into the workings of a large engineering firm and an opportunity to examine the current climate of power engineering.

I was assigned to the Process Analytics division where my primary task was the development of a Product portfolio, information CD-ROM. Prior to commencement of the task I was given time to study the products in the business unit's range, which included Process Gas Chromatographs, Continuous Gas Analysers, Physical Property analysers and Sample gas handling systems. I delved into the current science of the instruments and their history, not only the technical advances but how innovation often correlated to business acquisitions and takeovers.

Due to the innovation and high standards of service that ABB has come to represent, Branding has been realised as an integral part of the organisation. My period of employment coincided with the release of ABB's new visual identity. As such the development of the Product CD fell under the jurisdiction of the Marketing-communications department; this imposed stringent requirements on the documentation being produced, primarily in Microsoft PowerPoint and Adobe PDF. There was of course a degree of autonomy in adherence, the boundaries of which were tested in several communications with marketing-communications personal both here in Victoria and in NSW. This enabled me to further develop basic yet fundamental skills of email communications and conference telephone calls.

During my stay I completed many other smaller tasks for several individuals in the company, these included documentation, data entry, a Microsoft Excel spreadsheet and even the sizing of a relief valve for a gas sampling system. I was also fortunate enough to be allowed time to conduct research in response to the API essay competition. Certain Managers were all too willing to give of their time and share their views on current economic, political and technical challenges facing engineers today.

All together the experience of working for a large international company was enlightening. Coupled with the efforts of the engineers that went well and truly beyond, it made for an educational and greatly rewarding time.



STUDENT: Hong Cao (RMIT)
COMPANY: Wilson Transformer

My summer placement this year was at Wilson Transformer; one of two Australian owned and operated transformer manufacturers located in Glen Waverly, Melbourne. Upon arriving, Ed Wilson greeted us at the reception and briefed through all the necessary paper works, safety procedures and additional the safety gears.

The remaining of the day as well as the next two days was spent on an in-depth tour of the transformer manufacturing area, which divided into internal and external workshop. To aid with the understanding the development and manufacturing process, tutorial classes were included before and after each tour, which also explained the theory behind transformer. An informal meeting with the General Manager of WTC was organized for us students to learn about the challenges power industry are facing and more importantly problems WTC are combating.

As the demand of power increases in high populated areas where land are scarce, the design of a transformer is a challenge. Engineers needs to make changes or design a new transformer that can withstand the high demand but can fit in the old and limited enclosure. WTC also participate in finding solutions to the environment and the decreasing of resources by sponsoring research to find alternatives to oil; transformer main insulator.

Two mains necessity is non-flammable, in the case of fire, and more environmentally friendly in the case of oil spillage, the chemical cause less or even no damages to the surrounding natives. Also to reduce the usage of natural resources, WTC is also in the process of replacing non-renewable oil to a renewable source, plant oil.

