Organisational Occupational Health and Safety Culture and Behaviour in the Electricity Distribution / Retail Industry in New South Wales

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Master of Commerce
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Statement of Declaration

The work being presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted this material, either in full or part, for a degree at this or any other institution.

Signed

..............................................................

Arthur Rutter
Acknowledgements

The completion of this research has only been possible with the help of many individuals who have supported me throughout the period of study. My greatest appreciation must certainly be to my supervisors, Dr Nicola Balnave and Dr Terri Mylett. Without Dr Balnave’s unfailing support and encouragement, this research would not have been completed. Dr Terri Mylett, thank you for the creative comments, most invaluable suggestions and encouragement.

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Lastly but most importantly I want to thank my wife Elaine for her patience, support and understanding during the most difficult times.
This work is dedicated to past and present management of the Department of Energy Utilities and Sustainability NSW, and friends and associates working in the electricity distribution industry in New South Wales.
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Safety Culture in the Electricity Distribution Industry
Some limitations
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Abstract

While good progress has been made in the reduction of fatalities and serious incidents leading to injury in the electricity distribution industry in New South Wales, a further reduction seems difficult to achieve. This thesis investigates the influence that the organisational culture, and in particular the safety culture, has had on efforts to further reduce safety incidents in the electricity distribution industry in New South Wales. This industry is concerned with providing electricity throughout New South Wales through a network of wires carried on poles and also underground cables. Frontline workers construct and maintain the distribution system, operating from various field centres throughout the state in a diverse environment with risks including communication difficulties due to remote locations and adverse weather conditions.

In addition to the safety risks associated with manual handling and operating plant and machinery experienced by many people in workplaces, this industry has hazards associated with working with, or physically close to electricity. Historically a number of fatalities and serious injuries have occurred to frontline workers coming into contact with energised conductors and equipment, and falling from heights. The frontline workers have a raft of safety legislation, guidelines and procedures to enable them to work safely in the industry and a strict training and qualification regime.

In spite of this there have occurred over the study period a number of serious incidents resulting in injury and fatalities to front line workers. Transcripts of prosecutions in the industry from 1993 to 2007 reveal that the safety incidents were avoidable. The analysis of the transcripts indicate that a number of failures in the management of safety have occurred leading to the injury, or death, of front line workers. The missing factor in the management of safety is revealed as the lack in most cases of a positive safety culture. This is illustrated by the recognition by one of the three distributors (Country Energy) of the importance of organisational safety culture and the efforts by them to improve their safety performance. A study of the research that has been conducted by various authors including Hopkins (2005) and Reason (1997) in the discipline of organisational safety culture indicates that improvement can be made to the safety of front line workers by organisations creating a positive safety culture. The creation of a safety culture will require a greater focus upon total
commitment and active involvement at all levels of the organisations concerned, from the Board of Directors to the frontline workers. This would entail a genuine consultation process in the design and implementation of the cultural change program. Attitude changes in management from the ‘blame the victim’ approach evident in the transcripts of prosecutions to that of seeking to identify all causal factors in safety incidents and rectifying hazards identified. In this way further reduction in safety incidents can be achieved in the industry.
## Abb reviations and Explanatory Notes

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<th>Abbreviation</th>
<th>Definition</th>
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<tr>
<td>Contestability</td>
<td>Allowing contracts for work to be performed on conductors or equipment associated with the electricity distribution systems. Prior to deregulation all works were performed by the electricity distributor staff; deregulation allowed the work to go to general tender.</td>
</tr>
<tr>
<td>Danger Tagged</td>
<td>A piece of plastic or cardboard with the word DANGER printed on it to advise people that to operate a switch, fuse or other device to which it is attached may endanger people working on the wires or equipment.</td>
</tr>
<tr>
<td>DEUS</td>
<td>Department of Energy, Utilities and Sustainability, the New South Wales Government department responsible for regulating and compliance auditing the electricity industry in New South Wales (formerly the Department of Energy).</td>
</tr>
<tr>
<td>Earth connections</td>
<td>Cable or other equipment connections, such as transformers, which are not normally energised with electricity.</td>
</tr>
<tr>
<td>Energised</td>
<td>Wires, cables and equipment carrying electricity voltage. People coming into contact can receive electric shock or burns.</td>
</tr>
<tr>
<td>EWP</td>
<td>Elevated work platform (commonly known as a ‘cherry picker’). Used instead of ladders to allow frontline workers to work on overhead electricity conductors.</td>
</tr>
<tr>
<td>Fuse</td>
<td>An electrical device that is designed to ‘fail’ (melt), effectively disconnecting the wire or equipment from sources of electricity supply in the event that an electrical fault occurs.</td>
</tr>
<tr>
<td>Harness</td>
<td>A belt with shoulder straps and another long strap which secures the person and prevents them from falling to the ground if an incident</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>High Voltage</td>
<td>In the section of the industry researched this normally refers to voltages from 11,000 volts to 132,000 volts. Contact with these usually result in severe external and internal burns and are often fatal.</td>
</tr>
<tr>
<td>Isolated</td>
<td>The disconnection of electricity wires, cables or equipment from sources of electricity supply making them safe to work on.</td>
</tr>
<tr>
<td>Ladders</td>
<td>Made of non-conductive material that will not provide a path to earth for electricity, therefore suitable for use by people climbing poles to work on electric conductors.</td>
</tr>
<tr>
<td>Link stick</td>
<td>A long handled tool which is electrically insulated to allow staff to open and close electrical switches, or perform other tasks safely without the need to get close to the electrical conductors.</td>
</tr>
<tr>
<td>Live,Line connections</td>
<td>Cable or other equipment connections, such as transformers, which are normally, or can be, energised with electricity.</td>
</tr>
<tr>
<td>Lock-out procedures</td>
<td>A procedure to open or close switches on electricity conductors, cables or equipment and lock them to ensure that they cannot be opened or closed except by authorised people.</td>
</tr>
<tr>
<td>Low Voltage</td>
<td>This refers to a range between 240 and 415 volts which supply electricity to both domestic and commercial premises. Contact with these voltages can cause burns but also can be fatal due to the rhythm of the heartbeat being disrupted.</td>
</tr>
<tr>
<td>Poles</td>
<td>Wooden or concrete poles used to support electricity conductors and associated equipment.</td>
</tr>
</tbody>
</table>
| Prohibition Notice   | Issued by a New South Wales Workcover Authority Inspector to an
employer instructing them not to use the equipment or machine until identified faults have been rectified.

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tr>
<td>SWER Lines</td>
<td>Single Wire Earth Return Lines, one conductor on a pole usually in rural areas supplying farms.</td>
</tr>
<tr>
<td>Transformer</td>
<td>Equipment which converts high voltage down to low voltages suitable for use in commercial or domestic premises.</td>
</tr>
<tr>
<td>Wires</td>
<td>Overhead cables or conductors on poles carrying electricity.</td>
</tr>
<tr>
<td>Woodchipper</td>
<td>A machine containing rotary blades which chop up leaves and branches of trees that have been cut away from overhead wires.</td>
</tr>
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</table>
Chapter 1: Introduction

This thesis explores the safety culture that exists within the electricity distribution industry in New South Wales to investigate whether it is a lack of a positive organisational culture of safety that could be preventing a further reduction in the accident rate within the industry. Electricity distribution is a high risk industry for employees and for the public. The means by which this exploration and investigation is undertaken is to identify weaknesses in the application of health and safety measures in the electricity distribution industry through an analysis of the transcripts of Industrial Relations Court prosecutions of breaches of legislation and regulations. Despite the high degree of prescriptive regulation and processes of this high risk industry, serious incidents and fatalities still occur. Organisational cultural factors, such as management’s perception of front line workers’ behaviours, may be having a negative effect on efforts to achieve a further reduction in accidents in the industry. Incidents that have occurred in the three major distributors in New South Wales, Energy Australia, Integral Energy, and Country Energy between 1992 to 2007, are analysed to uncover features of the organisation culture in each organisation. Organisational culture will be assessed in the context of the industry as a whole, as culture is influenced by factors such as deregulation and contestability as well as technology and the regulation of occupational health and safety (OHS). The electricity distribution industry in New South Wales has not attracted much academic research in the past; this research attempts to rectify this.

This chapter first provides an overview of the electricity distribution industry to inform the reader of the historical and organisational structures in the research period of 1992 to 2007. It includes the results of a pilot study that was conducted as part of the research process to develop the research question and then moves on to define safety and organisational culture. Later the question of how to identify and how to measure the indicators of the research question selected is explored. Finally, this introduction explains the thesis structure.

Background and Nature of the Electricity Distribution Industry

Since the early 1990s, the New South Wales Government initiated reform of the electricity industry including the generation, high voltage distribution and what is now termed the retail/distribution sectors of the industry. In the early 1990’s the generation and high voltage
distribution were separated to form the various generation companies, for example the generators were named Delta Energy and Macquarie Generation, and the high voltage distributor was named Transgrid. There have also been amalgamations of the retail/distribution providers to the present three energy companies, Energy Australia, Integral Energy and Country Energy, servicing customers in New South Wales in addition to constructing and maintaining the electricity distribution systems. In addition, these three distributors have also been allowed to move into the retail trading of other energy sources such as gas and compete in construction and maintenance contracts in each others areas and in other states.

The restructure of the industry also involved changing the management structure from the previous County Councils controlled by councillors comprised of appointees from the various local government areas covered by the franchise of the distributor. These were replaced by Boards of Directors appointed by the New South Wales Government; some of these appointees also included senior union officers. Each sector of the industry management was also restructured to comply with the Corporations Act (NSW) 1995. This was designed to encourage competition between the various providers, and would allow the eventual transition to privatisation of the industry; this has occurred in Victoria, but in New South Wales pressure from the trade unions has prevented this happening to date.

Safety culture theory (that will be reviewed in Chapter 2) include consideration of broader industry and organisational changes, such as mergers, outsourcing and downsizing (Grote 2007). Tracing back the root causes of incidents that cause fatalities or serious injuries has found causes that are beyond the workplace: “the causes of organisational accidents can, in fact, be traced back to broader societal factors such as market forces, outsourcing, political events, privatisation and public pressures” (Branford 2009 citing Hopkins 2000a, 2005). The implementation of structural changes such as those within the electricity distribution industry would be expected to have had a negative effect on the management of safety and the efforts to implement a positive safety culture due to uncertainty and change.

The electricity supply industry consists of various components including the generation of electricity, high voltage distribution networks and a third section involved in the construction and maintenance of high voltage and low voltage distribution networks in New South Wales. This study does not concern itself with the generation and high voltage distribution sections
of the industry but with the construction and maintenance of electricity distribution to the industrial, commercial and domestic customers throughout the whole of New South Wales. This has been termed the ‘electricity distribution industry’ for ease of identification. The nature of electricity and its distribution means that the industry is a high risk industry. Risk is a two-sided concept that captures the probability of adverse events and their severity (Hopkins 2005). As argued in Chapter 2, it falls into the category of those organisations termed ‘high reliability’ organisations in the safety culture literature, such as nuclear reactors and the petro-chemical industry (see Reason 1997, for example).

The distribution system consists mainly of the wooden and concrete poles which support the ‘wires’ or conductors used to convey the electricity from the high voltage distributor networks through transformers to the domestic, commercial and rural establishments throughout New South Wales. In many of the city and larger towns the poles and wires are progressively being replaced with underground cables buried in the ground. The poles and wires section of the industry are the most labour intensive and due to the different geographical, environmental and physical aspects, pose the greatest risk of injury to people working in the industry and in some instances to the general public. In addition to the above risk factors there is the additional hazard of physical contact with electricity conductors which at times are worked on ‘alive’ or energised with electricity.

The hazards to which people working in the industry are exposed are varied, from faulty equipment, contact while working on the network to contact with ‘wires down’ or close to the ground. There are also hazards associated with the exposed work environment, such as weather (heat, cold, and storms) and traffic exposure. The people working in the industry usually operate from ‘field centres’ or work depots and may be required to travel long distances in country areas to where the work tasks have to be performed and at times radio communication can be difficult. Chapter 4 looks at particular hazards in more detail.

The trades involved are Electrical Fitters (electricians) and Linesmen, these historically different classifications now come under the joint term electrical workers and these workers
may be assisted in their work by tradesman’s assistants\(^1\). The tradesman’s assistant are classed as ‘unqualified’ in as much as they are restricted in the tasks they can perform and equipment they can access. Until the early 1990s all of these tradespeople were employed directly by the electricity distribution utilities. However, with the move by both Federal and State Governments to allow competition and improve efficiency and productivity, this work is made ‘contestable’.

The move to contestability meant that the construction and maintenance of the distribution systems was open to private contractors who could tender for the various work tasks that needed to be performed. However, the contractor’s staff would need to have specific training and certification to allow them to work on the electricity distribution networks and specialised equipment such as transformers. Without that training and certification they are not allowed to work on those tasks or equipment.

**Health and Safety Regulation**

The three organisations chosen for this study are the major state owned companies involved in New South Wales in the construction and maintenance of the system of power lines that distribute electricity, both high voltage (11,000kv to 132,000kv) and low voltage (240/415v), from the generators to the retail customers throughout the state. Although there are high risks involved by the employees working with both the ‘live’ low voltage and high voltage distribution systems, the most common types of injury that occur are slips and falls and muscular strain, as is common in most other workplaces not involved in the distribution of electricity. In New South Wales all work currently comes under the scope of the *Occupational Health and Safety Act 2000* and *Regulation 2001*. An additional source of regulation comes from the New South Wales Department of Energy, Utilities and Sustainability (DEUS) (formerly the Department of Energy). This Department administers

\(^1\) The modern terminology used to describe the front line workers is Electrical Workers, which is not gender specific and replaces the terms of Overhead Electrical Linesman and Electrical Fitter Mechanics. However the transcripts in Chapter 4 use the former terminology and this is retaining the historical concept and defines the demarcation of trades and skills that existed at the time of the incidents.
the Electricity Act 1945 that prescribes controls for hazards particular to the electricity industry.

The primary data considered in this thesis are from transcripts of prosecutions for safety breaches, particular those resulting in serious injury and fatalities. A number of the prosecutions examined (see Chapter 4) came under the previous New South Wales Occupational Health and Safety Act 1983. Industry-specific Acts and Regulations also apply, for example the Electricity Supply Act 1995 with subsequent amendments, in particular the Electricity Supply (Safety Plans) Regulation 1997 which introduced the requirements for risk assessment into the industry before this became a feature for all industries in the 2001 legislation. Other industry-specific guidelines are contained in the Electricity Council of New South Wales Guides which provide the standards for safety equipment and work procedures to be complied with. These also include the qualifications, skills and training required before front line workers are authorised to work in various aspects of electrical work tasks. These authorisations, in addition to the procedures for switching, disconnection and restoration and testing of electricity equipment, are designed to assist in the creation of a safe working environment for front line workers. The levels of prescriptive legislation, general duties and performance standards are important to the electricity industry as a high risk industry, not only for the front line workers but also the general public and customers. Bluff, Gunningham and Johnstone (2004:39) have studied regulatory approaches to OHS, and the particular combination of guidance and compliance needs described here are typical of high risk industries. Regulation is a significant OHS control (Reason 1997) and a component of safety culture. For example, Power (2007) argues that effective risk management combines regulatory imperatives with internal controls within corporate governance. Safety culture theory argues that regulation is insufficient to reduce risk. The need to establish a positive
organisational culture, including safety culture, as an essential component of controlling risk is discussed further in Chapter 2.

In response to regulation, organisations in the electricity distribution industry have developed OHS management systems to create ‘defences’, to use Reason’s (1997) terminology. Reason (1997) identifies various layers of possible defences to attempt to prevent serious incidents which could cause injury to people and damage to equipment. These defences are a mixture of hard and soft applications. ‘Hard systems’ are physical barriers to prevent unauthorised access and contact, for example, ‘lock out’ procedures; the soft defences include rules and procedures, regulations, training, ‘permit to work’ and close supervision of electrical switching operations. As will be shown later in the thesis, these ‘defences’ to reduce risk in the industry have been adopted. However, even though these defences and the appropriate policies and procedures are in place, incidents leading to serious injury to people working in the industry still occur, as will be discussed in the following section.

The Industry’s OHS Performance

The importance of creating a safe working environment cannot be underestimated. The impact of injury to employees has been measured, not only by the costs associated with Workers’ Compensation Insurance and upon the lives of the injured workers and their families but also the economic cost to productivity (Dorman 2000). Whilst investments to reduce risk, through technology or training for example, may be costly to organisations, for high risk industries, the severity of consequences of disaster means that a short-term financial perspective would be inappropriate for organisational sustainability. Weick and Sutcliffe (2007) argue that responding to disasters can strengthen organisations. Health and safety improvements could have a positive impact on a company’s viability and as such should not be seen as a cost but investment, in this way contributing to the so called ‘bottom line’. In the push to become competitive in a deregulated market, in this case in the electricity distribution industry, this emphasis on cost reduction and increased productivity should be of great importance to organisations. Another factor for this industry is the skills shortage. Apart from the trauma to the injured person and their families, the injury may result in a limitation or loss of ability to continue working in their previous occupation, meaning a loss to the organisation (and the nation) of skilled employees.
In New South Wales, the industry regulatory body DEUS has in the past recorded and published the rate of decline in serious injury and fatalities caused by electrical incidents which reveal a reduction in the incident rate over the period 1992 to 2004 (Figure 1) and a levelling off from 2001 to 2004. This is also a downward trend that has occurred in other industries, including high risk industries such as the construction, mining and steel making (Worker Compensation Statistical Report 2003/4). This may reflect the improved focus upon safety management efforts in those industries but it should not be a reason for all industries to relax their efforts rather an incentive to further reduce the safety incident rate.

**Figure 1**

![Graph showing serious electrical accidents on NSW electricity networks](image)


However is this reduction sustainable without further measures to improve safety? More recent anecdotal information from the DEUS staff (obtained from a meeting with the management team in 2004) suggests that the plateau that was evident in the late 1990s and early 2000s has changed to an upward trend, with more serious accidents occurring. Unfortunately DEUS is no longer compiling and publishing the data since 2003/4 to be able to compare performance accurately. Therefore, it is difficult to assess recent performance objectively. Nevertheless, this published data, the anecdotal information, plus particular severe injuries and fatalities that have occurred in recent years (see Chapter 4) provides
motivation to investigate safety management in the electricity distribution industry more thoroughly.

The reduction in serious injury in Figure 1 also reflects historically upon the positive impact of the introduction of Safety Management Systems which were implemented generally in the industry in New South Wales during the 1990’s, and efforts, both in money and manpower by the distributors to reduce the accident rate in the industry. A definition of safety management systems has been stated as “a combination of the planning and review, the management organisational arrangements, the consultative arrangements, and the specific program elements that work together in an integrated way to improve health and safety performance” Gallagher (2000:1), cited in the National Occupational Health & Safety Commission (2001) review of the effectiveness of safety management systems. This is best revealed by the generally downward trend of serious electrical accidents reported to DEUS shown in Chart 1 which was also paralleled by a reduction in other injuries in the industry. This is reflected in the New South Wales Workers’ Compensation statistical analysis (Workcover Authority 2004/5). Overall, considering the risk exposure in the industry (working environments, working at heights, terrain and traffic exposure in addition to the risk of electric shock, explosion or equipment failure), safety performance has improved due to safety management systems. However, the focus now is how to further reduce or eliminate incidents causing injury to people by identifying and measuring some of the other causal factors that influence workplace safety and seem to have impeded further improvement. Mikkelsen and Saksvik (2004) sought to measure the impact and influence of the introduction of Safety Management Systems into the electricity industry in Norway in the 1990s. The research results demonstrated that the incident/accident rate had declined but also that the amount of sick leave had also declined, which they claimed was a reflection of the positive attitudes and behaviours (culture) of the people working in the industry. That is, the safety management system was part of building a positive culture of safety. But the safety culture literature argues that a safety management system is only part of a culture of safety, as will be shown in Chapter 2.

When considering OHS performance, the most common series of measures that are used are what is termed lag or negative measures, which only measure the number of incidents/accidents resulting in injury to people rather than breaches of controls. These measures are expressed as Lost Time Injuries (LTIs) (see Standards Australia AS1885.1
1990: 20), which measure the number of accidents where employees have been unable to work more than one shift compared with the total number of employees in the company and the hours worked by staff. Other measures may include the medical treatment of injuries or Workers’ Compensation claims. These are again the outcomes of injuries to employees which record the negative impact upon people. A major criticism of these measures is that they only record the injury or health issues directly attributed to an incident/accident at work but do not accurately record the longer term health issues that result from exposure to chemicals or other dangerous substances in the workplace (Chapman, 2006). They also do not relate to any failures in safety measures that do not directly and immediately affect people. Reporting is a significant feature of safety culture; this issue is discussed further in Chapter 2.

To further improve the efforts in incident reduction, a broad range of causal factors should be considered, as will be presented in Chapter 2. The focus of this thesis is to uncover reasons for continuing problems in the industry despite the introduction of OHS management systems. In order to formulate and focus research for this thesis, a preliminary study of the reported causes of incidents was undertaken. This study analysed DEUS safety incident report statistics and the regulation of the industry in detail (Rutter 2005).

The research analysed archived incident reports held by DEUS. This analysis examined incident reports involving the electrical distribution network in New South Wales over a ten-year period, from March 1995 to March 2005. The textual content was analysed and numerical data compiled of the numbers of incidents in each of the various categories used in the Significant Network Incidents (SENI’s), and Electrical Accident report forms, used by the Department. This analysis was conducted to identify whether human and social factors and/or organisational factors were apparent which would indicate a significant weakness in the safety systems that operate within the industry in New South Wales. The result of the data collection from the SENI’s are contained in Table 1 below and reveal a large number of the causal factors being identified as incompetence, incorrect standard operating procedure and misuse/damage/human error.
### TABLE 1
Data from Electrical Accident Report form EAA-3, March 1995 and Significant Electricity Network Incident Advice, SENI – 1, issued from 1 July 2003 to March 16th 2005

<table>
<thead>
<tr>
<th>Description of Incidents</th>
<th>No. of incidents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Incidents involving contractors</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>25</td>
</tr>
<tr>
<td>Working with or for the electricity distributors.</td>
<td></td>
</tr>
<tr>
<td><strong>Incidents involving Apprentices</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>13</td>
</tr>
<tr>
<td>Age bracket 18 to 24, if they are not designated as apprentices they are not included in this category but in the general category.</td>
<td></td>
</tr>
<tr>
<td><strong>Remaining incidents involved full-time employees</strong></td>
<td>284</td>
</tr>
<tr>
<td><strong>Total Incidents</strong></td>
<td>322</td>
</tr>
<tr>
<td><strong>Cause of incident described as Incompetence</strong></td>
<td>69</td>
</tr>
<tr>
<td>This is the terminology that was used by the person filling out the reports with few qualifying comments, not used in SENI forms.</td>
<td></td>
</tr>
<tr>
<td><strong>Cause of incident described as ‘incorrect standard operating procedure’</strong></td>
<td>64</td>
</tr>
<tr>
<td>This includes failure to follow by the electrical worker in addition to issues identified with the operating procedure themselves.</td>
<td></td>
</tr>
<tr>
<td><strong>Cause of incident ‘incorrect risk assessments conducted’</strong></td>
<td>12</td>
</tr>
<tr>
<td>This was significant in identifying causal factors as risk assessments have been required in the industry from 1997 under the Electricity Act (Amendment) 1997.</td>
<td></td>
</tr>
<tr>
<td><strong>Cause of incident ‘lack of knowledge’</strong></td>
<td>38</td>
</tr>
<tr>
<td>This includes awareness and training</td>
<td></td>
</tr>
<tr>
<td><strong>Cause of incident ‘lack of supervision’</strong></td>
<td>11</td>
</tr>
<tr>
<td><strong>Cause of incident Attitude/Behavioural issues</strong>&lt;sup&gt;ii&lt;/sup&gt;</td>
<td>59</td>
</tr>
<tr>
<td>This includes failure to use protective equipment such as insulating gloves, helmets or clothing.</td>
<td></td>
</tr>
<tr>
<td><strong>Cause of incident ‘Misuse’/ ‘Damage’/ ‘Human Error’</strong></td>
<td>165</td>
</tr>
<tr>
<td>This category in the report forms includes misuse, damage, human error, carelessness, and incorrect use of machinery or vehicles.</td>
<td></td>
</tr>
<tr>
<td><strong>Cause of incident Equipment Failure or Faulty Design</strong></td>
<td>62</td>
</tr>
<tr>
<td><strong>Total Incidents</strong></td>
<td>480&lt;sup&gt;iii&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Nature of injury Electric Shock</strong></td>
<td>134</td>
</tr>
<tr>
<td>Contact with voltage.</td>
<td></td>
</tr>
</tbody>
</table>

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<sup>1</sup> Denotes number of reported incidents.

<sup>ii</sup> Includes Attitude/Behavioural issues.

<sup>iii</sup> Includes total number of incidents.
Fall from Heights
This category relates to electrical workers falling from poles or falling with poles that had failed due to decay or termite damage.

