RED DUST – THERE SHE BLOWS – AN ENVIRONMENTAL INCIDENT, CORPORATE DISCLOSURE AND LEGITIMACY THEORY

Introduction

This study explores, in the context of legitimacy theory, changes in the disclosure of social and environmental information within annual reports in the period 2004-2008. The focus is on an environmental incident that occurred in May 2006 which led to issues being raised by stakeholders and resulted in Alcoa being charged with criminal negligence by the Department of Environment and Conservation. The incident impacted on the environment and affected the health of residents living in the area to such an extent that it received media coverage both within the community and further abroad, and Erin Brockovich, US Health Campaigner became involved. Such publicity had the potential to generate a reaction from Alcoa (and possibly the industry) in the form of increased levels of disclosure to re-establish their legitimacy with stakeholders.

The Incident

The West Australian Department of Environment and Conservation (DEC) alleged that on the 14th of May 2006 poisonous dust was emitted from Alcoa's aluminium refinery located in Wagerup, Western Australia (Nine News Australia, 23 July 2007). Red dust was blown from Alcoa's waste stockpiles which contained radioactive thorium and heavy metals. Allegedly, Alcoa failed to fix the refinery's waste management system resulting in an accusation that the company was criminally negligent. The charge resulted from a health study that found residents living near the Wagerup refinery exhibited higher rates of symptoms associated with chemical exposure than people elsewhere in West Australia. Residents were found to have increased susceptibility to nosebleeds and cancer, effects unacceptable to the community. The charges were prompted by complaints made by thousands of the local residents over the emissions from Alcoa's alumina refinery in Wagerup, Australia. A community action group commented that most homes within three miles of the refinery have been sold to Alcoa (Napsha, 2007). Given the publicity this incident received, local reaction and the involvement of US health campaigner Erin Brockovich, it might be expected that Alcoa and firms involved in the mining industry could have faced a threat to their legitimacy, and have taken action to offset such a threat.

Motivation and Justification

This study set out to compare the incident with earlier studies of environmental incidents with a view to ascertain the relevance of legitimacy theory and social contract in assisting to explain behaviour noted. Hence it was examining whether the company in question (Alcoa), and the industry more generally, increased their level of environmental disclosures after a major environmental incident Given that such disclosures were increasing over that period, a significant jump in disclosures after the incident would be expected in order to suggest that the incident impacted on disclosure practices and could be explained by reference to legitimacy theory. It would also be expected that disclosures would fall off again after the initial reaction suggesting a pragmatic approach to legitimacy theory. Further, this study explored changing disclosure levels in the context of a number of categories of social and environmental disclosures developed later in this paper.

Contribution

This study was intended to fill a gap in the literature given that there are few Australian studies, and fewer more recent studies that have investigated the impact of environmental incidents on management's decision to change their level of disclosure as evidenced in annual reports. Types of disclosures were identified to explore not only change in total disclosure across the time period and between the pre and post incident periods, but also to consider change in the categories of disclosures undertaken by management. It therefore identified whether changes in social and environmental disclosure were more likely to be from particular categories of disclosure. This study also contributes to existing studies that seek to identify whether changing disclosure patterns can be argued to reflect legitimacy theory and social contract.

Legitimacy Theory and Social Contract

Disclosures may be utilised by corporations to demonstrate to society that they are fulfilling their obligations to stakeholders[1]. Legitimacy theory suggests that organisations continually seek to establish congruence between the social values associated with or implied by their organisational conduct and the norms and bounds established by the society of which they are part (Deegan & Bloomquist, 2006). The need to demonstrate that a firm is operating in a socially acceptable manner is at the base of legitimacy theory. It is expected firms involved in social and/environmental incidents likely to affect their perceived legitimacy will undertake disclosure strategies to explain and excuse any negative aspects of their corporate performance, or act to redirect attention in order to maintain society's acceptance of their activities.

Legitimacy is a status that is an outcome of society's collective perception about the organisation's operation. It is a social assessment or appraisal of corporate conduct that is considered acceptable, appropriate or/and desirable (Zimmerman & Zeitz 2002). Therefore it is expected that firms will undertake acceptable behaviour or at least to be perceived as such so that they are perceived to be "good" corporate citizens. Suchman (1995, p.574) emphasises that legitimacy is "a generalised perception or assumption that the actions of an entity are desirable proper or appropriate within some socially constructed systems of norms, values, beliefs and definitions". The basic tenet of legitimacy theory is that the perception of the firm by the community is based on how that organisation has acted in line or otherwise with socially determined expectations. Often this is the perception of management based on their views of the st[1]akeholder.

Major corporate incidents such as poisonous gas emissions, oil spills or chemical leaks can occur which often result in high environmental, social and/or financial consequence to both the organisation and the wider community[2]. From an organisation's perspective community response might include legal restrictions, increased difficulty accessing financial and human resources, and reduced demand. In such instances whereby society perceives that an organisation's cost is greater than its benefits to society a firm may risk sanctions forced upon it by society for it to continue to own and use resources, and ultimately its very existence may be threatened.

[1] For example, in 1995, Shell experienced negative publicity after it announced its decision to sink the Brent Sparr. Environmental groups such as Greenpeace activists undertook a campaign to stop ocean dumping. As a response Shell published an ethical report in 1998. Hoogheimstra (2000) suggested that this change in Shell's reporting policies revealed that social and environmental disclosures were aimed at providing information to legitimatise corporate activities (p.64).

[2] For example, the Prestige spilled 63,000 tons of fuel oil into Spain's Galician coast in 2002. The preliminary cost for cleanup and lost economic activity was estimated at $42 million (Time.com. 20 November 2002) with the death of 300,000 sea birds and destruction of 750 Spanish beaches (CNN.com, 6 November 2003).

Conversely, organisations that manage to communicate successfully that they are acting in accordance with the terms of what is socially acceptable (or explain why they are not) and contributing more benefits than harm to society, are likely to be considered legitimate.

Alcoa may be considered as a firm operating within an environmentally sensitive group because the company has received high levels of attention from Australian environmental lobby groups. In 1993 the Environmental Protection Authority of Western Australia stated that “Bauxite residue (red mud)...contains traces of some [highly poisonous arsenic, fluoride and aluminium] which if mobilised could pose environmental risk...” (Ryle, 2002). More than a decade later, the public pressure upon Alcoa for stronger environmental stewardship still existed. In 2005 Clare Wilson, a member of the environmental campaign group, Friends of Earth told BBC UK that the green credentials of aluminium mining by Alcoa are being overstated as the process of making aluminium is still very damaging to the environment (Ritson, 2005). In 2008 the conservation group, World Wildlife Fund (WWF) ranked Alcoa (together with Rio Tinto) as the world’s least prepared company in terms of reducing future carbon emissions (Macdonald-Smith, 2008).

Companies involved in the mining industry are also expected to face a threat to their legitimacy as a result of the Alcoa mining emissions as Alcoa and mining companies operate within an environmentally sensitive industry (see, for example, Deegan and Gordon 1996). Social perceptions can be the result of a number of factors such as the occurrence of an undesirable social or environmental event which negatively impacts on the legitimacy of the company or industry (Patten 1992), media influence (Brown & Deegan 1999) and changes in community expectations with the implication that what was once acceptable corporate behaviour no longer deemed acceptable (Deegan 2002).

Suchman (1995) asserts that during crisis situations organisations can lose their legitimacy if their operations no longer conform to society’s view of organisational behaviour, and therefore a firm must seek to ‘repair’ their legitimacy with stakeholders. ‘Crisis’ is interpreted by Pearson and Clair (1998, p.60) "... a low-probability, high-impact event that threatens the viability of the organisation and is characterised by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly". Therefore, firms impacted by a crisis will undertake actions to attempt to ensure that their status in society remains legitimate. One of these actions includes adjusting the environmental disclosures that are made in the company annual reports in order to project a positive image.