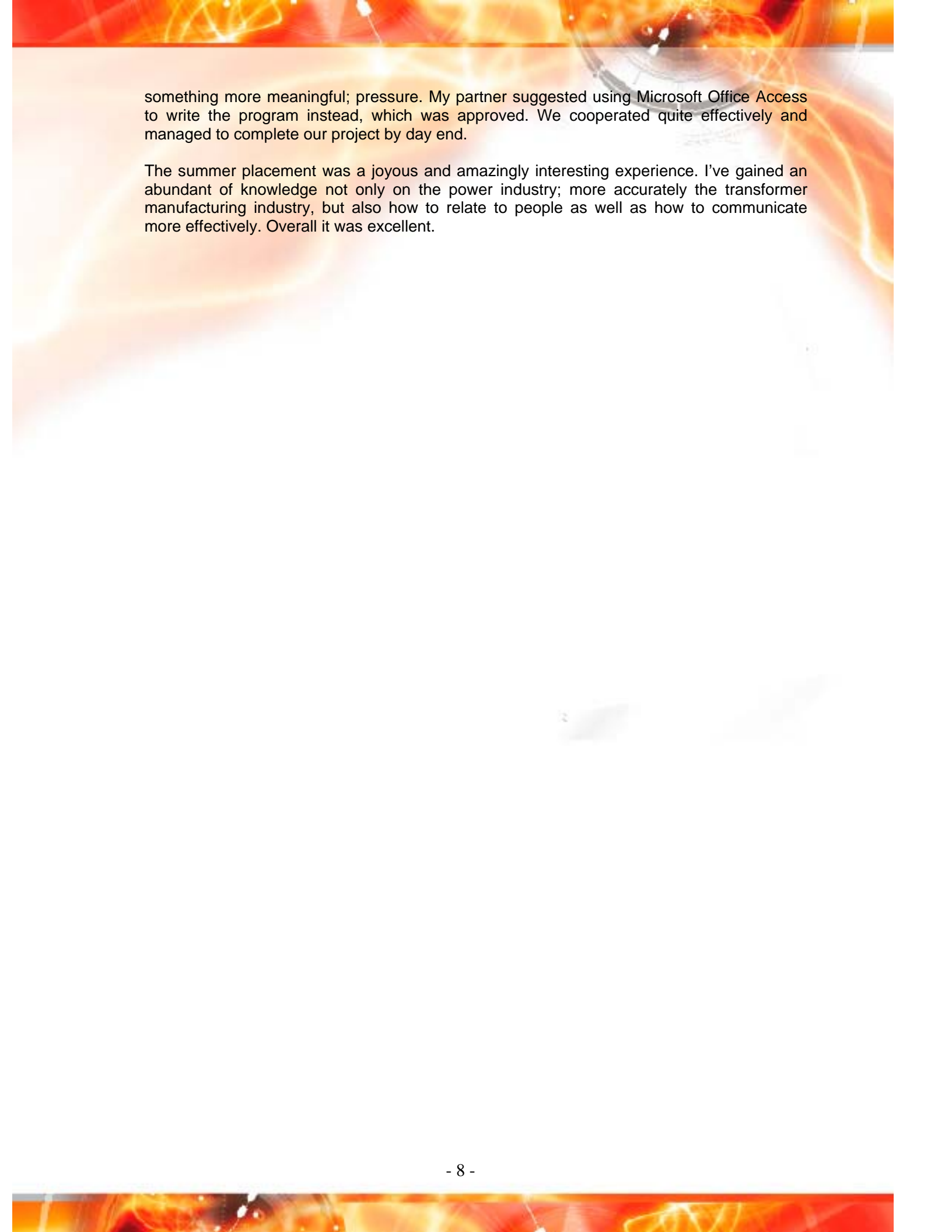
With remaining three weeks, I was placed at Dynamic Rating, a subordinate of WTC, in charge of transformer monitoring unit.

My main projects were to builds a number of different electronic test devices. It was required that I understand the function of the device, how the circuit work and why each component was chosen among the similar product before commencing. Upon understanding the circuit, I had to design and draw up each connection of the joints and components. The assigned projects give me a much better understanding of electronic circuit and how to:

- a) research for circuit samples and the required components for a particular function as well as
- b) placing part orders distributor.

I also get involved into assembling and simulating the transformer monitoring system, DRMCC. I first recorded the manufacturing number of the hardware, assembled the modules and simulate the hardware. I then check the software of these monitoring units and record all the quality assessments into the database system. All this is done according to customer's requirements.

Apart from working in DR, I spent one day with the service team. I was teamed up with another placement student. Our project was to create a program using excel to import the date recorded from the vacumn. Because the data is in voltage it needs to be converted into



something more meaningful; pressure. My partner suggested using Microsoft Office Access to write the program instead, which was approved. We cooperated quite effectively and managed to complete our project by day end.

The summer placement was a joyous and amazingly interesting experience. I've gained an abundant of knowledge not only on the power industry; more accurately the transformer manufacturing industry, but also how to relate to people as well as how to communicate more effectively. Overall it was excellent.




STUDENT: Shane Bezzant (VU)
COMPANY: SP AusNet

During the summer vacation period I completed a month vacation work experience with SP-Ausnet. My first day consisted of an induction into the company along with several other API sponsored students and the newly appointed graduates. The major topics discussed included safety in the work place and various policies and procedures.