Cause of incident Flashburn
As a result from contact with high voltage equipment or conductors.

Total Incidents
278\(^iv\)

Total Number of incidents that led to injury:
322

Source: Compiled from reports held by the New South Wales Department of Energy, Utilities and Sustainability 2005 (Rutter 2005).

Notes:

i. The age of workers injured was considered, especially in terms of apprentices (13 incidents), but no quantitative evidence points to age as a factor. Additionally, incidents involving contractors were considered (25 incidents); however, again, no quantitative data confirmed that contractors were at higher risk. Despite the increase in the number of contractors in the industry, there was no proportionate increase in injuries reported for this category. This issue is considered further in a qualitative way in Chapter 5, as two of the cases involved contracted labour.

ii. The category of attitude/behavioural issues was summarised by the author to identify research criteria, namely that the attitudes and behaviour of electrical workers reflected the prevailing safety culture. There was a lack of clearly identified causal factors included in the reports.

iii. Some incidents are described as having more than one cause/more than one category.

iv. For some incidents, no agency of injury was identified.

The report forms had been completed by various managers involved in the investigation of the incidents and also in the supervision and management of the employee injured in the incident. The reports reflect prevailing attitudes and perceptions around the causes of adverse events, a key feature of safety culture. For example, the use of the term incompetence (used to describe some 69 of the 322 reported incidents) was not elaborated in the reports. If in fact it was employee incompetence, this would reveal a number of other causal factors, such as whether the training and retraining of the employee was adequate for the range of tasks that were performed by the employee which led to the incident. If not, had these deficiencies been identified earlier by supervisory staff and fellow employees and remedial action taken either by training, counselling or even disciplinary action? In the SENI analysis only 38 of the 322 incidents had ‘lack of knowledge’ identified as a causal factor. An effective OHS management system should have encouraged the identification of a lack of relevant skills in employees and training required as a preventative measure and been accepted by all involved as normal practice. As will be evident in Chapter 2, there is much criticism of tendencies to ‘blame the victim’; that is, to limit the search of causes to actions taken by frontline workers at the instance of the event rather than seeing frontline workers’ actions as part of a system (Hopkins 2000a; 2005).
The category of ‘misuse / damage / human error’ had been identified in some 165 incidents reported. These included misuse of equipment to perform work tasks and the use of damaged equipment which again reveal the safety culture that existed in those organisations. This raises a question about why there is a climate where employees had been using equipment that they may not have been trained to use properly, or continued to use even though the equipment was damaged. The term ‘human error’ by the employees has been used in the reports, again without any elaboration in most instances. However, as Reason (1990) states in his study on human error, there are various categories of errors and not all of them relate to the actions of employees being the major causal factor in safety incidents. Again, that this term is used in the reports points to a culture of ‘blame the victim’ in contrast to ‘blaming the system’ reflected by the persons investigating the incidents and completing the incident forms (Bohle and Quinlan 1991: 89). Reason (1990: 7, 17) further defines error as being either intentional or unintentional, and distinguishes between ‘slips and lapses’ and ‘mistakes’. With specific reference to the use of the terms in accident reports he states, “[n]ot only are these mostly concerned with attributing blame, they also tell a story that may be inaccurate or incomplete” (Reason 1990:16). In total, there were a further 59 instances in the DEUS reports that could be interpreted as employee attitude and behaviour as contributing in some way to the incident or the severity of injury. As noted above, these were compiled into one category in Table 1.

The reports gave no indication of whether the particular incident resulted in a fatality or serious injury. The terminology used to categorise the data was taken from that which was used in the SENI forms, with the exception being the category of attitudes/behavioural issues. This category has been developed to accommodate those references to things such as not wearing appropriate personal protection equipment, insulating gloves, or protective clothing, which could indicate attitude, behavioural or safety culture issues. The language used in the reports is some evidence of the prevailing organisational safety culture existing among the managerial level staff that had completed the reports; the following section addresses the issue of safety culture more directly.
**Safety Culture**

Safety culture could be influencing attitudes and values and perceptions of workers in the industry, which may be impacting upon efforts to reduce the accident/incident rate further. “Safety culture is defined as: those aspects of the organisational culture which will impact on attitudes and behaviour related to increasing or decreasing risk” (Guldenmund 2000: 251). The perceptions of the frontline workers in the industry can also be positively influenced by better management of the safety process. There is limited information available on OHS in the electricity distribution industry and nothing on safety culture in the industry in New South Wales, so academic literature on high risk industries in general will be canvassed.

As noted above, the concentration upon individual frontline worker behaviour as a causal factor in safety incidents has been criticised; the work of Reason (1990) was seminal. Reason advocates a focus upon safety culture, as a component of the organisational culture, as the primary causal factor. A number of authors, detailed further in chapter 2, have sought to address the concept of safety culture. These include Guldenmund (2000) who explores the theoretical aspects of safety culture and organisational culture. Drawing upon Schein’s (1992) definition of culture he states “[t]he basic assumptions permeating throughout the organisation [includes] its aspect of safety” (Guldenmund 2000:251). Hopkins (2005:5) expands on this and links it to the development and effectiveness of safety management systems with the comments that “[t]he right culture is necessary to make safety systems work”. The existence of a positive safety culture is a reflection of the prevailing organisational culture, and it would be difficult to imagine a positive culture of safety within an organisation which has a negative culture of employee and management interaction or where OHS management is treated as separate to management of an organisation’s core functions. The overall organisational safety culture may have a major impact in the effort to improve safety within an organisation. This can be in effect either positive or negative, and in some organisations there can be examples of both with differences depending upon the separate departmental management styles and degree of autonomy the managers are delegated and also the geographical location. In the safety culture literature, this is discussed in terms of sub-cultures and in particular forms, as the ‘silo effect’ (see Chapter 2).

The weaknesses of using lagging or negative indicators for measuring OHS performance were noted above. Conversely, a feature of a positive culture of safety includes the use of
leading indicators. Those organisations that use ‘leading indicators’, or ‘positive performance indicators’ rather than lost time injuries reflect a proactive approach to the management of safety and are therefore more likely to reflect a positive organisational safety culture. These leading indicators or positive performance indicators may include the extent of safety training conducted and attended by all levels of employees and management, including executives. Other indicators could include the numbers of incidents (near misses) that have been investigated and remedial action taken to rectify the hazards identified, the evidence of employees actively involved in the formulation of safety policies, procedures and safety awareness programs, the recording of the numbers of actions or programs initiated by the Heath and Safety Consultative Committees (Bohle and Quinlan 2000). Models of safety culture are more thoroughly reviewed in Chapter 2.

Reason (1997) wrote of organisational safety culture but his main focus was on the ‘holes in safety barriers’ (p. 12, Figure 1.5) which allowed accidents to happen. He does concede that one of these holes could be the culture of the organisation as one of the ‘latent conditions’ in addition to the hard and soft barriers that exist. Hopkins focussed more on the safety culture or mindfulness of an organisation which, if negative, has the undesired effect, namely incidents/injury to people. If the safety culture is positive, this has the opposite effect of reducing the risk of injury/incidents occurring. Hopkins (2005) also warns of the difficulty posed by a ‘rule focussed organisation’ (p. 28) which would exist in an industry such as the electricity distribution industry due to the high risk nature of the industry. The significance of safety culture is reviewed further in Chapter 2.

Organisational safety culture does not exist in a vacuum or in any one separate part of an organisation. It must exist in all departments and functions, including the board and executive, to be effective. Another factor is that an overall positive culture (as opposed to negative culture) must exist within an organisation; this reflects a commitment by all people in the organisation to one mindset and adherence to the values of the company in all facets of the company operations, for example ‘this is the way we do things around here’. A key component of a good organisational culture is the degree of trust that exists between employees and management throughout the organisation and at all levels. New staff should only be recruited into the organisation if they will fit into the existing values of the company readily and that the recruitment process includes a comprehensive induction process to ensure
that the new employee is aware of and committed to the existing “espoused values” of the safety culture in the organisation (Guldenmund 2000: 247).

**Indicators of a Safety Culture**

Lawrie, Parker and Hudson (2006) have researched the existence (or lack of) organisational safety culture and sought to provide a framework to identify the processes that organisations must have to develop a safety culture. Such an approach is common in the safety culture literature, where case study research is used to develop prescriptions for improving safety culture (see Chapter 2).

The unanswered question that remains however, is how do you measure whether a safety culture exists? What series of measures can be devised that identify the sociological/psychological attitudes and behaviours that are necessary for a safety culture to exist? Safety audit processes focus upon identifying and measuring the effectiveness of the defences that Reason (1997) portrays, such as physical barriers, policies and procedures lock out, training and permit to work administrative measures. Audits do not generally measure people attitudes, commitment and ‘mindfulness’ which are much harder to successfully measure throughout all levels of an organisation. The audit process requires the auditor to verify or question employees to assess their awareness and knowledge of safety policies, procedures and acceptable workplace practices which should reveal the safety awareness of the employees. Weick and Sutcliffe (2007) present a means of auditing for safety culture and mindfulness (as opposed to safety management). Their model has over 60 items.

Fleming (2001, cited in Fuller and Vassie 2004:297) suggests that there are five levels of maturity of safety culture:

- **Emerging**: compliance and management.
- **Managing**: physical and management controls, accidents are viewed as a consequence of employee’s unsafe acts and omissions (blame the victim).
- **Involving**: employee involvement and accident causation models.
- **Cooperating**: employers adopt a moral as well as economic perspective and adopt a proactive approach to health and safety.
• Continuous improvement: health and safety and accident prevention is a core activity of the company.

Fuller and Vassie (2004:297-8) further reflect in some detail the complexity of the process and conditions necessary for the creation of a safety culture in an organisation. The basic level is still the recognition by an organisation that management need to act to reduce the impact and cost of accidents to their employees. The first step is to comply with the legislation and safety standards and to make the decision to actively manage the safety process. The second step is to manage the physical environment, plant, equipment, policies and procedures (the risk assessment requirements in the New South Wales Occupational Health and Safety Legislation provide management with these essential tools). The third step is an extension of the second step but with the active involvement of employees in the process of risk assessment and the designing and implementation of controls. The fourth stage is the adoption of pro-active measures and recognition of the staff involvement with management in managing safety. The fifth and final stage is the commitment of all employees and management that the creation and continuance of the ‘zero tolerance’ mindset is a key process of the organisation.

Research conducted in the Rail Infrastructure Maintenance Company in the UK by Farrington-Darby, Pickup and Wilson (2004) of the University of Nottingham is a good example of the application of a methodology to identify and measure the existence of a safety culture, for example framing questions to identify what physical evidence (policies/procedure/training records) exists and the identification of ‘open’ communication channels that show whether the organisation’s emphasis is on compliance or on the creation of a good (positive) safety culture mindfulness at all levels of the organisation. The authors have identified forty main factors that contribute to a safe culture within an organisation and have developed a framework for coding the data gathered from the research methodology. These include such factors as corporate strategy, communication, peer pressure, trust, rules and procedures and safety culture and these would provide a good basis for measuring the existence and maturity of an organisational safety culture. Chapter 2 reviews a number of models of safety culture. Key themes from these models are distilled into six themes that can be used for empirically investigating safety culture in the electricity industry in New South Wales.
Research Questions and Research Design

It is the intention of this thesis to investigate the impact that safety culture (as a part of organisational culture) has had on the number of serious incidents, or fatalities, in the electricity distribution industry in New South Wales. The research question is: ‘has the lack of a positive organisational safety culture been preventing a further reduction in the incident/accident rate in the electricity industry in New South Wales?’ Whilst the research question builds on safety culture theory, it has been instigated by noting the plateau in OHS performance in the industry in the DEUS reports and from research conducted by a DEUS manager into causal factors behind incident reports (Grant 2003). Grant (2003) has been the only author (to the writer’s knowledge) that indicated that safety culture was important for the electricity distribution industry. The research task is to replicate analysis of safety culture undertaken for ‘high reliability’ organisations in high risk industry for the electricity industry in New South Wales. Safety culture is assessed through analysis of transcripts from particular incidents, but incidents are analysed in terms of each of the three organisation’s organisational culture and also in terms of the industry’s context.

The criteria to assess the safety culture draws from the literature reviewed in Chapter 2 and is applied to transcripts of prosecutions, with interpretation supported by in-depth interviews with industry participants (Chapters 4 and 5). Six themes are developed, based upon the essential requirements of a safety culture as explained by Reason (1997) and Hopkins (2005). Management’s culture towards safety may be revealed by:

(1) Workers’ attitudes towards management’s commitment to safe working practices, rules and safety as a priority; for example, workers’ perceptions that it is acceptable to violate rules.

(2) Management/employee ‘holistic’ approach to safety through demonstration of safety ‘values’ of the organisational culture and employees working together to create/shape values.

(3) The degree of confidence in reporting systems for incident/unsafe conditions and whether it applies to contractors and their own safety systems and performance.
(4) Communication on safety issues and dialogue, both up and down the organisation between management and employees and without ‘fear or favour’.

(5) The degree of the organisation’s commitment to ‘safety first’ as the highest priority versus ‘getting the job done’.

(6) Perceptions of ‘blame the victim’ apparent in managements’ approach to safety issues.

These themes have been used to conduct the analysis of prosecutions conducted in the Industrial Relations Courts for breaches of the occupational health and safety legislation in New South Wales. As will be discussed in later chapters this methodology was adopted as the most appropriate. Other methodologies were considered which would have given a more contemporary review of the current safety cultures in the organisations concerned by the use of questionnaires and interviews with frontline workers. However, the three electricity organisations would not cooperate by giving access for this type of research activity; this is dealt with in more detail in Chapter 3. The alternative path to research was to analyse prosecutions from 1993 to 2007. As will be evident in Chapter 4, these prosecution transcripts reflect the lack of progress towards a culture of safety at Integral Energy and Energy Australia. Country Energy has shown some progress.

The following chapter, Chapter 2, compares and contrasts the writings of various authors in related subjects to this thesis and provides support for the development of six themes listed above. Chapter 3 details the examination of various methodologies and the reasons for the selection of the chosen methodology. Chapter 4 lists the findings of an analysis of the transcripts of prosecutions conducted against the various electricity distribution organisations between 1993 and 2003 in New South Wales. Chapter 5 discusses the findings of the previous chapter in detail relative to the six themes. Chapter 6 concludes this thesis, arguing that the safety culture existing in each of the three organisations studied is an essential factor in poor OHS performance.

In conclusion, those organisations that are successful in developing and maintaining a culture of safety, or safety mindfulness, are the organisations that are striving to achieve the ‘zero tolerance’ of incidents that cause injury to people. This will also have the resulting benefits of retaining a skilled and healthy workforce and reducing the economic losses caused by the
costs associated with workers compensation insurance and lost productivity in addition to the personal and family impact of the injured person. The task is to build upon the efforts taken to further reduce or eliminate incidents leading to injury of people working in the electricity distribution industry in New South Wales that has been achieved over the previous 10 years.

The discussion so far indicates that the issues preventing a further reduction in safety incidents and injury are complex and include such factors as organisational culture and change and the prevailing safety culture amongst the various management and employee levels. Other contributory factors, such as training, frontline workers’ attitudes and behaviour and the existence of ‘silo effects’ within organisations, also may impede the creation of positive safety cultures. The lack of particular research in this industry with its own attributes is further elaborated upon in the study of existing organisational and safety culture conducted in the literature review in the succeeding chapter.
Chapter 2: Literature Review

This chapter reviews the existing literature that was researched to derive key themes that can be used to assess safety culture in practice in the electricity distribution industry. The argument that a positive organisational safety culture drives an effective safety management system is considered via literature on safety culture. The literature reviewed includes theory about safety culture derived from case study research and, in some instances, quantitative research.

The review commences with the historical development of the management of safety towards risk management and OHS management systems. Next, safety culture is defined and some of the conceptual challenges in applying the concept to practice are considered, such as the connection between safety culture and organisational culture and the notion of ‘sub-cultures’. The principles of a positive safety culture and the measurement of safety culture is then examined. Throughout the review, an attempt is made to highlight the most significant issues that lead to a positive safety culture to develop a means for examining safety culture in practice via analysis of transcripts of prosecutions.

Progress in the management of safety has been driven by regulation. Responses to industrial accidents in nineteenth century Britain led to a common law ‘duty of care’ for employers but there were significant statutory initiatives through the twentieth century aiming to reduce injury rates (Johnstone 2004: 34-49). Australia, following on from the examples of mainly British and European safety management initiatives, has progressively introduced state-based safety legislation along similar lines. A significant development was the New South Wales Occupational Health and Safety Act 1983 that introduced the concept of safety committees to involve employees in the safety management process. In 2001, the legislation was revised to emphasise a risk management approach, with risk assessment to be conducted jointly by managers and employees. It encouraged a consultative approach to workplace OHS. Another development from the 1990s was the adoption of safety management systems. These systems focused on safety as an integral management function and responsibility and had significant impact in OHS improvement in the electricity industry. These systems encourage organisations to develop safety management approaches suitable for their operations rather than just relying on prescriptive controls for specific hazards. The National
Occupational Health and Safety Commission (NOHSC, now the Australian Safety and Compensation Council) issued a report into the effectiveness of safety management systems in Australia, commenting on the management styles conducive to OHS progress with the statement: “Those systems with innovative management structure and style, and principally reliant on a safe place control strategy, were found to be the most effective on several objective OHS and OHSMS performance measures” (NOHSC 2001: 56). A ‘safe place control strategy’ incorporates the concepts of ‘internal controls’ which have been implemented in Scandinavian countries generally following the requirements of the European Union’s ‘Framework Directive 89/391’ (Frick, Jensen, Quinlan & Wilthagen 2000).

However, there became a recognition that other factors needed to be considered to further reduce the number of safety incidents due to what could be perceived as a failure of safety management systems. As will be presented below, various writers in the OHS area such as Reason (1997) and Hopkins (2005) have identified the important factor of organisational and safety cultures as having an impact upon the collective practices of attitudes, perceptions and behaviour of both management and employees in the workplace. Schein (1992: 8-9) has encapsulated the definition of culture as being “the way we do things around here”, and this can be applied to an organisation’s safety culture. Schein’s approach to conceptualising culture is adopted by a number of safety culture writers, such as Hopkins (2005), Weick and Sutcliffe (2007) and Guldenmund (2000). The organisation studies discipline area has much research literature on organisational culture. For example, Hofstede and Hofstede (2005) examine various aspects of culture (such as language, traditions and history) and discuss how national cultures influence motivation and behaviour in organisations. By contrast, sources on the definition and nature of safety culture are limited. Key writers on safety from an organisational aspect in Australia include Bohle and Quinlan (2000). An influential safety culture researcher that uses Australian case studies is Andrew Hopkins, such as in Safety, Culture and Risk (2005). Hopkins’ other research focused on safety culture via the Gretley mine disaster (2007), the Longford Gas explosion (2000) and the Moura mine disaster (1999; 2000b). Apart from academic research, major contributions to safety culture have come from Commissions of Inquiry into the Glenbrook and Waterfall rail disasters in New South Wales. Both Inquiries were conducted by Justice Peter McInerney who saw the organisational culture of Railcorp as a very significant causal factor in the chain of events that lead to these crashes. Before discussing features of a positive safety culture, some discussion of the concepts and terminology around safety culture is required.
Organisational Culture, Safety Culture and Subcultures

Guldenmund (2000), in his research into the complex nature of safety culture and organisational culture, emphasises subcultures, difficulties of measurement, and connections between organisational culture and the culture of the industry. Indeed, to illustrate the complexity he quotes Ludborzs (1995 in Guldenmund 2000:245) who “recommends never to lose sight of the ‘cultural super-structure’ where safety culture is only part of a corporate culture, which in itself is part of an industrial culture and a national culture”. Choudhry, Fang and Mohamed (2007, p.3) present safety culture as a sub-set of organisational culture. Organisational culture is defined as “is the interaction between organisational and individuals, where employee’s behaviour can change through mutual interaction”. Members of the organisation create the culture. Ek et al.’s (2007) approach emphasises the shared values, attitudes and perceptions as fundamental to culture. There has been debate about terminology around organisational culture or, alternatively, organisational values or climate to describe the attitudes and behaviour of management and employees in a company. Particular authors’ approaches to defining safety culture are discussed below.

Farrington-Darby et al. (2005, p.58) define it as the ‘thing’ that drives attitudes, beliefs and perceptions, and these attitudes, beliefs and perceptions determine behaviour. Guldenmund (2000) defined safety culture in terms of those aspects of the organisational culture which will impact on attitudes and behaviours related to increasing or decreasing risk. He distinguishes between three levels of safety culture: the outer, middle and core levels (p.251). The outer layer consists of artefacts, such as dress codes and personal protective equipment. These are manifestations of the existing safety culture in the organisation being studied. Middle is espoused values and attitudes captured in policies, training, manuals, etc. Core refers to basis assumptions, such as the nature of reality and truth. The core (assumptions) cannot be observed but only derived from the outer and middle. The outer (artefacts) reflect the deep organisational convictions about what works and what does not. It reflects attitudes. Guldenmund defines ‘climate’ as the attitudes of individuals, which is measurable. Culture is
seen as unmeasurable but manifested in attitudes. However, fusing “safety climate and safety culture … does justice to the integrative, holistic concept of culture” (p.252).

One of the problems in working with the concept of safety culture is that its melds into ‘practice’, because culture can only be ‘seen’ as organisational practices. Farrington-Darby et al. research makes no attempt to conceptually distinguish between culture and practice when researching 100 factors that affect safety culture, which could lead to the criticism that safety culture is ‘everything’ and therefore unhelpful. This issue is considered further when analysing methodological issues.

**The Significance of Culture for OHS Performance**

As noted above, the significance of safety culture for OHS management in Australia received particular attention in inquiries into disasters. This is illustrated prominently in the Executive Summary of the Report of the Special Commission of Inquiry into the Waterfall rail crash of January 2003 by Hon Peter McInerney QC when he writes of an “… ‘us and them’ mentality” that existed at that time in the New South Wales Railcorp (McInerney 2005: 217, Section 17). That is, the characteristics of the organisation culture affected the safety culture. McInerney then elaborates: “Train drivers believed they were blamed for any delay or disruption to services, and employees in supervisory positions adopted a practice of bullying operational staff for the purpose of maintaining punctuality of train services” (McInerney 2005: xliii). The atmosphere of trust between employees and supervisors necessary for the creation of a good safety culture did not exist. The attitudes to safety in conflict with ‘on-time running’ in the report is reinforced by Mr Lauby the Special Commission’s lead investigator with the comment that: “In talking with operators, they are very concerned about on-time running. They are very concerned about, you know, making sure their trains arrive at the station on time or, you know, someone will be upset” (McInerney 2005: 216). Justice McInerney had previously conducted an inquiry into the Glenbrook rail crash of December 1999. His findings and recommendations from that inquiry indicate that the prevailing culture had contributed to the incident and that the State Government should initiate cultural change. This had not occurred and Justice McInerney’s Waterfall inquiry was critical of the government’s lack of remedial action following the Glenbrook inquiry. The importance of an organisation’s prevailing overall culture has been illustrated recently by a corruption inquiry into the New South Wales Railcorp. This has revealed an institutional history of corruption.
and fraud in Railcorp which reinforces some of the comments on trust and attitudes of management stated previously (Besser and Smith 2008:6).

There are also other issues such as the allocation of sufficient time and resources to carry out tasks with safety. Organisations can create a mentality of ‘must do’ (Hopkins 2005: 88) that encourages employees to cut corners to get the job done. If there is insufficient consideration given to the provision of sufficient resources this would negate any efforts to build a culture of trust between employees and management. This is true in any industry but can be particularly dangerous in high risk industries such as the electricity industry, as has been shown by Hopkins (1999) to be the case in mining and for the railways, with the potential for injury to the public in addition to the staff. Hopkins (1999) also analyses organisational culture and safety culture through circumstances surrounding the Moura mine disaster, in particular, the intermittent payment of a safety bonus compared with the weekly production bonus (Hopkins 1999:94). The structure of bonuses inferred that productivity was a higher priority, and would be rewarded more quickly, than achievements around safety, thus revealing the company’s priorities.

Hopkins’ (2005) case study research shows many times over the significance of safety culture: “The safety culture of an organisation has an impact upon the safety performance of the company” (p. x). Reason (1997) also believes that a good safety culture, once established in an organisation, becomes ‘the way we do things’. It can survive management changes: “A good safety culture… is something that endures beyond these palace revolutions and so provides the necessary driving force irrespective of the inclinations of the latest CEO” (Reason 1997:113). The time, effort and resources necessary to create a positive safety culture may be demanding, however the resulting reduction in incidents causing injury to people is worth the effort and the benefits can endure. Hopkins’ explanation of a good safety culture emphasises the characteristic of ‘collective mindfulness’. This concept draws from the work of Karl Weick (Weick and Sutcliffe 2001, in Hopkins 2005: 13). Such mindfulness can be found in ‘high reliability organisations’ due to the constant danger facing employees and the public. Both managers and employees in high reliability organisations have to be constantly aware of the potential risks involved and the need for safety to be the highest priority. High reliability organisations include nuclear reactors and aircraft carriers (Reason 1997). The electricity industry is appropriately placed in this high risk category due to the
hazardous nature of working with ‘live’ electricity, often at high voltages and working at heights.