In his paper Suchman (1995) identified three forms of organisational legitimacy. The first was pragmatic legitimacy, an approach where the firm responds to its most immediate audience to seek their support. The second was moral legitimacy, where the issue is not the self interest of the stakeholder (pragmatic) but an assessment of what is ‘the right thing to do’ in a particular circumstance. The third form Suchman (1995) termed cognitive legitimacy. In this view legitimacy either takes the form of support for the firm’s activities, or possibly, mere acceptance that the firm’s actions are necessary or inevitable. These forms of legitimacy are interrelated and may co-exist in the real world. They may each result in the firm disclosing information to gain, maintain, or repair (as might be expected after a major environmental incident) legitimacy. In this study Alcoa would appear to need to repair legitimacy. At the pragmatic level stakeholders were adversely affected, at the moral level the firm should be seen to do ‘the right thing’, and finally at the cognitive level it would need to gain acceptance or support for its activities. As noted by Suchman (1988) in a later paper, legitimacy can be viewed as either a resource that is manipulated by management through strategies put together for fostering socially accepted legitimating perceptions, or by the pressures created by the firm’s institutional environment which compel the firm to conform and become isomorphic with its environment, thereby achieving legitimacy. Tilling and Tilt (2010) have argued that legitimacy is a resource flow. While in many ways it is an intangible resource, it must be at the least, established, maintained and at times defended. Defence becomes necessary when the established legitimacy has been threatened,, for example by a major incident affecting the firm and the industry.

At a macro level Suchman (1995) discussed ‘institutional legitimacy theory’ to consider how business as a whole gained acceptance by society at large. This compares to the micro level where Discussion of Social/Environmental Issues has taken the form of ‘organisational legitimacy’, that is, the approach taken by the firm to seek the approval of the community (see, Dowling & Pfeffer 1975, Kaplan & Ruland 1991, Driscoll & Crombie 2001). This study embraces both levels by looking for changed disclosure practices by the industry (macro level), and by the firm, Alcoa (micro level). Both levels involve seeking the approval of the community.

While the notion of legitimacy implies the ‘acceptability of a firm’s activities’ it is not really that helpful in assessing how it might work in practice. To this end it is linked to social contract, an approach able to identify how this ‘acceptability’ might be shown. The notion of social contract is introduced to operationalise legitimacy theory, to explain the social obligation of a firm. It contains the implicit and explicit expectations of society about how an organisation should conduct its operations. This notion allows us to identify the way corporations demonstrate legitimacy to society. Explicit terms are made up of legal requirements while other non-legislated societal expectations represent the implicit terms of the contract. Explicit terms (laws) reflect societal norms and values since issues raised by society are analysed through the public Statements of Policy arena and if deemed necessary, enacted into laws (Patten 1992). Since societal expectations are not static, but instead change across time, the terms under the social contract on which social approval is granted upon an organisation also change over time (Deegan 2006, p.281).

The notion of the “social contract” can be used to explain the relationship between organisations and its stakeholders. Similar to principal-agent relationship established in agency theory, the firm may be viewed as the agent who has an obligation to its principal, the stakeholder to operate within the bounds and values that are deemed acceptable by society. The social contract allows society (the principal) to “monitor” the activities of corporations to ensure that they are operating in an acceptable manner. The contract can be viewed as an agreement between corporations and the wider community who provide or merely allow corporations the right to use various resources and in exchange society expects the benefits to exceed the costs to stakeholders (Mathews 1993, p.26). This means that an organisation is allowed to continue its operations to the extent that it complies with the social contract.

If an organisation is involved in an event that causes some sort of environmental damage that is deemed unacceptable by society, it implies that the organisation has failed the first test of relevance as identified by Shocker and Sethi (1974). Such an outcome could impact on the economic, political and social benefits to the society from which it derives its right to operate. This incident could also impact on the legitimacy of corporations operating within the same industry due to the high social and ecological impact on the surrounding environment and community. Alcoa appears to be operating beyond the bounds of what society considers socially acceptable behaviour. This could result in a loss of legitimacy and society may ultimately revoke Alcoa's "contract" to continue its operations.

Using a legitimacy perspective it is argued that as a result of Alcoa’s mining incident, Alcoa and the Australian mining industry will be motivated to change the level of their social and environmental information disclosures as a response to a perceived legitimacy threat from Alcoa’s incident. Alcoa and all firms involved in the mining industry may have to take corrective strategies to restore society’s perception and confidence in their companies’ reputations which includes particular social and environmental disclosures in annual reports. One way to counter a perceived legitimacy threat, especially in the face of an environmental incident, has been to increase voluntary social and environmental disclosures (Deegan & Rankin 1996; Walden & Schwartz 1997; Deegan *et al*. 2000, 2002; Cho 2009). In the current study the impact at the macro and micro levels is considered by looking at the annual report disclosures of Alcoa and a sample of mining companies prior to, and after the environmental incident at Alcoa. The annual report was chosen as a statutory document and as a document in which a firm seeks to establish its 'own social imagery' (Gray et al. 1995 p.82). The report is addressed to a wide audience (stakeholders) and is a way for the firm to manage external impressions and indicate corporate social responsiveness (see, for example, Stanton & Stanton 2002, Neu et al 1998, Mangos & Lewis 1995). As this study seeks to identify change resulting from an environmental incident, the annual report would be a logical starting point to explore this impact within Australia.

Incidents and Disclosure

Firms involved in major incidents have been found to undertake disclosure strategies to explain and excuse negative aspects of their corporate performance in order to maintain society's acceptance of their activities. Patten (1992) evaluated the effect of the 1989 Exxon Valdez oil spill on the annual report environmental disclosures of 21 North American petroleum firms, excluding Exxon. He found an increase in environmental disclosures following the oil spill. Patten's (1992) results were extended by Walden and Schwartz (1997) who considered social and environmental disclosures of four industries, including oil companies. They found significant positive differences in the levels of environmental disclosure for the years 1988-1990 and concluded that the firms increased disclosures were a response to the incident.

Deegan and Rankin (1996) explored the changes in environmental disclosure policies of firms involved in environmental prosecutions. The authors found that prosecuted firms disclosed significantly more environmental information in the year of prosecution in comparison to other years in the sample period. The prosecuted firms also disclosed more environmental information compared to firms not prosecuted. However, disclosures contained minimal reference to the prosecution itself, which suggested firms had chosen not to report about incidents or increased disclosures intended to redirect the attention of stakeholders from their poor environmental performance.

Deegan *et al*. (2000) examined the impact of five major incidents[3] on disclosure reactions within and outside the country in which the incidents took place. Deegan *et al.* (2000) showed that companies in industries related to the selected incidents provided greater levels of total incident-related disclosures after the incidents in their annual reports, with the disclosures mostly positive in nature. In addition, the company (BHP Ltd) directly involved in two of the incidents (Moura Mine and Iron Baron) provided greater levels of disclosures in comparison to other companies within the same industry (Deegan *et al.* 2000, p.126).

Magness (2006) examined annual report disclosure of environmental information after a major incident in the Canadian mining industry in 1995. After the mining incident, environmental disclosures were found to increase and companies that faced higher levels of media exposure were found to make greater social responsibility disclosures in the year of the incident (p.558).

Environmental disclosures increased when environmental incidents and penalties were the focus of media attention (Neu *et al*. 1998; Deegan *et al.* 2000). The growing influence of global media ensures that any social and environmental breach is brought to the attention of the public, often

[3] Exxon Valdez, Kirki, Moura Mine, Union Carbide and Iron Baron.

instantaneously worldwide. For instance, the internet enhances communication among activist groups and like-minded individuals, empowering them to spread their message while giving them the means to coordinate collective action (Werther & Chandler 2005, p.20). Deegan *et al*. (2000) used media-agenda setting theory to consider the impact of environmental incidents on social and environmental disclosures and found that extensive media coverage has the ability to raise awareness about a particular event (p.109). This suggests if an environmental incident receives high levels of media exposure, stakeholders may impose greater pressure on industries involved in that particular incident. Therefore, one would expect a greater need for those industries to disclose information regarding social and environmental responsiveness.

In sum, legitimacy theory predicts that if a firm's legitimacy is threatened the firm will make self-serving disclosures to repair legitimacy (see Suchman 1995, pragmatic legitimacy), seek to convince stakeholders that they are 'doing the right thing' (see Suchman 1995, moral legitimacy), and gain acceptance from stakeholders for their activities (see Suchman 1995, cognitive legitimacy. It is argued that if a firm is involved in an incident, perceived adversely by the community, there is likely to be a potential threat to the firm's legitimacy and the community may seek to revoke the firm's social contract. The expected response of the firm would be to undertake actions to restore/repair legitimacy (Deegan *et al*. 2002). Further, Clarkson et al (2008) found that firms that were poorer environmental performers were inclined to make 'soft claims' regarding their commitment to the environment. These claims typically were difficult to verify. Claims were made in areas such as strategy and vision for their environment performance, statements of environmental Statements of Policy and commitment and CEO statements on environmental performance to stakeholders. They concluded: it 'implies a greater propensity for "legitimisation" behaviour for firms whose environmental legitimacy is threatened' (p.324). Significant here is that firms appear to be inclined to make particular types of disclosure when their legitimacy is threatened.