The vocational employment period at SP went for four weeks starting on the 12th January 2009. During this time I was assigned to four different departments within the organization. My first week was spent at Yarraville with Remote Services Group (RSG). This group is responsible for testing relays and communication equipment from terminal stations to the Network Operations Centre (NOC) via Remote Telemetry Units (RTU). Whilst with RSG I learnt about the different types of RTU's. The main two types used for transmission are Foxboro and Microsol. The Distribution network also uses these types of RTU's however there are many older systems still in service such as MD1000 and Conitel.

The second week at SP was with the planned maintenance section, which is a section within the Network Services Group (NSG). Three of the projects that I became familiar with were the refurbishment of CB's at Moorabool Terminal Station. One refurbished CB from stores is to replace a current CB, which would be refurbished then that refurbished module will replace an operational CB. I learnt that replacing one contact requires several weeks of preparation. Each CB consists of three phases and each phase has two sets of contacts, which is a total of six modules for each CB. The set up of the Terminal Station at Moorabool is known as two and a half breakers, which means there are many modules that need to be replaced spanning over several years in order to complete the project. This is due to the age of the equipment and the need to not have customers without power and to ensure the work is carried out safely. Another project I learnt of whilst in this group was the rejoining of the underground transmission cables between Richmond and Brunswick Terminal Stations. In order to have access to the joins it is necessary to dig up sections of busy roads, which include Swan St, Hoddle St and Punt Road. This requires a great deal of co-ordination with contractors in order to block roads or at least converge lanes and hire large plant to dig up the roads to get access to the joints. Due to changed conditions of the roads such as widening and removing median strips over the past twenty years, access has become quite difficult. The third maintenance project I learnt about was the painting of socks on the tower structures. This prevents rusting of the legs near ground level. There are three companies contracted for this project, none of the contracting companies are required to use any specific paint although all towers must have a minimum thickness of paint on them, an independent person checked this thickness. The towers that required painting had been painted many years ago with a specialised paint which after many years in the harsh Australian conditions have begun cracking and flaking off.

The third week I was with Network and Data systems. This section is responsible for many things including updating the displays in the operation centre, testing of alarms from Terminal Stations to the operations centre and maintaining the system logs. Victoria had three consecutive forty plus degree days, during the week I was with this section, which also saw the highest maximum demand recorded in our States history which was over 10,000 MW. This high demand lead to load shedding as the Network was unable to cope with such demands in extremely high temperatures. This is a major challenge for the Power Industry in the near future as the demand for power increases at a rate faster than generation capacity. Another major concern would be the age of many of the assets that make up the Network and the cost of replacing equipment.



The final week was with the lines group. I spent most of the week transferring results of asset inspections of towers on the YPS – ROTS 220 KV line into the SP Ausnet database known as Maximo. This database contains all the asset records for transmission lines and Terminal Stations. I spoke to several members of this group and learnt that the group is responsible for all assets outside of substations from the transformers up to the customer's point of attachment.

During the four weeks at SP I visited numerous Terminal Stations and a Power Station. The knowledge I gained from these visits gave me a great understanding of the Transmission and Distribution Networks. An understanding to the amount of work required to replace faulty components, the age of a lot of the equipment, the dangers associated with working in this industry. A Capacitive Voltage Transformer (CVT) actually blew up during the time of high demand.

The vocational program has provided me with an outstanding understanding of the power industry. The knowledge I have gained from SP Ausnet will be a great benefit in the power subjects I am enrolled in at University and in gaining employment in this industry in the near future. I found everyone at SP Ausnet very approachable and keen to share his or her knowledge and experiences with me. I am sure my fellow students at University are envious about my experience over the summer break with SP Ausnet.

STUDENT: Genevieve Beart (Melbourne)
COMPANY: SP AusNet

My vocational work experience in 2009 took place at Melbourne-based SP AusNet. SP AusNet's assets include all of Victoria's electricity transmission network and the eastern half of the state's electricity distribution network. In short, SP AusNet are responsible for ensuring that the state's power is reliably transported from its point of generation throughout the state grid.