Other research that demonstrated the importance of safety culture for OHS performance includes a study of rail maintenance in the United Kingdom. Farrington-Darby et al. (2005) analysed unsafe behaviours in this high risk environment. They identified 40 issues from a starting list of 100 that were pertinent to unsafe behaviours that contradicted previous explanations that focused on the sufficiency of training alone. Therefore, they advocated a holistic approach to managing safety in organisations. The concept of safety culture captures the necessary breadth for managing safety, particularly those factors that are remote from the behaviours of frontline workers. Features of their explanation of safety culture will be discussed further below. Guldenmund’s (2000) argument about the significant of safety culture is based on the importance of assumptions for driving behaviour. Assumptions explain attitudes, and attitudes drive behaviour; it is the concept of culture that addresses assumptions. Choudhry et al. (2007) explain that safety culture creates the impetus for compliance with a safety management system at all levels of management and in all work locations. This is similar to Weick and Sutcliffe’s emphasis on the need for ‘mindfulness’ as the key to avoiding disaster in high risk circumstances; that is, rules and procedures will not develop resilience nor a capacity to deal with the unexpected.

DeJoy (2005) explores the relative significant of culture as opposed to an emphasis on employee behaviour. An emphasis on behaviour is only useful for incidents that have an immediate behavioural cause, but it will not counter factors that negatively affect safety, such as employee’s perceptions that managers give safety a low priority relative to production or profit imperatives. Behaviour is presented as part of culture, and DeJoy advocates a holistic approach. Whilst cultural interventions were argued to be difficult and unpredictable, enhancing the safety culture was crucial: ‘Efforts to establish the basic or root causes for safety problems lead back to management, “errors” or other system failures, which are often thought to occur as a function of the basic culture values of the organisation’ (DeJoy 2005: 6). Ek et al.’s (2007) research into air traffic control in Sweden also confirmed the importance of safety culture over safety management systems, with safety culture encompasses a broad range of factors. Rundmo and Hale (2003) studies how management attitudes influenced risk. They traced the relationship between the attitudes and decisions of
top management and middle management on priorities and employees’ attitudes and behaviour. Safety culture can capture management attitudes far from frontline work.

The following section moves from the significant of safety culture to explaining particular features of a safety culture. It draws mostly from case study research. As the culture approach counters an emphasis on frontline employee behaviour, the limits of a ‘blame the victim’ approach are also considered. Consideration is also given to ways that safety culture complement, and go beyond, OHS management systems in terms of workers’ perceptions of management’s priorities, a holistic approach to management safety that incorporate values, the effectiveness and openness of reporting and communication, and the degree to which organisation’s pursue safety as the top priority.

**Safety Culture**

This section canvasses a broad range of literature to identify key features of safety culture that could explain incidents in the electricity distribution industry, particularly the failure of the adoption of OHS management systems to secure improved OHS outcomes. The discussion commences with a review of Reason’s work, where the limits of relying on ‘human error’ to explain failures and relying on OHS management systems to avoid disaster are explained via case study research. The features of a positive safety culture are then explained.

Reason is the seminal author concerning the psychological aspects of the components that make up organisational safety culture, primarily with *Human Error* (1990) and *Managing the Risks of Organisational Accidents* (1997). Both of these are based upon research conducted through case studies of major industrial safety disasters which have occurred in various countries. *Human Error* includes studies of the Three Mile Island nuclear emergency, the Challenger space shuttle crash in the USA and the Chernobyl nuclear generator explosion in the USSR. The later publication includes studies of the Air Ontario Fokker-28 aircraft crash in Canada (Reason 1997: 163) and the Piper Alpha offshore oil rig disaster (Reason 1997: 78). These two later case studies were used to explore ‘human error’ as a primary cause of disaster, as initially concluded by investigators. Reason maintains that although some of the acts or omissions that operators may, or may not have taken, lead to the incidents, there are
other underlying managerial factors which lead to those acts or omissions occurring. That is, a focus on individual behaviour and psychology was not sufficient to explain the incidents.

Rather than human error, Reason (1997) considers other factors such as failures in procedures, the failure of vital items of equipment at critical times, and a focus upon ‘getting the job done’ as critical contributory factors leading to the incidents. Reason (1997) defines human error as “the failure of planned actions to achieve their desired ends — without the intervention of some unforeseeable event” (p. 71). He further gives a classification of error types, dividing them up into firstly, skill-based slips and lapses such as failure of attention by the operator or lapses of memory; and secondly, mistakes designated as rule-based or knowledge-based mistakes (p. 72, Figure 4.8). These would indicate that there had not been sufficient training or retraining conducted, or that the operating rules and procedures were inadequate to manage the work processes safely. Reason (1997) asserts that “human error is a consequence not a cause” (p. 126). His research reveals that

“[t]he evidence from a large number of accident inquiries indicates that bad events are more often the result of error prone situations and error prone activities than they are of error prone people. Such people do, of course, exist, but they seldom remain at the hazardous sharp end for very long” (Reason 1997:129).

The initial study of incident reports (Chapter 1) in the electricity distribution mirrors the factors considered by Reason, including the identification of human error as a primary cause for the incidents with similar issues such as incompetence, lack of training, inadequate procedures or rules, and also the failure of equipment. The issues and problems with the DEUS incident reports analysed in Table 1 exemplify what Reason (1990) indicates are problems with incident reports. He reveals that “Not only are these mainly concerned with attributing blame, they also tell a story that may be inaccurate or incomplete,” (p. 16). He further elaborates this by stating “that they contain less information than was potentially available and simplifying what was a complex and continuous set of events”. The DEUS incident reports revealed that the management involved in completing the incident reports may have reflected a prevailing tendency to ‘blame the victim’. Hopkins (2005) characterises a tendency to ‘blame the victim’, or to focus on human errors, as part of a negative safety culture. The approach quite often taken by management is to blame the workers for safety incidents. Reason (1997) calls this positional paradox: “those at the top of an organisation
blame most of the safety problems on the workers who simply follow procedures and use the equipment provided” (p. 113). Chapman (2006) is another author who argues against the ‘blame the victim’ approach. “Worker carelessness, or the absence of appropriate supervision is still used to explain many incidents, although the influence of poorly designed equipment, impossible deadlines or poor communications might be given some weight” (p. 10).

The initial adoption of safety management programs can lead to an effective reduction in safety incidents (NOHSC 2001). However, this in turn could lead to a state of complacency and a subsequent change in focus from maintaining the strong emphasis on safety to that of increasing productivity. A period without a serious injury occurring in an organisation could lead to what Reason (1997) terms as the danger of the “unrocked boat” (p. 6), where the driving motivation for a concentration on safety initiatives is lessened and complacency sets in. Safety rules and procedures to prevent incidents occurring are considered by Reason (1997) as being “defences in depth” (p. 9, Figure 1.4), that is, defences that prevent known hazards from causing potential losses. These may not be as effective as desired in reality or in appearance. The belief that because a serious injury has not occurred for some time it will not occur again, or to use Reason’s (1997) analogy, ‘the boat is sailing along nicely’, can be very misleading and distract management from maintaining the safety impetus. Whether management in the electricity industry have turned their attention to production once OHS management systems were adopted will be considered in Chapter 4 through the analysis of particular safety incidents. The need to move on from the emphasis on the management of safety to that of developing a positive safety culture and risk assessment process within an organisation would help to remove the unrocked boat concept (Reason 1997:6).

Relative to his earlier work, Reason’s Managing the Risks of Organisational Accidents (1997) is more concerned with safety culture and the importance of employee and management attitudes, motivation and workplace behaviour to the success of the safety program. Hopkins’ (2000a; 2000b; 2005) analysis of disasters draws heavily from Reason (1997), and builds on it. The work of Reason and Hopkins has been particularly influential for shaping the research in this thesis, so it is worthwhile to examine their notion of safety culture in more detail. The components that comprise the theory of organisational safety culture have been defined by Reason (1997) as having a number of essential elements:
- An ‘informed culture’, a holistic approach and knowledge by management of the human, technical, organisational and environmental factors comprising the safety system.
- An open communication or reporting system where information regarding safety, including ‘near miss’ reporting freely flows up and down an organisation.
- A just culture which encourages safe behaviour and reporting but also is not averse to taking remedial action such as training for unsafe actions.
- A flexible culture requires the ability of an organisation to adapt to emergency situations where operators on the spot can take action to prevent incidents without fear of retribution by management.
- The organisation must also possess a learning culture which is willing to examine its safety system and implement major reforms to its safety management system when required (p. 195-196).

These factors require organisations to develop a holistic approach and to constantly review their safety management systems and the development of safety culture as new techniques and ideas are researched, developed and implemented. Whilst Reason (1997) focuses on the internal aspects of organisations, he does point to an important role for regulators in creating a safety culture as one of the “soft defences” (p. 8), and later suggesting moving on from compliance to addressing “socio-technical issues” (p. 181). One criticism of Reason’s approach comes from Macrae (2009: 89), who argues that the model is appropriate to industries such as petrochemical and chemical industries, because of the emphasis on identifying and containing hazards. In contexts such as air services, she argues that organisational processes rather than hazard identification and control are more significant. This raises a question of the applicability of Reason’s model to the electrical distribution industry. Given that the nature of electricity also has that property of needing containment and isolation at the centre of safety, the criticism around the relative emphasis on hazard identification and control relative to organisational processes seems inappropriate.

Features of a positive safety culture have been identified in a number of studies, mostly through case study research. As will be shown here, there are a number of consistencies in the findings and connections with the approach taken by Reason.
Farrington-Darby et al (2005) investigated the causes of safety incidents in the rail maintenance industry in the United Kingdom. Reason is cited a number of times in the article. They developed a list of forty factors that contributed to unsafe behaviours. The forty factors ‘span immediate “at the time of the job” factors, such as the behaviour of someone in a safety critical role, medium term factors such as supervisors’ visibility and longer term strategic factors such as the quality of organisational accident and incident reporting systems’ (Farrington-Darby et al. 2005: 58). A particular feature of the study was analysis of rule violations (p.43). However, rule violation that could be considered as simple behavioural problems to be overcome by training were found to be more complex in orientation. Their interpretation of rule violation fits with Reason’s notion that errors are consequences rather than causes (discussed above). Given that ‘distant’ factors were found to be just as important as frontline work behaviour, the study reinforces the limits of a focus on behaviour and human error, and instead points to a need for a holistic approach to managing safety and explaining incidents. Particular causal factors are listed in Table 2 below.

Farrington-Darby et al.’s (2005) emphasis that insufficient or deficient training cannot be a causal factor in isolation raises a question about the categorisation of causes of safety incidents by DEUS using data reported by managers in the electricity industry (refer to Table 1 in Chapter 1). Categories such as ‘incompetence’ fit with a ‘blame the victim’ approach, rather than a holistic safety culture emphasis, and will not be eradicated through training of individuals. The temporal categorisation of causes in Farrington-Darby et al.’s research may be useful in application to for categorising causal factors in analysing incidents in the electricity distribution industry: ‘immediate’ (frontline workers), ‘medium term’ and ‘longer term’. It has potential for facilitating a broader and holistic approach to analysing incidents.
beyond the usual focus on immediate frontline worker behaviour in isolation from organisational contexts.

### Table 2: Factors that Influence Safety Behaviour and Safety Culture.

<table>
<thead>
<tr>
<th>Communication on the job (excessive and poor quality)</th>
<th>Poor and underused real time risk assessment skills</th>
<th>Individual perception of what safe is</th>
<th>Track workers knowledge and understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inconsistent teams/subcontractors</td>
<td>Safety role model behaviour</td>
<td>Social pressure of home life</td>
<td>Setting up site safety on the day</td>
</tr>
<tr>
<td>Rule dissemination</td>
<td>Physical conditions</td>
<td>Peer pressure</td>
<td>Feedback cycle</td>
</tr>
<tr>
<td>Competence capability and certification</td>
<td>Working hours: different behaviours out of normal hours</td>
<td>Manager’s communication methods</td>
<td>Information/communication route clarity</td>
</tr>
<tr>
<td>Pre-job information dissemination</td>
<td>Planners knowledge for job resourcing</td>
<td>Job feedback to planners</td>
<td>Volume of paperwork</td>
</tr>
<tr>
<td>Feedback messages from managers</td>
<td>Manager’s railway knowledge</td>
<td>Manager’s visibility and accessibility</td>
<td>Perceived purpose of paper work</td>
</tr>
<tr>
<td>Supervisors style visibility, communication, representation of staff</td>
<td>Supervisors’ (technical competencies and assessment of them)</td>
<td>Supervisors presence (visibility, leading by example, opportunity for verbal communication)</td>
<td>Fatigue, concentration, ability to function (alcohol)</td>
</tr>
<tr>
<td>Equipment (condition, appropriateness and availability)</td>
<td>Practical alternatives to rules</td>
<td>Perceived purpose of the rule book</td>
<td>Rule book usability and availability</td>
</tr>
<tr>
<td>Information pathway flow</td>
<td>Planners competency to plan</td>
<td>Methods for reporting</td>
<td>Information systems use</td>
</tr>
<tr>
<td>Contradictory rules</td>
<td>Recruitment methods</td>
<td>Training needs analysis</td>
<td>Training methods</td>
</tr>
</tbody>
</table>


DeJoy (2005) explores the relative worth of changing behaviours versus changing culture to improve safety performance. The conclusion is that an integrated approach is required, with behaviour seen to be part of safety culture. It is concluded that the culture change approach promised to be more comprehensive but also more complex and difficult to verify. A multi-level, holistic approach to behaviour and culture is required. To achieve this, organisations had to be willing to ‘look at themselves’ and make fundamental changes in the way they pursued their activities (DeJoy 2005: 9). Some of the key issues identified were communication, understandings of safety roles and responsibilities, information, and the
importance of trust between management and employees. Whilst DeJoy asserts that cultural change should be a ‘top down’ leadership initiative, influencing and shaping employees’ perceptions and behaviour can be impaired by employees’ impressions that management has a greater focus on productivity than safety. Such impressions will influence employee commitment to management’s plans and initiatives to manage safety. A positive safety culture would be demonstrated by all stakeholders in an organisation having similar perceptions of causal factors, responsibilities for safety outcomes, and these could be assessed to measure progress (DeJoy 2005: 16). Such an approach could also identify sub-cultures.

Ek et al. (2007)’s research into air traffic control safety builds on Reason’s learning, reporting, justness and flexibility model of safety culture. To these four factors, they add working situation, communication, attitudes towards safety, safety-related behaviours, and risk perception. Good communication received particular emphasis (Ek et al. 2006: 7). Their empirical research around the nine factors found significant differences between manager and non-manager perceptions, which managers holding more positive views of the safety culture than non-managers (Ek et al. 2007: 12, 18).

The issue of employees’ perceptions of management’s commitment to safety was explored by Lawrie, Parker and Hudson (2006) in a petrochemical plant in United Kindgom. The article presents a framework for assessing the maturity of a safety culture. Employees’ perceptions were that management was not committed to health and safety, that the organisation only paid ‘lip service’ to safety, that employees had to look after themselves, and that management just react after an incident has occurred. “The general feeling amongst the workforce [was] that profit takes priority in the organisation” (Lawrie et al. 2006: 12). The research also found that sub-cultures across an organisation were an impediment to safety management.
In contrast to Lawrie et al. emphasis of employees’ perceptions of management’s attitude to safety, Rundmo and Hale (2003) explored management’s attitudes to safety and then considered employees’ perceptions of management’s attitudes. The setting of the research was a ‘high reliability’ organisation: Norske Hydro. They traced out how management’s attitudes affected the priority of safety. The research found that management “agree that involvement in accident prevention is too time consuming, that some people are accident prone and consequently that accident prevention will not pay off, and that rules and safety instructions make it difficult to fulfil the production goals” (Rundmo and Hale, 2003: 9). Employees’ attitudes to safety were also considered and found to be related to risk-taking behaviour, such as attitudes that violating rules is acceptable. The article confirms that such ‘blame the victim’ attitudes, priority given to production over safety, employee perceptions of management attitudes, and acceptance of rule violations, are important aspects that can hinder the development of a positive safety culture.

Another source on safety culture in high reliability organisations reviewed, Weick and Sutcliffe (2007), takes a more prescriptive approach to developing a positive safety culture. A particular emphasis is placed on ‘mindfulness’ as the key to creating resilience in the face of uncertainty; a cultural necessity in contexts where disaster is possible and changes to contexts can be predicted, even if the implications of change cannot. Mindfulness is developed by adopting five principles. These are: track small failures, resist oversimplification, remain sensitive to options, maintain capability for resilience, and take advantage of shifting locations of expertise. These principles point to the importance of incident reporting, risk management and in preparing an organisation for the unexpected event which could damage its operations. The creation of a mindful organisation is a major step along the path to creating a positive safety culture and must be led by management.
Having a ‘blame free’ system for employees to report failures or incidents in the HRO is stressed. Ensuring that reported incidents are followed up and acted upon by management is also noted. The authors recommend that management planning include the assumptions, values, practices and artefacts (p.115). Whilst Weick and Sutcliffe consider the ‘silo effect’ (discussed below), they presume that it is possible to create an integrated culture. Whether this is possible in the electricity distribution industry with the extent of organisational change and the ‘us and them’ industrial relations climate will be considered. Nevertheless, as noted above, the electricity distribution industry falls into the category of ‘high reliability organisations’, so mindfulness to disaster, or ‘situation awareness’ (Weick and Sutcliffe 2007: 32) will be explored in the empirical research. Weick and Sutcliffe developed a number of audit tools to guide organisations through the creation of a positive safety culture (pp.186 – 103). These tools are helpful for further developing the themes for analysing specific incidents in the electricity distribution industry. Over 60 items are included. Common themes across the 60 items were: reporting, pressures that can lead to cutting corners, communication, blaming and the need to actively look for failures. Particular organisational changes that should generate questions about the level of safety include recent changes in supervision, issues delegated but not followed up, pressures that create distractions, staff being spread too thin, etc. (Weick and Sutcliffe 2007: 47 – 48). Breaking down silos is addressed in terms of the tools creating data that can be compared across organisational units. Transcripts can be analysed for the absences of mindfulness factors that Weick and Sutcliffe emphasise in their audit tools.

The authors also discuss elements of a negative safety culture, such as a culture of blame, a ‘club’ culture, a culture of fear, a culture of uncertainty, oral culture, a culture of justification, and paternalism (p.128). Transcripts about the investigation and prosecution of safety
incidents in the electricity industry can be analysed for such cultural characteristics, alongside characteristics of a positive safety culture.

The most recent published research on safety culture in high reliability organisations in the Australian context, a collection of papers edited by Hopkins (2009), also emphasises mindfulness as the key to safety culture, but also considers risk management processes and the importance of communication. A ‘no blame’ approach to accident investigation was one example of a connection between attitudes and safety management (Branford 2009: 178). Another is that deviance from work standards should not be acceptable (Macrae 2009: 97). The tendency to resort to ‘human error’ as a cause is explored through a case study of a crash of a Singapore Airlines plane. Rather than pilot error, a broader consideration of the context pointed to insufficient runway markings and a lack of barriers (Branford 2009: 182). Dekker (2007) undertook an analysis of a number of prosecutions of employees for safety incidents or mistakes. Dekker concluded that some employees are prosecuted to divert attention from deficiencies in the organisation’s procedures.

Despite safety culture being found to be significant, a note of caution is sounded by Fuller and Vassie (2004). Managing safety via culture is not simple. Safety culture is not a panacea for safety management. They note that ‘top down’ imposition of a safety culture program may not succeed if the perception of front line workers is that it is just another management tool to control staff (citing Back and Woolfson 1996). This could also apply to behavioural modification programs (discussed below). The involvement of all employees and all levels of management in the design and implementation of a cultural change initiative is important to its success. Another factor is the degree of trust that exists between frontline workers in building a positive safety culture and this is very fragile (DeJoy, 2005:15) - once the confidence in management is broken it is hard to rebuild.

The debate amongst writers in the field of workplace safety as to the best approaches and techniques to improve the health and safety of people at work is ongoing. One of the current
trends is to implement behavioural modification programs into workplaces to reinforce worker attitudes towards health and safety. These programs, if implemented as a stand-alone training program and not as a component of an overall cultural change program, could be perceived as a ‘blame the victim’ exercise by assuming that it is only the workers’ behaviour that is unsafe, without looking at the other causal factors which often include the safety culture of an organisation in addition to equipment, training and safety procedures. Hopkins (2005) elaborates on this hypothesis in his working paper, *What are we to make of safe behaviour programs?:*

“The given that it is the behaviour of management which is most critical creating a culture of safety in any organisation, behavioural safety observations are likely to have their greatest impact if directed upwards, at managers.”


“Whilst a focus on changing unsafe behaviour into safe behaviour is appropriate, this should not deflect attention from analysing why people behave unsafely. To focus solely on changing individual behaviour without considering necessary changes to how people are organised, managed, motivated, rewarded and their physical work environment, tools and equipment can result in treating the symptoms only, without addressing the root causes of unsafe behaviour”.

This research suggests that to achieve organisational cultural change, which encompasses behavioural change, the themes outlined in Chapter 1 should be addressed by organisations. These are:

1. **Workers’ attitudes towards management’s commitment to safe working practices, rules and safety as a priority; for example, workers’ perceptions that it is acceptable to violate rules.**

This particular theme derives predominantly from Lawrie et al. (2006) and Rundmo and Hale (2003) but the notion of the acceptability of rule violations is canvassed by a number of authors.

2. **A management/employee ‘holistic’ approach to safety through demonstration of safety ‘values’ of the organisational culture and employees working together to create/shape values.**
Whilst this theme is derived from a range of research, the creation of an integrated culture is particularly highlighted in the work of Weick and Sutcliffe (2007). It is also captured in the ‘mindfulness’ concept.

(3) The degree of confidence in reporting systems for incident/unsafe conditions and whether it applies to contractors and their own safety systems and performance.
Reason (2007) lists reporting as one of the four key aspects of developing a positive safety culture. It is also addressed in Farrington-Darby et al. (2005), Hopkins (2009), Weick and Sutcliffe (2007), and Ek et al. (2007).

(4) Communication on safety issues and dialogue, both up and down the organisation between management and employees and without ‘fear or favour’.
The issue of communication, and communication without ‘fear or favour’, is also embodied in Reason’s model in terms of a reporting culture and a just culture. Ek at al. (2007) perhaps gave greatest emphasis to communication in research around air traffic control. Failures in communication will be considered for particular incidents in the electricity distribution industry. Other authors who considered communication as part of a safety culture were DeJoy (2005), Weick and Sutcliffe (2007) and Branford (2009).

(5) The degree of the organisation’s commitment to ‘safety first’ as the highest priority versus ‘getting the job done’.
The most thorough examination of this issue was conducted via Hopkins’ analysis of particular disasters, such as Longford and Moura. Additionally, Rundmo and Hale (2003) explored the implications of management’s prioritising of safety relative to production in hydro electricity and Lawrie et al. (2006) explored the priority of safety relative to profit.

(6) Perceptions of ‘blame the victim’ apparent in managements’ approach to safety issues.
A key requirement for developing a positive safety culture is to relinquish the ‘blame the victim’ ideology because such a mindset undermines any effort to take a holistic, systems approach to managing safety. It is therefore canvassed in most literature on safety culture, but is particularly emphasised in the work of Reason (2007), Hopkins (2000a; 2005), Dekker (2007), Farrington-Darby et al. (2005), Lawrie et al. (2006), Rundmo and Hale (2003) and Macrae (2009).
These themes would apply to any industrial undertaking and are not specifically designed for electricity distribution industry.

**OHS in the Electricity Distribution Industry**

A review of published texts have indicated that there are a few publications relating particularly to health and safety aspects, which have been conducted focusing on the electricity distribution industry in New South Wales. The most relevant of those include *The Causes of Electrical Fatalities at Work* (Williamson and Freyer 1998). This text analysed work-related deaths due to contact with electricity in those occupations with high exposure to electricity, namely the electrical and related trades. This study included research into behavioural factors in the category of human error that may have contributed to accident causation. Another study analysing general causation patterns in a sample of 1,020 occupational fatalities across all industries entitled *Industry Differences in Accident Causation* (Williamson, Freyer and Cairns 1999) also identified behavioural and environmental factors behind unsafe work practices as contributory factors. As Williamson and Freyer (1998: 6) have revealed in their research, unsafe work practices were influential in causing fatalities due to electrocution in the industry. It is likely that this would also translate across to electrical accidents that did not result in fatalities. As similar acts of omission lead to similar outcomes, Williamson and Freyer (1998: 7) go further to claim that the most common types of unsafe work practices were unsafe ‘normal’ work procedures by either management or the individual. Further, Williamson and Freyer (1998) conclude that “[t]his indicates that in most electricity-related fatalities, the victim made a slip or skill-based error while carrying out some routine activity” (p. 7). This interpretation of causality that emphasises behaviour rather than the contexts for behaviour contradicts Reason’s (1997) and Hopkins’ (2000a; 2005) findings discussed above and fits more with a ‘blame the victim’ ideology.