Hypotheses Development

To explore this expectation three hypotheses were posed. Assuming that a firm's legitimacy is threatened, one way to restore legitimacy is to increase social and environmental disclosures in the company's annual reports. The use of social and environmental disclosures in annual reports allows organisations to address the social and environmental concerns of stakeholders or redirect attention away from the negative impact of actions (Patten 1992; Deegan *et al*. 2002). Various literature[4] have utilised legitimacy theory to suggest that the use of social and environmental disclosures in annual reports is linked to the effort by organisations to demonstrate that they are operating in a socially acceptable manner. Firms are expected to act in a responsible way and act to avoid less than desirable impacts on the environment. For example, firms may provide social and environmental information in annual reports to offset negative news publicised by the media, draw attention to past corporate achievements (for instance, environmental awards won) or provide information about corporate attributes previously unknown by the public in order to downplay the negative environmental and social implications caused by the incident (Deegan & Rankin 1996; Wilmshurst & Frost 1999; Deegan *et al.* 2000; Guthrie 2007).

After Suchman (1995) it is hypothesised that Alcoa, as a response to a major incident, one which threatens the legitimacy of the organisation, will respond to legitimacy threats by increasing the level of social and environmental disclosures with the aim of ensuring society's acceptability of its mining operations.

[4] See for example, Wiseman 1982, Patten 1992, Deegan and Rankin 1996, Wilmshurst and Frost 1999, Deegan et al 2000, 2002, Cho 2009.

H1: Alcoa will increase the level of its social and environmental disclosures when the legitimacy of the organisation is perceived to be threatened.

It is also expected that other companies in the mining sector will increase the level of social and environmental disclosures to demonstrate that their activities continue to be acceptable (and that such an adverse incident is unlikely to happen to them). Studies have found that a threat of legitimacy to an industry may not be caused by a direct involvement to the incident, but rather to the overall impact of the incident on the perception of society towards the entire industry (Patten 1992; Deegan *et al*. 2000; Guthrie 2007). If a major environmental incident results in a legitimacy threat, legitimacy theory would suggest that companies operating within the mining industry would change their social and environmental disclosures. This change would be consistent with an attempt to respond to potential legitimacy threats that may be directed at other firms within the industry. Therefore it is hypothesised that:

H2: Companies in the Australian mining industry will increase the level of their social and environmental disclosures as a response to a perceived legitimacy threat within the industry.

Deegan *et al.* (2000) found that companies involved in an incident responded with higher levels of social and environmental disclosures than other companies. It is proposed that Alcoa would provide more information in its annual report to demonstrate that the company is concerned about the environment despite the incident caused by its mining activities. Other mining companies may not disclose as much information as Alcoa because avoidance tactics such as restricting access their company's practices may be the extent of the organisations' response to any potential legitimacy threats to avoid further public scrutiny (Oliver 1991; O'Dwyer 2002). Alcoa may be discredited to a greater extent than other mining companies because of greater public focus brought upon by media exposure. Companies that maintain a media presence through press releases have been found to make more disclosures in annual reports than companies that operate away from the media spotlight (Brown & Deegan 1999; Deegan *et al*. 2002; Magness 2006). Alcoa may also face the risk of product boycott by society as stakeholders may shift their labour, economical, political, or social support to other companies that adhere by society's expectations (Deegan *et al.* 2000). Therefore it is hypothesised that:

H3: Alcoa will provide more social and environmental disclosures in comparison to other Australian mining companies in their annual reports as a response to a perceived legitimacy threat.

Methodology

Content analysis is undertaken of company annual reports to ascertain the quantity of social and environmental disclosures undertaken in each year and to enable a comparison of before and after impacts on disclosure: two years prior to the incident, the incident year and two years subsequent to the incident. Content analysis has been widely used to examine social and environmental disclosure behaviour (Patten 1992; Gray *et al.*1995b; Deegan & Rankin 1996; Deegan & Gordon 1996; Hackston & Milne 1996; Milne & Adler 1999; Wilmshurst & Frost 1999; Deegan *et al.* 2000, 2002; Unerman 2000; Campbell *et al.* 2003).

Disclosure in annual reports imposes various costs related to collecting, measuring, verifying and publishing information (Cormier & Magnan 1999) therefore management may allocate space to information that is perceived as important in managing their legitimacy (Wilmshurst & Frost 1999; Campbell et al. 2003). It is assumed that the quantity of words represents the level of importance that management places on a certain issue being addressed and the level of responsiveness to legitimise their operations. The focus on the corporate annual report is consistent with previous social disclosure studies (Deegan & Rankin 1996, Brown & Deegan 1999; Deegan *et al*. 2000) since the annual report is the main form of corporate communication (Wiseman 1982; Tilt 1994; Deegan & Rankin 1997; Neu *et al.* 1998), particularly in the case of publicly listed companies. It is also widely accessible by the public in comparison to other corporate reports (Adams & Harte 1998; Wilmshurst & Frost 1999). Previous studies also indicate that various stakeholder groups consider annual reports as their main source of corporate social and environmental information (Tilt 1994; Deegan and Rankin 1996; Deegan *et al*. 2002; Danastas & Gadenne 2006). Annual reports are used as the primary data source for this study because annual reports are produced on a regular basis as part of a company's reporting cycle (Neimark 1992) and since management often possess high levels of editorial control over the content and extent of environmental disclosures in annual reports information (Wilmshurst & Frost 1999), consistency and credibility is ensured as non-annual report information such as media releases may be subjected to the risk of journalistic misrepresentation (Guthrie & Parker 1989; Tilt 1994). For the purpose of this investigation, only annual reports available on the internet (via company websites and Aspect Huntley) are assessed as this study recognises that companies are now supplementing paper-based reports with information published on the internet in order to meet growing demands of customised information and wide accessibility on request to all interested parties (SustainAbility Reporting Assessment Methodology June 2004b). The exploration undertaken in this study is now being extended to include a broader sample of companies, and other web site based reporting where archival information is provided. One of the problems in using the web as such is that the information is at that point in time, and unless a company maintains accessible archives as they do for annual reports and sustainability reports, it can present difficulties for before and after studies of this nature.

The amount of disclosure is determined by a word count of any sentences (inclusive of headings and captions) that were considered to be of a social or environmental nature. Passages in the annual reports were converted to Word (2007), and counted using the 'word count' tool to ensure a consistent measurement of the number of words was made. The selection of content from the annual reports was initially made by one researcher, and then a selection across a number of sample companies, including the total Alcoa sample, were checked by each of the other researchers. Minimal inconsistencies were noted, and were discussed. Word count is the smallest possible unit of analysis which allows for maximum robustness and minimum errors caused by inconsistencies in calculating quantity of disclosure (Zeghal and Ahmed, 1990). The words count method has received various criticisms such as the arbitrary nature of words (Hackston & Milne 1996) to the possibility of overestimating the volume of distinctive disclosures due to repetitiveness of words (Holder-Webb *et al.* 2009). Nevertheless, studies have shown that analysis using count of words produced results with no significance difference to results produced by methods entailing counts of sentences (Milne & Adler 1999); number of pages and disclosure in pages as a percentage of the total number of pages in the annual report (Deegan & Gordon 1996, p.189).

To facilitate the content analysis, a checklist was designed to systematically record the amount of social and environmental disclosures in eight category statements. The checklist is adapted from a taxonomy of various social and environmental disclosures developed by Hackston and Milne (1996). The original checklist has been adapted to suit the present study. The mining incident gave rise to concerns about the environment therefore the checklist places a particular emphasis on environmental disclosures which include organisational environmental policies and Statements of Compliance, pollution prevention and rectification initiatives. The adapted checklist utilises Deegan and Rankin's (1996, p.56) definition of environmental disclosures which refers to statements "pertaining to the organisations' interaction with the environment. . . the installation of environmentally friendly machinery; undertaking site rehabilitation; recycling activities; admission of pollution emissions; incurrence of fines relating to environmental misdemeanours, and the like". In this study the selection of categories of social and environmental disclosure will also enable comments as to whether Alcoa and the mining companies within the sample make use of particular types of disclosure. It is possible that disclosure will increase more significantly in certain categories than others as a response to the environmental incident, suggesting that companies may use disclosure in a strategic way in responding to stakeholders.