Working at SP AusNet allowed me insight into the challenges facing the power industry. In terms of distribution and transmission, power losses in the lines are the largest contributor to SP AusNet's carbon footprint. Hence, reducing line losses as much as possible is a definite challenge facing the company. Furthermore, designing with an eye on future power needs of the state is a real issue facing SP AusNet. As the state's population continues to grow so will power demands. Thus, new terminal stations and zone substations need to be developed while older ones are continually upgraded and refurbished. It is vital to consider future demands in designing such augmentations to the network to reduce resource waste. More broadly, the power industry is facing pressure to turn away from brown coal as a power source. As the vast majority of Victoria's power is from brown coal, the transition to using more sustainable power will certainly be a long and complicated process.


My experience working at SP AusNet was an extremely positive one. I was able to view power engineering from the transmission and distribution perspective, where I had only previously considered it in terms of generation, and this certainly gave me a more complete understanding of the industry. I was lucky enough to go on several site visits to terminal stations, a zone substation and Newport Power Station. This allowed me to see how the state grid is constructed and how all the differing stages of power engineering are interwoven. It was very beneficial to physically see everything that I had studied at university, and also to transfer the knowledge I had acquired at SP AusNet into understanding all of the isolators, circuit breakers, transformers, etc. out in the switchyard.

Overall, my experience has shown me that the power industry is facing many challenging and interesting years to come. As the emphasis on reducing carbon dioxide emissions increases and energy demand soars innovation across all areas of the industry will be required and such challenges promise an exciting, fast-paced career for all those involved in the industry.

This report contains information about knowledge that I, Nathaniel Dunnett, have acquired and engineering experience that I have gathered on work placement at Queensland Alumina Limited.

Queensland Alumina Limited is one of the world's largest alumina refineries that uses the Bayer Process to produce approximately four million tonnes of alumina each year. The company commenced production in March 1967 in Gladstone and has a current workforce of over 1050 employees.

My position at QAL was within the Electrical/Instrument Maintenance Department as Technical Support under the supervision of Lead Electrical Maintenance Engineer Greg Powe. Major projects I was involved in included Relay Monitoring and a Motor Efficiency Study.



For the Relay Monitoring Project, I was involved in configuring and developing EnerVista Viewpoint Monitoring Software to communicate with field relays for measurements. This would eliminate time wasted during faults when information had to be manually retrieved at the relay in the field. I had the opportunity of learning the new software and developing single line schema to represent the plant and communicate with the relay devices using MODBUS protocol over the control network.

The Motor Efficiency Study involved gathering data on motors around the plant and comparing their load averages to their rated load. After research and gathering data I gave a presentation to QAL's Electrical Task Group to discuss the issues of running oversized and underloaded motors and make recommendations. This was very beneficial for my communication skills and I learned more about the plant by talking with area professionals.

Overall my experience at QAL has allowed me to apply and learn skills relevant to my career. The interesting projects have allowed me to work independently and communicate with a variety of industry professionals, improve my research and analysis skills, manage time, investigate a range of solutions for problems and make recommendations.



STUDENT: Shaun Perira (RMIT)
COMPANY: SP AusNet

SP AusNet, and the power engineering industry in general, face many challenges, both now and in the future, some of them inherited, some of them unavoidably approaching. The problems of an ageing network of transmission lines, towers and stations shows need for overhaul, while at the same time, the venerable workforce is reaching retirement age. Population growth, climate change and natural disasters comprise challenges that are ever present in the planning and maintenance of the network, requiring innovative solutions to evolving challenges, both in the engineering and the wider business sense. I was privileged enough to spend time on work experience working for SP AusNet, where I learned a great deal about an essential service that is too often taken for granted.

This work experience was highly valuable in many ways, the most valuable was being able to how things learnt from textbooks and labs apply to the real world. Things that may seem abstract in theory often make sense once you have seen the application of it. Being able to see how power is generated, transmitted and distributed was a real eye-opener, no longer will I take for granted the efforts that go into providing an essential service.