The particular hazardous nature of the electricity distribution industry, along with its decentralised and diffuse geographical work locations in the construction and maintenance process, can add additional factors into the management of safety. These factors include communication difficulties, small work crews in environmentally-difficult locations and, at times, the changes in the composition of work crews and management structures.
Organisational change (as discussed in Chapter 1 around corporatisation, etc.) from the 1990s increased the rate of change around teams, supervisors and managers. These factors could have a negative effect in the creation of a positive safety culture.

Another publication which concerned research with specific reference to the electricity supply industry was *Liability for Electrical Accidents* (Sappideen and Stillman 1995). It contained a number of case studies illustrating legal liability and negligence for incidents which impacted upon people working in the industry and also the public. The authors also explored the legal context where the statutory protection for legal liability for safety incidents applied to utilities set up under statute (the electricity industry) (Sappideen and Stillman 1995:6). This may explain why there appears to have been limited prosecutions, except for serious injury or fatality, conducted in the past against the electricity distribution utilities for health and safety matters previously. Both Hopkins (2007: 34 and 36) and Sappideen and Stillman (1995:10) have explored the degree of negligence, culpability and foreseeability as the basis for prosecution in industrial safety incidents in their publications. As will be shown in Chapter 4, the degree of negligence and foreseeability influence the decisions of presiding judges and the penalties imposed.

Industry reform since deregulation in the 1990s has been the theme of other further related studies in the Australian electricity industry. These were *Electricity Industry Reform: A Case Analysis* (Nelson and Dowling 1998), *Restructuring, A Review of Electricity Industry in Australia* (Outhred 1998) and *Change in the Australian Electricity Industry: a Case Analysis* (Nelson and Dowling 1999). These examined the impact of deregulation of the electricity industry in Australia and were mainly concerned with the structural organisational changes from government control to corporate structure, in some cases leading to privatisation. Of particular relevance to this research were the references by Nelson and Dowling (1999) to the lack of organisational cultural change due to continuity of senior managers (p. 58). Although the main focus of their research is on the restructuring, Nelson and Dowling (1999) show that structural change does not create cultural change.

As discussed above, the existence of sub-cultures is an important aspect to consider in examining a positive safety culture. In the electricity industry, it seems that sub-cultures arising from the ‘silo effect’ is most significant. The geographically-dispersed nature of production in the industry lends itself to the creation of ‘silos’ and it appears that reform in
the electricity industry has not countered that tendency. The ‘silo effect’ is where various departments and functions become separated culturally from the overall purpose of the company. Hopkins (2005) analyses the ‘silo effect’ as a causal factor in the Glenbrook rail disaster: “I have called this aspect of the way things were done, a culture of ‘silos’. The result was a failure of people working in the same organisation to recognise that their actions, or inactions, might have implications for the safety of people in other parts of the system” (p. 28). Weick and Sutcliffe’s (2007: 49 - 50) prescriptions about developing a positive safety culture emphasis tackling sub-cultures, particularly the silo effect. The ‘silo effect’ arises from organisational structures that restrict awareness to sections of an organisation, rather than to the organisation as a holistic system. The factors that can lead to the silo effect include “profession, work history, position, location, gender, age etc” (Helmreich and Merrit 1998 in Ek, Akselsson, Arvidsson and Johnasson 2007: 5). Guldenmund (2000) points to differences in leadership and attitudes of supervisors in different locations. The particular feature of organisations in the electricity industry that present the ‘silo effect’ obstacle is geographical dispersion. Disjunctures also arise on functional lines, such as around particular trade specialities, and those arising between those that work with live electricity from those that support that work. Specific examples to substantiate the impact of the ‘silo effect’ in the electricity industry will be reviewed in Chapter 4.

Of particular interest to this research has been a conference paper entitled Regulating for Safety Electricity Networks: For Workers and the Public, by Paul Grant (2003), Manager Electricity Networks, New South Wales Ministry of Energy and Utilities, presented to an electricity industry conference in Adelaide. These findings were the result of Grant’s own analysis of incident and investigation reports that have occurred and had been reported to the Department. Grant’s findings and analysis point to organisational culture and safety culture as shaping OHS outcomes. The paper detailed the reduction in the number of fatalities and serious injury in the industry in New South Wales from 1980 to 2002. The main emphasis was upon the progressive change from prescriptive legislation to “outcome orientated safety plans” (Grant 2003:2) and the introduction of risk assessments from 1997. Grant points to safety culture as necessary for effective management: “Unless there is a supportive, no-blame culture encouraging incident reporting, they will rarely be reported” (Grant 2003:13). He concludes by emphasising the need to develop strategies that will ensure that consultation processes are improved, that information will flow freely, and that there is a culture of open two-way communication (Grant 2003:16). Grant’s paper was also presented and discussed at
a meeting of DEUS departmental managers in Sydney that was attended by this researcher in March 2004\(^2\). In this meeting, the role of organisational culture was discussed and confirmed as significant.

Hopkins’ work is informative around safety culture in industries and organisations. His exploration of the relationship between culture and safety – such as case studies of the Australian Air Force and the New South Wales railways – is grounded in the organisational and industry context. An emphasis on industry was also taken in an article on the building construction industry. It concluded: “Most safety work ... focuses on the objective, on performance and systems, and not on the subjective, on culture and individual motivation” (Harley 2005:47, citing Greenspan 2005). A consideration is whether the unit of analysis should be an industry or an organisation. The electricity industry could be appropriate because the hazards are common across the industry. However, this research has taken the approach of studying organisations separately, even though this was problematic because of organisational restructuring. This issue is debated in Chapter 5 relative to the empirical findings in Chapter 4.

**Organisational Motivators for OHS Improvements**

Organisational interests around OHS include corporate reputation as well as productivity and profitability. Recent studies in Europe into aspects of Corporate Social Responsibility (CSR) investigate the activities of companies in their efforts to improve OHS; so far this is limited. In fact research shows that “[s]uch positive aims and visions are not yet very common as drivers in the area of health and safety at work, where risk reduction and control is the dominant paradigm” (European Agency for Safety and Health at Work 2004:8). Rather, attention is limited to OHS management systems that focus on ‘doing the right things right’ (EASHW 2004:14). However, a positive safety culture is a component of CSR, along with ethical behaviour and community involvement. The concept of CSR to improve the public perception of companies in Australia as good corporate citizens appears to be on the increase, particularly amongst larger companies involved in the electricity industry, for example AGL and Country Energy (AGL Annual Report 2003/4; Country Energy Annual Report 2003/4). These companies have recognised the interaction between employee attitudes involving

\(^2\) It was at this meeting that the DEUS unpublished data was granted to the researcher for this study.
workplace behaviour and the health and safety values and culture of the organisations, and present the CSR index as a form of measurement of their cultural achievements.

Aside from CSR considerations, it is arguable that OHS controls can be an investment rather than a cost or productivity impediment. Greenspan (2005, in Harley 2005: 47) raises the issue of safety and the demand for increased profitability: “Every construction job that has achieved exceptional safety performance also has exceptional profitability”. This is an important motivational factor for companies to move on from just compliance and managing the costs of workplace injury to a more holistic approach to safety. This is reinforced by research that has been conducted for the International Labour Organisation into the economics of safety (Dorman 2000). Dorman states “... four of the regulated industries achieved significant productivity gains attributable at least in part to their response to the regulatory challenge” (Dorman 2000:20).

**Measurement of OHS Outcomes**

Statistical information about serious accidents in the electricity distribution industry was reviewed in Chapter 1. This section considers the merits and limitations of such statistical data. Quantitative measures do not necessarily reveal that organisations are achieving a high degree of proficiency in accident prevention. Other factors which may be affecting the improvement may include the reduced numbers of frontline workers employed directly by the utilities and the use of contractors to perform some of the work previously done by utility staff. Although the proportion of contract employment rose from 1995 to 2005, the statistics for this period did not reveal an increase in the number of incidents reported by contractors in comparison with the number of incidents reported by utilities. This indicates either that the contractors have fewer incidents resulting in injury, or they are not being reported to the same degree. This sheds doubt on the accuracy and usefulness of the statistics due to incomplete reporting.

The reliance upon safety statistics as an indicator of accident rates can be misleading as it relies upon full and accurate reporting from all people and organisations involved in the industry in New South Wales. Furthermore, safety statistics do not reveal or measure the safety culture of the various organisations involved as they are generally ‘lag indicators’ only recording injuries that have occurred, and they do not reveal pro-active measures that
companies may adopt such as incident ‘near miss’ reporting and remedial action taken. As Fuller and Vassie (2004) state,

“... the absence of accidents, and in particular the absence of low probability/high consequence accidents, is not necessarily an indication of good safety performance or the presence of a good safety culture within an organisation” (p. 295).

The quantitative analysis of safety statistics to project trends and influence further planning and development of safety policy may also be misleading. Indeed, Morgan (1997) states that “many organisational decision makers insist that the facts and figures be examined before a policy decision is made, even though the statistics provide unreliable guides as to what is likely to happen in the future” (p. 146). With particular relevance to the electricity distribution industry, Hopkins (2009) warns that High Reliability Organisations may have low accident rates but any accident can have disastrous multiple fatality results. Hopkins (2009) particularly warns against relying upon injury statistics as an indicator for hazard management performance, because it is possible for organisations to lower their injury rates to zero yet still be at risk of major incidents with severe consequences (p.33).

However, research conducted by Mikkelsen and Saksvik (2004) revealed a correlation between the level of safety management systems in the Norwegian energy sector and sick leave taken during the period studied. Mikkelsen and Saksvik’s research in Norway covered a similar period to the research in this thesis; namely from the early 1990s into the early 2000s. The Norwegian energy sector experienced the same kind of restructuring and saw the introduction of safety management systems over this period. Although the Norwegian studies did not specifically refer to organisational or safety culture, they did highlight the importance of psychosocial factors and organisational change, finding that the introduction of safety management systems are important steps in creating a positive safety culture. A psychosocial factor, the failure to involve all levels of management and employees in the process, could be a major factor as to why some organisations manage change better than others. “Lack of insight into psychosocial factors is thought to be one of the main reasons why many organisations that want to change do not succeed”, (Mikkelsen and Saksvik 2004: 33).
Their research revealed that as the safety management systems became more effective, there was a reduction in the number of safety incidents and also that there was a corresponding reduction in sick leave and an improvement in organisational learning.

**Conclusion**

This chapter has reviewed a range of literature around OHS, in particular safety culture and OHS in the electricity distribution industry. It has shown that the most effective approach for the creation of a safe working environment is the recognition that there are many contributory factors. These include the overall culture of the industry, in this case a hazardous industry which requires constant focus on safe work practices. The overall organisational culture (which encompasses safety culture) is a major component. Chapman (2006) sums up the role of safety culture:

> “Employees respond to the prevailing culture of safety in the level of care, safety and risk behaviour they accept as normal; in the things they value and believe; their attitudes to training, reporting problems and working cooperatively; their views about the impact of their job on the work of others and the extent of shared responsibility for maintaining a safe and healthy workplace” (p. 12).

The management of safety and the importance of a positive safety culture to a successful incident reduction program had been demonstrated through a number of studies canvassed in this chapter. The incorporation of a positive culture of safety into a good organisational culture is essential for success. The writings of James Reason and Andrew Hopkins have been the core of this research. As stated previously the specific references to the electricity distribution industry are limited. However they are supported with references to other high risk industries. The themes running through these author’s writings will be apparent in the succeeding chapters. The following chapter will explore the methodology and the selection of the most appropriate methodology to apply to the transcripts of prosecutions in order to identify those themes. Chapter 4 considers empirical data around OHS fatalities and serious injury in the electricity industry, and causal factors identified by authors reviewed in this chapter will be considered, such as a lack of appropriate supervision and poorly designed equipment. However, such factors will be considered through a broader focus on culture, as captured by the six themes listed above.
Chapter 3: Methodology

This chapter addresses methodological issues. The sources of data were an analysis of industry incident statistics presented in the first chapter, interviews with two industry participants and transcripts of prosecution judgements arising from safety incidents. Some 15 judgements were considered and are detailed in Chapter 4. This data was interpreted through the lens of the researcher’s long experience in the industry as a lineworker, electrical safety officer and occupational health and safety officer/manager. The industry participant interviews were also used to interpret the judgements.

The path to select an appropriate methodology has entailed the exploration of various theoretical models and the selection of those which would answer the research question of the effect the organisational culture had on safety performance. Initially a pilot study was conducted in an attempt to identify causal factors for incidents that have occurred over the period 1993 to 2007; this study was presented in Table 1. A combination of models was selected including the initial analysis of incident reports held by the regulatory body for the industry. A detailed analysis of transcripts of prosecution judgements from the New South Wales Industrial Relations Commission was conducted. The review of the existing literature to the research questions was carried out to guide analysis. Six themes were developed as criteria for the analysis of the Commissions Court’s transcripts to identify important factors that would indicate the existence or lack of a safety culture. An additional methodological aspect was that the researcher was able to analyse the cases and the judgements through the lens of a longstanding participant in the industry and in safety management, without directly participating in the incidents recorded in the cases. This aspect of a former ‘insider’ with in depth working knowledge of the industry and the organisations involved gives added authority in analysis of the transcripts (Galea, 2009).

The review of the literature pointed to safety culture as the key impediment to the industry improving its occupational health and safety record. Therefore, the most significant methodological question for this thesis is how one can assess culture. Chapman (2006) suggests three measurable levels of safety culture maturity, as set out below in Table 3. The transcripts were reviewed to consider whether there is evidence of attitudes towards safety culture ‘maturing’ towards zero tolerance, using Chapman’s (2006) indicators.
Table 3: Three levels of safety culture in organisations

<table>
<thead>
<tr>
<th></th>
<th>Legal compliance</th>
<th>Safety mindedness</th>
<th>Zero tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety focus</td>
<td>An external requirement</td>
<td>Safety a goal of management</td>
<td>Safety built into all systems &amp; processes</td>
</tr>
<tr>
<td>Management attitude</td>
<td>Comply with rules &amp; regulations</td>
<td>Safety important even in absence of regulatory pressure</td>
<td>Zero tolerance of any incidents or breaches</td>
</tr>
<tr>
<td>Approach to safety management</td>
<td>Reactive - do what is legally necessary</td>
<td>Develop sound risk management strategies</td>
<td>Ensure all systems and processes meet highest standards of reliability</td>
</tr>
<tr>
<td>Stance</td>
<td>Reactive</td>
<td>Active</td>
<td>Fully vigilant</td>
</tr>
<tr>
<td>Causes of safety breaches</td>
<td>Operator error or carelessness</td>
<td>Poorly trained or careless operator; line management miscalculation</td>
<td>Failure of learning systems &amp; knowledge management in the organisation</td>
</tr>
<tr>
<td>Incident investigation</td>
<td>Minimisation of incident reports</td>
<td>Policy to investigate incidents</td>
<td>Near misses as well as incidents investigated</td>
</tr>
<tr>
<td>People responsible for safety</td>
<td>Employees &amp; line managers</td>
<td>Middle management</td>
<td>Everyone</td>
</tr>
<tr>
<td>Role of top management</td>
<td>Not important</td>
<td>Sets safety goals and targets</td>
<td>Leadership of safety culture &amp; outcomes</td>
</tr>
<tr>
<td>Role of safety culture</td>
<td>None</td>
<td>Encourages safety minded attitudes in individual employees</td>
<td>Underpins goal of zero incidents</td>
</tr>
</tbody>
</table>


Data Sources and the Pilot Study

Following initial discussions with the senior management in the New South Wales Department of Energy, Utilities and Sustainability outlining the research proposal, permission was granted for access to electrical safety incident reports compiled by that department over the research period. This pilot study was intended to identify causal factors from the text of the reports in order to provide a focal point. However, after conducting a detailed analysis of the incident reports it was apparent that these would not provide sufficient data to be able to
conduct an effective research program. This was partly due to the paucity of information on causal factors in the reports and the lack of comment that would reveal the organisational management and employee attitudes and perceptions towards the management of safety in the various utilities. The reports had been written by various managers in the utilities concerned and very little analysis of the causal factors had been included in them. The preliminary analysis is set out in the introduction in Table 1 with the explanatory notes on the criteria used, observations and comments that had been made at that time. A particular problem was that persons completing the reports pointed to immediate causes around an incident. Reason (1997) would suggest that looking to immediate causes is typical, but it is insufficient for research, as discussed above in regard to criticisms of the ‘blame the victim’ approach.

Other statistical data was available from the New South Wales Workcover Authority which publishes an annual statistical report of safety incidents that have resulted in injury in this state. However these did not provide any insight into the safety climate or expressed values of the organisations that are being researched as they are purely quantitative in nature. Other authors researched suggest that other studies had not identified a ‘causal chain’ between safety climate (attitudes) and safety culture (assumptions) (Guldenmund 2000). The reports are reactive statistical reports and simply reflect the number of incidents that have caused injury to employees in the previous year and are based primarily on workers compensation claims. To determine the existing safety climate at the time the incidents occurred it would be necessary to try to identify and determine the attitudes, behaviour and perceptions which reflect the prevailing safety culture organisationally, and if possible analyse the actions of management in dealing with the environment in which incidents occur. The statistical data that was available was sufficient to point to improvements in OHS performance in the industry but also to the fact that improvement had reached a plateau. This was presented in Chapter 1.

**Accounting for Context and Organisational Changes**

It is difficult to study organisational culture when the organisations underwent significant structural change. This environment had changed considerably over the period of research. In the electricity distribution organisations a number of smaller regional distributors were progressively amalgamated over this period. This resulted in some staff reduction and the recruitment of other staff from outside of the industry. This was done in an attempt to change...
the ‘corporate culture’ of the industry to accommodate the competitive environment of an open market for the industry where the previous franchises that were held by the distributors was thrown open to private contractors and energy retailers. However, there is some question as to whether this new environment has changed the culture of the organisations concerned to any degree. The safety cultural aspects of the organisations concerned are the focus of this research, but are the previous cultures retained and do they permeate, as if they were ‘in the walls of the organisation? Organisational culture is difficult to change and would require a long time scale and application by all concerned to implement change. This study considered whether the unit of analysis should be the safety culture of the industry rather than the safety culture of particular organisations. This issue is canvassed in light of the empirical data from the judgements and from two industry informants.

**Research Design**

A number of options for obtaining data were explored, including organisational case studies comprised of focus groups and questionnaires. This was seen as the avenue that would offer the most insight into culture, and this kind of research had been undertaken in studies by Berends (1996) and Lee (1996). A case study has the strength of studying culture in terms of lived experiences of organisations. This particular aspect of research has been investigated by both Schein (1992) and Guldenmund (2007), who both reflect upon the effect that outside influences have upon organisational culture. Questionnaires based upon the six themes developed via the literature review were thus developed. However, none of the three organisations approached were willing to participate in a case study. A particular roadblock appeared to be frontline worker involvement in the research. This was despite correspondence with key stakeholders, followed up with telephone calls and personal representations. It is possible that access may have been considered an unnecessary risk given the adversarial nature of occupational health and safety and employers’ duty of care in New South Wales legislation, which imposes the concept of strict liability by the employer for any incident that occurs and is deemed to be a failure by the employer to ensure the safety of employees and others in the workplace.

Case studies would be desirable to study culture in terms of lived experience of organisations. Some other aspects of this can be revealed through analysis of the transcripts and interviews. As will be shown in Chapter 4, issues of culture were revealed in the analysis of prosecutions
of fatalities and serious injury. The investigations behind the transcripts are an adequate alternative as the investigations had been conducted by Workcover Authority inspectors who are well trained and experienced in incident investigative techniques. In some ways analysis of transcripts are a superior research design because of the superior resources and standing of such investigations.

The use of transcripts was modelled on an approach taken by Hopkins (2000a; 2005) who has previously analysed the reports of commissions of inquiry into major accidents in Australia such as the Glenbrook rail crash and Longford gas plant explosion. There are also other examples in the use of case studies to illustrate the prevailing culture that have been used by Hopkins (2005) and Reason (1997).

The next step was to investigate the availability of official investigations into OHS in the industry. Initially considered was the possibility of using the transcripts of prosecutions of the electricity utilities for breaches of the Occupational Health and Safety Legislation to address the research question. However, subsequent enquiries to the Industrial Relations Commission revealed that the full transcripts are not in the public domain, but they are available at a cost, and accessing them via printing done by the Industrial Relations Commission Library was prohibitively expensive. The other alternative was to use the transcripts of judgements in various prosecution cases which are available online. Further detailed information may be gained by using the Industrial Relations Commission Library which is available for further research of the full transcripts of the cases not in the public domain.

The core of the data collection consisted of conducting a content analysis of a number of Industrial Relations Commission judgements made by presiding judges in prosecutions under the Occupational Health and Safety Legislation in New South Wales relating to the electricity industry and covering the period from 1993 to 2007. In particular the analysis comprised of findings against the three energy distributors and their predecessors for prosecutions relating to serious injury and, in some cases, fatalities. The research consisted of reading and analysing each of the judgements to identify key words and phrases which would help to reveal the organisational safety culture that existed in the relevant electricity distributing organisations at the time of the incidents. This content analysis of the documents that were available would enable research using documents available in the public domain and would be a viable alternative to other data collection methods.
Analysis and Presentation of the Data

The researcher’s own employment history in the industry gave an industry participant’s insight into the language used in the transcripts. The identification and interpretation of the key words and phrases were based upon the researcher’s own intimate knowledge of the industry gained from experience working in the industry as a frontline worker and also in various safety and training roles. This knowledge included exposure to the ‘hands on’ operation of the safety management systems, including auditing of the systems in operation. This was further complemented by the years of working as an overhead electrical linesman in various sections of Prospect/Integral Energy organisation. Contacts with other employees and safety personal working in similar roles throughout the industry spread over a long period of time added to this knowledge. This provided, as Grbich (1999) describes, a “participant’s view of reality” (p. 148) and interpretation of events and comments in the transcripts from a person who has worked in the industry with particular knowledge of electrical and industrial safety.

The analysis of the 15 cases in Chapter 4 lists the names of the energy distributor, the Industrial Commission’s year number in chronological order and file number, and, for easier identification, the case number and geographical location of the safety incident. The criteria used for the analysis consisted of six themes identified by a review of existing literature based primarily on the identification by Reason (1997) and Hopkins (2000a; 2005) of important factors that need to exist for the creation and maintenance of a positive safety culture within an organisation. The transcripts were colour coded for each of the six criteria and the detailed analysis was conducted to identify words and phrases using the appropriate colours that would indicate the existence or knowledge of these requirements for safety culture by employees or management representatives in the transcripts. The findings from this analysis of the transcripts are contained in Chapter 4 and a further in-depth discussion of these findings is elaborated upon in Chapter 5.

It was also possible to conduct two formal recorded, interviews with employees who were selected by the author for their current knowledge of the industry arising from longstanding involvement in health and safety management. The interviews were conducted using the questions developed earlier for focus groups and questionnaires (approved by the University
of Western Sydney ethics committee). In addition informal discussions with other industry participants were conducted at social functions and information and impressions were collected in a journal maintained throughout the research period. The information gathered was used to confirm, or otherwise, the analysis and observations of the Industrial Relations Commission Judgements formed from the stance of a former ‘insider’ in the industry. The names were changed to avoid any identification of the interviewees; they were designated the pseudonyms of Smith (2008) and Jones (2007). An example of the comments made about the attitude of management is illustrated in Chapter 5 with “safety is a big stick which is used to beat people when something goes wrong, and then put away” (Jones 2007). Attitudes such as these were then compared with the stated safety values and initiatives as expressed in the transcripts from the defendant’s spokespersons, and these were then compared and contrasted with the analysis of the case studies and the interviews. This allowed a qualitative data triangulation through the analysis of the available sources, which other researchers such as McMurray, Pace and Scott (2004:263-4) suggest are effective methods of research

**Justification of the Research Design and Conclusion**

As mentioned previously, both Reason, in his text *Managing the Risks of Organizational Accidents* (1997), and also Hopkins, in *Studying organisational cultures and their effects on safety* (2006), rely upon detailed analysis of various case studies to develop their arguments. Hopkins in particular relies upon the analysis of the reports of commissions of inquiry into serious accidents, for example, the Columbia and Challenger Space Shuttle disasters and more recently the Gretley Mine Disaster in New South Wales (Hopkins 2007). He also questions the use of surveys and interviews as effective research methodologies to identify and measure an organisation’s safety culture (Hopkins 2006: 878), which has been the accepted research methodology in industry where there are diverse methods, both geographically and in management. Other researchers such as Guldenmund (2007: 3) also question the effectiveness of the use of paper questionnaires to discover employee and organisational attitudes to safety, asserting that they are ‘quick and dirty’ (subject to unwanted influences affecting the responses). Guldenmund (2007: 9) also suggests that there are cultural differences between groups, or subgroups, within an organisation and this influences the response to questionnaires, and that the variation between those groups within an organisation could be significant. As suggested in the analysis the cultural and sub-cultural differences could be a major causal factor in some of the case studies.
The method of analysing publicly available transcripts of investigations, insider testimony, and judgements undertaken in this thesis is supported by the model of Hopkins’ research (2000a; 2005; 2007). This approach is combined with the pilot study of incident reports and focused on themes that were derived from research into other high risk industries ensure a sound methodology for this research. The findings in the next chapter are summaries of the transcripts with comments, and not the complete transcripts, as much of the data in the documents is repetitious and would add very little content to the findings and analysis.
Chapter 4: Findings

This chapter analyses the transcripts of the prosecutions conducted against Country Energy, Energy Australia and Integral Energy (and the smaller distribution organisations that have amalgamated during this period to form these distributors) in the New South Wales Industrial Relations Courts in the period 1993 to 2006. These prosecutions resulted from actions taken by the Workcover Authority of New South Wales against the Electricity Distribution Utilities for breaches of the New South Wales Occupational Health and Safety legislation.