Table 1
Checklist of categories of social and environmental disclosures

Category of Disclosure	Disclosure Statement
Statements of Statements of Policy	Statement of corporate governance policies,organisational po
Statements of Compliance	Statement that the firm is compliant with environmental and/or mining laws and codes of conduct (inclusive of environmental audits)
Discussion of Social and Environmental Issues	Discussion of Social/Environmental Issues of environmental and social issues
Discussion of Resource Use	Discussion of Social/Environmental Issues about the effective use of resources in operations e.g. water and energy usage
Pollution Control Initiatives	Pollution Control Initiatives (capital investment, ongoi Environmental assessments, research and development expenditure for pollution abatement)
Statements about Environmental Impacts	Statements indicating that environmental impact have occurred from operations
Discussion of Prevention or Repair to the Environment	Discussion of Social/Environmental Issues relating to th Discussion of Prevention or Repair to the Environment to the environment resulting from mining activities such as deforestation, or mining waste management
Compliance with OHS Policies	Statements of Compliance with health and safety standards and regulations and internal employee OH&S policies

Sample

The sample[5] adopted included Alcoa and 130 companies randomly selected from the total 404 listed mining companies on the Australian Stock Exchange (ASX). Random selection was made after identifying those with headquarters and mining operations based in Australia. The sample was limited to companies which operate and are headquartered in Australia because the

[5] Appendix One – List of Companies in this study.

majority of the negative publicity from media coverage of Alcoa's mining incident is by Australian media which might be expected to influence the perceptions and attitude of the local community towards the Australian mining industry (Brown & Deegan 1999). The public nature and size of companies listed on the ASX is believed to be sufficient for them to attract public attention in relation to their activities (Deegan *et al.* 2000). Thus companies that that are exposed to public scrutiny may face potential threats to their legitimacy in the event of an environmental incident and may therefore be more likely to provide disclosures.

Analytical Framework

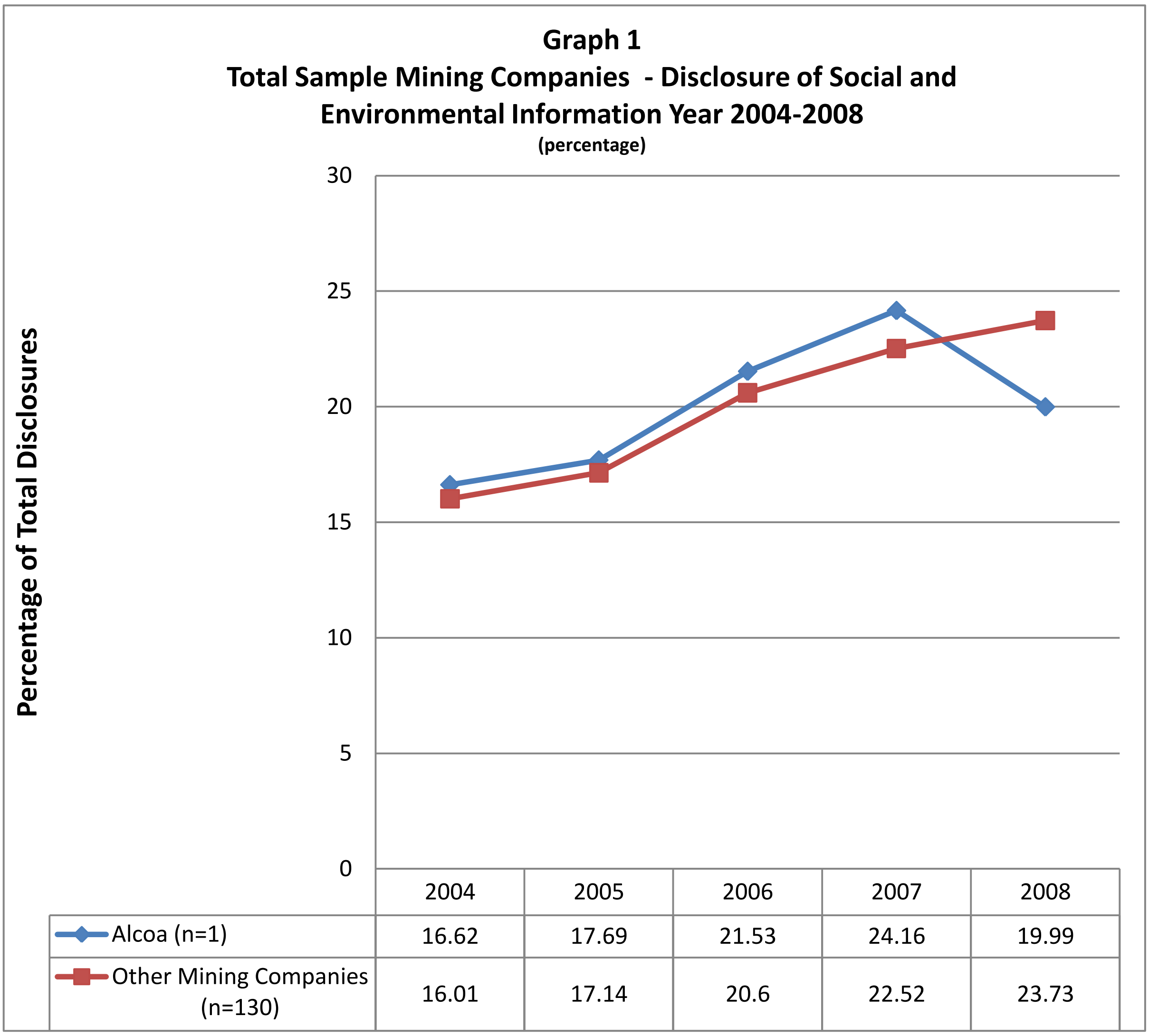
Numerical data from annual reports were entered onto a spreadsheet set up with checklist categories by year. Descriptive statistics depicted the basic features of data collected, for example, the average number of words disclosed for each category across time. Analysis was undertaken visually looking at the words of disclosure and then generating descriptive statistics using SPSS V18. The descriptive statistics such as the mean and standard deviation enabled a broad overview of the data. In testing for normality a number of aspects needed to be satisfied. The sample was numerical and interval based, the sample selection was random with the exception of Alcoa as the 'incident company', there was some variation in standard deviations, though as Burns (1998) notes 'within quite wide limits, they (the underlying t-test assumptions) can be broken without invalidating the results' (p.160), and the population from which the sample was drawn was normally distributed. The latter was established by the use of histograms with normal curves superimposed. It was found that the data approximated normality (Burns, p.155). As a result parametric t-testing was adopted to assess whether there had been significant increase in reporting disclosures across the time period as identified by the number of reported words both in total and by category of disclosure. A paired sample t-test was undertaken to identify whether there was a significant increase in disclosure after the incident by making a comparison between the before and after reporting periods for Alcoa (Alcoa reports at December 31) and the sample of companies. Since the interest is whether an increase in disclosure across time, and an increase in disclosure after the 'incident' at Alcoa and the random sample of companies occurred single tailed significance was adopted. In this way comment could be made on the nature of the change in reporting in total and by category of disclosure, and whether the incident impacting on Alcoa affected disclosure by Alcoa, and had impacts within the sampled mining companies. This approach is consistent with other social and environmental reporting research (Patten 1992; Deegan & Rankin 1997; Wilmshurst & Frost 1999; Deegan *et al.* 2000; Wilmshurst & Frost 2001).

Analysis

Profile Alcoa and the Mining Industry Sample

An analysis of social and environmental disclosures was undertaken for both Alcoa and a sample of 130 companies within the mining industry. Content analysis adopting words of disclosure related to eight of categories of disclosure was undertaken. Graph 1, adopting percentages, shows how the total words disclosed across the time period were distributed. The results indicate that for Alcoa the quantity of disclosure increased to 2007 and for the sample of mining companies the quantity of disclosure increased across the 2004 to 2008 period.

