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Disclosure of environmental issues in the annual reports of Australian multi-national corporations operating in Papua New Guinea: a legitimacy theory approach

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DISCLOSURE OF ENVIRONMENTAL ISSUES IN THE
ANNUAL REPORTS OF AUSTRALIAN MULTI-NATIONAL
CORPORATIONS OPERATING IN PAPUA NEW GUINEA: A
LEGITIMACY THEORY APPROACH.

A thesis submitted in fulfilment of the requirements
for the award of the degree of

MASTER OF COMMERCE (HONOURS)

from

UNIVERSITY OF WOLLONGONG

by

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DEPARTMENT OF ACCOUNTING & FINANCE

1998

I, SILAS KAVALE UMAROPi, certify that this thesis has not been submitted previously as part of the requirements of another degree and that it is the product of my own work.

Signed: _____
Silas K. Umaropi

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Abstract

Since the Ok Tedi lawsuit in 1994 highlighted the environmental degradation issue, Multinational Corporations (MNCs) operating in Papua New Guinea (PNG) have come under scrutiny for causing environmental degradation. This scrutiny created animosity between resource owners and the developers (MNCs), to such an extent that the bitterness created anxiety about their future among the MNCs. Various attempts have been made in PNG to minimise the adverse impacts caused by the MNC operations, however, environmental degradation continues to be adverse. The PNG government will not arbitrate in this issue because of its conflict of interests.

The problem of environmental degradation caused by MNCs needs to be exposed to minimise the adverse impacts. Environmental disclosure to external interested parties is a possible source of exposure which has not been explored. This is because environmental accounting is a 'green' area which many countries are just beginning to incorporate and enforce in their legislation. In addition, there is no law to enforce environmental reporting. It is currently provided voluntarily (Deegan, 1996). This study investigates the possibility of engaging environmental disclosure to address the environmental issue in PNG.

The focus in this study is on Australian MNCs because their annual reports are accessible and Australian MNCs dominate PNG economy. The study seeks to establish whether Australian MNC in environmentally sensitive industries, currently provide adequate environmental reports within their financial statements. The disclosure requirement is based on the Legitimacy theory because the MNCs operate under a social contract with societies

and are therefore obliged to legitimise both their presence and their activities. To achieve this goal, MNCs need to provide environmental reports within their financial statements. MNCs currently lodge environmental impact plans with every proposal. Despite this lodgement, environmental degradation persists, therefore they ought to report on the implementation of their environmental impact plans within their financial statements (Gray, 1990).

This study is patterned after Patten (1992) who studied oil companies following the Valdez oil spill. Patten noted a sizeable increase in environmental reporting following the incident. Similarly, a content analysis of the annual reports of Australian MNCs found that environmental disclosure is higher among MNCs who operate in PNG than those which only operate in Australia. Increases are noticeable after 1994 which indicates that the Ok Tedi lawsuit influenced disclosure. It appears that MNCs will only increase their environmental disclosure when coming under scrutiny.

It would be interesting and informative to analyse all MNCs in PNG because Australian MNCs are not the only ones operating in the sensitive industries in PNG. Future studies may undertake such an analysis. In order to maintain a constant surveillance on environmental degradation, MNCs ought to continually provide environmental information with their annual financial statements. When MNCs fully disclose their environmental degradation, it is expected that ethical investors will be powerful enough to exert pressure on MNCs to be more sustainable in their operations and minimise environmental degradation.

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List of Abbreviations

ACF	Australian Conservation Foundation
ACIA	Australian Chemical Industry Council
AAS	Australian Accounting Standards
AASB	Australian Accounting Standards Board
AEPA	Australian Environment Protection Authority
AICA	Australian Institute of Chartered Accountants
AIDAB	Australian International Development and Assistance Bureau
ANI	Australian National Industries
ANZOG	Australia, New Zealand Oil & Gas
AusAid	Australian Aid
BAC	Business Advisory Committee
BEA	Bureau of Economic Analysis
BHP	Broken Hill Proprietary Limited
BPNG	Bank of Papua New Guinea
CED	Commonwealth Economic Development
CERES	Coalition for Environmentally Friendly Economics
CICA	Canadian Institute of Chartered Accountants
CRA	Conzinc Riotinto Australia Limited
CSC	Canadian Security Commission
CSD	Corporate Social Disclosure
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEC	Department of Environment and Conservation
EATF	Environmental Accounting Task Force
EIA	Environment Impact Assessment
EIRIS	Energy Information Resources Inventory Statistics
EMAS	Environment Management and Audit Scheme
EMS	Environment Management System
EP	Environment impact Plan
EPA	Environment Protection Authority
EQD	Extended Quantity Discussion

ESD	Economic Sustainable Development
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Products
GPFR	General Purpose Financial System
HDI	Human Development Index
IACB	International Accounting Control Board
ICAEM	International Committee on Economic and Applied Microbiology
ICAE	International Conference of Agriculture and Economics
ICAEW	Institute of Chartered Accountants in England and Wales
ICC	International Chamber of Commerce
ICME	International Council of Metal and Environment
IFAC	International Federation of Accounting Commission
IPA	Investment Promotion Authority
ISAR	International Standards of Accounting and Reporting
ISO	International Standards Organisation
MEF	Melanesian Environment Foundation
MIM	Mount Isa Mines Limited
MNCs	Multinational Corporations
NEC	National Executive Council
NSDS	National Sustainable Development Strategies
OCED	Organisation for Economic Co-operation and Development
OTML	Ok Tedi Mining Limited
PJV	Pogera Joint Venture
PNG	Papua New Guinea
RGC	Rensions Goldfields Consolidated Limited
RTZ	Rio Tinto Zinc Corporations
SARA	Super Amendments and Reauthorisation Act
SEC	Security Economic Commission
SQD	Short Quantity Disclosure
SWOT	Strength, Weaknesses, Opportunities and Threats
TNC	Transnational Corporations
UIG	Urgent Issues Group
UKASB	United Kingdom Accounting Standards Board

UNCED	United Nations Conference on Economic Development
UNCTAD	United Nations Conference of Trade and Development
UNCTCD	United Nations Department of Technical Co-operations and Development
UNCTC	Centre for Transnational Corporations
UNCEP	United Nations Conference of Environment and Development
UNFCCC	United Nations Framework Convention on Climatic Changes
USEPA	United States Environment Protection Authority

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Chapter One

Introduction

1.0 Introduction

Papua New Guinea (PNG) has enjoyed unprecedented levels of economic benefits from Multi-National Corporations (MNCs). On the other hand, the operations of the MNCs have also caused widespread adverse environmental impacts. Several recent events have highlighted the extent of this environmental degradation. The environmental crisis, caused by mining on Bouganville, raises questions about foreign investments in PNG. The recent \$A3 billion lawsuit against Broken Hill Proprietary Limited (BHP) by the people of the Western Province of PNG and the deportation of their Melbourne based lawyer, has focused Australian attention on the problems involved. The extent and pervasiveness of environmental degradation has resulted in conflicting views on foreign investments in the country. According to Dunning (1981), MNCs are the main channel for foreign investment in PNG, and as such, are essential for PNG's economic development. However, objections to their presence are growing, especially after the experience of the Bouganville crisis.

1.1 Statement of Issue

Environmental issues in PNG connected with MNC operations, became the centre of focus with the Ok Tedi lawsuit in 1994. However, the issues began much earlier in

Bouganville before the Ok Tedi area litigation began. The crisis on Bouganville is alleged to be caused by environmental degradation from the Paguna mine dumping wastes into the Kaverong and Jaba rivers. Before its closure, the Paguna mine was dumping 600 million tonnes of waste into the rivers which caused extensive damage to the area (Young, 1992). The affected villagers, as well as disgruntled landowners, confronted the mine developer Conzinc Riotinto Australia Limited (CRA). This led to its eventual closure.

Eaton (1986), traces environmental degradation in the Ok Tedi area as far back as 1984, when a barge, carrying a shipment of 2700 drums of sodium cyanide up the Fly river, capsized and sank. This sodium cyanide contaminated the Fly river and affected the 4200 villagers who relied on the river for sustenance. The affected villagers were given food by the provincial government at the cost of \$A417,000 until their source of sustenance was declared safe. When the Ok Tedi mine started operating, 80 000 tonnes of tailing were dumped daily into the Fly River. Over the years the mine has been operating, heavy metal contamination has resulted in the first 70 kms of the river being virtually 'dead' (Rosenabum, 1996).

Despite the environmental issues, exposed by the Ok Tedi lawsuit, PNG continues to experience environmental degradation. A recent report on the Pogera mine's impact is just as disturbing. Kennedy (1996), reports that Pogera's mine waste is dumped into the Strickland river. Consequently, the levels of zinc, lead and mercury at various sites down the river are 3 to 3000 times that permitted in Australia. This is despite the project being

commissioned with an acceptable Environment Impact Plan (EP) under the PNG Environmental Planning Act 1978. Projects are only commissioned when their EP is approved. However, as Commonwealth Scientific and Industrial Research Organisation (CSIRO)'s (1996) independent study into the Pogera mine reveals, MNCs are only meeting the minimum requirements. They present an EP, but its implementation is ineffective. This problem is highlighted in section 1.4 below. Effective implementation of an EP involves 'planning, implementing, monitoring, auditing and reporting of environmental issues' (Barnes, 1994,p. 8).

Environmental Degradation to spread with MNCs

It is anticipated that an expansion of both the number and extent of operations of MNCs occurred because of PNG's current mineral boom. The entrance of foreign MNCs is in line with the World Bank's (1978) forecast, that foreign investment will boost PNG's export. This potential expansion is confirmed by Shann (1995), who reports in the *Business Weekly Review*¹ that minerals and petroleum alone made up 55 percent of PNG's export over the period 1991-1994. This situation creates a fundamental problem for PNG. The MNCs that appear to be essential for PNG's economic development, are also responsible for the widespread and ongoing degradation of its environment.

¹ Monday February 1995, page 34

A fundamental problem for the PNG government and its society is to attract MNCs but, at the same time, monitor and reduce the adverse environmental impacts caused by their operations. Australian International Development Assistance Bureau AIDAB's (1990) assessment of developing countries is that low income countries like PNG can grow without straining their environment growth or lowering their environment standards to attract MNCs. However, the danger is that MNCs can bargain their way into low income countries. Once inside the country, the host's 'lack of legal and technical expertise as well as an inadequate political system allows MNCs to continue with harmful environmental practices' (Tabor and Rosenbaum, 1994, p.3).

The problem is an urgent one. MacPherson (1996) advises PNG that the environmental degradation issue needs to be addressed soon because the country is on the threshold of a mineral boom. There is an urgency in this advice, especially, if what PNG is experiencing is the fulfilment of Stanko and Zeller's (1995) prediction. Their prediction is that environmental degradation will spread as the MNCs expand their operations.

Although attempts to regulate MNC impacts are starting to appear, they are not very effective at this stage (1994). The Department of Environment and Conservation (DEC) currently attempts to enforce the EP requirement as a prerequisite for every proposal and expects the MNCs to implement them. Since PNG still experiences environmental degradation after the MNCs lodge their EPs, the lodgement of the EP alone is insufficient. Furthermore, lack of resources prevents the DEC from effectively policing it. The DEC is only allocated a budget of K4.93 million with K531, 200 for monitoring

mining activities, compared to Ok Tedi Mining Limited (OTML)'s K6.6 million for environmental studies alone. That explains why the DEC accepts mining companies' environmental reports without conducting its own studies to verify the information (Australian Aid (AusAid), 1996). Consequently, environmental damage is rampant because there is no effective monitoring to control it.

