# Executive Summaries

2012-2013 Bursary Vacation Placements in ‘WESTERN AUSTRALIA’

## List of Executive Summaries

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My employment at the Alliance Power and Data (APD) East Perth office during the summer of 2012/2013 gave me a greater appreciation of the many challenges involved in electrical designing power distribution networks, as well as a greater technical understanding in many areas of the power industry, including soil resistivity testing, electrical infrastructure, network protection, design and drafting.

One of my main tasks during employment included conducting feasibility studies for the Department of Housing which involved assessing the network capacity and power quality in a number of stand-alone communities in rural Western Australia. The study was to determine if reinforcement of the electrical distribution network was required to cope with proposed housing developments and forecasted growth in these communities, and to provide design solutions to improve the network if this was the case. This required me to develop an understanding of many components of the distribution network, including the network loading, generator capacity, switchboard design, transformer, conductor and cable rating, network voltage drop and fuel tank capacity based on information and photos provided by external parties.

Design drawings and cost estimates for the construction of new service connections were to be included in the submission. If the network was determined to be in need of an upgrade, design drawings and cost estimates were also required for any recommended works to reinforce the network.

I was also tasked with developing a way to create a Google Earth file that displayed the location and results of all soil resistivity tests undertaken by the company throughout the State. This was to be automatically uploaded from a table of results in Microsoft Excel format. This required my own independent research into KML coding, Visual Basic and the various features available on Google Earth, as well as searching for and compiling a complete record of all testing undertaken by the company.

My experience with the company made me acknowledge and appreciate the many stages of the design process during my time of employment, and I also gained confidence in my ability to work independently and develop solutions to a variety of complex distribution design problems. I also developed practice in communicating effectively with clients, other companies, and other colleagues in the office in order to progress with my assigned tasks.
STUDENT: Kalam Ciantar (Curtin)  
COMPANY: Western Power

Vacation work is not only a graduation requirement but the most essential way for aspiring engineers to learn about the business they will soon be entering, and most importantly for me, an opportunity to get a better idea of the different positions and various engineering jobs available. This summer I was fortunate enough to attain a five week position at Western Power’s Head office in the Smart Grid Development Branch. The purpose of this report is to outline my first experience in professional engineering work, including my role and what I have gained from the placement.

The Smart Grid Development Branch’s main objective is to undertake research and deployment of smart grid technology which will ideally provide customer choice and savings while increasing power quality and reliability, this section was the location of my placement.

Western Power appeared to focus their time on giving me a general idea of the industry, which would ultimately be more beneficial to me than being confined to one definite project requiring specific skills that I may or may not need in the future. I was given the main task of investigating life support customers and the possible mitigation of the problems surrounding their necessity for constant supplied power by improving the reliability of their electricity meter. The predominant difficulty with this was the lack of information. As this was an area that has not been looked into in detail before, the task tested and developed my research and information obtaining abilities.

While this was my main task, most of my time was spent helping others in the branch with whatever odd jobs I could. The difficulty in this was that all jobs were unique and quite foreign to me. But in doing this I was forced to teach myself many new skills while being of use to Western Power. It was also a good chance to diversify myself and get exposed to different areas of engineering.

During my time with Western Power I learnt to work independently but also got to witness how engineers work as a team by attending many meetings. I also learnt a great deal about the cycle of energy from generation to transmission as well as some of the main problems faced in demand management.
Over the course of my three month employment at Western Power’s Transmission Lines Design section, my technical and non-technical understanding of Western Australia’s power sector has increased, and the position has better equipped me to further my studies in the field and eventually work in the power sector.

My role as an engineer in the Transmission Lines Design team involved completing easement and clearance calculation, providing technical advice to outside parties, compiling construction manuals for senior engineers and providing Safety in Design assessments for some of the projects in the section.

Mainly, I was involved with completing easement calculations, clearance calculations and technical advice requests, the results of each being relayed back to the customer. This involved researching the transmission line concerned with each job, and manipulating that information, and the information provided by the customer, to come to a conclusion (whether it be an easement width, a clearance pass or fail, or a list of guidelines to adhere to). This conclusion was then relayed to customer.