Graph 1 indicates that in each year words disclosed increased for the mining industry sample, and for Alcoa until 2008. In 2008 Alcoa's total disclosures fell by 4.17% from 2007. Graph 1 indicates that Alcoa increased disclosures by 4.91% from 2004-2006, with a spike in 2007 to 24.16%, an increase of 2.63% after the incident year. This compares to the industry sample of 4.59% increase from 2004 to 2006, with an increase of 1.92% after the incident to 22.52% in 2007. 2007 was the peak year for disclosures by Alcoa declining to 19.99% in 2008, a drop of 4.17% compared to the industry sample which continued to grow to 23.73%, with a growth in disclosures from 2007 of 1.21%. It does appear that the greatest percentage increase in disclosure occurred between 2005 and 2006, with Alcoa increasing disclosures by 3.84% and the mining sample by 3.46%.



In the sample of mining companies including Alcoa, total disclosures rose from 46,001 words in 2004 to 67,204 in 2008, across the time period a total of 286,464 words were reported (Table 2). Across time changing levels of disclosure can also be viewed in terms of the categories of disclosure. In terms of categories of disclosures across the 2004 to 2008 period total words reported ranged from 19,447 in discussions of resource use to 102,832 words relating to statements of compliance with regulations, statements of policy being the second most reported disclosure of 40,457 words.

In 2005 decreases in disclosure were noted in 5 of the 8 categories shown in Table 2. With the exception of the category - discussion of social and environmental issues - all categories indicated increasing levels of disclosure in 2006. In 2007 this category rebounded with an increase in disclosures of almost 40%. In 2007 the category – discussion of prevention or repair to the environment declined by some 7%. In general, this study supports the view that social and environmental disclosures have increased across time, and generally in each of the categories examined.

Table 2
Total Sample - Words Disclosed

(Total and by Category)

Category of Disclosure	2004	2005	2006	2007	2008	Total
Statements of Policy	5762	7438	8673	7950	10634	40457
Statements of Compliance	15581	19719	23001	22650	21881	102832
Discussion of Social/Environmental Issues	6263	4657	4584	6364	6471	28339
Discussion of Resource Use	1718	2378	2930	5661	6760	19447
Pollution Control Initiatives	4367	4085	4904	6156	5504	25016
Statements about Environmental Impacts	4571	4144	5290	5219	5802	25026
Discussion of Prevention or Repair to the Environment	3586	3530	5361	4950	5734	23161
Compliance with OHS Policies	4153	3250	4456	5909	4418	22186
Total Disclosures	46001	49201	59199	64859	67204	286464

Table 3 indicates that the increased level of disclosure across 2004 to 2008 was significant for all eight statements relating to disclosure.

Table 3
Total Sample - Total Social and Environmental Disclosure

(By Year)

Category of Disclosures	Descriptive Statistics (n=5)		t-tests (one tailed/test value=0)		
	Mean	Standard Deviation	t-value	significance	df
Statements of Policy	8091.4	1780.2	10.164	0.000	4
Statements of Compliance	20566.4	3064.7	15.006	0.000	4
Discussion of Social/Environmental Issues	5667.8	959.2	13.212	0.000	4

Discussion of Resource Use	3889.4	2196.5	3.959	0.008	4
Pollution Control Initiatives	5003.2	842.2	13.283	0.000	4
Statements about Environmental Impacts	5005.2	650.4	17.209	0.000	4
Discussion of Prevention or Repair to the Environment	4632.2	1019.3	10.162	0.000	4
Compliance with OHS Policies	4437.2	956.2	10.377	0.000	4

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To assess whether there was a significant difference between the period prior to the incident at Alcoa and in the subsequent periods a paired samples t-test was undertaken. The results are shown in Table 4. The results indicated that the difference between disclosures in the period prior to the incident (2004 to 2005) were statistically significant from those after the incident (2007 to 2008), as was the analysis comparing the pre incident period (2004 to 2005) to the incident and post incident period (2006 to 2008).

Table 4
Total Sample
(Paired Samples t-Test)

Paired Sample Time Periods	Descriptive Statistics		Paired Samples t-Test (one tailed)		
	Mean	Standard Deviation	t-value	significance	df
2004/5 to 2007/8	-4607.6	2783.1	-4.683	.001	7
2005/6 to 2007/8	-2957.9	1798.9	-4.651	.001	7
2004/5 to 2006/7/8	-120007.5	8532.9	-3.980	.002	7

For the industry as a whole it would appear that social and environmental disclosures have increased in the period 2004 to 2008, and that there are significant differences in disclosure between the pre and post incident periods.

The analysis will now be broken down to look at Alcoa and the mining industry sample separately. Of interest is whether Alcoa responded to the incident by increasing disclosures, and whether the sample drawn from the industry also reacted to the incident.

Disclosures Alcoa 2004-8

In terms Alcoa’s social and environmental disclosures there was a continuous increase in disclosure to 2007 (Graph 1). A review of table 5 indicates that disclosure categories were of varying importance and, in a number of cases changed overtime. Statements relating to policy and compliance were consistent across time, and largely repeated. Interestingly in 2008 Alcoa dropped reference to policy. Reporting on social and environmental issues, resource use and statements relating to environmental impacts have increased across time, in particular relating to the latter. In terms of reporting in regard to pollution control initiatives, and the prevention of repair of the environment reporting has varied. Of interest is the decline in all forms of social and environmental disclosure in 2008 with the exception of statements regarding environmental impact.

Table 5

Alcoa - Social and Environmental Disclosure by Category

(Total words by year)

Type of Disclosure	2004	2005	2006	2007	2008
Statements of Policy	24	24	24	24	0
Statements of Compliance	143	143	143	143	146
Discussion of Social/Environmental Issues	252	212	378	456	121
Discussion of Resource Use	55	127	228	285	0
Pollution Control Initiatives	275	457	261	412	105
Statements about Environmental Impacts	2560	2590	3430	3430	3824
Discussion of Prevention or Repair to the Environment	52	100	55	198	0
Compliance with OHS Policies	128	60	0	122	0
Total Disclosures	3489	3713	4519	5070	4196

Interestingly, disclosure for category Statements about Environmental Impacts was consistent for the incident year and subsequent year, and unlike other categories continued to increase disclosure levels in 2008. Between 2005 and 2006, the incident year, disclosures in this category increased slightly over 25%. Overall, between the incident year and the subsequent year total disclosures increased 11%, falling in 2008 almost 20%.

Table 6 provides the descriptive statistics for each category across 2004-2008 and the level of significance of change in disclosures under each category using a parametric t-test. Results indicate that change in the level of reporting for disclosure categories was significant from 2004 to 2008 in the categories: Discussion of Social/Environmental Issues, Pollution Control Initiatives and Statements about Environmental Impacts. In the other categories (Resource use, prevention or repair and OHS compliance) increases are noted across time but were not statistically significant.

Table 6

Alcoa - Social and Environmental Disclosure by Category

(Descriptive Statistics and t-tests)

Category of Disclosures[6]	Descriptive Statistics (n=5)		t-tests (one tailed/test value=0)		
	Mean	Standard Deviation	t-value	significance	df
Discussion of Social/Environmental Issues	283.8	133.4	4.757	0.004	4
Discussion of Resource Use	139.00	118.1	2.633	0.029	4
Pollution Control Initiatives	302.00	139.1	4.856	0.004	4
Statements about Environmental Impacts	3166.80	563.8	12.560	0.000	4
Discussion of Prevention or Repair to the Environment	81.00	74.4	2.435	0.036	4

[6] In the assessment of t-tests Statements of Policy and Statements of Compliance were disregarded since between 2004-7 disclosures remain constant. The cause of any variation was evidenced only by change in the year 2008.

Compliance with OHS Policies	62.00	62.5	2.217	0.045	4

To assess whether there was a significant difference between the pre and post incident time period a paired samples t-test (Table 7) was adopted. While it is clear that Alcoa has increased reporting, especially in a number of categories the difference between the pre and post incident period is significant only in the 2006 to 2007 period, that is, immediately after the incident. This tends to suggest any impact of the incident on increased levels of disclosure was short lived.