1.2 Purpose of Study

Given the widespread evidence of the escalating environmental degradation, this study seeks ways to contribute to the monitoring and controlling of the MNC operations in PNG. The context for the thesis is to examine the part which environmental accounting might play as a monitoring and reporting tool. In particular, this thesis looks at the potential to minimise the current environmental degradation through an investigation into MNCs' environmental reporting practices. Various authors have suggested that reporting in the MNCs annual financial statements on environmental aspects of their operations could, as a monitoring tool contribute to the solution of the problem but the MNCs may not be willing to report voluntarily. Some form of regulation, requiring minimum reporting standards, may be necessary. Against this background, this study aims at establishing the extent to which MNCs in PNG have so far incorporated environmental reporting as part of their overall accounting and financial reporting policies and practices.

The specific objectives of this study are (i) to investigate and establish the current pattern, extent and the degree of environmental disclosure of the MNCs operating in PNG and (ii) to establish whether critical events, likely to adversely impact on the public image of MNCs, are associated with changes in disclosure practices. This research is built on the premise that adequate disclosure will assist to expose the MNCs' detrimental activities and that accounting has the potential to address it with environmental disclosure requirements. The focus is on the environmental accounting practices of the MNCs, as reflected by their environmental disclosure within their annual reports, and on the potential of critical events which may adversely impact upon the companies images to change those reporting practices (Gray et al, 1993).

In Australia, the timing for such a study is appropriate, because the Australian Institute of Chartered Accountants (AICA, 1998) has noted an increase in public demand for environmental information and is developing a conceptual framework with guidelines to assist its members with incorporating environment issues into their accounting records. These guidelines may further assist/require accountants in MNCs to provide environmental information for their stockholders.

1.2.1 Theoretical Framework of this Thesis

The planned investigation in this study is supported by a framework of Legitimacy Theory. This theory is particularly appropriate to study the role of critical events in influencing environmental disclosure by MNCs, since it suggests that companies will

increase their environmental disclosure to legitimate both their existence and their operations, when confronted by a threat whether perceived or real (Lindblom, 1994).

Previously, legitimacy was only considered in terms of economic performance. As long as the company was making a profit, all was well. However, as the community's understanding of environmental issues increases, its questions are more penetrating, which forces MNCs to legitimise every move. Every MNC operates under a social contract with the local community. Whenever a discrepancy of interests emerges, a gap is created between the two parties concerned. Unless something is done soon, the gap will widen (Socker & Sethi, 1974) and will result in further confrontation.

With the support of Legitimacy theory, an analysis is conducted on annual reports of MNCs operating in PNG and Australia to determine the current extent, degree and pattern of environmental disclosure by MNCs. The analysis covers a five year period from 1992-1996. The period (1992-1996) is selected for study because it encompasses the critical event of the Ok Tedi lawsuit (1994). Encompassing the critical event is vital because the analysis will establish whether the critical event, which is environmentally related, has any impact on the environmental disclosures of MNCs which operate in PNG. The Legitimacy theory suggests that such a critical event will pose a threat to the MNCs and should cause them to react by changing their pattern of operations and extent of environmental disclosure, in order to minimise the potentially adverse effects and therefore legitimise their operations.

1.2.2 The Empirical Investigation

Much of the environmental accounting literature suggests that the MNC's environmental disclosure is inadequate (Gray et al, 1995a). This investigation examines the extent and pattern of environmental disclosure by the MNCs operating in PNG and the effect of the critical event. Two propositions are presented as hypotheses for testing whether environmental disclosure has increased as the result of the critical event and if it has, whether the increase was pursued after the incident. These hypotheses are:-

H1. There was no increase in environmental disclosure among Australian MNCs operating in PNG as the result of the critical event.

H2. If environmental disclosure did increase, it was time and event specific (Walden & Schwartz, 1997) and did not persist in the subsequent period.

The study is carried out by analysing the content of annual reports of Australian MNCs operating in PNG for the period 1992-1996. Australian MNCs are isolated for this analysis from other MNCs operating in PNG because:

1. they dominate in PNG industries,
2. their annual reports are easily accessible, and
3. two of their MNCs (CRA and BHP through the Ok Tedi Mining Limited (OTML)) were involved in the conflicts over environmental issues which was the initial impetus of this study.

One hundred and twenty Australian MNCs were sampled and contacted for their annual reports (1992-1996). The process began in Australia with a random selection of annual

reports of Australian companies. These were sent to PNG for classification and confirmation. However, these companies could not be traced back to their Holding companies in Australia. So, MNCs in four sensitive industries, mining, forestry, manufacturing and oil & gas were sampled instead, using the Australian annual reports CD file using a double sampling process. Firstly, all Australian MNCs in the four industries were selected. Secondly, companies were chosen if they operated over the full period of 1992-1996 to accommodate the period surrounding the lawsuit.

A Content Analysis approach is used to analyse the sample annual reports. This analytical approach is considered appropriate because inferences can be made to other MNCs operating in the same industries. If need be, it can be replicated (Krippendorff, 1980). This approach follows Patten's (1992) pattern where the author investigated the oil companies' extent of environmental disclosure after the Exxon's Valdez oil spill in 1989. Walden and Schwartz (1997) also used the same approach to extend Patten's study for subsequent years. Niskala and Pretes (1994), used the same approach when they studied Finnish companies' willingness to disclose environmental information. These three studies analysed reports to determine the quality and quantity of environmental disclosure. In the same way as Pretes and Niskala, this study analyses reports to determine the environmental information voluntarily disclosed. It also investigates the volume of environmental disclosure, especially after the Ok Tedi lawsuit as did Patten (1992) in the Valdez oil spill. The result for PNG was the same, an increase in MNCs' environmental disclosures to legitimise their activities which persisted beyond the critical event.

1.3 Contribution of this study

It is expected that this study will make two basic contributions towards environmental degradation issues in PNG. The first, is a possible solution in addressing the environment degradation issue. Although various attempts have been made in PNG to address environmental degradation, the potential role of accounting/environmental disclosure has not yet been investigated. Evidence of the PNG government's concern about environmental degradation is illustrated by the strong steps it has taken to incorporate long -term environmental perspective in its approach to national development. In 1991, PNG's National Executive Council (NEC) endorsed a sustainable development approach to resource development, and endorsed Agenda 21 at the United Nations Conference on Environment and Development (UNCED) conference in 1992 when PNG signed the Rio Declaration. This was followed by the enforcement of the United Nations Framework Convention on Climatic Change (UNFCCC) in March 1994 in PNG of the UNFCCC, and in April 1994 by the NEC's endorsement of a National Sustainable Development Strategy (NSDS). A Steering Committee was created to coordinate the formulation of the NSDS through a nationwide participatory process.

Evidence of PNG's environmental commitments can also be found in the comprehensive system of laws dealing with natural resources management. PNG's resource management laws, including its forestry and mining, are generally considered quite advanced institutional and legislative frameworks. Effective implementation of these frameworks, however, has proven to be a major hurdle to effective resource management, given a lack

of central policy making, coordinating, planning, and project implementation functions (UNFCCC, 1994). Consequently, unsustainable resource usage with adverse environmental impacts are being experienced.

This thesis examines the potential role of an accounting approach to environmental reporting as a tool in the monitoring and regulatory process whereby MNCs must effectively implement their EPs which includes environmental disclosure. The only other empirical study on the possible role of environmental accounting to the problem of environmental degradation in PNG is Bartelmus (1994). This study emphasised the interdependence between socioeconomic activities and environmental processes by calling for an integrated approach for sustainable development. The use of 'Green Accounting' with its limitations was only highlighted as a national policy strategy. This thesis is among the first to address the environmental degradation issue (and sustainable economic development) through an environmental accounting/disclosure approach.

This study is motivated by the possibility of using environmental reporting by Australian companies on their PNG operations as a form of effectively implementing their EPs for a sustainable economic development. There are a number of studies on environmental disclosure for domestic operations by Australian companies, for instance, Guthrie and Parker (1989, 1990); KMPG (1993, 1994); Coopers and Lybrand (1993); Deegan (1996); Deegan and Gordon (1996); Deegan and Rankin (1996) and Fayers (1998), but all these studies concentrate on disclosure by Australian companies on their Australian operations where Environment Protection Authority legislation is enforced in every state.

As Tabor and Rosenbaum (1994) point out, many less developed countries face similar problems associated with MNCs. These problems include poor labour conditions, transfer pricing, corruption, restricted technology transfer and inadequate consumer and environment protection. Therefore, this study may have applications for other developing countries which may consider adopting a strategy requiring all foreign MNCs to disclose environmental reports to their shareholders in their country of origin.

The second contribution is towards establishing the potential role of critical events to influence environmental disclosure among Australian companies since 1991. There is some evidence that such events may increase responsible disclosure, through their potential to invoke legitimising reactions by the MNCs. Deegan and Gordon (1996) analysed Australian MNC annual reports on their Australian operations to see whether environmental disclosure increased between 1983-1991. The authors used Content analysis approach to analyse 100 annual reports of 25 out of the 197 selected companies. These 25 companies were from the top 500 Australian companies by market capitalisation. The authors found a general increase in disclosure between 1983-1991.

The present study investigates whether similar results hold for Australian MNCs operating in PNG for the more recent period of 1992-1996. The MNC sample in this study is also from the top 500 Australian companies by market capitalisation. The main result is that environmental disclosure among Australian companies has also increased over this period for their PNG operations. While the critical event appears to have at

least influenced this result, it may not be the sole factor in this trend since increased disclosure continued 2 years after the critical event. Environmental disclosure is expected to improve further when the AICA implements environmental accounting guidelines based on the conceptual framework being formulated.

1.4 Structure of the thesis

The thesis is structured as follows. The next three chapters: 2, 3 & 4, present the literature review. Chapter two reviews relevant literature on MNC operations in PNG to establish whether MNCs in PNG degrade the environment. The review identifies the MNCs, their operations and any adverse impact their operations have on the environment. Unless this is established, there is no point in pursuing this line of investigation any further.

Chapter three outlines a suggested accounting approach as a tool for addressing environmental degradation established in the previous chapter. This chapter briefly traces the development of environmental accounting globally through developed countries whose MNCs operate in PNG. The discussion centres on the relevant application of current development to this study's context. While environmental accounting is still in its infancy, its current development is that the demand for environment reporting is exceeding supply. Therefore this study's proposal for MNCs to disclose environmental information is timely.

Chapter four presents the literature review on the theoretical framework which supports the propositions in this thesis. While there are several possible theories, legitimacy theory is considered the most appropriate since this theory emphasises the notion that companies operate under a societal contract. Whenever there is a threat, whether genuine or perceived it creates a legitimacy gap between the society and the corporate entities which the concerned threatened party has to rectify. The literature survey by Gray et al (1995a) reveals that companies are under immense pressure to be responsible for their actions. Legitimacy theory argues that companies legitimise their actions with greater environmental disclosure when threatened.

Chapter five describes the empirical study used to investigate environmental disclosure and the method used to obtain the data. A sample is drawn from Australian MNCs which have operated continuously between 1992-1996 in PNG. It outlines the sample selection process, the pilot study, and the methods used to extract data on environmental disclosure from the sampled annual reports. It also describes how the data is analysed to obtain the results on the extent and pattern of disclosure and the influence of the critical event on disclosure over time.