The cases are arranged chronologically. This allows for consideration of whether managers’ attitudes towards safety had altered over the period of research. As noted in Chapter 2, safety management systems were implemented in many organisations in the early 1990s. Changes in occupational health and safety legislation have also occurred during the research period, including the requirement for risk management processes as a vital function in managing health and safety and the greater involvement of employees in the consultation and, indirectly, the management process. There has also been a recent emphasis on corporate social responsibility (including safety). This reflects community expectations that companies should no longer accept high accident rates. The analysis of the judgements is informed by the work of Reason (1997) and Hopkins (2005).

List of Case Studies

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Case 1: Goulburn

Judgement of Southern Tablelands Electricity 1994, New South Wales Industrial Relations Commission (NSWIC) 115 (14 October 1994), Matter No: CTI of 1243, concerning the fatality of one employee and serious risk of injury to one other employee. Judgement was by Justice Bauer.

The prosecution was conducted by Inspector Vassel of the Workcover Authority of New South Wales and the Authority Legal Team pursuant to Section 15 (1) Occupational Health and Safety Act 1983. It was alleged that the defendant failed to ensure the health, safety and welfare of all its employees, particularly the two employees in this case. The defendant pleaded guilty.

This incident which occurred in June 1992 reflects the types of tasks that have to be performed by people working in the industry and, in this case, the environmental conditions (extreme cold) that were an added hazard to the task. The need to climb up the poles supporting the conductors and perform the work tasks in inclement conditions place a physical demand upon the workers in the industry. The majority of the cases that are analysed in this chapter have involved persons being in contact with or exposure to either high voltage 11KV, or low voltage 240/415v. This case involves a higher voltage of 33KV. As a general rule the higher the voltage, the greater the risk of burns to the victim. Low voltages 240/415v carry the greater risk to life of causing the persons heart to go into ventricular fibrillation if the current passes through the heart of the victim, as the main arteries and blood system offer a path for the current, being a conductive fluid.

In this particular incident a high voltage fuse leading from the 33KV high voltage mains to a transformer on the same pole had ‘blown’ (failed), causing a loss of supply to the area. One of the two linesmen attending the incident had removed, with some difficulty, the broken fuse...
using an insulated ‘link stick’ and, after placing a new fuse in the fuse carrier, had attempted to replace the fuse carrier, without success. This may have been due to the environmental conditions at the time as the weather was extremely cold. The other linesman offered to take over this task and this was agreed to and he attempted to replace the fuse carrier. During the attempt to replace the fuse carrier a porcelain section of the insulator assembly broke and a ‘dropper’ carrying a live high voltage current fell onto the linesman attempting the task. The other linesman climbed the pole and freed the injured linesman and attempted to revive the person. This effort was unsuccessful and the injured linesman subsequently died.

The particular charges were that the defendant:

Failed to ensure the health and safety of its employees, in that it required its employees to replace the 33KV fuse without first de-energising the line;
Failed to provide an elevated work platform for its employees. The response of the defendant was that there were alternative work methods available to the employees, including an elevated work platform, but they chose not to use them (p. 4); and
Failed to ensure that in the event of a failure of the insulator that the length of the unrestricted ‘dropper’ was not secured so that it could not come into contact with low voltage wires below.

The defendant was aware that previous failures had been experienced with the particular type of fuse assembly but failed to put in place a system of reporting such failures. The prosecution claimed that as this risk was known to the employer, that this particular type of insulator had failed in a similar manner five times previously, and that an alternative work method for performing this task should have been implemented.

This is an example of the failure to act upon identified risk potentials until an incident occurs, which in this particular case led to the fatality of an employee. Well established reporting systems and a series of checks ensuring that remedial actions are taken to guarantee that effective risk management controls are put in place are essential components of an effective safety management system, risk assessment process and safety culture. These are part of the pre-requisites as outlined by Reason (1997:118-119) for acting upon ‘near misses’ and part of creating the framework for an effective safety culture within an organisation. This could be an example of the ‘blame the victim’ culture existing in the organisation at that time.
The judge imposed a fine of $30,000 with moiety (undivided half share) (Butterworth 1998:292) for the legal costs of the prosecution. While the maximum fine available was much greater than this the Judge stated that the Southern Tablelands Electricity had had no previous convictions recorded (page 4).

**Case 2: Mayfield**

Judgement of Shortland Electricity (1995) (a predecessor of Energy Australia) in the New South Wales Industrial Relations Commission (NSWIRC) 67 (5 May 1995), Matter no: CT 1244 of 1994. This incident resulted in the fatality of two employees. The prosecution was conducted by Inspector Gordon of the Workcover Authority of New South Wales and the Authority Legal Team pursuant to Section 15 (1) *Occupational Health and Safety Act 1983*. It was alleged that the defendant failed to ensure the health, safety and welfare of all its employees, particularly the two employees in this case, contrary to s 15 (1). Judgement was by Justice Marks. The defendant pleaded guilty.

Two linesmen were working from an elevated work platform on an electricity pole carrying out ‘live line’ maintenance work on November 22, 1992 when the elevated work platform bucket that they were standing in caught fire. The clothes of both linesmen caught fire after being sprayed with burning hydraulic oil and one of the linesmen leapt from the bucket immediately. The other stood on the outside of the bucket until he too fell to the ground. Both linesmen died as a result of the severe burns suffered in the accident.

The particulars of the charges contained in the summons issued by the Workcover Authority are as follows:

- That the defendant failed to provide plant and systems of work that were safe and without risks to health in that: the defendant failed to assess the risks of providing its employees with hydraulic tools which were attached to a hose protected at the ends by exposed helical steel sheaths. (The steel sheaths protecting the hoses should have been covered with an insulating material to prevent the metal becoming a conductor of electricity should they come into contact with ‘live’ conductors. The points of
contact with live conductors and the metal sheath in the hydraulic tool have, according to the transcript, created ‘arcing’ providing the source of flame and ignition which set alight the hydraulic oil. This risk is particularly important when ‘live line’ work is being carried out as the safe working distances between the conductors and the tools being used is very much reduced.)

• The defendant failed to ensure that the hydraulic tools used by its employees were placed in such a position in the elevated work platform that such tools could not come into contact with live power lines.

• The defendant failed to provide its employees with communications equipment for use between the person acting as the observer and the persons carrying out work in the elevated work platform.

• The defendant provided its employees with equipment that was driven by hydraulic oil but failed to adequately assess and reduce the risks associated with the use of such equipment.

• The defendant provided its employees with an elevated work platform which could not be manoeuvred once the hydraulic system had failed. (A back-up system of hydraulic controls to allow any person on the ground to manoeuvre the elevated work platform down to the ground was fitted to the base of the elevated work platform.)

• The defendant did not provide its employees with an adequate means of escape from the bucket of the elevated work platform should it catch fire. (Two control descent devices, similar to abseiling equipment, were fitted for emergency descent from the ‘bucket’; however, the burning oil being sprayed over the two linesmen would not allow them to use this device.)

Tests conducted by the Workcover Authority established that voltage applied across the helical sheath on the hydraulic hose of the wrench tool brings it rapidly to a temperature high enough to cause failure of the hose, release of oil under pressure and ignition of the oil (there were marks on the hydraulic tool consistent with sustained arcing). It had been claimed that
the oil used would not ignite below 200 degrees Celsius; however, the Workcover tests established that under pressure the oil ignited at a lower temperature.

The defendant also claimed that this type of incident had not been foreseen. However, a bulletin had been issued by the then Department of Minerals and Energy, Electricity Distribution Division in October 1990, two years prior to the incident, which had been circulated to the defendant at that time and gave details of a similar event where arcing ruptured a hydraulic hose attached to a chainsaw igniting hydraulic oil.

In imposing a fine of $85,000, Justice Marks indicated that although there was clearly a lack of foresight and, perhaps to some extent, vigilance, this is not the case of blatant, wilful or reckless disregard of obligation under the Act which, if present, would attract the maximum permissible penalty. This decision is in contrast to the much later comments by the presiding Justice noted in the ‘Lessons from Gretley’ (Hopkins 2007:34) when addressing the issue of the ‘culpability’ of the defendant. In that particular case the Justice commented on the concept of culpability when assessing the degree of sentence or deterrence to be imposed. This may reflect the changing attitudes of society to the incidences of serious accidents occurring in workplaces and the desire to impose more severe penalties upon the offending companies as a deterrent and to send the message that the public expects a higher degree of diligence in safety matters from employers. This general awareness and recognition of the expectation of corporate social responsibility and the need to create a positive safety culture within companies is a reflection of changing attitudes within society to the management of safety and the responsibility of management to create safe working environments for their employees and the need to make the companies, and the various levels of management accept accountability for failure to provide safe places of work.

**Case 3: Ingleside 1**

Judgement of Energy Australia, in the New South Wales Industrial Commission (NSWIC) 123 (16 July 1996), Matter no: CT 1285 of 1995. This incident resulted in the fatality of an employee. The prosecution was conducted by Inspector Gilbert of the Workcover Authority of New South Wales and the Authority Legal Team pursuant to Section 15 (1) Occupational Health and Safety Act 1983. It was alleged that the defendant failed to ensure the health,
safety and welfare of all its employees, particularly the two employees in this case, contrary to s 15 (1) of the *Occupational Health and Safety Act 1983*. Judgement was by Vice-President Cahill.

This incident occurred on December 2, 1993 which resulted in the death of one of the employees of Energy Australia when he came into contact with ‘live’ low voltage conductors and suffered an electric shock and fell to the ground. In this incident there are a number of important items or statements in the judgement which reflect the negative safety culture of the distributor. In arguing that the prosecutions were “duplicitous” and should be dismissed, rather than accepting the charges, pleading guilty and listing remedial actions to be taken, the organisation fails to demonstrate a learning culture. In this matter the Workcover Authority listed a number of separate charges. This may have been an effort by the Workcover Authority prosecutors to try and emphasise the seriousness of the offence by trying to gain the greater amount of convictions and penalties than may have been given under one offence only.

The particulars of the charges are set out below:

- Failure by the defendant to ensure the health and safety at work of its employees by failing to provide supervision as was necessary to ensure the health and safety at work.
- Failure by the defendant to ensure adequate supervision to screen workers from inadvertent contact with live conductors or earth.
- Failure by the defendant to ensure adequate supervision in the placement of adequate numbers of, and positioning of, insulating mats to prevent inadvertent contact by the employees.
- Failure by the defendant to ensure adequate supervision of the use of leather instead of insulating rubber gloves when frontline workers are required to perform particular work tasks.
- Failure by the defendant to ensure adequate supervision of the working height of the employees to maintain a safe working distance of 500 millimetres.
This section refers to a comment made by another employee at the worksite that he heard “Van Bruinessen fall to the ground”. This raises the additional question of the use of safety belts/harnesses and their effectiveness.

The defendant, Energy Australia, sought to have the summons reduced to one offence on the grounds of duplicity of offences, or failing that, to have the summons dismissed. However, the judge did not agree that the summons should be dismissed and ‘stood over’ the matter to allow the prosecution to reconsider its position regarding the number of separate offences laid.

The judge’s lack of recognition of the possible causal factor of culture is reflected by the use of the term defect. To illustrate this it would be useful to reproduce the statement by the judge:

“I have concluded that, having regard to the different types of work performed during the overall period and the locations of each of the two employees referred to in the summons at different stages within that period, the summons is duplicitous. It seems that, in that regard, it suffers from the defect of alleging that the defendant allowed to subsist, over a period, a particular proscribed environment, rather than alleging a particular act or omission amounting to a failure to maintain that environment at a particular point in time.” (Emphasis added.)

This later resulted in another finding of the Industrial Relations Commission in 1998, some two years later, relating to an amended charge from this prosecution in Case 4 listed below.

**Case 4: Ingleside 2**


This case involves the same incident as in the previous case which occurred on December 2 1993 resulting in the death of an employee. The defendant was charged with failing to provide adequate supervision and failing to ensure the correct placing of insulating material
on ‘live’ exposed electrical conductors. This allowed the employee to come into contact with the conductors receiving an electric shock and subsequently falling to the ground.

A notable feature of this case is that controls for the particular hazards were readily available; that is, it is an incident that could have been averted. Whilst it is difficult to isolate any one factor when researching safety culture, the incident points to the values underpinning management actions and priorities in the industry and the inadequacies of relying on regulation. The interview data supports such an interpretation; that employers do not make safety a priority and that ‘law and governments’ do not assist in the creation of safety (Jones, Pers. Comm., May 17, 2007). It is well established that the creation of a positive safety culture is dependant upon many influences including the law, social expectations and government as well as all levels of management from the directors to front line supervisors.

It would appear from the transcript that the repeated restructures and amalgamations that have occurred in the electricity industry in New South Wales over the past 17 years since the early 1990s may have contributed to, in this case, the employer avoiding prosecution for the death of an employee. In this particular instance it is under the various combinations of utilities now comprising Energy Australia that the incidents have occurred, and the failure of the New South Wales Government Departments drafting the legislation to ensure that the criminal liability for the safety of its employees has been transferred to the succeeding utility structure.

As far as can be determined, the reason for the retrial of the prosecution of Energy Australia for the death of one of its employees following the decision by Justice Cahill on October 22 1996 was that the original summons issued by the Workcover Authority was ‘bad for duplicity’ as it specified more than one offence and an appeal on November 20 1997. The prosecutor, the Workcover Authority elected to move on a single offence and to which the defendant pleaded guilty. The judge heard the case on May 14 1998 on the penalty to be imposed. When the question of the defendant’s prior convictions arose, Energy Australia did not have any for this particular type of offence - only prior convictions relating to different types of work; this is similar to the statements made in the Integral Energy (NSWIC 47 25 February 2005) case stated below. Again, this represents a particular mindset where the defence appears to narrow consideration for offences to a particular type of offence rather than for any breach of the Occupational Health and Safety legislation. The defendant claimed
that Energy Australia was not a mere name change and separate legal entity for its various component entities but that there was also a new focus on safety and a new corporate culture; yet the attempt to avoid penalty would not engender a key component of a good safety culture, that of trust between employees and employer. This case would suggest to employees that management was seeking to avoid responsibility for the failure of one of its previous corporate structures to ensure the health and safety of its employees. As DeJoy (2005), stressing the importance of trust, asserts, “[a]s such, we propose that trust and organisational commitment are central ingredients in creating a positive safety culture” (p. 15). This is particularly relevant as the senior management in the utilities have remained fairly stable throughout these organisational changes, reflecting the prevailing culture existing in those utilities. In his text on the Gretley mine disaster, Hopkins (2007:39) explores the concept of remorse of the company and managers for an occupational health and safety incident. When a company fights in court on points of law which effectively obscure the acceptance of responsibility for an incident, in this case causing the death of an employee, remorse is not evident.

Also as a contrast this type of argument was not used in the case of Country Energy NSWIC 29 (0) 3 February 2003 in which The Judge noted that Country Energy and its predecessors, North Power and Northern Rivers Electricity, have had six previous convictions between 1992 and 2003 (page 8 item 30) but none for this particular type of offence. It may be that in this case the management was primarily concerned with investigation and determining causal factors and implementing remedial actions. This would reinforce the argument by Reason and Hopkins that organisational culture influences the actions and decisions of management.

The final decision by Justice Hungerford was apparently based on the failure of the government department responsible for drafting the legislation transferring ownership and responsibilities of Sydney Electricity to MetNorth Energy. To illustrate this it is useful to quote in full the findings of Justice Hungerford:

For the foregoing reasons, I conclude that Energy Australia is not the proper defendant to the charge laid against Sydney Electricity for a breach of s.15 (1) of the Occupational Health and Safety Act. On the dissolution of Sydney Electricity and on the repeal of the Sydney Electricity Act the said charge abated and effectively lapsed; Sydney Electricity ceased to exist and there was no statutory provision to enable the prosecutor to continue proceedings against the same legal person. The transfer of all the liabilities of Sydney Electricity to MetNorth Energy (MetNorth 1) was restricted to the transfer of civil
liabilities and not criminal liabilities. Accordingly a verdict of not guilty to the subject charge must be entered in favour of Energy Australia and the summons dismissed. I so order. The question of costs is reserved, with liberty to either party to have it dealt with on application.

This particular case reflects to some extent the difficulties posed by the changes and amalgamations that were occurring in the electricity industry in New South Wales at that time. The 1990s was very much a transitional phase in the industry from Local Government-controlled smaller entities to that of ‘corporate structures’ controlled by State Government-appointed boards of directors. In this case there was also a failure of the Department drafting the corporate governance and the legal liability for criminal (Safety) as well as commercial liabilities of the newly created entities.

Case 5: Casino

Judgement of Northpower (also known as Northern Rivers at the time of the incident), held in the New South Wales Industrial Relations Commission (NSWIRC) 35 (9 February 1998), File: IRC 5172, 5175, 5177,5180 and 5182. A total of five prosecutions under the New South Wales Occupational Health and Safety Act 1983 section 15 (1) were heard together by Justice P. Fisher who had also adjudicated in the case of Workcover Authority v Energy Australia NSWIRC 129 (9 October 1997) mentioned previously. This resulted in the fatality of one of the two employees at the work site. The defendant pleaded guilty.

This incident occurred on September 16, 1994. It was not listed for hearing until 1996, and then a further two years passed before it was heard in court. For all parties concerned, this is a very long period of time to wait before issues are resolved, even though the payment of Workers Compensation by the employer may have reduced the financial impact of the incident to the victims and their families. The need to have these legal issues resolved is also important for employers and employees to ‘move on’ and create a positive safety culture, particularly as in this case the employee died as a result of his injuries.

Two Northern Rivers employees attended at the work site in response to a radio message of a ‘no supply’ call from a customer. The two employees were both qualified electricians although one of them had only joined Northern Rivers earlier that year. Arriving at the site it was observed that two out of three high voltage drop out fuses were hanging down from the
carriers and the other was hung on a ‘pole step’ of the transformer pole. It is revealed in the transcript that the transformer had been inoperative for approximately four years. Neither of the two employees were aware of this and apparently no indication of this was attached to the pole. It appears that the transformer and all the associated fittings and switchgear were still on the pole but no warning signs to indicate that the transformer was inoperative and, as it was revealed later, was in fact faulty; however, it appears that no attempt to remove the transformer or switchgear had been made. This is in contravention of the Electricity (Overhead Line Safety) Regulation 1991 Clause 22 which states:

“If an overhead line has ceased to be used for the conveyance of electricity, the owner of the line must dismantle it as soon as reasonably practicable or continue to maintain it in accordance with the Regulation” (Wales v Northpower NSWIRC 35 1998:6).

One of the employees climbed the pole and attempted to replace the fuses into the carriers. After some difficulty this was achieved. However, tests conducted by both the employees at a meter box at ground level revealed that there was insufficient voltage from the transformer. The employee climbed back up the pole to test the low voltage fuses to ensure that they were working correctly; however, he came into contact with a ‘live’ metal conduit and a bare earthed cable on the pole and was electrocuted. The other employee carried out a ‘pole top rescue’ and applied resuscitation but was not able to revive the injured employee.

It is worth noting here that one of the requirements due to the hazards of the industry is that because of the risk of electric shock sometimes working on poles, all employees in the industry who work in a ‘field’ environment are required to have carried out a practice ‘pole top rescue’ and cardio pulmonary resuscitation during the previous twelve months (Electricity Council of NSW Guides 1993: 7).

The Electricity (Workers’ Safety) Regulation 1992 Clause 26 requires that employees wear appropriate clothing, which in this case would be long trousers or overalls. However, in this case the employee climbing the pole was wearing shorts which allowed his bare legs to contact both the conduit and earth wire. As the judge pointed out in this case, even the appropriate clothing would not have prevented the accident. This, however, reflects upon the safety culture that existed at that time in the organisation to allow employees to perform work tasks not in compliance with the regulations. In addition, the employee was not an authorised person and as such should not have climbed the pole. The other employee had not been
instructed to supervise the other employee in question and proper training or instruction had not been given to allow both employees to perform the task with safety.

The lack of what Reason (1997: 9-10) refers to as the defences in depth and active and latent conditions are best exemplified with a comment from page 10 of the transcript:

“This was an accident that never should have happened and a death that was eminently avoidable. It was the result of many cumulative failures that disclosed a profoundly unacceptable disorganisation of safe working in an environment requiring working with care and precision. It is a most unsatisfactory case and in terms of failures to take proper care, it must be numbered amongst the worst. Mr Hodgkinson, for Workcover, submitted it was not acceptable to the community that an Authority should be lagging in relation to basic safety procedures, far behind acceptable standards for under-resourced or under-capitalised organisations.”

The defendant was convicted and one penalty of $75,000 was imposed with the defendant to pay the prosecution’s court costs. As was stated previously, this was out of a potential penalty under the Occupational Health and Safety Act 1983 for a breach of section 15 (1) of $550,000.

It should also be noted here that Northpower used as part of their defence that a Safety Management System had been implemented (such comments are common throughout the cases during the period of research). However, the attempts to change the safety culture, and with it the values and attitudes expressed in performing the daily work tasks, are not reflected in many cases in the actions of managers, supervisors and employees. It suggests that it has been a very slow progress overall to implement a good organisational safety culture, and reflects the difficulty in changing perceptions, attitudes and behaviour. The difficulty imposed by the geographical spread of workplaces which are affected by the environmental issues, such as working sometimes in remote areas, weather and communications, should also be recognised. These are in addition to the decentralised management, particularly in cases involving Country Energy with 140 customer and field service centres, which may have different safety subcultures, covering approximately 80 percent of the State of New South Wales (Country Energy Annual Report).
Case 6: Glendale

Judgement of Shortland Electricity (1997) (a predecessor of Energy Australia) in the New South Wales Industrial Relations Commission (NSWIRC) 129 (9 October 1997), Matter no: IRC 6483 of 1996. This incident resulted in injury to one of two employees. The prosecution was conducted by Inspector Goldrick of the Workcover Authority of New South Wales and the Authority Legal Team pursuant to Section 15 (1) Occupational Health and Safety Act 1983. It was alleged that the defendant failed to ensure the health, safety and welfare of all its employees, particularly the two employees in this case, contrary to s 15 (1) of the Occupational Health and Safety Act 1983. Judgement was by Justice Fisher. The defendant pleaded guilty.

This incident occurred on February 12, 1995 and resulted in injury to an employee and risk of injury to another employee and members of the public. The prosecution alleged that the employees had not been given sufficient training to operate an elevated work platform (EWP) with safety. In particular the charges were that the defendant:

- Failed to provide plant and systems of work that were safe and without risks to health;
- Failed to provide such information, instruction, training and supervision as may be necessary to ensure the health and safety at work of its employees;
- Failed to provide chocks for use by its employees when parking on slopes vehicles mounted with an elevated work platform; and
- Failed to ensure adequate instructions were given to its employees.

The two employees had been involved in applying insulating material to overhead electrical power lines. One employee was applying the material working in an elevated work platform; the other employee was the driver of the vehicle and also the ground observer. The vehicle started to roll down the steep incline of the street with the employee still in the basket in an elevated position, and crossed another street. The other employee tried to gain access to the moving vehicle but failed and the vehicle subsequently crashed into a house containing two residents. The employee in the basket of the elevated work platform sustained fractured ribs, lung damage and other cuts and bruises.
This particular incident posed safety risks to the two employees, the residents of the house and potentially any other pedestrians or motorists who may have been in the area at the time of the incident. Fortunately this was not the case and only one employee was injured, however the incident raises the possibility of prosecution on behalf of the residents of the house in addition to compensation for damage to the property.