Table 7
Alcoa - Social and Environmental Disclosure
(Paired Samples Test)

Change in Disclosures for Alcoa	Descriptive Statistics (n=8)		Paired Samples Test (one tailed)		
	Mean	Standard Deviation	t-value	significance	df
2006 to 2007	-68.92	64.9	-3.000	.010	7
2004/5 to 2007/8	-.258.0	753.2	-.969	.182	7
2005/6 to 2007/8	-.129.2	453.7	-.806	.223	7
2004/5 to 2006/7/8	-.822.9	1912.2	-1.217	.131	7

The analysis is indicative of support for the first hypothesis:

> *Alcoa will increase the level of its social and environmental disclosures when the legitimacy of the organisation is perceived to be threatened.*

While the evidence is not conclusive results indicate that, at least in part, the level of disclosure by Alcoa increased at a greater rate than for the sample of mining companies. For example, in Graph 1 the percentage growth in Alcoa's disclosures across the 2005-7 time period was 6.47% as compared to the mining industry sample of 5.38%. In addition, Alcoa's disclosure increased at a faster rate than the industry in the time period immediately after the incident (2.63% in the 2006-7 time as compared to 1.92% for the mining company sample). One tailed t-tests confirmed (Table 6) that across time increased disclosures by category were statistically significant. Further a paired t-test (Table 7) of the disclosures by year, addressing before and after the incident yielded a significant result between 2006 to 2007 suggesting that Alcoa did respond to the environmental incident by increasing disclosure levels in particular categories.

Other Mining Companies 2004-8

Similar to Alcoa the quantity of social and environmental disclosure was calculated for the sample of other mining companies. Table 8 shows that for all categories of disclosure the quantity of disclosure increased between the period 2004 to 2008 other than in the category of Statements of Compliance in 2007, and for categories other than OH & S and Statements about Environmental Impacts in 2008. Interestingly disclosure in the category of Statements of Compliance rose to a new high in 2008.

Table 8
Sampled Mining Companies - Social and Environmental Disclosure by Category

(Total words by year)

Type of Disclosure	2004	2005	2006	2007	2008
Statements of Policy	5738	7414	8649	7926	10610
Statements of Compliance	15438	19576	22858	22507	21735
Discussion of Social/Environmental Issues	6011	4445	4206	5908	6350
Discussion of Resource Use	1663	2251	2702	5376	6760
Pollution Control Initiatives	4092	3628	4643	5744	5399
Statements about Environmental Impacts	2011	1554	1860	1789	1978
Discussion of Prevention or Repair to the Environment	3534	3430	5306	4752	5734
Compliance with OHS Policies	4025	3190	4456	5787	4418
Total Disclosures	42512	45488	54680	59789	62984

Table 8 provides descriptive statistics and t-tests for each category of disclosure by year. In all cases the increase in disclosure is found to be statistically significant across the time period.

Table 9
Sampled Mining Companies - Total Social and Environmental Disclosure
(By Year)

	Descriptive Statistics (n=650)		t-tests (one tailed/test value=0)		
Categories of Disclosures	Mean	Standard Deviation	t-value	sig	df
Statements of Policy	8066.6	1781.5	10.125	0.000	4
Statements of Compliance	20422.8	3064.4	14.903	0.000	4
Discussion of Social/Environmental Issues	5384.0	983.6	12.239	0.000	4
Discussion of Resource Use	3750.4	2202.5	3.807	0.008	4
Pollution Control Initiatives	4701.2	880.4	11.940	0.000	4

Statements about Environmental Impacts	1838.4	182.4	22.538	0.000	4
Discussion of Prevention or Repair to the Environment	4551.2	1036.9	9.814	0.000	4
Compliance with OHS Policies	4375.2	939.3	10.416	0.000	4

Finally, a paired sample t-test (Table 9) was undertaken to assess whether there was a significant difference between the pre and post incident years for 'other mining companies'. The test revealed that there were statistically significant differences between the pre and post incident time periods.

Table 10
Sampled Mining Companies
(Paired Samples Test)

Change in Disclosures for Other Companies	Descriptive Statistics (n=8)		Paired Samples Test (one tailed)		
	Mean	Standard Deviation	t-value	significance	df
2004/5 to 2007/8	-4346.6	3092.6	-3.975	.002	7
2005/6 to 2007/8	-2825.6	2003.6	-3.989	.002	7
2004/5 to 2006/7/8	-11180.6	9136.5	-3.462	.005	7

It would appear that Hypothesis 2 is supported:

> *Companies in the Australian mining industry will increase the level of their social and environmental disclosures as a response to a perceived legitimacy threat within the industry*

A continual rise in social and environmental disclosures across the time period is evident in Graph 1. Unlike Alcoa the increment is continuous without spiking after the incident year. This continual growth occurred across the various categories of disclosure as shown in Table 8. T-tests confirmed that the gradual growth in disclosure was statistically significant for all categories (Table 9). To assess whether there may have been a response to the environmental incident at Alcoa a paired sample t-test was undertaken to assess whether there were significant differences pre and post the incident year. The results shown in Table 10 indicate that there were significant differences between the 2004/5 period and the incident year 2006, and the subsequent years 2007/8. While this is not conclusive that a legitimacy threat was the trigger it is indicative that the significance of disclosures were different pre and post the incident year, and the incident at Alcoa may have played a role.

Comparing Alcoa to the Sample Mining Companies

This section provides a comparative analysis of disclosures provided by Alcoa and the mining industry across the 2004-2008 time periods with particular focus on the time period before and after the Alcoa mining incident. In relation to the category statements indicative of social and environmental disclosures Alcoa and the 'other mining companies' generally increased their level of social and environmental disclosures during the period 2004 to 2008 (Table 11 and 12). These increases and their significance across the time period were shown in Tables 2, 3 5 and 6 above. Attention in this section turns to the percentage change across the time period in each of the category statements for Alcoa and the 'other mining companies'. These results are reported as percentage change in Table 11 and 12.

In terms of Table 11, focused on Alcoa, change has been mixed throughout the period. Alcoa reports at December 31, the incident occurred 14 May 2006. As a result it is possible that within the 2006 report Alcoa may have modified disclosures to reflect the environmental incident. Change in the 2005-6 time period disclosures in the category Discussion of Social/Environmental Issues increased 78%, and in Discussion of Resource Use 80%, while in the period 2006-7 these categories increased a further 21% and 25% respectively. In the 2006-7 period there was a 260% increase in the category Discussion of Prevention or Repair to the Environment, reflecting on Discussion of Social/Environmental Issues relating to the Discussion of Prevention or Repair to the Environment of the environment resulting from mining operations; in the category OH & S relating to Statements of Compliance with health and safety standards and regulations, an increase in disclosure of 122% occurred, and a 58% increase in the category Pollution Control Initiatives disclosures. Interestingly in the 2007-8 period, many disclosures in each category fell as much as 100% reflecting that no disclosure was made for example in Statements of Policy, Discussion of Resource Use, Discussion of Prevention or Repair to the Environment and Compliance with OHS Policies. Alcoa appeared to react to the incident and increased the level of disclosure but in the 2008 period reduced reporting significantly, for example, discussion of prevention or repair ceased entirely.

Table 11

Alcoa Percentage change in Category Disclosures

(Year Group)

Category of Disclosure	Year			
	2004-5	2005-6	2006-7	2007-8
Statements of Policy	0	0	0	(100)
Statements of Compliance	0	0	0	2
Discussion of Social/Environmental Issues	(19)	44	17	(277)
Discussion of Resource Use	57	44	20	(100)
Pollution Control Initiatives	40	(75)	37	(292)
Statements about Environmental Impacts	1	25	0	10
Discussion of Prevention or Repair to the Environment	48	(82)	72	(100)
Compliance with OHS Policies	(113)	(100)	100	(100)

'0' reflects no change from the previous year

The results for 'other mining companies' is reported in Table 12. In the 2005-6 period disclosures increased 35% for prevention or repair, and 22% for pollution control initiatives. Interestingly, in the 2006-7 period a 50% increase in disclosures regarding resource use is noted. Discussion of social and environmental issues increased 29% on the back of a 6% fall in the previous year. At this time, 2005-6, 2006-7 sizable increases in OHS compliance reporting took place (28% and 23% respectively).

In comparison to Alcoa while discussion of social and environmental issues increased 78% (2005-6), and discussion of resource use had increased 140% (2004-5) and 80% (2005-6) the sample of mining industries did not replicate the significant increases in disclosure. For example, the sample of mining companies increased the reporting of social and environmental issues in 2006-7 by 29%, in 2005-6 discussion actually dropped discussion by 6% as compared to the 78% increase in disclosure by Alcoa (2005-6), and the more modest increase in 2006-7 of 21% compared to the sample of the mining companies 29%. It may be that there are lags in the response of the mining industry as compared to the individual firm.