Through my position, I gained an understanding of the complexity and the vastness of the SWIS network in WA, as well as how to design not only for now, but for future projects. I also gained an understanding of the infrastructure of the transmission network, and the parts and components of which it is composed. I also gained an understanding of how considering Safety in Design at the commencement of a project can help to minimise risks at later stages of design and construction. In addition to this, I was able to improve my research skills, office etiquette and professional conduct with other colleagues and external parties. All of these skills I plan to improve further still and use once I start my career in the power sector.

I would like to extend my sincerest gratitude to the API and to Western Power for giving my the opportunity to participate in the 2012/2013 Summer Vacation Program for the second time and gain an insight into what is, and is set to become, a more and more exciting industry to be a part of.
The Water Corporation is Western Australia’s largest supplier of water, water treatment and waste water drainage services. For the entirety of my twelve week work placement at the Water Corporation I was stationed at the Shenton Park depot. Within the depot the majority of my work consisted of aiding Inspection Services (IS) who perform internal and external assessment of both above and underground assets such as water distribution mains. A wide variety of work was undertaken during my time at the depot. Initially I was tasked with creating a catalogue of datasheets which were sourced from manufacturers or distributors for components used in the construction of a three phase powered Remotely Operated Vehicle (ROV) capable of cleaning the internal lining of an intake pipe. Practical work involved interpreting wiring diagrams, terminating wiring and connecting sensors. Office based work involved writing reports and graphing data.

The Water Corporation has a large emphasis on the safety of the environment, the public and its employees. Accordingly, during my placement work was undertaken involving Material Data Safety Sheets (MSDSs), Safe Work Method Statements (SWMSs) and fall prevention with regard to fleet vehicles.

Overall my experience at the Water Corporation was enjoyable and beneficial to my development as an engineer. It was a unique opportunity allowing me to experience and observe real world engineering within a large corporation. My placement has increased my understanding of how engineers operate within the workplace and the skills they require.
STUDENT: Marcus Willis (UWA)
COMPANY: Western Power

Over my twelve weeks with Western Power I had the opportunity to work with the Integrated Design Branch on the Standardised Transmission Engineering Practices (STEP) project. This project aims to implement the international IEC61850 standard at a new substation in Balcatta, offering a major advancement in substation automation and communication. This new substation will be the first to implement the standard at Western Power and set the foundations in design philosophies for future projects.

My task for the summer was to create a database that would manage IEC61850 SCADA (Supervisory Control and Data Acquisition) protection relay templates. These templates store relay statuses and controls along with associated alarms that are sent back to a control station for monitoring. The database tool had to take these templates and manage the data by automatically applying circuit numbers and other information to the templates. After completing my database, it was used to automatically generate commissioning sheets, data reports, and ultimately provided a simpler way to manage these templates. My tool also helped to generate gateway mapping files which saved hours of monotonous manual work.

During my time with Western Power I learned a great deal about the power industry, substation design and automation. I had the opportunity to develop many skills essential to a professional engineer. One of these areas included problem solving as errors in the data had to be found and corrected accordingly. This often resulted in minor database design changes in order to work around these errors. My communication and team work skills also benefited greatly as it was imperative to work as a team. Communication was crucial to understand the operations behind the project and discuss ideas and thoughts on difficulties as they occurred.

Completing my vacation work placement with Western Power has taught me a vast variety of important skills as I gained valuable insight into the engineering workplace. The opportunity has been a tremendous help to my professional development and I feel privileged to have been a part of this momentous project. Learning more about the power systems we use each day has strengthened my interest to work and enhance my knowledge within the power industry. I would like to extend my sincerest gratitude the Australian Power Institute and Western Power for this incredible opportunity.
STUDENT: Christopher Tan (UWA)

COMPANY: Western Power

Over the course of my three month employment in the Protection and Automation team at Western Power, I have developed technical and non-technical skill sets and a better understanding of the power industry. This report summarises my vacation work experience and demonstrates the skills that I have learnt.

As a vacation student, I worked with PowerFactory software to deliver an instruction manual on common Protection procedures and a Protection PowerFactory Case. This involved a diverse range of activities, including power systems modelling, system simulations, data verification, and protection applications.

During this time, I have gained an intuition for power load-flow and a familiarity with the South West Interconnected System. I encountered technical details in protection concepts. My work experience also improved non-technical skills in communication, identifying safety hazards and managing risk.

I would like to thank API for the opportunity to participate in Vacation Employment Program, and extend my gratitude to the Protection and Automation team at Western Power for sharing their time and expertise.