It was revealed in the judgement that no training in the operation of this particular type of vehicle was given to the employees, even though these were a new type of vehicle and this was the first time that the employee had driven this vehicle. The safety features of the various types of elevated work platforms used in the industry vary considerably - some have outriggers to provide stability, others have springlocks and at times of steep inclines wheel chocks are required in addition to the braking systems fitted to the vehicle. These measures are particularly important when the elevated work platforms are parked on steep slopes, as in this case, and the basket may have to be fully extended to enable tasks to be performed. It is not always possible to park the vehicles in the optimum position to perform tasks on overhead power lines due to fencing, drainage, footpaths and buildings. It is important that supervisory staff go on site to assess the particular requirements and difficult locations which may require extra precautions to be taken to ensure that the tasks can be performed safely.

The judgement criticised the lack of training provided in the operation and safety requirements, particularly as this was a new type of elevated work platform vehicle.

A penalty of $25,000 was imposed with the defendant to pay the prosecution costs in addition to the penalty. Although the penalty appears to be small it may be that the judge was convinced that the deterrent of a conviction may be sufficient to encourage the defendant to examine and rectify the safety issues raised in the prosecution.

A contextual factor surrounding this case concerns the number of mergers and amalgamations that occurred in the electricity distribution industry in New South Wales over the period of this research, from 1993 to 2007. The uncertainty and lack of stability in the industry due to restructuring was argued by Grote (2007) to impede the development of a safety culture. In this case Shortland Electricity was incorporated on July 1, 1993, transferred to MetNorth Energy on February 29, 1996 (three years later) and then on March 2, 1996, a few days later, changed to Energy Australia. Although the restructuring of the industry did offer
opportunities to change and influence the management of safety along with the other changes
taking place in company restructure, there would be difficulty in introducing and creating a
climate where a safety culture could be established.

Case 7: Ballina

Judgement of Country Energy (also known as Northpower at the time of the incident) was
held in the New South Wales Industrial Commission (NSWIC) 104 (7 June 2001), File: IRC
1033. This resulted in serious injury to one of two employees of a contractor P.F. Thearle &
Company, contracted to Ballina Shire Council, and the exposure to risk of the other
employee. It should be noted that P.F. Thearle and Company were subject to a separate
prosecution by the Workcover Authority in relation to this same incident at a different time.

The prosecution was conducted by Inspector Reynolds of the Workcover Authority of New
South Wales and the Authority Legal Team pursuant to Section 16 (1) New South Wales
Occupational Health and Safety Act 1983. It was alleged that the defendant failed to ensure
the health, safety and welfare of persons not in its employment, were not exposed to risks to
their health or safety contrary to s 16 (1) of the Occupational Health and Safety Act 1983.
Country Energy as the defendant pleaded guilty. Judgement was by Justice Glynn.

This incident, which occurred in March 1997, and the succeeding case directly related
highlighted the lack of clear communication between Northpower and a contractor working
on a third party’s behalf. The delegation of authority and the necessary training to the
contractor’s employees to perform tasks safely was not provided. Other issues such as the
delivery and acceptance of equipment to ensure compliance with industry standards were
factors in this incident.

The defendant was contracted to Ballina Shire Council to supply, install and commission a
kiosk-type electrical transformer and supply mains to the Wardell Sewerage Treatment
Works Construction Site. The defendant at all times controlled access to the kiosk electrical
transformer to all persons, including contractors to the Ballina Shire Council. The charges
laid by the prosecution included that the defendant had:
- Failed to ensure that the kiosk electrical transformer was not electrically energised whilst electric cables were installed to the said transformer;
- Failed to ensure that only trained and authorised persons pursuant to the Electricity (Workers Safety) Regulation 1992 were able to gain access to the live kiosk transformer; and
- Failed to ensure that the two employees of the contractor were supervised by a trained person pursuant to Clause 9 and 43 of the Electrical (Workers Safety) Regulation 1992 whilst undertaking work upon, or near (within 500mm) live kiosk electrical transformer terminals. Ballina Shire Council (who owned the site) had contracted P.F. Thearle & Co to carry out electrical installation work, including running cables from the kiosk transformer to an adjacent electrical switch room.

The contractor’s two employees were required to pull six cables through an underground conduit between the switch room and the low voltage section of the electrical kiosk. The cables were fed through the kiosk into the conduit and through to the switch room. At the completion of this stage, one of the contractor’s employees attempted to connect one of the cables to an earth bar at the rear of the kiosk transformer, coming into contact with a live 240 volt cable termination, and received an electric shock and burn injuries. The other contractor’s employee was not injured. However, as revealed in the transcript of the related prosecution of P.F. Thearle (IRC1034 1999) detailed below, there was a Thearle apprentice working at the other end of the cables who was also exposed through this incident to potential risk of serious injury, or even fatal injury.

The prosecution claimed that the contractor’s employee was not entitled to access the transformer without authorisation or supervision, and even then, only as a sub-contractor to NorthPower whose employees had been trained and were aware of the process that was required and was working safely in accordance with the Electricity (Workers Safety) Regulation 1992. Therefore to gain access to the kiosk transformer to pull the cables the transformer should have been isolated and de-energised to allow the work to proceed, and also constant supervision by authorised NorthPower staff should have been provided. The prosecution further claimed that this represented a gross failure by NorthPower and revealed that it had been common practice to allow unauthorised contractors access to a Northpower electrical installation. It would appear that there had not been a full and comprehensive
induction conducted by Northpower with Thearle employees specifically to warn them not to attempt any connections on the transformer.

The investigation and transcript revealed that this particular kiosk transformer had two existing defects at the time of the incident: the first was that of incorrect colour coding of live wiring cables, and the second was that the positioning of connections was not in accordance with the specifications laid down by NorthPower and not in accordance with practice. The Workcover Inspector was advised that NorthPowers’ predecessor Northern Rivers Electricity had purchased nine other transformers with the similar defective construction since 1993 and no action had been taken to redress the defects with the manufacturer to comply with the specifications or relevant Australian Safety Standards (page 22 section 128 (b)). This was even though this particular transformer had been commissioned in 1996 (page 16 section 100) and the defect should have been noticed and reported at this time. This reveals evidence of the ‘silo effect’ where the safety requirements in another department of the organisation are not recognised and addressed. The prosecution also allege that Northpower had failed to advise Theale employees of the incorrect colour coding on the transformer which indicated that it was an earth connection when in fact it was live and the potential for an electric shock existed if treated as an earth or contacted in any way. However, later in the transcript (page 7) it was revealed that even though the Workcover Authority was aware following this particular incident that there had been defects with the transformer delivered to Northpower, no legal action had been taken by that Authority against the manufacturer under section 16 of the *Occupational Health and Safety Act 1983*.

The transcript reveals that the defendant’s spokespersons attempted on at least two instances (page 15 sections 89, 90 and 93) to place the blame squarely upon the shoulders of one of its employees, alleging that the organisation’s safety processes and procedures were not followed by that employee in giving access to a non-authorised and suitably trained person. There is no mention in the transcript by either the defence or even the prosecution of a requirement for a full and comprehensive induction process for non-employees working on or near to NorthPower electrical equipment, or to actively involve all staff, including both NorthPower and contractor employees, on site in the risk assessment process to ensure that all persons involved in a series of tasks are aware of all potential risks to safety.
The existence of safety regulations and processes such as risk assessments do not in themselves create a holistic culture of safety in an organisation’s activities. For example there appeared to be a very ad hoc system of checking whether transformers delivered to NorthPower complied with specifications and standards, and if a process to have them rectified was identified before being delivered to work sites. The fact that Thearle’s employees were allowed to have access to transformers to pull cables through reveal that this was apparently a common practice in NorthPower, affirming the prevailing culture of ‘turning a blind eye’ at times to regulatory requirements. The existence of a comprehensive safety management system is also called into question. An efficient system needs to be applied across all sections of staff and the management team, including board members. This is essential to a comprehensive safety management/culture and to reduce the risk of negative safety subcultures developing.

The judge stated in section 148 (p. 25) of the transcript that the failure of the employee of Northpower to implement in full the worksite risk assessment and the subsequent provision of clear instruction in documentation given to the contractor were primary causes in the incident. This section and statements reveal that there has been a progress in the understanding of the existence of multiple causal factors to workplace safety incidents and that this understanding is being reflected in Industrial Relations Court deliberations. Also the creation of a positive safety culture within organisations is an important factor in reducing workplace accidents, as revealed in the judge’s statements in sections 149 and 151 (p. 25) of the transcript when deliberating on the penalty to be imposed by the court. He stated:

“In considering penalty, I also take into account the defendant’s involvement in, and implementation of, safety programmes and procedures; the priority placed by Northpower on safety as indicated by its active sub-committee comprising four of its directors; the worksite hazard program in place since June 1996, and in which all employees are fully trained and which is reviewed each year (latest revision 17 January 2000) and is, as Mr Coleman said, ‘based on continual improvement’”.

The judge found the defendant guilty and convicted of the offence and imposed a penalty of $60,000 with a moiety to the prosecutor for the payment of legal costs. This penalty included a discount of 35 percent which the court found appropriate in this case.
Case 8: Ballina 2 (Thearle)

The prosecution of Thearle & Company in relation to the same incident discussed in Case 7 also resulted in a plea of guilty to the charges of breaches to section 15 (1) of the New South Wales *Occupational Health and Safety Act 1983*. The judgement was handed down of the 7th June 2001 as Matter No. IRC 1034 of 1999 by Justice Glynn.

As stated above, this case and the previous case occurred in March 1997 and both relate to the same safety incident. However, it was revealed in the transcripts that there was also a lack of clear communication, instruction and delegation within the contracting company. Apparently there was also the absence of any system of the management of safety by the contractor’s management towards its employees.

The transcript of this particular prosecution reveals that the colour coding on the cable was earth coloured (yellow/green), which was not mentioned in the Northpower prosecution transcript. This is a significant factor which may have lead to the contractor’s employee attempting to connect the cable to the transformer thinking that it was safe, as the earth cables and connections do not normally carry any current for various technical reasons. However, this must be qualified as at times the earth cables and connections may carry current and it should not be assumed that it is safe to handle unless tested to prove safe. In fact from the details of the prosecution it was established that it was a ‘live cable connection, not an earth connection’.

The charges included that the defendant (Thearle) failed to provide safe systems of work and also that they failed to provide training for installing electric cables to exposed conductors of an electrical transformer. Nor had they conducted, or been trained to conduct, risk assessments prior to commencing work. The question also arises from the transcript of communications and delegation issues with Northpower’s employees. The transcript establishes that the Northpower employee was not instructed to supervise Thearle’s contractors while they were working at the transformer as required under the Electricity (Workers Safety) Regulation 1992.
The defendant’s legal counsel made the observation that Thearle “is a small company where there is discussion between the officers of the company and its employees” and that “[i]t is not a question whether or not there is a written procedure. Written procedures are not necessarily and indicator of a safe system. An indicator of a safe system is the practice and knowledge which the employees of a company have” (sections 45 and 46 Page 12 of the transcript). This particular case study illustrates the lack of appropriate training for both Northpower’s and Thearle’s employees, a lack of understanding of the legislative safety requirements relevant to the work being performed, and communication between Northpower and the contractor and between Northpower and its own employees creating a hazardous environment which could have resulted in more serious injury than which unfortunately occurred.

Thearle was ordered to pay a fine of $58,500 plus the prosecutions costs; this decision was subsequently appealed by Thearle in IRC 4369 of 2001 Judgement 28/03/2002. The appeal was dismissed.

Case 9: Orange 2

Judgement of Advance Energy (2000) (a predecessor of Country Energy) in the New South Wales Chief Industrial Magistrates Court (NSWCIMC) 28 (1 June 2000). This incident resulted in the death of one of the Advance Energy employees. The prosecution was conducted by Inspector Tyler of the Workcover Authority of New South Wales and the Authority Legal Team pursuant to Section 15 (1) Occupational Health and Safety Act 1983. It was alleged that the defendant failed to ensure the health, safety and welfare of all its employees, in particular the employee in this case contrary to s 15 (1) of the Occupational Health and Safety Act 1983 in the use of plant. The judgement was by Justice Miller. The defendant pleaded guilty.

The charges specifically stated three failures by Advance Energy in this case:

• That it allowed the use of alligator type connections to temporary supply outlets;
• The temporary electricity supply system relied upon a correct phase connection; and
• That it failed to make adequate arrangements for alternative electricity supplies not reliant on alligator type connections.
When making connections between an electricity supply and equipment it is essential that electrical testing is conducted to ensure that the proper connections are made. If these are not conducted, or not conducted correctly, the tool or equipment may become ‘energised and give an electric shock to anyone handling the tools or equipment’ (Electricity Council of New South Wales 1993:21/22).

In this case the employee, an electrician, had connected temporary supply leads to a low voltage switchboard to obtain power supply to a crimping tool - the correct polarity (live cable and neutral connection) was essential for a safe system. The normal safe working process would require that the polarity was tested to ensure that it was correct before making any connections. The system did not allow for inadvertence or carelessness on the part of the employee and as such posed the potential for serious harm, as in this case. This particular case is an example of reliance upon human factors to create and maintain safe systems of work where alternative engineering systems are available. This is an essential component of the risk assessment and control process where potential risks are identified and alternative engineering or technology systems are used to avoid reliance upon the human factor. The risk assessment and control regulation had been in force in the industry from 1997 (Electricity Supply Safety Regulation 1997). The judge expressed surprise that this system of using temporary supply leads which was used in the industry had not earlier been identified as a potential risk of serious injury. Advance Energy itself was an amalgam of five former electricity distributors: Western Power, Southern Mitchell Electricity, Ophir Electricity, Central West Electricity and Ulan Electricity. Advance Energy later became a part of a conglomeration, Country Energy, covering the greater part of New South Wales. The transcript reveals that Advance Energy had introduced a “structured safety management system to standardise the safety practices and to drive the right safety culture across the new organisation of Advance Energy” (NSWCIMC 2000:2).

The maximum penalty for a breach of the legislation under section 15 (1) was $550,000. However, the conviction and fine in this case was $25,000 plus court costs of $54 and professional costs of $300 with a moiety of the fine to the Workcover Authority.
Case 10: Kemps Creek


This incident occurred in the later period of research, in March 1999, and as we have seen in some of the other cases studied there has been a development of awareness of the importance of safety culture within the organisations concerned. However, in this case the essential components for a positive safety culture appear to be missing.

Below is listed an identification of important items or statements in the judgement which reflect the safety culture of the distributor. Discussions with the industry participants with experience in this particular work process raised questions as to the work practices being followed, and the failure to properly supervise such a risky task does not fit in with their own experience. Other factors such as the involvement of work crews from different field service centres and the lack of clear instruction were contributory factors to the incident occurring.

The transcripts of the judgement detail the allegations of failure by the employer (Integral Energy) by the Workcover Authority prosecution to provide a safe place of work underneath live high voltage conductors where there was a risk ‘unknown’ to the defendant. (Where there are bays of conductors of unequal length the risk of uplift always exists unless it is restrained, usually by having the conductors held down, often by looping a rope over the low voltage conductors to prevent uplift or restrained by attaching a stringing rope). The bays of conductors between poles, due to the spacing between the poles, may be of different lengths and the weight of the extra length of conductor in a long bay would cause the conductor in the shorter bay to tighten and lift up above the normal sag position. Where there is high voltage conductors above the low voltage conductors, as there was apparently in this case, contact could occur unless the low voltage conductors are restrained. Hopkins (2007:36) deals with the subject of the foreseeability of an incident occurring in assessing culpability and the judge’s comments were “[t]he question was whether there was ‘an obvious or foreseeable risk to safety against which appropriate measures were not taken’.”
Other notable sections of the prosecution included:

- Failure to provide supervision;
- No site coordinator where one was required when three separate work crews, some from different field service centres, were working;
- Risk assessment conducted by an acting leading hand;
- No written conductor augmentation procedures;
- No verbal job instructions given to the work crews prior to the job commencing;
- In term of project management, apparently there was a discrepancy between crews on planning for the job and the job actually performed;
- Crews from different work locations (field depots) with possible different sub cultures, and no site coordinator appointed; and
- Changes to the sequence of work to be carried out, and not all crews were advised of the changes (communication).

Justice Kavanagh commented on the application of ‘looping’ over mains and details of demolition in manuals, especially when working under live mains. He further quotes the Integral Energy Overhead Line work – Module 11 – Course Book (Second Edition 1997 at pages 15-4):

“There are times when it is necessary to string conductors underneath energised mains. Special precautions have to be taken to ensure the conductor being run does not come into contact with the live mains”.

The defendant was found guilty and fined the sum of $160,000 with a moiety to the Workcover Authority.

**Case 11: Inverell**

Judgement of Northpower held in the New South Wales Industrial Relations Commission (NSWIRC) 92 (31 May 2002), File: IRC 3347 of 2001. The prosecutions under the New South Wales *Occupational Health and Safety Act 1983* section 15 (1) were conducted by Inspector J.Forster of the New South Wales Workcover Authority and the Workcover legal
team. The matter was heard by Justice Kavanagh. The incident resulted in electric shock and serious burns injury of one of the three employees at the work site. The defendant pleaded guilty.

This particular case illustrates a situation where there are existing policies and standard operating procedures within an organisation which did not address the particular hazards involved in certain types of work locations. A non-electrical tradesman was required to enter a high voltage substation under the supervision of a qualified electrical tradesman to measure for the construction of a working platform.

In this particular case the prosecution alleges that Northpower failed to ensure the health, safety and welfare at work by failing to provide a safe system of work in a high voltage (66Kv) substation on May 27 1999, contrary to section 15 (1) of the Occupational Health and Safety Act 1983. The injured employee was attempting to measure, using a metal tape, the height required for a work platform to be erected for future work on a circuit breaker. The metal tape came within safe working clearance of the circuit breaker and it arced over going to earth through the injured employee’s body causing serious burns. Two of the employees were ‘authorised persons’. The other employee was to supervise the injured employee. Another employee at the site was not involved in these tasks but assisted the injured employee after the incident occurred.

One of the main issues in this prosecution was that there was a contradiction between the safety policy and the safety procedure in the organisation as to what type of equipment is to be used in high voltage substations. For example, the policy document “Electrical Safety Rules, Document number SWP 01 001” dated July 17 1997 states “[d]anger can arise when making measurements in the vicinity of high voltage conductors. Steel tapes, metal reinforced linen tapes and long steel rules can be very dangerous and shall not be used in high voltage electrical stations or on transmission lines”. These are set out on page 4, sections 11, 12, 13 and 14 of the transcript.

Reason (1997:17) refers to organisational factors leading to a ‘latent condition pathway’ that lead to failure of the safety system; in this case the organisational factors were the existence of policy documents prohibiting the use of metal tapes in high voltage electrical substations.
However they were primarily written for electrical trades and technicians. The injured employee was a fitter and turner who, although he was authorised to enter and work in electrical substations, was apparently not aware that metal tapes should not be used in electrical stations.

There was also apparently a contradiction between the Electrical Safety Rules as stated above and other procedural documents (page 6, sections 9 and 10 of the transcript) and also that Northpower only issued metal tapes to employees and not fibreglass tapes which would have eliminated the risk to employees. It calls into question the effectiveness of the risk assessment processes as conducted by Northpower which should have highlighted the potential hazards posed by using any metal or other conductive material close to the safe working clearances of high voltage equipment and conductors, particularly in a restricted working environment such as an electrical substation. There is also the question of audits, both internal and external, of the safety management systems and documentation that should have been revealed by cross checking policies and procedures.

Justice Kavanagh considered the foreseeability of this type of incident and further commented (page 7) that this incident was a serious breach of the Occupational Health and Safety Act 1983. Hopkins (2007:34 and 40) maintains that this question of foreseeability or the use of the terms culpability and deterrence are important devices to raise the safety culture of organisations and discusses the degrees of culpability in relation to industrial manslaughter. This does not apply in this case as the employee did not die but suffered serious injury. However, Hopkins writes, “These same commentators argue that the culture of a corporation may be a culture of carelessness or a culture of risk denial, and that such cultures need to be taken into account when determining corporate liability” (Hopkins 2007:76, citing Fisse 1990 and Wells 2001).

Justice Kavanagh found the defendant guilty and imposed a penalty of $160,000 which had been discounted by 25 percent due to an early guilty plea being entered by the defendant, and also prosecutor’s costs of $7000 with a moiety to the Workcover Authority. This penalty also took into account the measures that Northpower management had already implemented such as the restriction on access to high voltage electrical substations, the banning of metal tapes in Northpower and the audit of safety policies and procedures to ensure that they are consistent.
Case 12: Orange

Judgement of Country Energy 2003, New South Wales Industrial Relations Commission (NSWIC) 369 (7 November 2003), File Number: IRC 2343. The prosecution was conducted by Inspector Malone of the Workcover Authority of New South Wales and the Authority Legal Team pursuant to Section 15 (1) Occupational Health and Safety Act 1983. It was alleged that the defendant failed to ensure the health, safety and welfare of five of its employees, particularly the one employee injured in this case. Judgement was by Justice Haylen.

This case study is a particularly convoluted one and another example of an electricity distributor seeking to avoid prosecution and conviction for an offence which occurred prior to the amalgamation of its component parts. In this case Country Energy sought to avoid conviction for an offence committed while a part of the entity was called Advance Energy. The basis for the defendant’s argument was that the assets and civil liabilities were transferred from Advance Energy to Country Energy by the State Owned Corporations Act 1989 but not the criminal liabilities, including the Occupational Health and Safety Act 1983. Country Energy was brought about by the amalgamation of various entities such as Great Southern Energy, Advance Energy, Northern Rivers, Northpower and Southern Tablelands which occurred over a period of some years and may have resulted in some disruption to the management of those entities.

Another interesting feature is that the Workcover Authority had waited two years to the date (April 27, 2000 the alleged offence occurred, April 27, 2002 the summons was issued) before issuing a summons for breaches to the Occupational Health and Safety Act 1983. This has been a feature of Workcover Authority prosecutions from the study of the transcripts as illustrated in the other cases. For example, in the case Workcover Authority Vs Integral Energy 2002 IRC1650 Case Number 11, the alleged incident took place on the March 26, 1999 but the charge was eventually laid on March 14, 2001. This appears to be a long time before prosecutions are initiated for serious offences involving the health and safety of people subject to the hazards of working in industry. There may also be other delays which sometimes result from the backlog of cases to be heard in the industrial relations courts. The convoluted legal arguments set out in this particular judgement are an example of the time
consuming nature of these processes. The hearing date was September 16 2003 and the final judgement was not handed down until November 7 2003. The outcome was that the judge decided that Country Energy was in law the successor of Advance Energy with all the liabilities, both civil and criminal and the prosecution should proceed, but this would be at a later date.

To the five employees concerned in the incident, one of whom sustained injuries, the long drawn out legal process must have been frustrating and not conducive to the creation of a degree of trust between employees and management, an essential feature of a positive culture of safety in an organisation. The five employees had been working in an electricity substation when an explosion occurred exposing all five people at risk of serious injury. Fortunately in this case only one person sustained injury but the result could have been worse. To the people involved in the incident and their families the protracted legal process could be viewed as a delaying tactic designed to protect the company and not conducive to the creation of a positive safety culture.

Case 13: Moree

Judgement of Country Energy (known as Northpower at the time of the incident) held in the New South Wales Industrial Commission (NSWIC) 206 (26 June 2003), File: IRC 1279. This resulted in serious injury to an employee. The prosecution was conducted by Inspector Mason of the Workcover Authority of New South Wales and the Authority Legal Team pursuant to Section 15 (1) Occupational Health and Safety Act 1983. It was alleged that the defendant failed to ensure the health, safety and welfare of all its employees, particularly the two employees in this case contrary to s 15 (1) of the Occupational Health and Safety Act 1983. Country Energy pleaded guilty. Judgement was by Justice Boland.

Listed below is the identification of important items or an agreed statement of facts in this judgement which reflect the prevailing safety culture of the distributor. In this case two employees were instructed on December 28, 2000 to investigate a report of a live 22kv transmission line close to the ground (about 1.5 metres) after having been hit and dislodged by a crop dusting plane. One employee proceeded to ‘walk the line’ to conduct a visual inspection while the other employee went to isolate (disconnect) the power to the line,
approximately seven kilometres away from the site. The first employee commenced walking in the muddy cotton field towards the fallen power line. He was later observed by a farm worker to be falling to the ground after hearing a loud bang and flash. He was subsequently transferred to hospital for treatment for electric shock and severe burns to his body which left him with scarring to various parts of his body, some requiring skin grafts.

On page 4 of the judgement the following statement of facts were listed:

- There was a failure by the two employees to complete a risk assessment as required in the Electrical Safety Rules 4.6.1, even though apparently this had been discussed by them.

- After discussing the process to be followed one employee left the site to isolate the power supply. The other employee did not wait for the isolation to be carried out by the first employee before commencing a field inspection.

- The injured employee was not wearing a safety helmet which had been provided by the employer as personal protective equipment.

- The injured worker’s contact with ‘live’ fallen high voltage conductor whilst walking across a muddy field was observed by a farm worker driving along a nearby road who then sought assistance using the radio in the Northpower vehicle.

- Inadvertent contact by the employee with the fallen conductor resulted in an electric shock and severe burns to his head and body. The main contact point was the injured worker’s head.