Table 12

Sampled Mining Companies Percentage Change in Category Disclosures

(Year Group)

Category of Disclosure	Year			
	2004-5	2005-6	2006-7	2007-8
Statements of Policy	23	14	(9)	25
Statements of Compliance	21	0.14	(2)	(4)
Discussion of Social/Environmental Issues	(35)	(6)	29	7
Discussion of Resource Use	26	17	50	20
Pollution Control Initiatives	(13)	22	19	(6)
Statements about Environmental Impacts	(29)	16	(4)	10
Discussion of Prevention or Repair to the Environment	(3)	35	(12)	17
Compliance with OHS Policies	(26)	28	23	(31)

'0' reflects no change from the previous year

The final hypothesis posed:

> *Alcoa will provide more social and environmental disclosures in comparison to other Australian mining companies in their annual reports as a response to a perceived legitimacy threat.*

As noted in the section above 'other mining companies' showed a fairly consistent growth in disclosure across the time period with a decline in a number of categories in 2008. On the other hand, in the categories of Statements of Policy and Statements of Compliance, Alcoa's reporting was fairly consistent across time, with strong growth in Discussion of Social/Environmental Issues, Discussion of Resource Use, Pollution Control Initiatives, Environmental Impact and Discussion of Prevention or Repair to the Environment across the 2006-7. This growth and then decline in disclosure is noted in Graph1. This hypothesis would be supported in terms of the spike noted. However, significant growth in disclosure was noted across the industry over the time period.

Conclusions

This paper investigated change in disclosure across eight categories of social and environmental reporting between 2004 and 2008. The focus of the paper was to explore the impact on disclosure in total, and in each category of disclosure, of the impact of an environmental incident, specifically a mining incident at Alcoa’s alumina plant at Wagerup, WA. In line with a number of other studies (Patten 1992; Deegan & Rankin 1996; Walden & Schwartz 1997; Deegan *et al*. 2000, 2002; Cho 2009) the interest was to identify whether the level of disclosure changed subsequent to the mining incident for Alcoa, and the mining industry. In addition this paper explored whether the change in disclosure occurred across specific categories of disclosure, for example, evidenced by increased Discussion of Social/Environmental Issues of environmental issues, Discussion of Social/Environmental Issues relating to Pollution Control Initiatives and/or actions taken to prevent future damage, or repair existing damage to the environment from mining activities.

It was anticipated that for both Alcoa and the sample of 130 companies drawn from the mining industry there would be an increase in disclosures in response to a perceived threat to legitimacy resulting from the incident and expressions of concern from stakeholders. That is, as a result of the environmental incident disclosures made to address concerns raised about the acceptability of both Alcoa and the mining industry’s activities. It was anticipated that Alcoa would react to repair legitimacy. While the mining industry would react to maintain legitimacy, perhaps even, to seek to a competitive advantage by distinguishing themselves from Alcoa.

The evidence indicated that the mining incident was not deemed to be acceptable to the community, if for no other reason, than the health issues that arose. Charges laid by the Department of Environment and Conservation, prompted by complaints from stakeholders, the local residents. Wider interest was activated and evidenced, for example, by the presence and interest of Erin Brokovich. It would appear that Alcoa had breached their ‘social contract’ by allowing an unacceptable mining incident to occur, and to impact on the surrounding community to the detriment of that community.

Data was collected adopting content analysis and counting words of disclosure in total and by category of disclosure. Results indicate that social and environmental disclosures overall had increased throughout the 2004-2008 period for the mining industry, though had fallen for Alcoa in 2008. While Tables 2, 6 and 9 above provide the in-depth detail of disclosure patterns, Table 13 provides a summary.

Table 13
Yearly Disclosures for Alcoa and Sampled Mining Companies’, and Percentage Change between Years

Year of Disclosure	2004	2005	2006	2007	2008
Alcoa	3489	3713	4519	5070	4196
		6%	22%	12%	(17)%
Other Mining Companies	42512	45488	54680	59789	62984
		6.5%	17%	8.5%	5%
Total Disclosures	46001	49201	59199	64859	67204

	7%	17%	9%	3.5%

Looking at the growth in disclosure between years, Alcoa's disclosures increased 22% to the December 31st reporting date in 2006, and a further 12% to December 31st 2007. Given that reporting to December 31st 2005 increased by only 6%, and to December 31st 2008 declined 17% together with the evidence discussed in regard to disclosure categories and significance testing it would seem reasonable to accept that hypothesis one was supported. That is, Alcoa did increase disclosure in response to the mining incident further evidenced by disclosures reducing in total at December 31st 2008 by 17%. A paired sample t-test revealed a significant result for the period ended December 31st 2007 (t=-3.000, sig. .010). Categories of disclosure (Table 11) also provided evidence to support this belief, for example, with a 72% increase (2006-2007) in reporting on Discussion of Prevention or Repair to the Environment, declining to zero in 2008, Pollution Control Initiatives increased 37% (2006-2007), then declined 292% to 2008 once the perceived legitimacy threat had passed.

The evidence would offer support for hypothesis two. The actual number of words increased for the mining sample, the percentage growth slowed from 17% from January 1 2005 to December 31 2006 to 8.5% and 5% respectively for the twelve months ended December 31 2007 and 2008. In the year of the Alcoa incident there was a significant expansion in disclosure. In each category of disclosure the increase across the 2004 to 2008 was significant in all categories (Table 9). Paired sample testing was also supportive of this hypothesis. Between the pre and post incident years significant results were found (Table 10).

In terms of hypothesis three, it was proposed that Alcoa was likely to provide greater levels of social and environmental disclosure in response to a perceived legitimacy threat than the other mining companies sampled. While the mining industry increased disclosure in total, and by category the increase was gradual (in terms of words reported), and as shown in Table 14 growth in reporting increased by 17% between 2005 and 2006 and then declined with growth in disclosure increases slowing. Equally there was no spike in disclosure subsequent to the mining incident as was the case for Alcoa to December 2007. In terms of Alcoa, Graph 1 indicated a spike in disclosure after the mining incident and the paired sample t-test indicated a significant increase in disclosure in the 2006 to 2007 time period. In terms of Alcoa (see Table 13) percentage increase across the 2005 to 2007 time period was 34% compared to the mining industry sample of 25.5%. Hypothesis three is supported: Alcoa did provide more social and environmental disclosure in comparison to other Australian mining companies in their annual reports quite possibly as a result of a perceived legitimacy threat.

This result also provides additional support to the general consensus among researchers that all kinds of social and environmental reporting is increasing and will continue to increase over time (Gray *et al* 1995; Wilmshurst & Frost 2000; Deegan *et al* 2002).

Support for Legitimacy Theory

The results of the analysis are consistent with legitimacy theory which implies that in situations where a firm perceives that the acceptability of its operations are brought into question, and this has been seen to have a detrimental effect on the perceptions by stakeholders of the firm, that action will be taken to restore that legitimacy. One such corrective legitimising strategy is to increase the level of voluntary corporate disclosure to show and communicate that the firm is acting to address the concern. As noted when discussing support for hypothesis one, actual words of disclosure indicated that there was a spike in disclosure within the annual report after the mining incident, as supported by t-tests which indicated that within a number of categories of disclosure significant positive change had taken place. In the categories of Discussion of Social/Environmental Issues about social and environmental issues, the effective use of resources, Pollution Control Initiatives, statements indicating that activities had resulted in Statements about Environmental Impacts, and Discussion of Social/Environmental Issues relating to the prevention and repair to the environment resulting from mining activities, significant results were found. A paired sample t-test also yielded a significant result for the period 2006 to 2007, the post incident time period. It could be argued that this is not only supportive of reaction to a perception that legitimacy has been threatened, but also a pragmatic (Suchman, 1995) approach to the threat by addressing stakeholder concerns in the annual report in the immediate reporting period subsequent to the incident. In particular, there would be a need to give increased attention to Discussion of Social/Environmental Issues relating to Discussion of Prevention or Repair to the Environment of damage caused.