Chapter six contains the main analysis of the data. The method of analysis is based on the format in Patten's (1992); Niskala and Pretes (1994); and Deegan and Gordon's (1996) studies, in analysing annual reports. Their employment of Content Analysis is also adopted to analyse the data. Attribute analysis is used to identify the different aspects of environmental issues which are disclosed. The location of these disclosed

features within the annual reports is also treated as significant. Semantic analysis is then used to determine the quantity and quality of disclosure.

Chapter seven presents a summary and the final conclusion of the study. It briefly presents an overview of the study reiterating the study's objectives, the theoretical support, the analysis and the results. It then discusses their implications for the potential role of environmental accounting as a tool for monitoring and controlling the environmental impacts of MNCs operating in PNG. The chapter ends by highlighting the study's implications for future research.

Chapter Two

The Role of Multinational Corporations in Papua New Guinea

2.1 Introduction

The basic purpose of this chapter is to examine whether MNCs cause any adverse environmental impact in PNG. Adverse environmental impacts occur despite the present requirement of an EP for every proposal to minimise impacts. The chapter will identify and examine issues connected with adverse environmental impact in order to lay the groundwork or context for this thesis. This study focuses on environmental disclosure as a potential tool to address environmental impacts caused by MNC activities. This chapter identifies the seriousness of the problem of adverse environmental impact by MNCs and indicates that these adverse effects may more than offset any economic benefits that PNG receives from allowing the MNCs to operate in the country. If the situation is as serious as the literature on environmental degradation and empirical studies show, then the disclosure of environmental impacts in the annual reports of MNCs becomes a very significant issue.

The objective of this study is to address adverse environmental impacts by MNCs operating in PNG. These MNCs are invited, in the name of economic development, to exploit PNG's natural resources. MNCs create employment, transfer technology, produce goods for export, build infrastructure and provide the state with much needed

tax revenue. Natural resources however, are being extracted at an unsustainable rate. 'In the process of extracting and processing of resources, pollution is created and emitted into the air, water and on land' (Warner, 1996, p.1233).

The roles of the MNCs in PNG are examined in this chapter. Young (1992) alleged that environmental degradation existed in the Paguna mine before the Ok Tedi incident and is a contributing factor to the current Bouganville crisis. Environmental destruction is also prevalent in other industries. Eaton in 1986, reported that reports forests and their fauna were being destroyed. 'Soil is eroding along the river banks from illegal logging, from forest clearings and from access roads built in the area. Wildlife is driven away by noise and air pollution from emissions. Drinking water is contaminated from sawdust, oil, fuel and toxic preservatives such as arsenic, chromium, boron and dieldrin used for dipping logs' (Eaton, 1986, p.165).

If these claims can still be substantiated in 1998 and the environmental damage is significant, then government action is necessary to control them. Environmental degradation should not be the price for economic development. However, government actions needs to be cautious because the MNCs were originally invited to develop the natural resources. They are 'engines of development' and contribute to PNG's economic growth. Sham (1995) reported that foreign investments through the MNCs boosted exports. Petroleum and minerals make up 55 percent of the country's export. Table 2-2 reveals that export earnings from logs and minerals have more than doubled since 1990. These export earnings reduce the country's debt. Further, MNCs create employment

opportunities (Table 2-3) and ultimately contribute to economic growth (Bank of PNG, 1996).

Hence, Wescott (1992) warns against developing countries launching into complex actions to control environmental degradation. He cites Thailand's experience that earned its label, 'Paper Tiger'. Thailand initiated a complex environmental program it could not enforce and lack of enforcement led to the Bangkok Chemical Explosion in 1991. It is suggested that an enforceable action such as the environmental disclosure requirement may be more appropriate. This study will show PNG's need to capitalise on a current development while enjoying the MNCs' benefits, and at the same time minimise the adverse environmental impact. A current Environment Accounting Task Force (EATF, 1996) survey reveals that the Australian public is demanding greater environmental information. Therefore, this study investigates the Australian companies' current extent, pattern and degree of environmental disclosure to establish whether the current demand is being met. Where it is deficient, this study suggests that MNCs incorporate environmental disclosure into their accounting practices. This will add force to the current demand to address the environmental degradation issue.

Veslinds and Peirce (1983, p.358) draw attention to a more pressing concern that 'ecology and economy are on a collision course.' In an attempt to increase productivity to satisfy basic needs, the ecology is being destroyed. At the current rate of productivity, the environment with its ecology, will be totally ruined unless something is done soon. Man cannot continue to exhaust nature without giving it time to recuperate and

refurbish, or it will lead to eventual self destruction (Goldsmith et al, 1972). That is why Daly (1992), expressed concern that the current economists (including those in PNG) operate under the assumption that unlimited economic growth is forever possible. Economists ignore the biophysical limits and the imbalance in nature caused by the unsustainable rate of resource usage.

At the current rate of economic development, ecology is traded off for economic development. Although this study is not assessing either economic development or the ecology, both terms will be defined to clarify their usage here. The Macquarie Dictionary (1997) defines ecology as, 'a branch of biology that deals with balanced interrelationship between organisms and their environment. It can include distribution of people and institutions and their interdependence'. Economic development is a new, exciting and challenging branch of broad economics and political economy. It refers to the minimisation or erasure of unemployment, inequality and poverty through the development of resources. In this study both economic development and the ecology are considered because the impact changes both people and wildlife in their respective environments.

To minimise and control this unsustainable rate of activity, this study focuses on the MNCs' environmental disclosure. Environmental disclosure ought to reveal the MNCs' policies to mitigate environmental impact because each MNC is required, under the Environment Planning Act 1978, to lodge an environmental impact plan for each major project. Tabor and Rosenbaum (1996), report that MNCs' large financial standing gives

them an easy excess into developing countries like PNG. Once inside, the host country's inadequate political, legal and technical expertise leave much of MNCs' work unscrutinised. The problem is, their operations are inadequately monitored after the projects are commissioned. This 'leads to severe consequences such as the destruction to the environment, poor labour conditions, corruption, transfer pricing, restricted technology transfer, and inadequate consumer protection' (Tabor and Rosenbaum, 1994, p.3). Therefore, an analysis of MNCs' environmental disclosure should reveal the extent of their compliance.

The analysis of adverse effects from MNC operations will proceed in the following manner:

Section 2 discusses the concept of MNCs. This is necessary since there are several definitions of MNCs. A firm or corporate body which is an MNCs under one definition may not be considered so under another definition. The analysis then looks at the categorisation of the MNCs. While the operations of MNCs in a developing country such as PNG can have economic benefits, the extent to which these benefits are offset by the adverse environmental impact of such operations may be determined by the industry category of individual MNCs. The potential effects vary from industry to industry. Consequently, the categorisation of MNCs can increase our understanding of the types and extent of environmental damage they cause. Most studies into environmental impacts of MNCs stress the importance or significance of this categorisation (Meyer, 1996). In this section the types and significance of the categorisation which shape the MNCs objectives and define their roles, as advanced by the literature, are examined.

Section 3 highlights the benefits of MNCs. It would be biased if this study only highlighted the adverse impacts (although that is the focus of this chapter) without presenting the benefits, even if they are offset by the adverse impacts. MNCs, as engines of development, earn PNG foreign currency, create employment, bring about economic growth, service PNG's debts and transfer technology. Each of these benefits will be discussed and ranked according to their order of importance.

Section 4 identifies issues connected with adverse environmental impacts and serves three purposes. Firstly, the benefits identified in section 3 will be reassessed against the costs of the MNCs' operations. The second purpose is to assess the significance of environmental degradation caused by MNCs in PNG. If the cost is significant, then costs will offset the benefits of the MNCs. Thirdly, those MNC characteristics which are associated with the severity of environmental degradation will be identified. Previously, the MNCs have been defined and certain characteristics highlighted. This section will correlate the MNC characteristics with their environmental degradation and their severity to search for any relationships that might exist.

2.2 The Multinational Corporations (MNCs)

This section is devoted to focusing on the MNCs because it is alleged that foreign companies cause adverse environmental impacts. These impacts are the results of the MNCs' large operations. As 'Engines of Development', MNCs are invited into the country with large amounts of capital to develop multi million dollar projects. This

raises several issues which this chapter will address. Issues such as, the identity of the MNCs, their major identifying features, their origins, the types of operations in which they are involved which it is alleged, are causing adverse impacts, and the benefits for the country from their operations.

The section begins with the definitions and characteristics of MNCs which will assist this study to identify a sample of MNCs for the main analysis. The MNCs' country of origin and their categories are useful for sample selection because this study will concentrate on Australian MNCs which are involved in four sensitive industries: mining, petroleum & gas², and manufacturing. Although only the mining and the forestry industries are currently under scrutiny over environmental issues, the other two industries have the potential to degrade. In the concluding section, MNC benefits are contrasted against the impact their operations have on the country.

Definition of an MNC

There is no single or agreed definition on what an MNC is (Rockbok and Simmons, 1989). Thus various MNC definitions, along with their characteristics are discussed and contrasted below. This leads to deriving a definition for this thesis with discussions supporting the derived definition and its use.

An MNC is broadly defined as 'any corporation that controls economic resources in production or service facilities in two or more countries' (Grub et al, 1986, p.255). This

² Since Oil and Gas industries are small, they are grouped together as oil & gas in this thesis

is a traditional definition presented within the context of the International Accounting and Control Board (IACB), which is appropriate for this accounting based study. This definition has political connotations with an emphasis on control. Several contributing features enable an MNC to achieve power (control). These includes its size, relative significance in the countries of operations', the number of geographical locations, and the extent of foreign, compared to domestic, operations.

However, a better description of an MNC power is that derived by the Harvard University Multinational Enterprise Project. This definition is: 'that the MNC's control is linked with their 'invariable size, their operations in a substantial number of countries, their access to a common pool of human and financial resources, and their widespread activities, rather than serving as mere exporters or licences of technology' (UN ST/ECA/190, 1973). Size and control appear to be the dominant features of an MNC in both these definitions.

An MNCs' importance is further emphasised in Dunning's (1993) definition where he defines an MNC as 'an enterprise that engages in foreign direct investments (FDI) and owns or controls value adding activities in more than one country' (Dunning, 1993, p.3).

The definition is expanded to include certain MNCs' characteristics. An MNC:

1. owns a number of sizeable subsidiaries or associate companies,
2. informationalises degrees of management or stock ownership,

3. gains advantages from governance and influences over economic activities in various countries,
4. has a fair share of global assets, revenue and income,
5. operates businesses in a number of countries, and
6. has higher value of its activities internationally.

MNC's ownership and access to resources contributes to its expansion. This is where the developing countries see MNCs as 'Engines of Development'. This term is defined below, under benefits from MNCs.

According to the bureau of economic analysis (BEA), an MNC is 10 percent or more owned by foreigners although MNCs originate as private companies from developed countries (Grub et al, 1986). A company becomes an MNC when its ownership changes by 10 percent or more. Although BEA sees ownership as the determining factor, it has not diverged from the previous definitions because accumulation of resources (assets) builds up the size of the MNC. Unlike the 10 percent change cited here, this study considers foreign ownership to have substantial control and external decision making.

In contrast to the definitions given above, a more neutral and generalised definition is provided by Renwick (1983, p.56) who defines an MNC as:

‘a cluster of corporations of different nationalities that are joined together by a parent company through bonds of common strategy and draws on a common pool of financial and human resources. MNC expansion is motivated by a belief to plan, organise and manage on a global level. Their merger or acquisition is to maintain stability.’