Further on page 9, section 20, Justice Boland stated in his consideration that “… employers cannot rely upon the good sense of their employees when it comes to health and safety”. He further states that

“[t]he employer’s duty is to ensure the health, safety and welfare at work of all of its employees by, amongst other measures, providing and maintaining safe systems of work. In this case, the defendant’s system of work was deficient in that it did not ensure safe access to live overhead power lines.”
A number of other relevant issues were raised by the presiding judge as significant factors (page 10); they are:

- Previously there had been 23 reported ‘wirestrikes’ (aerial agricultural aircraft contacting, and in some cases breaking electricity powerlines) in the area covered by Country Energy (including the former Northpower) between 1997 and 2001.

- Justice Boland posed the question as to why there had not been any prosecutions by the Workcover Authority of crop dusting planes (aerial agricultural aircraft) bringing down powerlines thus creating a serious risk to health and safety.

The judge’s comments point to a failure to prosecute by the Workcover Authority in New South Wales which is both the regulatory body and the prosecuting body for health and safety. They also include DEUS which is the industry safety regulator and inspectorate which does not have separate prosecuting authority. However, Country Energy could have initiated action, including prosecution, against the companies owning and operating the crop dusters for creating serious risk not only to their staff but also to members of the public who could have come into contact with the fallen powerlines or fence lines, which may have remained ‘live’, and for damage to their property and the cost of repairs. This is a significant causal factor that leads to the injury of the employee, the failure to act upon a ‘latent condition’ (Reason 1997:10), and the 23 reported wirestrikes in the four-year period which eventually lead to the injury to the employee. This failure may reveal an existing culture of the perception of immediate risk as being only on a particular worksite, rather than an overall ‘holistic’ risk to both employees and members of the public. The lack of recognition of the potential risk for employee and members of the public, including farmers, farm workers and their families, from coming into contact with a ‘live’ fence some distance away from the site of the wirestrike resulted in an act of ‘omission’, a failure to take action to prevent a re-occurrence of the wirestrike. In addition, the fact that risk assessments were not conducted by the employees and the failure by the injured worker to wear protective headgear (his safety helmet) also reflects upon the culture of safety and the need for compliance to safety rules existing in the work environment. While this may not be true of every regional depot of
Country Energy, this is identified as an issue in creating a positive safety culture in a
geographically diverse industry with varying degrees of focus upon health and safety.

**Case 14: Bargo**

Judgement of Integral Energy, New South Wales Industrial Commission (NSWIC) 47 (25
February 2005), File no: IRC 2595, 2596, 2597. Serious injury to employees and non-
employees. The prosecution was conducted by Inspector Wilkie of the Workcover Authority
of New South Wales and the Authority Legal Team pursuant to sections 15.1 and 16.1 of the
Occupational Health and Safety Act 1983. The defendant pleaded guilty. Judgement was by
Justice Staff.

In the first incident which occurred on May 17, 2001, an employee of the distributor was
feeding branches into a wood chipping machine, assisted by the labour hire company
employee at Bargo. The defendant’s employee was apparently dragged into the wood
chipping machine by a branch catching the glove the employee was wearing. The employee
suffered a considerable number of lacerations to his arms and head in the incident and was
only saved from further injury by the other person dragging the injured employee out of the
chute of the woodchipper. The resulting investigation by the Workcover Authority included
a ‘Prohibition Notice’ being placed on the machine prohibiting the defendant from using the
machine.

The second incident, which occurred just eight days later on May 25, 2001, at a work site in
Ingleburn also involved the labour hire firm’s employee and another of the defendant’s
employees. On this day the Workcover Authority again visited this other work site of the
defendant and again issued a Prohibition Notice on yet another wood chipping machine. The
Workcover Authority in its prosecution claimed that both of the wood chipping machines
were not constructed according to acceptable safety standards.

This judgement of the two related incidents which occurred later in the research period
reflects both the changing industrial relations scene and also the lack of a safety culture in the
organisation concerned. It also involves the use of contract labour by the electricity
distribution organisation and the inclusion of suppliers of equipment in prosecutions by the
Workcover Authority. This is a non-electrical incident which however reflects some of the wide variety of tasks that are undertaken by the organisations to supply energy to its customers. The incident involved an employee of a labour hire firm in both of the occurrences, although the employee himself was not injured but was exposed to the risk of injury and effectively saved the life of the distributor’s employee by his quick action. In addition, the effective suppliers of the two items of equipment (woodchippers) and the labour hire company were also the subject of separate prosecutions by the regulatory authority.

Other parties were prosecuted and convicted at other times for the same incident including: Greater Lithgow Skills Training Inc., Batequip, the supplier of the Mortdale Woodchipper and Kennards Hire, the supplier of a Brush Bandit Woodchipper. The fact that there were a number of companies prosecuted in this action, including the suppliers of the plant in question, could indicate a failure by Integral Energy to ensure proper training for its employees and other non-employees engaged by Integral Energy to work alongside its own employee. It could also indicate that its purchasing policies need to be reviewed to ensure that equipment purchased or hired should comply with safety requirements and standards and that documentary evidence of compliance should be essential before finalising purchase. Again these failures reflect the prevailing negative organisational safety culture of Integral Energy and evidence of a ‘silo effect’ within the organisation in as much as the purchase or hire of equipment did not demand documentary evidence of compliance with industry standards.

While the submission for the defendant reflected that the defendant is a large organisation (Integral Energy) with an ‘impeccable safety record’ in that it has not previously or since been before a court in respect of offences involving wood chipping machines, the defence did not refer to prosecutions for other offences under the Occupational Health and Safety legislation).

Justice Staff commented that in reference to guaranteeing the safety of its employees “[i]t is essential that the approach be pro-active and not a re-active one”, (Page 12 section 43), revealing the judge’s awareness of problems with the safety culture within Integral Energy. He further added that “[w]e add one comment on the question of the previous record, and that is that the court should attempt to ensure the accuracy of the record and have objective regard to it in relation to the industrial enterprise and the extent of its operations” (Page 13 section 53) and that “[i]t is important to give appropriate weight to the objective seriousness
of the offence, bearing in mind the inherently unsafe system that was in place, that the risk was obvious and that the risk was entirely foreseeable” (Page 13 section 55).

The existence of a safety management system in Integral Energy was noted in the transcript (page 8, section 18). However, in reference to the hire and purchase of plant and equipment it would appear that not all departments had the same commitment to health and safety. As in previous cases studied the ‘departmentalisation’ or ‘silo effect’ is evident with the failure in purchasing or hiring process to demand compliance with existing standards for equipment. This theme is also revealed in Case 7 in the purchase and delivery of transformers with incorrect colour coding on cable connections.

The failure to address the identified defects with the transformer is also similar in effect to the Case 7. This reveals that not much had changed with the safety culture in the organisation in spite of the reported efforts by management representatives in both cases to introduce change within that organisation. There are of course some differences. This later incident concerned damage to NorthPower’s property by crop dusters planes which had the potential, in fact realised, to cause injury through fallen power lines. The incident in Case 7 was the failure by the organisation to act upon the known defects with transformers delivered from the manufacturer. In this case it was not the most significant causal factor in the incident but the potential existed. The failure to act upon issues which were identified by the reporting systems in both instances are important safety culture issues for the organisation; these are good examples of ‘failures of defence’ identified as causal factors by Reason (1997:12). The lack of identification of near misses, defects in equipment or maintenance, or compliance with purchasing specifications, policies or procedures and the failure to act and remedy the issues can eventually lead to serious injury or damage to property. It is an example of the ‘mindfulness’ (Hopkins 2007) that should exist in an organisation towards safety which is necessary for the creation of a positive safety culture.

Cases 7 and 14 also illustrate the existence of departmental subcultures within the organisation which could have negative effects to the safety program. The relevant departmental managers in Case 7 should have been aware of the exposure to hazards of other employees in the organisation when receiving and checking the transformers from the supplier, and refused to accept them until the faults were rectified. In Case 14 the relevant managers should have acted to ensure that the wire strikes were not repeated.
Returning to Case 14, after the initial incident in which an employee of the defendant had been injured, and a prohibition notice placed upon one woodchipper machine, another machine was hired with similar defects. This is revealed in the transcript that the Workcover Inspector had noted in both of the incidents that the in-feed chutes were not long enough or the side guards sufficient to be worked with safely. He also noted that there were no easily accessible safety mechanisms to stop or reverse the operation of the in-feed rollers in the event of a person being pulled into the woodchipper. This reveals a lack of a culture of safety, or to use Hopkins’ (2000a) term ‘mindfulness’ in this organisation which had not been built up, even though it was evident in the transcript that a safety management system had been in existence for a number of years.

The conviction and penalty was imposed for all three matters IRC 2595, IRC 2596, IRC 2597 and a fine of $50,000 imposed for each matter. In addition the defendant was to pay the prosecution costs of the Workcover Authority.

Case 15: Gilgandra


Prosecution under Section 8 (1) Occupational Health and Safety Act 2000. This judgement was listed as *ex tempore* (by reason of time; by lapse of time. An *ex tempore* judgement is given without preparation) (Butterworths 1998:159). The prosecution was conducted by Inspector Evans of the Workcover Authority of New South Wales and the Authority Legal Team pursuant to Section 8 (1) Occupational Health and Safety Act 2000. It was alleged that the defendant failed to provide and maintain a safe system of work in relation to electrical line work, in that it failed to ensure that all electrical lines were properly examined, tested, de-energised and isolated prior to anyone commencing work on them. The defendant, Country Energy pleaded guilty. Judgement was by Justice Haylen.
The judge noted that Country Energy and its predecessors, North Power and Northern Rivers Electricity, had six previous convictions between 1992 and 2003 (Page 8 item 30); however, none for this particular type of offence. This incident, which occurred on August 27, 2003, apparently involved a complicated isolation process and without photographs and access to the full court transcript it is difficult to get a clear picture of the technical and physical construction aspects of the incident. As with the previous case, this case occurred late in the research period and even though there is mention by the defendant of the implementation of a safety culture program, this case reveals that it had not been entirely successful.

On page 7 item 24 of the judgement, Justice Haylen states “this defendant has pleaded guilty, acknowledges its failure to ensure that all electrical lines were properly examined, tested, de-energised and isolated prior to anyone commencing work upon them”. However, there are a number of items that were central to the findings in the judgement (Page 3).

Firstly, a documented risk assessment was undertaken at the site prior to work commencing. These risks were identified as being the use of an elevated work platform (which has its own limitations on use) and employees working at heights and low voltage mains (it is noted in item 18 of the judgment that the controls for these were to be “isolated via c/b (control box) locked plus DT (danger tagging) attached, tested dead (de-energised)”). The employee who suffered the fatality and one other person signed the risk assessment. It is worth noting that the possibility of any other supply source of electricity from outside of the immediate work site had not been explored or identified in the risk assessment. Not all of the possible sources of supply had been identified and tested; if they had been the incident would not have happened. This particular causal factor involves the identification by the management and supervisory team, including in the design stage, of any other potential sources in the planning stage of this particular job.

Secondly, while the circuit breaker had been isolated, another low voltage circuit from the transformer on to the distribution pole had not been isolated. Switching off the circuit breaker in the fuse box switch did not de-energise the low voltage circuits fed from the transformer on the distribution pole. This was because the low voltage circuits had been hard wired (not through fuses or switches) into the transformer.
Finally, the defendant’s chief safety officer outlined the safety management system of Country Energy mentioning the “…systems and programs in safety and maintaining a strong safety culture” (Page 5, section 8).

It is significant to note that this is the first time in the judgements that there is a mention of a ‘safety culture’. This may mean that there is a recognition by at least one of the electricity distributors and the judiciary that there is a need to move away from the ‘rules based’ regulatory approach of safety management, to that of a holistic view of the overall culture of the organisation, encompassing safety culture, to address safety issues and reduce the number of accidents. As Country Energy is a conglomerate of a number of smaller utilities covering a large area of the state, this is a bold initiative and shows at least the intention of the company to reduce the number of safety incidents occurring. There is also the difficulty in a necessarily decentralised administration to influence the overall organisational and safety culture, and the existence of ‘subcultures’ would be very challenging.

The judge also stated that “I am unable to say from the evidence precisely what happened on this particular day” (Page 7 section 26). As stated previously in this analysis it would be difficult without a reconstruction on site to discover what actually happened. These comments illustrate the difficulties in identifying accident causation factors in what is essentially a high risk industry and was confirmed in an interview with industry participant number two (Smith, Pers. Comm., May 19, 2008). One mistake can, and did in this case, lead to the death of an employee. This does not excuse the employer but reminds everyone of the need for a positive safety culture to permeate the industry and each aspect of the management of each distributor.

The defendant was fined $145,000 with half of that amount to be paid to the prosecutor by way of moiety and further the defendant was to pay the legal costs of the prosecutor.

The judge’s comments referring to the efforts made by the defendant to further improve the safety management systems and to build a safety culture within Country Energy reveal the contrast between this judgement and other earlier judgements that have been the subject of this research.
Conclusion

The implementation of Safety Management Systems in the early 1990s has led to the recognition of the importance of a positive safety culture in the reduction of incidents leading to injury. A transition has been reflected in the later judgements over the period of this research and shows a maturity, in some cases, of organisational culture and the recognition by the legal system of the changes in the management of safety and the tools that are available to organisations. This also reflects the changes in occupational health and safety legislation that has occurred over the period of time in addition to the recent emphasis on corporate social responsibility in Australia, which includes good safety management. CSR reflects the changes to community expectations that companies should no longer accept high incident rates resulting in injury to employees and others, including contractors. Some of the legal requirements have been to implement risk management processes as a vital function in workplace management and a greater involvement of employees in the consultation and indirectly the management of safety.

This chapter has examined the transcripts of prosecutions in the Industrial Relations Courts and Commissions arising from safety incidents that have occurred in the electricity distribution industry in New South Wales between the years 1993 to 2003. The issues that have been raised by this detailed analysis and the outcomes and comments that have been made will be further addressed in the discussion chapter of this thesis. At this stage the observation should be made that in more recent years the Workcover Authority appear to have initiated more prosecutions of all parties concerned than in the past for failure to ensure the health and safety of employees, and others, working in the industry. Also the judges of the Industrial Relations Commission have dealt more in depth than is revealed in the earlier judgement transcripts. They have also raised the issues of safety management systems and safety culture, which reflects changing community attitudes to health and safety at work and the responsibility of employers to provide a safe working environment. The next chapter, Chapter 5, entails an in depth discussion and elaboration of the issues that have been raised in the findings from the cases examined.
Chapter 5: Discussion

The purpose of the chapter is to discuss the findings presented in Chapter 4. The findings are assessed relative to evidence that points to the existence or absence of a culture of safety in each of the three organisations, using the six themes developed from the literature review. Progress towards the development of a safety culture is considered from evidence in the transcripts. Analysis of the transcripts points to progressive improvement in the attention paid by management to OHS issues in the industry over the 1993-2006 period. This was revealed by comments made by the various presiding judges and the stated aims of the various electricity distributors to introduce safety management systems to reduce the number of safety-related incidents. There has also been recognition, at least in some of the comments of organisations’ spokespersons, of the importance of safety culture to the incident reduction effort. The analysis of transcripts in Chapter 4 provides a foundation for assessing OHS in the electricity distribution industry in terms of the academic literature on safety culture.

As described in the literature review, safety culture is multifaceted. Safety culture is created and changed through organisational practices that reflect prevailing management values and workers’ perceptions of management values in a holistic way (Chapman 2006). The effort to improve the safety performance of the electricity industry will require the organisations concerned to adopt a multi level, holistic approach instead of an ‘either/or’, adoption of safety management initiatives (DeJoy 2005). Therefore, it is inappropriate to point to one factor at a time as the cause of an incident; rather, the approach here is to consider each case through the lens of a number of the themes identified in Chapter 2 as significant for safety culture.

If the interpretation of the data put forward here is correct - that is, that the industry did make progress towards safety management systems and safety culture - it should be supported by declines in rates of serious injuries and fatalities. The progressive reduction in serious injuries sustained by people working in the industry, including fatalities, as recorded by DEUS was shown in Figure 1 of Chapter 1. This was consistent with the analysis of transcripts of all prosecutions of serious injuries and fatalities in the industry undertaken in Chapter 4: of the six fatalities that occurred in the industry over the research period, five happened in the period from 1992 to 1997 and only one in the latter part of the research time scale which occurred in 2003. However, as noted in Chapter 2, there is some doubt about the reliability of
statistical information. Over the period of the research, there had been a reduction in the numbers of people directly employed by the three organisations and an increase in the use of contractors, as encouraged by the competition policies of both State and Federal Governments. There has also been an increase in the size of the industry in line with population and economic growth. There has not been an increase in the number of incident reports received by DEUS nor in the proportion of incidents that involved contractors. Therefore, the statistical improvement may point to reduced reporting of safety incidents to the department rather than conclusively pointing to reduced incidents.

**Theme 1: Workers’ perception of managerial attitudes to safety**

The analysis of the cases in Chapter 4 revealed that frontline worker perceptions of managements’ priorities around work practices was that it was acceptable for staff to cut corners to achieve task outcomes. This included avoiding the need to wear protective clothing (such as hard hats) and to use insulating gloves. It is also connected to the failure to provide adequate supervision of work. This theme was identified in some 14 instances in the analysis of the 15 cases and therefore suggests that managers endorsed such practices. In Case 13, the failure of the injured employee to wear a safety helmet may have worsened the burn injuries sustained. In Case 5, the employee was wearing shorts rather than the long trousers required; protective clothing would not have prevented injury as they were not made of insulating material, but they may have reduced the injury. In Case 3, failure to wear protective clothing was even more directly the cause of injury, as the employee was apparently wearing leather gloves instead of the insulating gloves that are required when working on ‘live’ low voltage conductors. This transcript also reported on the employer’s failure to provide adequate supervision. The failure to provide adequate supervision is also apparent in Case 10 around the failure to coordinate three work crews on the site the day the incident occurred. In Case 14, the lack of adequate training to both the employee and also a contractor’s employee was highlighted by the judge as one of the causal factors in the incident.

Although it is a requirement for employees working in the industry to wear prescribed clothing such as long trousers, long sleeved shirts and hard hats, the enforcement by the various levels of management should reinforce the culture of the organisation to safety with the philosophy that ‘we work safely all the time’ and that there are no exceptions. This
concept is similar to “collective mindfulness” expressed by Hopkins (2005: 13). Employees should get reinforcement from management that management are serious about workplace safety and will not tolerate deviations in work practices around protective clothing and proper use of equipment that may expose employees to severe injury. The reverse is also true: if management show a double standard in their commitment to safety, it soon becomes apparent to the employees and the message is that it is okay to ‘cut corners’. This interpretation is supported by an industry participant, Jones (pers. comm.): “safety is a big stick which is used to beat people when something goes wrong, and then put away”.

The cases cited above points to a prevailing safety culture where management have not prevented attitudes from developing that cutting corners on hazard controls is unacceptable. This perception of employees as part of the safety culture may increase the risk of injury to the employees themselves but it is seen as a reflection of management priorities. This has been revealed in research by Reason (1997) who stated that “[o]ne of the enduring findings of work psychology is that people will be tempted to take short cuts whenever the opportunities present themselves” (p. 48). This is reinforced by Guldermund (2000) in his definition of safety culture as “… those aspects of the organisational culture which will impact on attitudes and behaviour related to increasing or decreasing risk” (p. 215). The importance of employee perceptions is stated as “attitude amongst employees accepting rule violation is the strongest predictor of shop floor worker’s risk behaviour” (Rundmo 1998a and 1998b in Rundmo and Hale 2003:3). In the cases quoted above employee and management perceptions appear to be contributing to the increased risk of injury. So even though there may be an increase in risk to employees, the prevailing safety culture allows a general relaxation, or ‘turning a blind eye’ to breaches of safety rules.

**Theme 2: Holistic approach to organisational culture and values**

This theme reflects the values of the organisations and the need to have employees and management working together to an agreed set of values to create a holistic approach to the management of safety. The effort to improve the safety performance of the electricity industry will require the organisations concerned to adopt a multi level, holistic approach instead of an either, or, adoption of management initiatives. To achieve this, the organisations concerned need to be willing to ‘look at themselves’ and make fundamental changes in the way they pursue their activities (DeJoy 2005). Case 4 shows the difficulties of creating a
positive safety culture within an organisation. The organisation claimed that there had been a new focus on safety and a new corporate culture. However, the transcript reveals that the organisation had attempted to avoid responsibility for the failure of one of its component organisations to manage safety. This would not engender an environment of trust between the employees and management which is an essential component of a culture of safety.

In Case 13 concerning a crop dusting plane striking wires, the previous lack of action on wire strikes over many years created a risk of injury to employees and also to customers, animals and members of the public who may have come into contact with property fencing which is ‘alive’ from fallen wires resting on them. An overall ‘holistic’ safety environment in the organisation concerned would have urgently identified the risk involved and the staff in other departments would have taken action to remedy the safety risk. By contrast, it seemed that no organisation was willing to acknowledge the risk and need for action. Progress towards a holistic approach to safety was evident in Case 15 in terms of a shift away from a reliance on rules without regard to shared values and attitudes. The judge commented that the defendant, Country Energy, claimed it was continually updating and improving occupational health and safety systems and procedures, which would require reporting and learning (Reason’s terminology). As mentioned earlier, this particular fatality occurred in 2003, some six years later than the previous fatality in the industry in New South Wales, which could reflect upon the progress made in the management of safety in the industry.

Case 7 illustrates the opposite of a holistic approach to safety. Here, various departments in the defendant’s organisation failed to act after identifying colour coding on transformer connectors that were noncompliant with the Australian Standard. No action was taken to rectify the known fault. This later resulted in an injury to a contractor’s employee and placed at risk yet another employee of the contractor, in this case an apprentice. These cases illustrate the ‘silo effect’ in which the various departments in an organisation feel remote from the high risk operations of other sections of the organisation. This is in contrast to “collective mindfulness” (Hopkins 2005:13) of an organisation in which all the departments are committed to the same safety values and act to rectify safety issues which may effect people working in other departments in the same organisation.

Failure to act on ‘near misses’ was evident in Case 1, where the fatality involved a particular type of fuse carrier that had failed on previous occasions. No action had been taken to
replace the faulty carriers. In Case 11, there is a different kind of example of the lack of a holistic approach to safety. Written safety policies were contradictory and this resulted in a non-electrical tradesperson in the organisation using a metal tape measure in an electrical substation close to high voltage equipment. Even though the employee worked in the same organisation, but in a different department, he was not apparently aware of the hazards associated with using metal tapes close to electrical equipment. It is remarkable that apparently only metal tapes were issued to employees to use at work; not non-conductive tape measures. This is an example of what Reason (1997) refers to as organisational factors leading to “a latent conditional pathway” (p. 17) that lead to the failure of the safety system and injury to an employee. The safety policies were not being followed in all parts of the organisation. In a similar vein, Case 14 reveals the lack of a company-wide holistic approach to safety management in the purchase of equipment that complied with safety requirements and standards. The suppliers of the woodchippers involved were also prosecuted, as was the employment agency who supplied one of the employees also involved in the incident.

This incident and the subsequent prosecutions by the regulatory authority in New South Wales represent a change in the enforcement of breaches to the occupational health and safety legislation. This particular incident was not an electrical incident, but it involved employees of an electrical distribution organisation and in this way was different from the other cases. Other factors were that the prosecutions were also extended to the suppliers of the equipment in the incident and the training provided. This represents a significant shift in the treatment of the legal process, making other contributing parties to an incident bear some responsibility for the incident; this is the approach suggested by Reason (1997) in addressing all of the safety ‘causal factors’ leading to an incident. This also represents attempts by the prosecuting and court systems to work with the recognition that safety culture is important in the successful management of safety over the period studied in this thesis.

**Theme 3: Reporting of unsafe conditions**

Frontline workers’ perceptions around prevailing management attitudes towards safety will influence reporting of hazards and incidents. In three of the cases, the reporting of incidents and unsafe conditions were identified as contributory factors. In Case 13, the transcript revealed that there had been 23 reported wire strikes by crop dusting aeroplanes between 1997 and 2001. One of these wire strikes contributed to the serious injury of an employee. It
is possible that the reporting systems worked in some way but not in a way that led to action by electricity distributors, DEUS and WorkCover. This would not create confidence in employees that safety was a high priority. In Case 7 and 8, the failure to report a defect in the colour coding of transformer connection terminals was a significant causal factor in the incident which resulted in electric shock and burn injuries to a contractor’s employee. The question of communication between Northpower and the Thearles contractor through the employees on the site on the day the incident occurred was identified as an issue in the transcript. It appeared that the contractors (Thearles) had not been advised that they were not authorised to make any connections between the cables and the transformer. The contractor’s employee attempted to make a connection and received an electric shock and burns. In addition, it appeared that the Northpower employee on the site had not been specifically instructed by management to supervise the Thearles employees who were not authorised to work on electrical transformers.