This result also provides additional support to prior studies which has found that published corporate disclosures play a role in seeking to change the perception of stakeholders particularly when the firm has been involved in an event that is likely to negatively affect the legitimacy of its operations (Wiseman 1982; Patten 1992; Deegan & Rankin 1996; Deegan *et al*. 2000, 2002; Cho 2009). Alcoa's decline in disclosure in 2008 may also indicate that a company's disclosure strategy is purposive, calculated and often oppositional with management assuming a high level of control over the legitimation process (Suchman 1995, p.576). Since management often possess high levels of editorial control over the content and extent of environmental disclosures, the decision to make disclosures is often strategic in nature. The other mining companies sampled would appear to be acting to maintain their legitimacy overtime by increasing disclosures given the expectation that social and environmental reporting takes place.

Environmental disclosures may allow organisations to address the social and environmental concerns of stakeholders that have the ability to influence the legitimate position of the company. These disclosures may also draw attention to past corporate achievement or provide information about corporate attributes previously unknown by the public. For example, Alcoa provided more information that discussed the impact of mining operations and long term Pollution Control Initiatives undertaken to offset reports to negative news publicised by the media. The willingness of Alcoa to provide more information about the negative impact of its operations after the mining incident provides an alternative observation to Deegan and Rankin's (1996) study which demonstrated firms that faced legitimacy threats, such as prosecution by the EPA, provided little disclosure either for the prosecution itself or concerning any environmental information with a negative impact.

This study gives an indication of the areas of disclosure that may increase as a result of an environmental incident. In the case of Alcoa increased disclosure was noted in the area of prevention, Discussion of Resource Use, Compliance with OHS Policies, Discussion of Social/Environmental Issues, Pollution Control Initiatives and Statements about Environmental Impacts. The majority of these increases were statistically significant between 2006 and 2007. Disclosure by Alcoa increased in the time period after the incident. On the other hand, for the industry, while disclosure increased across the time period it did not appear to be related to the incident at Alcoa. In comparison to the industry Alcoa disclosed more information in response to the mining incident. It would appear likely that increased disclosure was a response to a perceived legitimacy threat and was evidenced by increased disclosure, with increased disclosure in specific categories such as Discussion of Social/Environmental Issues of social and environmental issues, initiatives in regard to Pollution Control Initiatives, environmental impact of activities and actions to prevent or repair Statements about Environmental Impacts.

Limitations and Further Research

A number of limitations need to be borne in mind. The focus was on annual report disclosures although other mediums of disclosure do exist, hence future research could explore the implications of sustainability reports and web based disclosures. While this study is indicative of the impact of an incident's effect on disclosures, and the role that legitimacy theory may play, it is not conclusive.

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Appendix One
Australian Mining Companies Included in this Study

ASX CODE	COMPANY NAME	MARKET CAPITALIZATION ($A MIL)
BHP	BHP Billiton Limited	125,517
RIO	Rio Tinto	39,444
NCM	Newcrest Mining Limited	16,485
FMG	Fortescue Metals Group Ltd	11,814
LGL	Lihir Gold Limited	7,840
BSL	BlueScope Steel Limited	5,379
AWC	Alumina Limited	3,904
SGM	Sims Metal Management Limited	3,846
OZL	Oz Minerals Limited	3,668
CNT	Centamin Egypt Limited	2,457
MCC	Macarthur Coal Limited	2,241
ILU	Iluka Resources Limited	1,424
MGX	Mount Gibson Iron Limited	1,387
MRE	Minara Resources Limited	981
CZA	Coal Of Africa Limited	927
AGG	AngloGold Ashanti Limited	767
LYC	Lynas Corporation Limited	708
KZL	Kagara Limited	689
GBG	Gindalbie Metals Ltd	605
WEC	White Energy Company Limited	510
SBM	St Barbara Limited	508
PRU	Perseus Mining Limited	470
CGX	CGA Mining Limited	466
PAN	Panoramic Resources Limited	459
SMM	Summit Resources Limited	442
ASL	Ausdrill Limited	297
BRM	Brockman Resources Limited	266
CFE	Cape Lambert Iron Ore Limited	263
HIG	Highlands Pacific Limited	243
JML	Jabiru Metals Limited	238
FMS	Flinders Mines Limited	222
ARU	Arafura Resources	214
AGS	Alliance Resources Limited	208
HER	Herald Resources Limited	203
CQT	Conquest Mining Limited	184
CAH	Catalpa Resources Limited	176
IMD	Imdex Limited	174
FML	Focus Minerals Limited	171

IOH	Iron Ore Holdings Limited	146
IGR	Integra Mining Ltd	144
HGO	Hillgrove Resources Ltd	143
IAU	Intrepid Mines Limited	135
CTO	Citigold Corporation Limited	135
SAR	Saracen Mineral Holdings Limited	128
RRL	Regis Resources Limited	128
BDG	Bendigo Mining Limited	117
FRS	FerrAus Limited	116
TZN	Terramin Australia Limited	111
SRK	Strike Resources Limited	107
CBH	CBH Resources Limited	106
GRY	Gryphon Minerals Limited	91
THX	Thundelarra Exploration Limited	89
HEG	Hill End Gold Limited	88
RED	Red 5 Limited	86
EXS	Exco Resources Limited	85
WGR	Westgold Resources Limited	83
BGD	Boulder Steel Limited	77
HRR	Heron Resources Limited	71
PEN	Peninsula Minerals Limited	64
AXO	Aurox Resources Limited	56
PSH	Penrice Soda Holdings Limited	54
RWD	Reward Minerals Ltd	54
IXR	IMX Resources Limited	52
EXM	Excalibur Mining Corporation Limited	47
POS	Poseidon Nickel Limited	44
LEG	Legend Mining Limited	42
WCP	WCP Resources Limited	39
JRL	Jindalee Resources Limited	37
LOD	**Lod**estone Energy Limited	36
SRI	Sipa Resources Limited	36
PMH	PacMag Metals Limited	36
ARM	Aurora Minerals Limited	35
GIP	Gippsland Limited	32
CUL	Cullen Resources Limited	31
ADX	AuDAX Resources Limited	30
DRX	Diatreme Resources Limited	30
AJM	Altura Mining Limited	29
FCN	Falcon Minerals Limited	29
PSP	Prosperity Resources Limited	28
HRS	Hudson Resources Limited	26
TAS	Tasman Resources Limited	26
ADN	Adelaide Resources Limited	24
GOA	Gold Aura Limited	24

GCR	Golden Cross Resources Limited	23
AGD	Austral Gold Limited	23
CAZ	Cazaly Resources Limited	22
GME	GME Resources Limited	22
TNG	TNG Limited	21
HNR	Hannans Reward Limited	21
QUR	Quantum Resources Limited	20
MOY	Millennium Minerals Limited	20
URL	Universal Resources Limited	17
BRW	Breakaway Resources Limited	16
GUN	Gunson Resources Limited	16
PIO	PIONEER RESOURCES LIMITED	16
GDN	Golden State Resources Limited	16
BTV	Batavia Mining Limited	15
JRV	Jervois Mining Limited	15
TRO	Tri Origin Minerals Ltd	14
HLX	Helix Resources Limited	14
RCP	Redbank Copper Limited	14
HAW	Hawthorn Resources Limited	14
STB	South Boulder Mines Limited	13
MSC	Minerals Corporation Limited	13
INL	Intec Ltd	12
AUZ	Australian Mines Limited	12
DEG	De Grey Mining Limited	11
SML	Synergy Metals Ltd	10
AAO	Australasia Gold Limited	10
GML	Gateway Mining Limited	10
MGK	MIL Resources Limited	10
RMI	Resource Mining Corporation Limited	10
VWM	Victory West Moly Limited	10
CGT	Castlemaine Goldfields Limited	9
SRE	Stirling Resources Limited	9
GLN	Gleneagle Gold Limited	9
MDS	Midas Resources Limited	8
NST	Northern Star Resources Ltd	7
MPJ	Mining Projects Group Limited	7
PDM	Paradigm Metals Limited	7
FNT	Frontier Resources Limited	6
TKL	Traka Resources Limited	6
LMG	Latrobe Magnesium Limited	6
MZI	Matilda Zircon Limited	6
RXL	Rox Resources Limited	5
ORO	Oroya Mining Limited	4
PEL	Pelican Resources Limited	3
NIO	Nickelore Limited	3

AXC	AXG Mining Limited	2
RLC	Reedy Lagoon Corporation Limited	2