While an MNC's motive for expansion may vary, the instrument is the same. The expansion is through a common pool of resource and finance where resources are acquired and accumulated prior to the actual expansion. Renwick (1983) identifies four common features of MNCs which include two recurrent features (size and control). MNCs:

1. are large in size, activities and turnovers,
2. diversify internationally their investments, production, sales and bargaining power,
3. increase their sizes through oligopoly, and
4. their global structure strengthens their bargaining power.

These are by no means an exhaustive list of definitions for an MNC. Although MNCs are well recognised for their global reach patterns of changing international business, there is no agreement on a definition of what an MNC is (Rocbok and Simmons, 1989). Various existing definitions emphasise different features of an MNC. For example, a structural criteria emphasises transnational operations. Some others emphasise size, including earnings, while others focus on global moves. Each definition reflects the various nature of the MNCs and the definition chosen depends on the context of the study. The UN (1973, p.4) prefers to label an MNC as a 'transnational corporation (TNC)', stressing the importance of identifying the MNCs' origins. This is because MNCs come from developed countries where some operate as private companies, others are government owned, some are public while the rest are of mixed ownership.

Since there is no one agreed definition for an MNC, a combination of four features or common characteristics will be adopted by this study to identify an MNC. They are size, structure, resource seeking-accumulation, and foreign ownership, ie an MNC comes from a developed country. Size is a prominent feature included in nearly all the definitions above. It is measured by the ownership of resources (assets) or financial size and magnitude of activities or operational size. It is also measured by annual turnovers and earnings (sales and profitability) which are also operational size and the number of its employees. Financial size is vital for this study because MNCs are invited to develop large projects (such as the mines in PNG) for which the host country does not have adequate funds. Size will also be a paramount feature as this study will concentrate only on the top 500 Australian companies.

The second feature is a structural criteria which considers MNCs as transnationals with a majority of external ownership with establishments in various countries. Through globalisation, MNCs expand their operations to different countries, including PNG, seeking for resources to maximise their wealth. (Some of these foreign companies are invited to invest in large projects because PNG cannot afford to develop them with its low savings (Bank of PNG, 1996). Strengthened by their global structure, the MNCs gain excess into different countries (Dunning, 1993) and maintain their presence through their bargaining powers (Renwick, 1983). An Australian Aid (AusAid, 1994) report, claims that some of these companies exercise their bargaining powers to the maximum in the host countries.

Thus for the purpose of this study, an MNC will be any large corporation with foreign ownership (and control), that is involved in large scale operations and whose impact is intense and potentially adverse. While this may appear too general, four major (common) features from various definitions are combined. Various studies such as Trotman and Bradley (1981); Pang (1982); Ferrer and Parker (1987); and Deegan and Gordon (1996) have noted a correlation between size and disclosure. MNCs have the means to disclose and as public companies are required to issue annual reports. This study relies heavily on annual reports for the main analysis which comes from the MNCs.

MNCs' transnational structure enables them to control their operations from their country of origin. Their international operations are a form of diversification for wealth maximisation. However, MNCs become the focus of the local community and are expected to meet social demands. The last two features appear vague because they are interwoven into the first two. Thus, this thesis will rely more on the first two for the reasons given above. The other two features will be the focus in the next section. For example, the accessing of the MNCs into developing countries will be discussed along with their underlying reasons for their venture. Resource seekers, it alleged venture abroad to maximise wealth through acquiring resources (Shapiro, 1996). Finally, foreign ownership needs no explanation for all MNCs enter from developed countries.

2.3 Benefits of Multinational Corporations

Much of the attention in the literature from economists, political policy makers, political scientists and academics is devoted to the MNC's size and span of operations as reflected in the definitions above but little attention is given to their significant role. The significance of MNCs depends largely on their functions (Jones, 1996) which will be discussed in this section. The discussion on the function of MNCs will be in three parts: accessing of MNCs into PNG, the benefits they derive and the ranking of these benefits. Access into a country may be through any of the following: An MNC may acquire an existing company in the host country, form a partnership with an existing PNG company, establish a subsidiary, win a government tender, or use some other arrangement. The benefits they derive from this is determined largely by their access and their goals. For example, an MNC entering on a tender will complete a project such as an infrastructure, and retreat leaving the host with long term benefits. Another, acquiring an existing company, may become a monopoly and earn excessive profits with adverse impacts. Discussions around information such as access will be provided to set the stage before the benefits for the period 1992-1996 are discussed and ranked.

2.3.1 Accessing of MNCs into PNG

The pattern of MNCs access into developing countries has become more varied and complex. Shapiro (1996) categorises and discusses three broad categories as: raw material seekers, market seekers and cost minimisers. Raw material seekers were the

earliest form of rogue MNCs. They were firms which operated under the mantle of the UK, Dutch, French and Belgian colonial empires. Their aim was to exploit the raw materials which could be found overseas. Modern - day counterparts are the mining and oil companies which are often the first to invest overseas.

Market seekers are an archetype of modern companies that are established internationally, produce and sell in foreign markets. IBM is an example of an early market seeker. Other examples such as Coca Cola, Nestle and MacDonaldis have been operating for some time. Their unique feature is that it was a one way investments spreading out of the US, up until the 1960s when a reverse occurred when others such as Japan started investing in the US. Japan began seeking markets in the US to counter restriction on its goods in the US.

Cost minimisers are a recent addition to MNCs. These are MNCs who seek out low cost countries to establish and produce their goods in order to remain cost competitive in their own countries and abroad. These countries have capitalised on low cost countries such as Hong Kong, Taiwan and the Philippines (Shapiro, 1996).

MNCs seek markets in both developed and less developed countries if there is an actual or perceived restriction on their exports. They enter the country, produce locally and thus evade any import restrictions. Market seekers enter through an acquisition of existing enterprises or through establishing subsidiaries. Sytyk (1982) concluded, following an interview of 58 Australian company representatives in the Pacific, that

MNCs' investment overseas is an economic tool for the investor. The interviewees' main reason for investing in the Pacific region is to exploit the cheap labour and establish markets for their products. Dunning (1993) confirms that it is production and marketing costs that drive MNCs close to their customers.

By the 1960s cost minimisers were establishing where there was cheap labour. Ferreria et al (1993) cite the example of the MNCs in the Philippines. They established manufacturing and assembling enterprises to exploit labour which was considered 'reasonably priced', efficient and comparable with other countries. Renwick (1983) noted MNCs also use their bargaining powers to gain entrance to exploit opportunities.

Behrman's (1972) taxonomy as adopted by Dunning (1993), classifies MNCs into: resource seekers, market seekers, efficiency seekers, strategy asset seekers and seekers of countries with lax legislation. The first three of Behrman's taxonomy is identical to Shapiro's categorisation. Strategy asset seekers are those who acquire assets of foreign companies to promote their objectives to exploit specific markets or cost advantages. It appears that MNCs in that category are seeking international localities to minimise cost. Hence, efficiency seekers and strategy asset seekers can be grouped together as market seekers or cost savers. That leaves those who evade legislation as the only difference in the two authors' categorisations.

Unfortunately there are some MNCs who seek countries with lax legislation which Ferreria et al (1993), label as 'colonial masters'. The post war era introduced these

MNCs as the direct successors of the colonial masters because these MNCs come from countries which had earlier colonised the developing countries such as the Australian MNCs in PNG, and American MNCs in the Philippines. Both are cited in this study. These MNCs move to exploit resources and relocate to a lax environment if they are threatened. Japanese firms enter South East Asia where legislation is lax and avoid their own stringent regulations. Ferreria et al also noted US and Japanese manufacturing and assembling industries moving in to utilise the cheap labour besides evading legislation as cited above.

In PNG some MNCs enter through government arranged contracts. The PNG government recently awarded a contract to an Italian company to install radar systems at various airports in the country (Yombon, 1998). Previous examples include the controversial Sandline contract which led to the overthrow of the last government in 1997. MNCs are also invited on a joint venture basis under PNG's Investment Promotion Authority (IPA) guidelines (1994). Under this arrangement, Papua New Guineans plan out a business venture (which requires a large outlay of capital) and seeks a MNC through IPA. IPA searches, selects and organises the partnership venture.

Whichever way MNCs enter a country, Jones (1996) lists their access for one of these reasons:

1. overall macro-economic conditions - Fast developing countries will attract more MNCs while stagnant economies are staved off. There is also a trade off where fast

economic growth in turn, stimulates MNC growth while a recession depresses MNCs growth.

2. attitudes of recipients - receptivity among different countries depends on government regulations which can promote or inhibit the MNC's presence. Peffermann (1992), observed a changed attitude and lax standards amongst developing countries towards MNCs. Previously, developing countries identified MNCs as reaping unearned profits and resorting to bank loans to develop their resources. However, loans are found to be expensive and thus standards, therefore are being lowered to attract MNCs (Peffermann, 1992).
3. liberation of capital - MNCs flourish when restrictions such as exchange controls are relaxed and shrink during periods of tighter control. Shapiro's (1996, p.2) observation is that capital moves 'at the pace of light' as MNCs raise capital in several markets simultaneously.
4. trade protectionism - especially where there is a choice between export and foreign direct investment (FDI). Trade barriers discourage export but encourage FDI.
5. development of communication and transport technology - reduced cost in transport and the improvements in communication boosts the transnational business activities. Both developments make control over their international operations easier.

MNCs enter developing countries through these various avenues. Once inside, they generate benefits but also exploit and create impacts which are at times severe. The next two sections discuss the benefits which are more than offset by the adverse impacts. The remainder of the chapter is devoted to the discussion on the impacts of MNCs.

2.3.2 Benefits derived from MNCs

Developing countries lower their standards to attract investors (MNCs) in anticipation of benefits (Ferreria et al, 1993). Often these benefits are pursued with little or no regard for the impacts which are at times, severe. Benefits include export earnings, creation of employment, economic growth, foreign debt reduction and transfer of technology.

Jenkins (1987, p.1) referred to MNCs as 'engines of development or growth'. This reference was made in the context of MNCs' having the potential to control excessive capital in the form of assets. This stock of assets when transferred, is capable of eliminating poverty and misery in developing countries. Capital availability is important because countries that export capital are also the homes of MNCs (Jones, 1996). Large projects are capital intensive and MNCs move capital around the world quickly with the use of the electronic media (Shapiro, 1996). Capital thus imported is invested in large projects to earn export revenue, reduce the host country's debts, create employment which in turn reduces unemployment, transfers technology and skills, and ultimately contributes to economic growth. Each of these benefits is discussed below.

2.3.2.1 Export Revenue

This section discusses revenue from exports. A World bank report (1978), painted a bright picture for export earnings through MNCs in PNG. The report emphasised that

MNCs are contributing to PNG's export earnings. This is predicted to continue into the foreseeable future given the abundant natural resources of the country.

Sham (1995) reported in the *Business Weekly*³ that foreign investments by MNCs has boosted exports for PNG. Table 2-2 shows the value of export earnings and their export share. This table depicts investments in minerals, petroleum, agriculture, marine and forests. Of these, petroleum and minerals earn more than 55 percent of the country's total exports. Ok Tedi alone provided over 45 percent of the export earnings before other mines were commissioned. This is one of the contributing factors to the state's alleged conspiracy to minimise disruptions to Ok Tedi's operations. In a biased move, the state deported the Fly River landowners' Melbourne lawyer and through negotiation, settled the case out of court for a reduced sum of \$11million from the original \$3billion. This solution is understandable when it is considered that major export benefits come from minerals and log exports, the earnings of which have more than doubled since 1990 (Rosenbaum, 1995).