A more serious example of the failure to have effective reporting systems was in Case 1 (June 1992) where failures in service of a particular type of high voltage fuse carrier was a significant causal factor leading to the death of an employee. This particular equipment had apparently failed in a similar manner five times previously. This is an example of the failure to identify a safety risk and to replace the equipment or to implement management controls. Reason (1997: 118-199) emphasises the importance of acting on near misses and to learn from near misses as important for creating a positive safety culture. There is insufficient evidence in the transcripts to be able to assess the reporting systems of contractors working in the industry. However, as stated earlier, there are doubts about the number of serious incidents reported to DEUS. This is an example of the lack of a ‘reporting culture’ stressed by Reason (1997:195) and Chapman (2006:120) as being essential components of a safety culture.

**Theme 4: Communication as a safety culture issue**

A number of cases involved a failure of communication. Case 5 that concerns a fatality in 1994 showed the importance of simple communication measures that were provided for by regulation. Two employees received a radio call instructing them to attend a ‘no supply’ from a customer. It became apparent from the transcript that this particular transformer had been inoperative and faulty for approximately four years, but had not been replaced or dismantled.
as required by the Electricity (Overhead Line Safety) Regulation 1991 Clause 26. This fact was not apparently known to the employees, neither were there warning signs on the transformer pole to advise employees of the fault. One employee attempted to replace the fuses. However, subsequent testing indicated that there was still insufficient power. The employee again climbed the pole but came into contact with a ‘live’ metal conduit. This particular incident has been mentioned previously as one in which the employee was not wearing protective clothing; he was wearing shorts which allowed his bare leg to contact the live conduit. The lack of communication of vital information was in this incident a direct causal factor leading to the death of the employee. The importance of good communication as a significant factor in the safety management process is stressed by Reason (1997: 195-196).

In another incident which lead to the deaths of two employees, the failure to communicate to employees and perhaps to some levels of management involved the operation of an ‘elevated work platform’ and hydraulic equipment. Case 2 (which occurred in 1992 but which was not decided until 1995) involved the contact between the live low voltage conductors and non-insulated hydraulic equipment which caused the hydraulic oil to ignite. The two employees were engulfed in burning oil and subsequently both of them died. It was claimed by the defendant that this risk was not known. However, it was revealed in the court transcript that a bulletin had been issued two years previously by the then Department of Minerals and Energy (the predecessor to the now Department of Utilities, Energy and Sustainability) advising the industry of the hazards associated with using this type of equipment on ‘live’ electricity conductors. It appears that this advice had not been acted upon by the organisation’s management team.

In Case 10 in 1999, the communication challenge concerned the planning and coordination of work of three crews. The work crews involved in the work tasks had not been advised of changes to the sequence of work to be carried out. This was particularly important on this day as the tasks were being carried out by work crews from different field service centres and no site coordinator was appointed, yet a risk assessment had been conducted. These communication failures were major factors in the subsequent incident which resulted in serious injury to two employees.
**Theme 5: Commitment to safety first**

Evidence around organisational values and attitudes is harder to discern and substantiate from the transcripts than more objective failures such as poorly designed equipment. It is necessary to impute values and attitudes from occasions when risks that were eminently foreseeable were tolerated or not addressed or where regulations were ignored. There are three cases that sustain an argument that ‘getting the job done’ was given greater priority than safety. Case 10 around the coordination of work crews discussed above seems to indicate an unwillingness to take time to coordinate work that was reckless considering the risks identified in the manual around the work to be performed. In Case 6, employees were given the task to use a new type of elevated work platform on which they had received no training. This task involved positioning the vehicle on sloping ground and there is a wide variation in the types of stabilisers used to lock a vehicle in position to prevent it moving. The vehicle rolled down a steep hill and crashed into a house with the employee in the basket of the elevated work platform. In Case 9 in 1997, the use of temporary supply outlets and connections were used to ensure that tasks were completed quickly. This was instead of using alternative methods such as mobile generators to obtain power in a safe manner which would have relied upon ‘cut off’ switches to protect the employees in the event of an incorrect connection which apparently happened in this incident.

**Theme 6: Blame the victim**

The management tactic of ‘blaming the victim’ (Reason 1997) as a causal factor in safety incidents had only been clearly illustrated in two of the cases examined in the analysis of the court transcripts. The first was Case 7 in 1997 in which the defendant’s spokesperson attempted twice to blame the employee for the incident. It was alleged that the safety processes were not followed when access to electrical transformers was given to untrained and unauthorised non-employees and, further, that the employee had not conducted a risk assessment. The transcript reveals that there had not been an induction for the contractor’s employees advising them of the restricted access to the transformer and instructing them that they were not to make any connections of the cables to the transformer. In Case 1 in 1992, the defendant claimed that there were alternative work methods available (an elevated work platform), but that employees ‘chose not to use them’. As this particular incident involved a porcelain section of the fuse assembly type which had failed five times previously at other
locations, the defendant should have devised alternative work methods to enable the safe replacement of the fuse carriers and then ensured that these methods were used. Acting upon the previous failures is part of the management of ‘near misses’ identified by Reason (1997:118-119) as essential to create an effective safety culture. Another example of the ‘blame the victim’ management attitude is illustrated in the pilot study of incident reports where ‘incompetence’ was identified by organisations as the cause. The focus on incompetence points to an underlying assumption that individuals cause adverse incidents rather than incidents being an outcome of the ‘system’. Blanford in Hopkins (2009) asserts that the ‘blame the victim’ tactic could be used to divert and prevent in depth investigation into the organisational causal chain.

The various cases illustrated the importance of a positive safety culture inculcated throughout the organisations structure reaching all sections, not only those that are readily identified as hazardous. The total commitment of all staff to identifying potential hazards and acting upon them and also that ensuring that all equipment purchased or hired conform with the safety policies and all relevant standards. The creation of a safety culture within an organisation is a slow process and the total commitment by all people, including senior management and the board of directors, is essential for its success in reducing incidents causing injury. The industry in New South Wales commenced the process by implementing comprehensive safety management systems in the early 1990’s. It would appear that this process has been disrupted from time to time by the restructures and amalgamations forced on it by the State Government. The safety management systems implemented relied upon constant auditing processes to ensure that the systems were being effectively managed and then to move on to the next phase, the development of an overall culture of safety in the organisation.

**Conclusion**

The transcripts show the difficulty of further progress on OHS in the industry due to problems associated with developing organisational safety culture through the involvement of all employees and management. This is reinforced by the statement, “reveal that organisational culture is not owned by any group but, is created by all of the organisation’s members” (Glendon and Stanton 2000 cited in Choudhry, Fang and Mohamed 2007:3). The transcript analysis revealed some of the safety risks that exist in the industry and the exposure of employees in the industry and contractors to potential harm from this exposure. The need
is, as Guldenmund (2000) states, “... those aspects of the organisational culture which will impact on attitudes and behaviour relating to increasing or decreasing risk” (p. 251). Employees and management must be involved with and respond to the safety component of the overall organisational culture. It cannot be separated from the attitudes and perspectives of all the people involved. It is about creating ‘mindfulness’ (Hopkins 2007) around a total commitment with safety, where safety is given priority when planning, scheduling tasks and providing manpower and equipment to complete the work tasks.

The essential components of a safety culture have been set out by Reason (1997:194) are: a reporting culture, a just culture, a flexible culture, and a learning culture. Taken together, these interact to create an informed culture where the employees are fully aware of what is happening with safety in the industry as well as in the organisation. An impediment to an overall safety strategy within organisations in the electricity distribution industry in New South Wales is the geographical spread of the field services centres and decentralised management functions. This can lead to the formation of sub-cultures and the ‘silo effect’ (Guldenmund 2000, Weick and Sutcliffe 2007) where the influences of established work methods and peer group pressure can impact upon staff, particularly newly trained staff that moves into those field service centres. This was confirmed in the interview with the second industry participant Smith (Pers. Comm. 2008) where the ‘old hands’ denigrated the training that the new employees had received. However, this negative may be balanced out by regional or field centre subcultures being aware of differences in the working environment which need to be managed. Such an approach to safety could be accommodated within an organisational safety culture. For example, there are particular safety issues raised by working with SWER (Single Wire Earth Return) lines between some regions where they do exist and others where they do not exist. Within the subcultures there should be joint efforts between staff and management in counselling staff for lack of compliance or resistance to using safety processes, or whether there are underlying personal or domestic issues such as bullying which may impact upon their safety performance. The target should be to achieve joint management-employee teams which focus upon the management of safety within the particular regions or field centres to change the culture to that of an agreed safety culture and to move away from enforcement to engagement. Another focus is to ensure that the latest technologies are spread throughout the organisation as quickly as possible with the training required to use the new technology safely. Work methods may also vary between regions and field service centres and as long as it can be proved that the methods are safe then the points
of difference can be accommodated. The main aim is to try and fully engage employees and management and also to ensure the compliance by the various contractors to the safety and reporting standards and those contractors are a part of the overall safety communication systems of the organisations. The creation of a positive culture of safety within the organisation’s culture is by necessity a long and slow process (DeJoy 2005) but will eventually have the result of reducing the number of incidents that result in injury to people. The concluding chapter in this thesis seeks to encapsulate the lessons learned and point the way future research can concentrate to further reduce the number of safety incidents in this industry.
Chapter 6: Conclusion

The purpose of this thesis was to explore the role of organisational culture and safety culture in improving OHS in the electrical distribution industry. This concluding chapter reviews the research questions, the research design and empirical findings. The significance of the thesis, and its limitations, are then assessed and possible future research directions are considered. Throughout the chapter, ways that the three organisations in electricity distribution in NSW could further improve OHS are identified.

The research questions came from preliminary research into records of injuries and fatalities in the industry compiled by DEUS. As shown in Chapter 1, there had been improvement in performance that seemed to derive from the introduction of OHS management systems and stronger regulatory standards in the 1980s and early 1990s. This improvement appeared to plateau in the early 1990s. DEUS records were unclear around the causes of injuries and fatalities. Additionally, some of the explanations seem to fit with the ‘human error’ or blame-the-victim approaches. It was considered that organisational cultural factors, such as management’s perception of frontline workers’ behaviours, may have affected efforts to achieve a further reduction in safety incidents in the industry. Other factors considered were the restructuring of the industry, including the expansion in the role of contractors. The uncertainty created by structural changes through mergers, outsourcing and downsizing has been identified as creating detrimental effects to organisations in their efforts to implement safety management and safety culture programs (Grote 2007).

A review of the literature about the definition and elements of safety culture and about safety culture in the electricity distribution industry was undertaken. The review pointed to factors that were relevant to particular aspects of safety in the industry. Safety culture was discussed as an element of overall organisational culture. The development of OHS legislation was also examined and progress in regulation and OHS around the contemporary concepts of risk assessment, consultation and the importance of safety culture in the management of safety was considered. An important outcome from the literature review was the conceptualisation of safety culture as an outcome of practice and values and attitudes. It encompasses many factors, and a holistic approach is required (Reason 1997). Management attitudes are particularly important for developing a culture of safety, but a further component is frontline
workers’ perceptions of management attitudes towards safety; for example, whether organisational practices show support for the value that safety is important or whether they support ‘getting the job done’ first. An important lesson from the literature review was Hopkins’ argument that OHS management systems and regulations are not enough. For such systems to be effective there must be a ‘collective mindfulness’ around safety throughout all worksites in an organisation and at all levels of an organisation. Mutual trust is also important. This was particularly emphasised in the UK’s Health and Safety Executive’s explanations of a safety culture:

“The safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style of, an organisation’s health and safety management. Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures” (Health and Safety Executive 1999:45 cited in Farrington-Darby et al. 2005).

Insights from a range of authors, most particularly Reason and Hopkins, were used to create six themes for empirically investigating safety culture in the electrical distribution industry.

Ways of researching safety culture and organisational culture were canvassed in Chapter 3. Alternatives were explored, such as surveys, focus groups and interviews with frontline workers in the electricity distribution companies to create case studies. However, the companies refused access to frontline workers, so a case study approach was not possible. A different approach was then taken, following the examples of Reason (1997) and Hopkins (2007) where research was undertaken through analysis of publicly-available information around inquiries and investigations of serious injuries and fatalities in high risk organisations, such as chemical plants, mines and railways. The high risk nature of the electrical distribution industry meant that this kind of information was available through prosecutions of fatalities and serious injuries under OHS legislation in NSW. The transcript of the judgement of every prosecution from 1993 to 2006 was analysed for insights into the causes of serious injury and fatalities and also in terms of evidence of the existence of, or absence of, elements of a safety culture. Prosecutions for breaches of the Occupational Health and Safety Act 1983 (NSW) and, more recently, of the Occupational Health and Safety Act 2000 (NSW) and the Occupational Health and Safety Regulation 2001 (NSW) were reviewed. There were 15 cases.
Over the period of this research, a number of amalgamations were taking place in the industry, consolidating a number of smaller distribution organisations into the three that exist today. The cases were listed in chronological order. Nine cases concerned entities that became part of Country Energy, four concerned entities that became part of Energy Australia, and two cases concerned Integral Energy. Most of the breaches concerned the employers’ failure in their duty of care for their own direct employees, but some cases also considered contractors, suppliers and designers of equipment. The analysis of the transcripts included some of the relevant comments by the prosecution, defendants and in some cases the presiding judge. These findings illustrated the prevailing safety cultures of the organisations concerned at the time of the incident and at the time of the Court proceedings. The transcripts provided details that illustrated the failure of safety management and highlighted the lack of safety culture.

To sum up, the sources of data for this thesis were an analysis of industry incident statistics and also the incident report forms presented in Chapter 1. Interviews with two industry participants (‘Smith’ and ‘Jones’), who were working in the industry during the research period, and the transcripts of prosecution judgements. This data was interpreted through the lens of the researcher’s long experience in the industry as a lineworker, electrical safety officer and occupational health and safety officer/manager. This aspect of inside knowledge of the industry is confirmed with the observation that, “An organisation can appear complex and overwhelming to the uninitiated” (Galea 2009:7). The industry participant interviews and informal discussions with people still working in the industry were also used to interpret the judgements.

Chapter 5 is an in-depth discussion of the empirical data from the transcripts, elaborating upon some of the contributory factors relative to the six themes developed from the literature review. These included management issues and in some cases the impact the lack of communication and ‘departmentalism’ had on the safety performance of the distributors. It also revealed that in most cases studied there had been a progressive adoption of safety management systems and some recognition of safety culture as an important factor in future management of safety. This has also been revealed by the comments made by the various presiding judges and the stated aims of the various electricity distributors to introduce safety management systems to reduce the number of safety related incidents. There had also been
recognition, in the comments made by some of the organisations spokespersons, apparent in the transcripts, of the importance that safety culture has in the incident reduction effort.

**Safety Culture in the Electricity Distribution Industry**

The contribution to knowledge by the thesis lies in its assessment of empirical evidence of safety culture in three electricity distribution companies. The elements of safety culture were distilled into six themes appropriate for this industry and the approach was influenced by case studies undertaken by Reason and Hopkins for high-risk workplaces. This analysis of safety culture in the electricity distribution industry breaks new ground. The evidence was considered relative to six themes derived from the literature to identify essential requirements for changing safety culture:

1. Workers’ attitudes towards management’s commitment to safe working practices, rules and safety as a priority; for example, workers’ perceptions that it is acceptable to violate rules;

2. Management/employee ‘holistic’ approach to safety through demonstration of safety ‘values’ of the organisational culture and employees working together to create/shape values;

3. The degree of confidence in reporting systems for incident/unsafe conditions and whether it applies to contractors and their own safety systems and performance;

4. Communication on safety issues and dialogue, both up and down the organisation between management and employees and without ‘fear or favour’;

5. The degree of the organisation’s commitment to ‘safety first’ as the highest priority versus ‘getting the job done’; and

6. Perceptions of ‘blaming the victim’ apparent in managements’ approach to safety issues.

Safety culture has many facets and is part of organisational culture. Examples of practices around safety from the transcripts point to where the organisations concerned could have
taken action earlier to create a positive safety culture and lead the way for future improvement. An example would be the removal of communication barriers between departments that create the ‘silo’ effect, or the promotion of an ethos that ‘we are all involved in safety in this organisation’ that extends to all locations, contractors and suppliers of equipment. The need to create a positive safety culture involves the total commitment of front line workers and all levels of management, including the board of directors. Added to this is the need to change the tendency revealed in the transcripts to ‘blame the victim’ and instead carefully examine all the causal factors in an incident and rectify those factors.

Reason (1997), Hopkins (2005) and Fuller and Vassie (2004) examine the actions taken to remedy identified safety risks as one of the measures for a safety culture. This thesis has in particular examined two instances where organisations did not respond to known risks. One concerned wire strikes by crop-dusting planes, where planes have hit and in some cases broken high voltage conductors causing them to sag close to the ground or fall down completely. However the management of the utility concerned did not take legal action against the perpetrators and did not remove the safety risk. Such strikes occurred 23 times at various locations. The fallen wires would have posed a risk of serious injury, or even fatal injuries, if front line workers and members of the public came into contact with the fallen conductors or with a fence line that has been energised by the fallen conductors. This is in addition to the other hazards the employees of the utilities concerned are exposed to, particularly in remote rural locations. All risks should have been assessed and action taken. The transcripts revealed no action had been taken, as indicated by the judges’ comments.

The findings also showed that lack of action can also occur on safety through ‘departmentalism’ within an organisation. This was illustrated by the failure to rectify colour-coding wiring faults in transformers being delivered and commissioned by the organisation in contravention of the Australian Standard 3000 relating to the colour coding of electrical wiring. This situation was known to exist and had been identified in nine other transformers delivered to the same organisation previously. In addition to the responsibility of the employer to rectify known safety hazards there is also a breach of the Act by the manufacturer and supplier.

There were a number of indications of ‘common practice’ that existed in various utilities which did not necessarily comply with regulations, industry guidelines, standard operating
procedures or Australian Standards. These reflected either the lack of supervision or a tendency by various levels of management to ignore these as long as the work tasks were completed. It may be that the concentration on productivity has influenced some levels of management to covertly allow front line workers to ‘cut corners’ by disregarding policies and procedures.

In some instances there was a lack of consultation and communication between various workgroups involved in work at different sections of a task in close proximity or with contractors involved in work. This revealed a culture of departmentalism, or the ‘siloh effect’, where issues that ultimately became significant ‘causal factors’ in the safety incident were not passed on to all frontline workers and contract staff. This did not indicate the existence of the ‘holistic’ approach to safety in the organisation that is necessary for a positive safety culture. In a similar vein, one fatality involved a failure to pass on information to frontline workers that a transformer had been faulty and out of service for a number of years when workers were allocated a task by radio communication.

The cases also showed an absence of trust necessary for a positive safety culture. This was manifested by instances of a ‘blame the victim’ attitude to employees involved in workplace incidents. There were at least two instances where employers attempted to avoid legal responsibility for injury to employees and the subsequent prosecutions. In one of these cases, the presiding judge allowed the attempt at avoidance to stand. This would not have sent a very positive message to employees of those organisations’ commitment to and acceptance of responsibility for their safety by the senior management. In fact the response from employees would probably be ‘do they really care about safety’? Chapman (2006) describes stages in the development of a safety culture as a maturation process: from legal compliance, to safety as a priority, and then finally to a ‘zero tolerance’ approach. From some cases, management did not even seem to commit to legal compliance. Denial of responsibility and ‘blame the victim’ approaches fits into the category.

Trust is a two-way process between management and employees. There can be a degree of trust by the management that employees will perform the tasks safely and efficiently. However, if there is a perception amongst employees that management do not trust the employees, or the reverse (that employees do not trust management), then the two-way process is not complete. Conversely, if management espouse the concepts of safety
management and adherence to safety policies and procedures but in effect do not give sufficient time or resources to carry out tasks with safety, this would negate any efforts to build a culture of trust between employees and management. Changing the organisational culture, and in this respect the safety culture of an organisation, requires development of trust and this is a difficult and long process. Attempts have been made to introduce behavioural modification programs in some sections of the organisations concerned. However, these could be perceived as a ‘top down’ initiative by senior management to reduce incidents. A holistic approach throughout the whole of the organisation, involving all employees in the design and implementation of the safety program, is more likely to gain total commitment.

Another aspect of safety culture considered in the literature review was the role of law, social expectations (such as corporate social responsibility), and government. The chronological presentation of the approach of judges in particular cases revealed that the expectations of regulators and judges increased over the research period. The latter transcripts make explicit reference to the importance of OHS management systems and safety culture.

**Some limitations**

Practical and conceptual difficulties have been encountered in this study. The most significant issue is safety culture’s multifaceted nature and challenges of identification and measurement. Can safety culture be measured through reduced incident/accident rates, reduced absenteeism, or increased productivity? Is the safety culture positive or negative? A negative safety culture would negate the effectiveness of safety systems already in place. A positive safety culture would reinforce and complement the safety management systems through the exercise of ‘collective mindfulness’. In the electricity distribution industry, OHS management systems had been introduced into in the 1990s, as part of a series of measures to reduce the high accident rate which had existed at that time. One way to measure safety culture could be to review the incidences of the failure to follow safety policies and procedures which may result in injury of damage to equipment. Another could be through monitoring the success of consultation/safety committees in identifying safety solutions and also implementing remedial actions, or the number of controls implemented through the application of the risk assessment process. Safety systems should be devised by collective discussion and agreement on the safety management program to be implemented between
management and employees. This could be measured through the records of discussions and surveys that lead to the design and implementation of the safety management system and the active involvement of employees. As noted above, the original intention of this study has been to undertake three case studies that would use surveys, focus groups and interviews. Preliminary contact with industry participants was encouraging and an ethics application was made successfully. However, final approval from the organisations was not forthcoming. This difficulty was overcome in part through accessing information about day-to-day practices in these organisations around particular incidents that led to serious injury or fatalities. A strength of this approach is that the information was to a standard required for prosecutions and reviewed by a judge. A weakness of the approach is that values, attitudes and perceptions had to be deduced from practices and events evident in the transcripts, rather than direction accessed through surveys, focus groups and interviews. There was some confirmation of the interpretation via two interviews with industry participants and via the researcher’s own experience in the industry. However, it was not possible to investigate workers’ perceptions of managements’ attitudes to safety directly. Also, care had to be taken to avoid claiming that an organisation had a poor safety culture merely because of an injury or fatality involving a frontline worker. The application of the themes to the data helped avoid this because it focused the interpretations on features of safety culture identified in the literature.

Another difficulty that has practical and conceptual elements concerns the nature of the industry. The decentralised nature of the industry and the existence, in some cases, of subcultures which may impact at times on the attitudes and perceptions to safety to the staff in the various field centres is also an important factor. Safety sub-cultures should be assessed alongside organisational-level safety cultures and a case study may have allowed for some consideration of this. Additionally, there was significant restructuring of the industry during 1993 to 2006. The purpose of this thesis was to study organisational culture; the ‘organisations’ changed many times. It was mostly a process of consolidation of small utilities into larger utilities. This issue was considered in the literature review. There, some evidence was presented that changing organisations forms did not always disrupt the organisational culture, because senior management teams did not change. Perhaps a more significant factor was changes to regulation and raising community expectations around OHS. This raises the question of whether the study should be of the industry’s safety culture, or of the organisations’ safety culture. The cases considered in Chapter 4 and 5 suggest that
an organisational approach is appropriate. It seemed that Country Energy, even with the highest number of serious injuries and fatalities (9 from 15 cases), made greater steps towards developing a safety culture. This interpretation is based on evidence from transcripts that Country Energy had actively taken steps to develop a culture of safety.

**The way forward for safety culture**

This thesis has shown that focus upon safety rules, standards and procedures may have lead to a compliance-only outlook toward safety culture. A compliance approach means that frontline workers may not use their judgement and full knowledge of the processes involved to complete their tasks safely. Case 15 seems to fit a ‘compliance’ approach, where the failure to electrically test every potential source of electricity supply was a factor in the death of a front line worker. Part of this confidence in the processes would include the removal of any fear of retribution if safety issues have been raised, and also that the issues raised will be rectified quickly. The reliance upon legislation, guidelines and safety plans do not necessarily work if there is no culture of safety in an organisation. If there exists a culture of ‘non compliance’ by frontline workers and an acceptance of this by management, all the rules and guidelines could fail at crucial times with disastrous results. Reason (1997: 9) refers to these as ‘defences in depth’. They consist of both ‘hard and soft’ applications. In the electricity industry, the ‘hard’ defences include barriers, isolation and locking of switches. The ‘soft’ applications include the legislation, guidelines and rules. Chapter 4 showed multiple failures of hard and soft defences that led to serious injury and fatalities.

On a positive note it would appear from the transcripts and an interview with industry participant Smith (2008) that at least one of the three organisations researched, Country Energy, has been attempting to create a positive safety culture. However, from the evidence revealed in the transcripts little progress had been made in the other two organisations, Energy Australia and Integral Energy. Further development requires continued organisational cultural change for these organisations to progress through the levels of safety culture development identified by Chapman (2006): from ‘legal compliance’, to safety considered a priority, to a ‘zero tolerance’, fully vigilant stance.
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