Power engineering is not a glamorous field, as demonstrated by the distinct lack of movies and TV programs about the profession, and the tendency for power engineering to be featured in the media only when something goes wrong. This is attested to by simply reading a newspaper during the recent heatwaves and power outages, readers writing in to vent their anger, and often impart an uninformed opinion on how they would run the network. This may seem to be simple catharsis of built up anger from the general public, but it may present a deeper problem: potential power engineers are exposed to the failings, and not the rousing successes of the industry. This initial biased exposure may turn off graduates from working in the field.

However, my short time working in the power engineering industry has shown me that power engineering is a very complex, yet rewarding career. I witnessed both the tribulations and successes of the industry in a volatile time in the state's history, and my interest in the power industry has developed, gaining new understanding and respect for power engineers and the essential service they provide.



STUDENT: Glen Kuhne (Melbourne)
COMPANY: VENCORP

This report details the vacation employment I undertook at the Victorian Energy Networks Corporation at the beginning of 2009, what I learned about power engineering during this period and the value of this to my experience of the industry.

Beginning on the 5th of January, we (The other bursary students who had been placed at VENCORP and me) started our induction at VENCORP. As most of us were only there for only two weeks, our program involved seminars and workshops on what VENCORP's role in the Australian power industry is. We also had a number of site visits to various power and terminal stations, including Loy Yang, the Waubra wind farms, South Morang terminal station, and others. During our second week we also spent some time at the National Electricity Market Management Company (NEMMCO).

At the beginning of the program, I had little idea of what VENCORP did in the Australian Power industry. I now understand that VENCORP and NEMMCO are responsible for controlling, planning and augmenting Australia's energy transmission networks and markets (Electricity and Gas). I also learned the importance of some of the other API members, including SP AusNet, who build and service Australia's transmissions network, and Wilson Transformers who design and build some of the equipment in terminal stations.

The program also greatly improved my knowledge of how the Australian power industry is structured, with VENCORP and NEMMCO controlling the transmission of energy, and the generation and distribution of that energy being supplied by many different private energy companies, which bid on the markets run by VENCORP and NEMMCO.

Being only a first year, and given that my work experience program with VENCORP was for only 2 weeks, my program was more of an induction type thing. I didn't work on any project myself, it was more about learning what VENCORP does as a company, what people do in their various roles within the company, and how the Australian Power Industry is structured, however seeing the problems that VENCORP find solutions for, such as accounting for constraints and generator performance in the design of the transmission line networks, and maintaining pressure in the gas lines, makes me appreciate much more the work done by engineers in the power industry, and has given me a much broader idea of the range of jobs available, in just this small area of the power industry.



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STUDENT: Jethro Kairys (RMIT)
COMPANY: ABB

For the summer period between 1st December 08 and 20th February 09 I was employed as a vacation student for ABB Australia. For this period I worked in the company's Lilydale Office, within the power systems and substation automation group as an undergraduate electrical engineer.

I had the following objectives for my work placement:

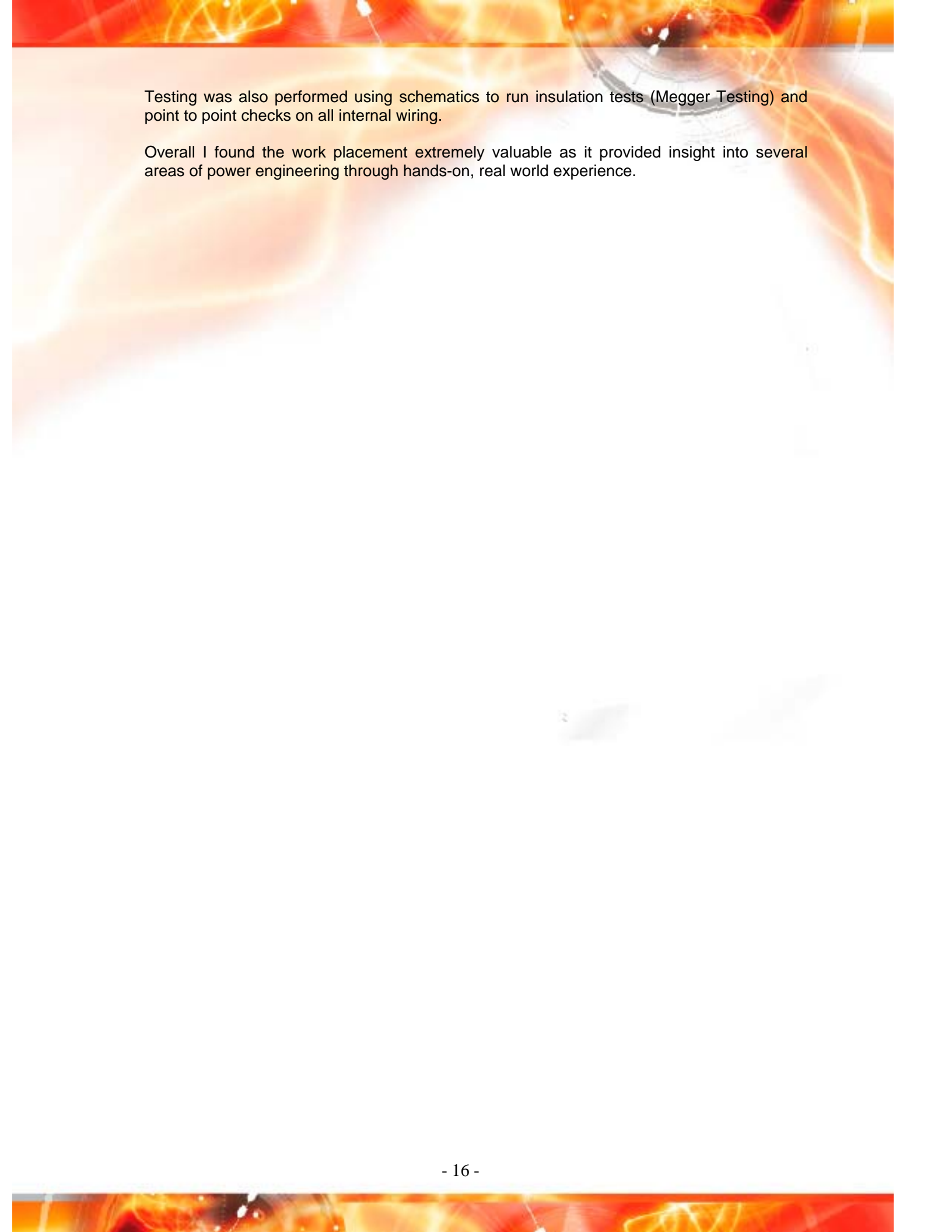
- To gain experience and understanding of duties involved as an electrical engineer for a multinational company.
- To gain an understanding of the structure and procedures defined by the company, including HR, OH&S and IT.
- To successfully undertake a research project and produce a report detailing the opportunities for ABB Australia to enter the power generation industry with a specific focus on solar thermal power.
- To learn and carry out basic design, construction and testing procedures associated with substation design and automation.
- To gain valuable hands on experience within the power engineering industry and assess this against preconception of my suitability to different roles.

While working at ABB Australia I was given two separate and varied tasks to complete. The first involved a research project that would continue throughout the duration of my work placement, assessing opportunities for ABB Australia to enter the domestic power generation sector. The first stage of this project involved liaising with colleagues to define the scope and requirements for the report and produce a project brief for submission and approval by the front end sales manager, David O'Neil.

After the brief was approved I was given several internal documents pertaining to previous internal investigations on the subject matter as well as suitable components manufactured by ABB, and other solar energy projects the company had worked on abroad. Throughout the duration of my work placement I returned to this report in time between other tasks, submitting regular updates to my supervisor which were often followed by meetings to assess and discuss any difficulties or ideas pertaining to the task. By the end of the placement I had completed the project and presented it to my supervisor, after which we assessed the impact of the research on my ideas regarding and intended direction in the power industry.

My second group of tasks were assigned to me by Lester Shultz of the substation Automation division. These tasks varied in size and complexity, but were all of common nature to projects under development at the time. The tasks covered most of the design process of marshalling boxes and equipment cubicles to be installed at a number of sites for the mining industry. The earlier stages of design were covered by devising wiring tables based on circuit schematics of the cubicles and boxes; these tables included point to point descriptions of all internal wiring in addition to the required jumpers for internal terminals.