The state's action in the Ok Tedi case maybe commendable. The mine's closure would have minimised some of the benefits discussed in this section. Export earning would certainly be minimised and debt servicing reduced. An immediate effect from closing the mine would make thousands of employees, with dependents, unemployed and compound the underemployment problem.

³ Monday, February Issue page 34

2.3.2.2 Employment

During the 1983 Tokyo Round Table Conference, foreign investments (MNCs)⁴ were credited with the creation of employment. In a recent IPA (1996) report, it was noted that 858 companies registered with investments valued at K4,384,120,000 in PNG between July 1992 and 31st December 1995 (Table 2-4). This investment, created during the 3.5 years, provided employment for 17,757 Papua New Guineans. Agriculture employed the highest number followed by forestry and business activities, respectively. Although mining and petroleum have the highest investment value, they do not employ as many, because they are both capital intensive industries.

Consequently, there is a serious underemployment of 44 p000 of the work force added annually to the PNG labour force. This amount of labour is not fully utilised due to the high cost of wages. Australian International Development Assistance Bureau (AIDAB, 1989) reported that wages in PNG is rated 2 to 10 times higher than other developing countries such as Malaysia, Philippines, Indonesia, Western Samoa and Sri Lanka. Even labour intensive activities such as tourism, are too costly. Hence, expensive labour costs, arising out of the high wage rate, is hindering economic development (AIDAB, 1990).

Jarret and Anderson (1989), alleged that the high rate of the minimum wage was inherited from Australia. Urban wages doubled between 1972-1976 to Australian

⁴ This thesis equates foreign investments with MNCs because foreign investments medium are MNCs

contract officers' advantage. Therefore Australians found working in PNG attractive, because the scale of salaries and wages was higher and allowed them to build up savings to remit home. Inevitably, PNG wage and salary costs grew out of Australian consumption standards, instead of local economy and culture (World Bank Report, 1978). While the report is 20 years old, it still highlights the central problem of unemployment, ie wages are too high and the MNCs cannot employ more labour which creates the serious underemployment referred to earlier. Those employed by MNCs from the able work force constitutes only a fraction of the population.

Goodman et al (1987), recommended that PNG should reduce its wage structure substantially if it is to reduce unemployment and increase productivity. This would mean that more people will earn money to buy goods and services and improve their standard of living. The authors argued that PNG's high wages structure is discouraging investments. Even its rural wage in 1980 was US\$62.07 per week compared to the Philippine's US\$10.50. This argument still holds 11 years later (1998).

Despite the high wages some MNCs do establish themselves in PNG. By December 31st 1996, US investments exceeded other developed countries with a large portion of investment in manufacturing and petroleum. These investments boosted employment significantly from 251 during the second quarter to 1322 in the third quarter (refer to Table 2-3 in the appendix p.337). This increase in employment was mostly in the unskilled and semi-skilled labour force. Some MNCs which are set up in the country

seek labour substituting techniques to minimise costs (Goodman, 1987). Occasionally, MNCs provide some training. However, its significance is minimal because the training is specific to a particular company's need with little chance of transferring the skill to other industries (Jenkins, 1987).

The overall impact of investment on employment in PNG has been disappointing despite the mineral booms experienced in the period. During 1995 OCED meeting in Paris on foreign investment, trade and employment, it was reported that although foreign investment surged, employment levels remained constant. Thus PNG is not deriving maximum benefits, in the area of employment, as it should. Even the high economic growth did not generate many job opportunities. Millet (1993), paints a gloomy picture when he claims that by the year 2000, 50 percent of the labour force will be unemployed. However, for the period concerned (1992-1996) some growth in employment was experienced in the third quarter of 1996. The main investment which created this growth was transportation for the Lihir gold mine and the Poreporena freeway.

Despite this disappointing experience of under-employment, employment contributes to economic development because it reduces unemployment, inequality and poverty. Employees use their earnings to acquire goods and services and reduce poverty. Increased employment contributes to increased production for consumption and exports that lead to economic growth.

2.3.2.3 Economic Growth

Economic growth in PNG continues to fluctuate. Economic growth in the 1960s was rather rapid but stagnated in the 1970s. Growth measured in Gross Domestic Products (GDP) for this period (1960s) was 6.5 percent while other middle income economies were experiencing only 5.9 percent growth. PNG's high GDP growth was attributed to slow growth in the country's population in the 1960s which eventually caught up in the 1970s. As PNG's population increased, economic growth stagnated causing it eventually to decline in the 1980s. The Terms of trade deteriorated even though the volume of exports increased. This deterioration was caused by two factors: First, high wages and the skilled expatriates mentioned earlier departed with their savings. Second, consumption continued to increase despite a decline in production, with food import making up 20 percent of total imports (Jarret and Anderson, 1989). Increased imports also increased the foreign debt which will be discussed below.

Since independence, economic growth has been fairly modest until the 1980s. The experience during the 1980s was a mixed one, with a slow start at the beginning of the decade, moderate in the middle before it deteriorated towards the end of the decade. The decline was caused by the Bougainville crisis. However, it picked up early in the 1990s with a prospect of a mineral boom for the decade (AusAid, 1992).

Actual economic growth gradually picked up from a trough in 1985, until it reached an enormous growth in GDP averaging 12.6 percent for the period. Combined with the

expansionary fiscal policy of the period this produced a rapid increase in the real GDP, per capita of approximately 30 percent between 1990-1993. Over the 3 years (1992-1994), PNG's economy grew by 33 percent from export earnings (Sham 1995). Much of this growth is attributed to the mineral boom and this is where the MNCs play a crucial role in the country's economic development (AusAid, 1995). There was a rapid, even if short lived expansion in mining and petroleum output, which quickly restored economic growth that had slumped with the closure of the Paguna mine. Despite this growth from the mineral boom, there was no economic development in the sense that it did not alleviate poverty, because of uneven distribution of benefits. Benefits were mainly diverted towards urban areas and to the resources' owners (BPNG Economic Bulletin, 1996).

Following the recession caused by Bouganville crisis and the fall in commodity prices, the resource sector recovered. Initially, it was the development of the Ok Tedi copper mine, the Pogera gold mine and the Kutubu oil field, followed later by the improved agricultural commodity prices, including forestry products. Growth peaked at 16 percent in 1993 but slumped drastically to 3.1 percent in 1994 with the introduction of stronger monetary policies which eventually led to the floating of PNG Kina⁵ (Aus Aid Report, 1996).

Economic development for PNG would be faster if it were not for a number of constraints besides high wages. AusAid (1992) identifies three constraints which are

⁵ PNG currency

outlined below. The first constraint is the adoption of western laws, institutions and standards in a country with several hundreds of languages and distinct tribal cultures. The AusAid Report (1992) claims that it is difficult to apply western beliefs and practices in PNG because they only result in social tension, unrest, and law and order problems. Experiences elsewhere has shown that it is difficult to achieve economic success without public security. The second constraint observed is the inappropriate government policies which over regulates foreign investments. This is further complicated by difficulties in acquiring land which is highlighted as a serious obstacle to private investment. The third constraint, which is related to the second is the mentality or the focus on distribution of wealth rather than the creation of it. This wealth comes from generous foreign assistance or donations including Australian annual aid. The suggestion is that the PNG government expenditure needs to be restructured towards supporting growth, emphasising basic education for all, and promoting efficiency in the public sector to increase productivity.

It is difficult to conclude that AusAid (1992) identified the constraints that beset economic growth for PNG. There are a number of factors which affected PNG's economic growth which fluctuated throughout the period. Factors include high wages, dependence on imports, crises and changes in prices of export goods. Some are contingencies such as the Paguna crisis (Bougainville) and changes in export commodity prices. Others such as high wages and heavy dependence on imports, are controllable to minimise foreign debt.

2.3.2.4 Debt Servicing

The most significant benefits from the MNCs is the repaying of debts from earnings generated by MNC operations. Domestic debt doubled while external debt tripled between 1980-1989 with concessional interest rates jumping from 33 to 42 percent. Public debt was the result of government borrowing to cover shortfalls and to acquire equities in mineral projects, while the private sector debt, was due to the development of the Ok Tedi mine. The debt serviced in the same period rose from 19 percent to 40 percent. It was estimated then, that it would require \$US1.5 billion to cover private debts to develop Misima, Pogera, Hidden Valley and Lihir gold mines. Towards the later half of 1980s external debts were repaid, while the government switched to domestic debt sources. The switch placed pressure on the central bank because it had to reduce its foreign reserves (AIDAB, 1990).

Fortunately, the mining and oil boom in the early 1980s turned the current account deficient into a substantial surplus. PNG relies entirely on exports to earn foreign exchange and the improved prices in agricultural and forestry products also contributed to the above surplus. However, this surplus was short lived and was quickly depleted by imports for Pogera and Kutubu as well as consumer goods from increased government expenditure. Other mining and oil project debts were also met out of this surplus. Much of the government's tax earnings and royalties were largely recycled back into imports (AusAid Report, 1996).

Thus the surplus scene drastically changed in the next decade. Wages and salaries increased by \$100 million and the falling agricultural incomes were subsidised by \$174 million. Domestic demand increased without any change in real output or export earnings and had to be met by imports throwing the balance of payment into a deficit of \$271 million over 1993-1994. Even the delay in the development of the Lihir gold mine only exacerbated the deficit problem (AusAid Report, 1996).

It could have been worse, if it was not for improved commodity prices and tightened fiscal policies. Levies collected from agricultural commodities were used to offset some of the foreign debts. Thus PNG's debts were reduced significantly from 1994 onwards. In the following year, its performance bettered that of the African economies. Foreign debt decreased from 31 percent down to 21.9 percent. This was the result of the decline in debt servicing by MNCs in the mining and petroleum sectors and an increase in exports. Since 1992, the ratio of PNG's debt outstanding to current account receipts improved significantly in comparison to other developing economies. PNG's debt began at 140 percent in 1991 and dropped to 70 percent (50 percent reduction) in 1995, while developing countries began at 130 percent but only experienced a minor decline of 10 percent⁶. Again, PNG's rapid decline was due to the significant growth in exports from mining, petroleum and the non-mining sector combined with the decline in the stock of debt outstanding (BPNG Economic Bulletin March, 1996).

⁶ Since original data is not available, these percentages are approximations only from a graph

However, the balance of payment is expected to remain fragile due to the floating of the Kina (PNG currency). The floating has other ramifications for the country's balance of payments. With a fixed exchange rate the Central bank can determine in advance and retain enough foreign reserve. That is not possible with a flexible exchange rate which will fluctuate with demand. The government will need prudent fiscal and monetary policies to maintain a stable balance of payment position. The main area of concern is borrowing for consumption⁷ (AusAid Report, 1996). Reduction or control over heavy reliance on imports will assist in lowering foreign debt.

2.3.2.5 Transfer of Technology

The last of the major benefits is the transfer of technology. 'Within one generation, technology has moved from stone age to steel, and in recent years, to the computer age in many parts of PNG' (AusAid, 1995, p.49). This unprecedented transfer of technology is through the MNCs in the private sector and is especially evident in the mining and petroleum industries where computer based technology is operating in remote parts of the country. The transfer of technology, in some industries, is more advanced than others. In agriculture, forestry and fishery, technology transfer has an impact on the lives of the people. Machinery and tools contribute to increased productivity and provides users with opportunities to develop skills. Jones (1996) disagrees with those authors who rate the transfer of capital as a priority for developing countries. He rates the transfer of technology and organisation, entrepreneurship and culture, higher than capital. Jones's reasoning is that those who rate capital as a priority classify all transfers

⁷ PNG's current outstanding debt is \$US2.349 billion (World Bank Debt Table 1998)

of resources as finance. However, the MNCs control a package of resources such as technology, managerial skills, machinery, skills to operate the machinery and manage finance. Jones argues that capital is more than just money and without the combination of technology, management and organisational skills, little will change for developing countries.

The MNCs provide workers with on the job training, in-house training, and scholarships to tertiary institutions to master the latest technical skills. The mining industry has committed a lot of resources into setting up the mining school at the University of Technology in Lae. However, this has little effect on the top end of the labour market because MNCs like Chervon, are still flying experts from outside including the US, on a rotation basis (AusAid, 1995).

Benefits, both temporal and permanent for a developing country, depends largely on its priorities. If foreign investments are sought for quick fix/solutions to a problem, then its benefit will be temporary, alternating with stagnant growth. On the contrary, seeking MNCs with thorough planning, with sound development strategies, will earn lasting results. MacPherson (1996), identifies sound development strategies, as lacking in PNG which deprives the country of maximum benefits. Even those derived trickle down as ranked below, being hampered by the distribution processes.

2.3.3 Ranking of Benefits

The type and the amount of benefits discussed above vary for PNG over the period observed. Some benefits such as employment is a contentious issue. However, PNG is deprived of the maximum benefit by its wage policy. Other benefits such as the transfer of technology, are difficult to assess. Therefore the ranking may not be accurate. Overall there is little evidence of these benefits because they trickle into the economy in varying degrees in different parts of the country which also makes ranking problematic. For the majority of the country, there is little economic development. Since the quality and quantity of benefits vary, and given these shortcomings, this section ranks the above benefits based on the discussion in the last section.

Ranking of the above mentioned benefits is artificial because there is no yardstick in PNG to measure them against. The benefits are not discrete but continuous and overlap each other. They trickle down in varying degrees into the country. Therefore, the ranking is arbitrary and generally based on different reports such as AusAid and the United Nations (UN).

The benefits are compared against the UN Human Development Index (HDI) because economic development is intended to reduce unemployment, inequality and poverty through foreign investment. Individual benefits from MNCs' operations, discussed in the last section, are discussed below in a descending order:

2.3.3.1 PNG's Poor Rating

Although the period under discussion shows increases in export earnings and a reduction in PNG debt, its performance against the UN Human Development Index (HDI) is below that (126 out of 174) of other countries in the same category. This is due to the deterioration in social conditions, caused by high population, rural-urban migration combined with inappropriate government policies. While PNG is endowed with rich natural resources and is experiencing a mineral boom, the exploitation of these natural resources only leads to a dualistic economy (AusAid Report, 1996).

Experience from other developing countries show that financial resources are not the most significant determinants of development. Even the reserves will be quickly depleted, sending the country back into debt. Hence, the country's overall economic performance has been disappointing. MacPherson (1996) predicts that although PNG is rich with natural resources, its people will remain poor. This will lead to widespread social and political unrest for which the only remedy is an implementation of sound development strategy, free of corruption (MacPherson, 1996).

2.3.3.2 Servicing Accumulated Debt

Given PNG's poor rating against the HDI, debt servicing is a top priority. Aka (1998)⁸ warned of further growth to PNG's outstanding debt, if the country continues to borrow for consumption, because the main contributing factor is the country's high import

⁸Post Courier, Friday August 7, 1998 - internet

consumption bill. Aka reveals that PNG's debt has been in place since independence and continues to accumulate. The total cumulative debt, to the end of 1997, stands at \$US2.349 billion (World Bank Debt Table, 1998). The current practice of borrowing for consumption will only widen the deficit gap. It can be argued here that borrowing for consumption brings much needed goods and services to the people. However, much of the imported items, including foodstuffs, are non essential and could be substituted with local produce.

Given this gloomy picture of PNG's debt, repaying it is the best option. Money has to come from somewhere to repay because PNG's annual tax revenue is less than K2 billion. Borrowing money to repay creates further debt. One option would be to use export earnings to repay debts, as seen in 1994, without creating further debt (BPNG Economic Bulletin, 1996). An extreme alternative would be to take the action which Romania took in 1980 to ban all imports (Aka, 1998).

2.3.3.3 Export Earnings

However, a total ban will affect industries such as minerals and oil & gas which are generating revenue from export earnings that eliminate some debt. These industries import necessary materials. Nonetheless, provisions could be incorporated in a ban to allow material imports for mineral industries because minerals earn revenue for PNG. Export earning is ranked as the second most important benefit after debt servicing

because debt is serviced out of export earnings. MNCs also pay taxes to the state and wages to workers to acquire goods and services. The country is resource rich and will generate more wealth (MacPherson, 1996) but it needs proper management.

2.3.3.4 Transfer of Technology and Training

There are mixed results on the transfer of technology. While there is a rapid transfer of technology (AusAid, 1995), it is limited. Yet is essential for some of the industries eg mining, where the latest equipment is used. On the down side, is the question of transferring the skills gained in one industry into another.

The root of PNG's development problem lies in the lack of training and employment for its people (MacPherson, 1996). According to the Australian Conservation Foundation (ACF, 1996) human resource development is a key area, however, its lack of development is disappointing and creates social problems. Local participation (employment) is necessary to promote sustainable development and will come only after its citizens gain further education and training. Employment plays a dual role of contributing to the country's output and is also a medium for distributing goods and services.

Under the dualistic economy, wages are the only personal earnings which can pay for goods and services and raise the standard of living. Although wages earned is the only personal wealth gained from the MNCs, collectively wages reduces unemployment,

poverty and increases goods and services. However, only a few in the country are employed despite the mineral booms and consequently, PNG's HDI performance is poor. Even those employed are in the unskilled or semi skilled area. Those employed by the mines provide cheap labour. Lihir gold mine became the world's cheapest gold producer @ \$US 245 per ounce, compared to the general average of \$US 250 (Davis, 1993). BHP is also reaping benefits from cheap labour at OTML where the cost of producing copper is just 40 US cents per lb compared to 70 cents per lb in other mines (Malik, 1988). There is transfer of technology but it is limited to the privileged few with some education. PNG has only a 52 percent literacy rate (AusAid Report, 1996). Hence, employment would be the fourth ranked benefit of the MNCs discussed above (MacPherson, 1996).

2.3.3.5 Employment

Whether the MNCs provide much employment is a contentious issue. Although the FDI, through the MNCs, are credited with creating employment, the OCED (1995), meeting in Paris, revealed that although the FDI increased, employment remained constant. PNG's rate of job creation in the same period was disappointing, despite experiencing a mineral boom. PNG experienced a sharp increase of open unemployment from 2.0 percent to 7.3 percent (Marsden, 1993).

Both oil & gas are capital intensive and the opportunities for employment are minimal. Employment in the manufacturing industry is restrained by the high wages problem

which is inhibiting its growth. That leaves the country with employment opportunities in areas outside those named. Those opportunities need to be explored, but that is outside the realm of this study. Employment will raise the standard of living and promote social development. However, as discussed in the last section, increase in employment will reduce unemployment, poverty and earn more goods and services if wage rates are lowered. They are currently too high and costly. The AusAid report (1992), suggests that the lowering of wages will increase employment and lower the unemployment rate. Increased employment will increase production and employees can acquire more goods and services. Such acquisition reduces inequality and minimises poverty.

If the MNCs involvement in PNG only results in benefits, as discussed above, then PNG's indiscriminate acceptance of MNCs is commendable. Unfortunately, this is not the case. MNC activities leave impacts on the country which are at times adverse and more than offset the benefits discussed above. This aspect is taken up in the section below.

2.4 Adverse Environmental Impacts=Inevitable Self Destruction

Although MNCs have created opportunities for employment, produced goods for export, and earned PNG foreign reserves to offset its debts, their impacts have been considerable. This is because ill-managed economics and ecology are incompatible and the unsustainable rate of resource usage will eventually lead to self destruction (Veslinds and Peirce, 1988).

This section compares the costs of environmental degradation with indiscriminate allowances for MNCs operating in PNG with the benefits derived for the host. The section begins with a definition of environmental degradation. This is followed by two examples of MNCs causing environmental degradation in Nicaragua and the Philippines before considering PNG's situation. Significance and severity of environmental degradation are identified in each case to determine whether there is any link between the MNCs' characteristics and environmental degradation.

2.4.1 Environmental Degradation

A definition of 'environment' is needed before identifying environmental degradation. Environment is 'the aggregate of the physical factors of the surroundings of human beings, including the land, waters, atmosphere, climate, sound, odour, taste, the biological factors of animal and plants and the social factor of anaesthetics' (CCH Macquarie Dictionary of Business 1993, p.203). Environment covers physical, social and biological factors. Therefore, damages to any of these constitutes environmental degradation.

These two examples are noted here briefly to illustrate that adverse environmental impact in developing countries is commonly caused by MNCs. Only two examples involving MNCs in environmental sensitive industries, which are considered in this thesis, are cited below. Forestry, mining and manufacturing are the industries concerned.

2.4.1.1 Nicaraguan Forest case

The two examples of MNCs causing environmental degradation are from Nicaragua and the Philippines. Nicaragua had a large portion of the world's remaining tropical forests on the ancestral land of indigenous people. A trilateral agreement was formed between the landowners, their government and foreign owned timber companies to develop the timber commercially. This agreement was to minimise the environmental problem because previously there 'was unrestrained commercial harvesting of valuable timber and stripping of forest lands at an alarming rate'. Experience among the indigenous Sumo people of Nicaragua shows that large scale commercial logging degrades environment, destroys the ecosystem and dispossess the indigenous people of their lands (Anaya and Crider, 1996, p.347).

This occurred despite the Nicaraguan government entrusting the job of environment protection, administration, regulating and development of the country's resources to the Ministry of Environment and Natural Resources. However, like PNG, their Ministry of Forest Services lacked resources (finance and manpower) to monitor commercial operations compounded by an unstable government which led to the environmental degradation reported above (Anaya and Cridder, 1996). Thus the Nicaraguan forest experience parallels that of PNG as discussed below. The common contributing factor is the lack of resources to effectively enforce local legislation.

2.4.1.2 Philippine's Case

Philippine's problems, caused by manufacturing, mining and forestry were more serious. The country's lax legislation and the indiscriminate allowing entry of MNCs' contributed to the severe consequences, including death. The Philippine government created a favourable investment climate with lax restrictions and consequently experienced severe environmental degradation. Its reasonably priced labour was exploited fully by manufacturing and assembling industries from the US, Japan and Hong Kong. These manufacturing industries caused so much air pollution that the Philippines had the highest negative impacts with 20 percent of morbidity and a wide spread of lung related diseases and deaths (Ferreria et al, 1993).

The manufacturing industry was followed by mining and logging companies. Commercial logging and mining degraded the landscape while toxic industrial wastes polluted the rivers and seas. So much so, it was reported at the Earth Summit in Rio de Janeiro (1992), that the cost of reforestation and rehabilitating their rivers to support life again would cost US\$500 million (Ferreria et al, 1993).