I was able to enter the workshop and assist construction of these cubicles, adhering to OH&S policy with required PPE gear for the workshop. Tasks here included mounting of face plates, jumpers for terminals and packaging the completed product ready for transport.



Testing was also performed using schematics to run insulation tests (Megger Testing) and point to point checks on all internal wiring.

Overall I found the work placement extremely valuable as it provided insight into several areas of power engineering through hands-on, real world experience.



STUDENT: Ross Jackson (RMIT)
COMPANY: VENCorp

For two weeks between the 5th of January and 16th of January I was employed as a vacation student for VENCorp, which is the Victorian Energy Networks Corporation. And whilst two weeks doesn't sound like much, the learning and experience I got from working there will last for many years to come. During those two weeks, three fellow Bursary students and I went on numerous site visits, including a day long trip out to Waubra to see the wind farm currently being constructed there, as well as a visit to the massive coal power station at Loy Yang.

The first few days at VENCorp mostly concentrated on educating us in the role that VENCorp plays within the national electricity network, and describing the various functions that they perform, such as forecasting the supply and demand for both gas and electricity for the state of Victoria, as well as analysing the numerous constraints and possible faults that could occur within the energy network. Not all the time was spent learning the theory, and the site visit to the South Morang Terminal Station helped make sense of all those complicated diagrams that we were shown the previous day.

More impressive however, was the trip to the Waubra wind farm, where not only were we shown the workings of a wind farm facility, but also got to see a terminal station under construction, which believe it or not, was far more interesting than it sounds. And visiting the coal power station at Loy Yang the next day made stark the contrast between the two technologies, and gave me a greater perspective of the challenges that face the power industry. But it wasn't long after that until we were back in the board-room, but this time at the NEMMCO headquarters at Melbourne, where we were treated to a comprehensive overview of the entire Eastern Australian electricity network.

Although it was only for brief time, by working at VENCorp my understanding of what it is like to be a part of the power engineering in Australia was greatly increased, and further encouraged me to pursue my studies and interest in the field of power engineering.



STUDENT: Simon Kelly (Melbourne)
COMPANY: VENCorp

In the two weeks following February 5th 2009, I spent 8 days vacation employment at VENCorp and 2 days at NEMMCO.

My objectives for the experience was to:

- See different roles engineers take on within the Power Industry.
- Find out how different organisations in the Power Industry interact with each other, eg. Market Operators, Distributors and Suppliers.
- To see Core Principles I have learnt at University applied within the Power Industry.

At VENCorp we (3 other API bursary students and I) spent most of our time within Connections and Procurement and also spent a day with Gas Operations. We had many valuable overviews with different employees regarding what their role was within the Corporation, it was usually done in a pretty relaxed setting with a PowerPoint presentation, where we could interact and freely ask questions. I learnt a lot from these overviews, and it gave me a good idea as to what tasks were necessary to keep the electricity and gas networks running smoothly.

Similarly, at NEMMCO we were given an introduction to the NEM and had some great sessions as to what their role in the power industry is.

My favourite part of the vacation employment was going on site visits. Our first site visit was to a terminal station in South Morang where we were given a tour of the terminal station. It was great to see the station up close as it enhanced my understanding of how a terminal station operates. We also visited a gas compression station, which was also very interesting.

Even better was visiting the Waubra Wind Farm and the Loy Yang Coal Station. It was brilliant to see how power is generated. What I also found quite interesting was learning about the specific standards electricity has to meet before it is allowed to be connected to the grid.

These site visits really put everything in perspective and also showed how the different bodies within the power industry interact with each other (eg. VENCorp, ABB, Wilson Transformers, SP AusNet, NEMMCO as well as other many others) It was also great to see different applications of mathematics within peoples various roles and to see the computer programs used to both control and simulate the gas and electricity networks. I would very much like my future career to have a strong mathematical basis, and as I found out there is plenty of opportunity for this within the Power Industry.

In Summary, VENCorp and NEMMCO provided me with a valuable experience and gave me a real insight into the operations of the power industry.