The above examples from the Philippines and Nicaragua suggests, inter alia, that indiscriminate allowances given to MNCs under a lax atmosphere is a recipe for environmental degradation. Both examples above show sources/causes and types of environmental degradation similar to PNG's which this study is assessing. PNG also promotes commercial logging and mining giving favourable terms to MNCs. These

MNCs come from Canada and Malaysia besides Australia, and unless action is taken soon, PNG will experience a similar environmental impact to Nicaragua and the Philippines. A Japanese Federation of Bar Association's recent study entitled, *Export of Japanese Pollution and Environment Destruction*, blames the environmental deterioration on the result of despoliation and improvishment caused by foreign exploitation (Ferreria et al, 1993). Therefore, to mitigate further destruction, this research analyses four industries to substantiate the claim that MNCs degrade the environment and investigates ways of controlling them.

2.4.2 Environmental Degradation caused by MNCs in PNG and its

Significance

Environmental degradation is a common feature of MNCs, especially among raw material seekers, as revealed by the Nicaraguan (Anaya and Cridder, 1996) or the Philippines (Ferreria et al, 1993) experiences. This analysis would be able to produce significant results if the assessment was conducted on an industry by industry basis for every industry. However, the available literature on environmental damages in PNG is limited to the environmentally sensitive industries. Thus this research focuses only on mining, forestry, oil & gas and manufacturing industries.

Although AIDAB (1990) advises that developing countries can experience economic growth without straining their environment, PNG is currently experiencing adverse impacts caused by the MNCs. The MNCs in mining, forestry and oil & gas are raw

material seekers which also exploit cheap labour as pointed out among the benefits above. The manufacturing industry is establishing itself in PNG to avoid trade barriers. For instance, an Australian canned meat supplier, is canning the same brands of canned meat in PNG which the company previously supplied from its cannery in Australia.

This section discusses the adverse environmental impacts on an industry by industry basis of the four industries selected. The adverse impact and the magnitude vary among industries. What is discussed here is compiled from available information.

2.4.2.1 Forestry

Impact from logging is severe, however the report is brief because MNCs in the logging industries are mainly Malaysian for which there is insufficient information, to make any comments except of a general and brief nature. This thesis concentrates on Australian MNCs, for which there is adequate information.

Globally, rainforests are reported to be ‘disappearing at the rate of 45,000 square feet per second and an estimated 100 species of wildlife disappear daily. This loss supersedes all previous losses’ (Beder 1993, p.187). Sensing the danger of forest extinction, both the Indonesian and Philippine governments placed restrictions on logging. Consequently, log prices leaped by 200 percent on the Japanese and South Korean markets. It was to exploit this price increase that attracted Malaysian logging companies into PNG.

These logging companies have been known to log indiscriminately throughout PNG's forests. Although 'there is a severe loss of aquatic life, the destruction of the tropical rainforest habitat is equally disastrous because it contains some of the world's rarest species of flora and fauna' (Solnes, 1995, p.54). Reid (1995, p.4) reports a UN environment protection 'estimate of as many as 30 million species in the biosphere. Of these 1.5 million have never being described and up to 2.5 percent may face extinction'. 'PNG is among those who have the world's last pristine tropical forests with a rich biodiversity of flora and fauna. It has the fifth largest remaining tract of rain forest with unique and diverse plants, wildlife and its ecosystem is being destroyed' (Greenpeace International Pacific Campaign, 1996, p.21). This exploitation leaves its impact on the forests and wildlife, the environment and the people.

Environmental degradation from logging has the worse effects of all MNC activities. Besides destroying the forests and its rich wildlife, illegal logging, the clearing of areas of forest for access and road construction have destroyed the area by causing soil erosion even along the river banks. Wildlife is driven away by noise and air is polluted from emissions. Such logging affects the people who rely on the forests for their livelihood as well as destroying the landscape. Indigenous people have been displaced because their hunting grounds have being disturbed and the wildlife driven away by the logging activities. Fertile land for gardening is destroyed by new roads being built for logging access and erosion occurs along the roads. In some places, the source of domestic fuel is being reduced by logging companies which do not practice reafforestation. This is partly due to the deficiency of the forestry legislation which does not have any reafforestation

requirement for logging companies. 'Drinking water is contaminated from the sawdust, oil, fuel and toxic preservatives such as arsenic, chromium, boron and dieldrin used for dipping logs' (Eaton, 1986, p.166).

From this brief discussion, it is noted that logging impacts on both people as well as fauna and flora. Logging operations drive out species even to extinction and displaces people whose livelihood is affected. Therefore, there can be no better contribution to preserve the resources of PNG than to draft a policy to monitor (Greenpeace International, 1996) and control degradation. This study suggests environmental disclosure is one way to enforce the compliance of such a policy.

2.4.2.2 Mining Industry

Environmental degradation caused by mining is one of the adverse effects of the MNCs. The environmental issue first surfaced from the mining operations on Bouganiville. The flow-on effect affected the Ok Tedi and even the Pogera mines. This section discusses the general impacts and makes specific references to the Ok Tedi and Pogera mines. It also points out that this thesis considers the Australian MNCs failure to implement ICME principles as a loophole that the MNCs exploit.

Like the mining industry, raw material seekers also exploit and degrade the environment. A 'typical mine development in PNG results in forests logged, roads, tunnels/pits built and tonnes of mined rocks/dirt dumped into rivers used for drinking and

washing, as well as obstructing boats/canoe transports. Poison from heavy metal released from mining activities such as cyanide, poses risks to people, animals and plants' (Rosenbaum, 1995, p.37). Consequently, notable disasters have occurred in PNG from MNC operations. For instance, the Paguna mine on Bouganville (PNG) was dumping 600 million tonnes of tailings into the Kaverong and Jaba Rivers before the mine closed. This dumping destroyed aquatic life and affected villagers along both rivers and is believed to be a contributing factor to the current Bouganville crisis (Young, 1992).

Similar environmental degradation has been experienced at other mines such as the Ok Tedi. Eaton (1986), traces the pollution in the Fly River area back to the period before the mine began dumping its tailings. Pollution began when a barge carrying a consignment of 2700 sodium cyanide capsized at the mouth of the Fly River in 1984. The sodium cyanide spill affected both marine life and those who rely on it. The killing of 1500 fish was reported around the site and there was an unsubstantiated report of some villagers dying from eating poisoned fish. This incident affected 4,200 people who relied on the river for sustenance. Their source of fish and other protein was polluted. Therefore, the villagers were fed by the provincial government at the cost of \$A417,000 until the area was declared safe. Three weeks after the barge capsized, there was another cyanide spill near the mine. Dead turtles were seen floating around the site of the spill (Eaton, 1986).

When the Ok Tedi Mining Limited (OTML) began its operations, it impacted on the environment adversely. ACF's (1996) report reveals that OTML's impact was severe

on the Fly River system. So severe was it that the first 70 kilometres of the river is considered virtually 'dead' from the dumping. OTML drew severe criticism from the International Water Tribunal (1993) for dumping its tailings into the Fly River. OTML was also warned to cease operation unless it builds a dam and treats its waste. Rosenbaum (1993) reports OTML did not comply even though its own research confirmed the reduction in fish biomass. Its impact on both the aquatic and terrestrial ecosystem is indisputable. However, the company denies that its mining operations have adversely affected the Fly River estuary.

2.4.2.2.1 Ok Tedi River-Toxic for Human and Aquatic Life

OTML's claim that its activities were not degrading the environment was refuted by Kreye and Castell (1991) after conducting a series of ecological tests. Lutz Castell, a scientist from the Stanberg Institute (Germany) compared samples from fourteen different sites along the river before the mine was opened and again after the mine opened in 1990. He found concentration of iron, manganese, zinc, and lead content to be 200 times greater than that of arsenic and the turbidity is about 100 times greater. Copper content alone was 1000 times higher than before the mine was opened.

Castell then compared the Ok Tedi river to the Rhine River (Germany) at the height of the Rhine's pollution period. The following is a comparison of the degradation of Ok Tedi with the Rhine river:

1. Zinc level was 20 times higher,

2. Cadmium was 10 times higher,
3. Copper was 170 times higher and
4. Lead was 50 times higher.

He concluded that the arsenic content alone constituted the entire Ok Tedi river too toxic for human and aquatic life. *Concentrations exceed the maximum for drinking and for aquatic life from three to thirteen times.* Castell also noted that *limits for copper in the rivers were four times higher than limits permitted by the European Community Directive.* As one senior mining officer confided to Castell and Kreye, *mining in this form would not be allowed in either Australia, US or any of the western world* (Castell and Kreyer, 1991). This is a serious revelation but the mine continues to operate and degrade.

To deflect the negative reactions from Castell's report, OTML management claimed that the height of Ok Tedi and Fly rivers will return to pre-mining levels within 20 years of the mine's closure and nature will recuperate. With a mine life of 30 years, this represents 50 years of disruption (Rosenbaum and Krokerberger, 1993). Recovery of fish stock will depend on continuous reproduction in the flooded wetlands to recuperate. Nevertheless, these wetlands are in danger of being contaminated by the copper so the fish face a grave danger of extinction (Rosenbaum, 1995) and may not recuperate and return to pre-mining levels.

The destruction caused by the dumping into the Fly river system raises the question of how seriously Australian Ecological Sustainable Development (ESD) Recommendation 63, is actually applied by Australian MNCs. This ESD recommendation requires:

‘that Australian Mining Companies with operations Overseas endeavour to operate to at least Australian practices and standards of environmental management, in a manner which respects local environmental values and cultures and provide appropriate returns to the economy in which they operate’.

ICME Principles

The ACF believes that BHP which is a member of ICME, should apply the charter’s environmental principles. ICME principles require mining companies to:

1. meet all applicable environmental laws to protect and minimise environmental risks
2. review the effects of each activity to reduce adverse effects
3. employ risk management strategies in handling and disposing of wastes
4. conduct regular reviews and act on results (ICME Charter).

If these requirements were conscientiously implemented, then the above problems would be minimal.

2.4.2.2.2 Pogera Mine

Environmental destruction is not confined to the Fly River alone. The Maiapam-Strictland rivers are also affected. While OTML is causing environmental destruction along Fly River, similar problems are being encountered in Enga. Simultaneous Ok

Tedi is pumping 80 000 tonnes daily into Fly river while the Pogera Joint Venture (PJV) which involves two Australian companies (Mount Isa Mines Ltd and Rennson Goldfields) releases 11 000 tonnes of tailings daily into the Pogera river which eventually comes out to the Papuan Gulf into the Torres Strait Islands. Along with rock waste are heavy metals, ferro-cyanide complexes, arsenic and jarosite.

‘The company’s monitoring system is infrequent so that it is not impossible to detect accidental discharges of cyanide, heavy metals or alkaline. At various sites downstream, the zinc, lead and mercury presence is 3-3000 times the Australian or even PNG standards’ (Rosenbaum, 1996, p.18). Under the ‘Responsible Care’ principle of the Australian Chemical Industry Council (ACIC), waste should be monitored at the point of discharge. It should be done frequently enough to detect and rectify the problem within hours of any poisonous discharge (Rosenbaum et al, 1995).

Present reports of the Pogera mine highlight its adverse impact with fatal consequences. For instance, the Sydney based Mineral Policy Institute has recently detailed up to 133 unusual deaths reported by local administrators around the Pogera mine zone between 1991-1993. Locals believe these deaths were caused by the contamination of water and riverside gardens, despite claims by PJV of establishing an ‘excellent environmental protection’. ‘Dr. John Konga confirmed a death at Sopas Adventist Hospital which he believes could have been caused by arsenic poisoning (Kennedy, 1996, p.22). The question is whether PJV’s excellent environmental protection’ and arsenic poisoning from contamination are compatible. A recent Commonwealth Scientific and Industries Research Organisation (CSIRO, 1996) study, on the environmental impact by the Pogera

mine noted that PJV was merely complying with regulations. There was no extra effort to exceed the minimum requirement.

Following these reports, the ACF and several other Australian Non Government Organisations (NGOs) are reported to have called for an inquiry into PJV's operation. This was to review the tailing management, independent oversight of the mine's pollution monitoring, mitigation of environmental impacts and fair compensation to the affected communities. The PNG government was silent because of a conflict of interest. The state cannot be an independent arbiter when it holds equity in large projects which leaves the country open for exploitation (Rosenbaum and Krokerberger, 1993). Like Ok Tedi, this call by the NGOs had a minimal effect, if any.

Despite the above cited problems at Paguna, Pogera and the Fly river from mine dumping, only two mines (Pogera and Tolukuma) are currently practicing a limited amount of backfill while the rest continue to dump tailings either in the sea or river systems (Table 2-4). Current mine disposal causes adverse impacts and affects many communities. Damage from riverine disposal spreads beyond the mine sites (AusAid Report, 1996). Ignoring the impacts to correct later will be both disastrous and expensive as the Philippine's experienced shows (Ferreria et al, 1993). Worse still are the fatal consequences which are irreversible. This is where highlighting the adverse impacts, shown in this study, is vital to support a call for immediate action.

Australian MNCs Pledge Environmental Care in Asia

Although the Saulwick Poll conducted in March 1994, indicated that the majority (2:1 or 57 percent to 33 percent) of Australians believe that environmental protection has a higher priority than economic growth (Rosenbaum, 1995), Australian MNCs engaged in large projects in PNG do not have the clean records they claim elsewhere. A survey sponsored by the Prince of Wales Business Leaders Forum (1994) studied activities of Australian MNCs in Asia. Eighty percent indicated that they would be as careful as, or more careful, about environment in Asia than in Australia. *If Australians rate environment protection as a high priority and MNCs are extra careful in Asia, then the Australian MNCs need to demonstrate that claim in PNG.* Alternatively, if they disclose their overseas operations truthfully in their annual reports, their shareholders might influence them to act honourably which is the intention underlying this study.

2.4.2.3 Manufacturing

There have been recommendations that PNG should become involved in downstream processing in order to diversify its sources of revenue, as well as minimise the foreign exploitations, such as transfer pricing. Presently, PNG relies heavily on the export of primary products which are subject to world price fluctuations. These have been countered by the establishment of several major projects such as the veneer factory because the allegation of price transfer is forest related. The impacts are yet to surface and, what follows below does not contain any environmental degradation reports.

In contrast to the MNCs in the other three industries which are raw material seekers, MNCs in manufacturing industries are out to minimise the cost of transport and evade trade restrictions. This is evidenced by the same overseas suppliers establishing manufacturing plants in PNG, as cited earlier in the meat cannery example.

While the focus is on the current controversial industries-logging and mining, oil & gas, manufacturing industries can also pollute the environment as shown in the Philippine's experience above. Manufacturing industry degrades the environment, especially the marine life from factory waste disposals. Fortunately the manufacturing industry in PNG is very small, mostly to meet local market needs with minimal environmental effects but there is no empirical work available to support or refute this. Areas of manufacturing industry include food processing, beverages, tobacco and timber. It has not shown much growth since independence and the high wage structure is blamed for its dismal performance (AusAid Report, 1995).

This is likely to change with the establishment of major projects such as fish canneries in Lae, Wewak and Madang; a meat cannery Port Moresby, Lae and Madang; a cement factory in Lae and the Jant Chips Mill in Madang. Work has begun on oil and LPG refineries planned for the Central Province. Between 1992-1995, 107 applications were received for manufacturing. This is the third largest applications received by an industry in the period (Table 2-5). As these and other projects in other industries are established, environmental impact will be inevitable. Rather than take a reactive approach, the government should take a cautionary approach to ensure environmental plans are

incorporated in the proposals to prevent environmental impacts. Both manufacturing and oil & gas are included here because they have the potential to degrade. It is a proactive approach to mitigate an envisaged environmental degradation as reviewed in other developing countries.

2.4.2.4 Oil & Gas

The current focus on environment issues is focussed on the mining and forest industries but oil extraction can be just as destructive because land is cleared for drilling and the laying of pipes to transport crude oil down to the Papuan Gulf. Clearing activities destroy flora and fauna. In recent years, more gas and oil wells have been commissioned. Although some oil fields are already producing crude oil and gas, there are a few minor complaints on environmental damage. This does not mean that the MNCs involved are innocent, because there are possibilities of oil spills and gas fires, but their nature of extracting is such that it does not require much excavating, therefore, there is little waste for dumping. However, it is too early to draw any conclusion on environmental impact of this industry because the limited studies referred to above were done when concerns were raised on environmental damage in the forestry and mining industries.

Such adverse impacts caused by MNCs should provoke public outcry or protest but they have not. A lot has to do with lax regulations by the government for the MNCs entry and operations because MNCs are embraced as engines of development. The state has a conflict of interest and cannot arbitrate in issues affecting large projects where its

interests are at risk. Further, these projects not only have state investments but earn the state much needed revenue, reduce unemployment and give a host of other benefits. Only a few concerns were raised by those directly affected at different times and in different locations. Those who protest are parties who are concerned about guarding their resources more than their environment. This study is a subtle approach which the state can implement to ensure MNCs practise sustainable usage of resources and minimise impacts.

2.5 Summary

This chapter discussed the concept of what MNCs are and their main features of identity. Their categories of entry were also observed. MNC operations were also covered in an attempt to identify the adverse impacts which MNCs are causing and contrasted these against the benefits derived. It is established from the literature that environmental degradation is severe in the forests and mining industries. The mining industry is causing fatal impacts. Although there are some benefits from MNCs, they are offset by their adverse impact. Having established that MNCs cause adverse impacts, the next step is to ascertain whether these impacts should be disclosed in their annual reports to expose them. This is considered next in chapter 3.

Chapter Three

Environmental Disclosure

3.1 Introduction

The literature, reviewed in chapter 2, established that MNCs in PNG have an adverse environmental impact. Although MNCs bring benefits to PNG, the adverse impacts they have more than offset these benefits. Since the general context of this study is to seek ways to monitor and control the adverse impacts of MNCs, in this chapter it is proposed that MNCs incorporate environmental disclosure in their annual reports. The environmental reporting will act as the medium of exposure to interested parties such as shareholders, ethical investors, environmentalists, employees, customers and others who read annual reports, the adverse impacts that the MNCs have. Such exposure may exert pressure on the MNCs to reduce unethical practices and thus minimise the adverse impacts. This chapter reviews the literature on environmental disclosure in annual reports and suggests two approaches to promote environmental disclosure among the Australian MNCs in PNG.

Purpose of Chapter

After a review of the adverse impacts caused by MNC operations in PNG, the next step is to seek for possible solutions. If the current rate of resource usage continues and the environmental degradation is unchecked, no sustainable development will be possible in the future. PNG is currently facing an impending disaster. The trend needs to change before PNG reaches the point of self destruction as Goldsmith et al (1972) predicted.

This is the main argument behind the accounting proposal to control any adverse impact. Other forms of control cannot be effectively policed, as was pointed out in the previous chapter.

Structure of the Chapter

The chapter commences with a definition of environmental accounting. While there are various definitions of accounting, for the purpose of this thesis, Gray et al's (1993) definition will be adopted. This is because there are no guidelines from the state or the accounting profession on what should be included under social reporting (including environmental accounting). What is currently reported in annual reports is voluntary and largely depends on the discretion of the management. Gray et al's definition is wide and embraces all expected features of environmental disclosure in this thesis.

The rest of the section is organised as follows: Section 2 establishes the groundrules for environmental management and reporting. Environmental management is defined to set the boundaries of the topic discussed. Environment policies, adoption, implementing and monitoring against possible conflicts/hindrances and legislation.

Section 3 discusses global development of environmental disclosure because it is a global issue. This study observes global developments to learn how different countries approach the issue. Some countries are advanced in their handling of the issue while others are still discussing possible approaches to implement it, including green accounting. There are differences in what constitutes green accounting due to

disagreements on what to report because as pointed out above, there are no accepted guidelines. Therefore various countries have approached the issue differently.

An extended observation is carried out on developed countries such as the US, UK and Canada in section 4. These countries are chosen because their MNCs operate in PNG and they (especially the US) are advanced in developing various strategies and legislation to address the environmental issue. The main benefit of studying these is to establish how they handle environmental issues. Such knowledge will assist this study to formulate practicable solution(s). Companies from Europe including the UK are reacting to environmental issues pro-actively (Kestigan, 1991). The section also covers the challenges of motivating MNCs to disclose fully. There will be better cooperation provided, it is thought, if the MNCs are informed about the benefits of environmental disclosure.

Discussion on developments in the US, UK and Canada will represent those of the developed countries. This is necessary because these countries have developed environment management and reporting systems which will become models for this study. Environmental disclosure in these countries should be reflected by their MNCs in PNG. Throughout the analysis of the developments, constant reference will be made to its application among the Australian MNCs in PNG to address its environmental problems.

Australia is considered separately from the other developed countries in section 5 because the focus of this study centres around Australian MNCs in PNG. Already pressure is mounting on Australian MNCs to incorporate and report on environmental issues. Currently environmental reporting is voluntary in Australia, but that is likely to change. The Australian commonwealth government has introduced green accounting and a professional body is preparing a conceptual framework along with guidelines to assist their members meet the demand. Developments in Australia ought to influence their MNC's disclosures. Such developments will assist this thesis in assessing the viability of the proposed environment reporting to remedy adverse environmental impacts experienced in PNG.

In the final section (6), the need for environment reporting in PNG is emphasised as the basis for recommending an accounting solution. Although it is a timely study, this section warns of dangers of overreacting or taking drastic actions because it will compound rather than alleviate the current problems. Eco-audit and an Award system are recommended to promote environmental reporting among MNCs. In this chapter, two hypotheses will be incorporated which this study will test in the main analysis (chapter 6). The hypotheses test the current disclosure trend among Australian MNCs to substantiate the suggestion of environmental disclosure as a strategy to address the environmental issues in PNG.

3.2 Environmental Management and Reporting

This section commences with definitions of environmental management and accounting in order to establish a groundwork. To report on environmental impacts, the environment must be first managed because adverse impacts are the results of unchecked economic activities. Problems like ozone layer depletion, soil erosion, water and air pollution, loss of wildlife and deforestation are evidences of an imbalance among the economic sub-systems. This section then discusses conflicts over social disclosure, environmental policy development, adoption/implementation and monitoring, and concludes by noting perceived hindrances that prevent environmental disclosure.

3.2.1 Environmental Management & Accounting

In order to rectify the problems listed above and restore the balance among the economic sub-systems, corporate managers have to fully incorporate concerns for the natural environment into the decisions they make. This is possible if they work within a framework of decision making which is both economically successful and environmentally sustainable. Sustainable strategies generate more revenue while minimising costs which are crucial to restoring a balance between ecosystems and economic systems (Warner, 1996).

Gray et al (1993, pp.6-7) define environmental management to include 'a range of responses by companies to environmental issues in reviewing their environmental

position, developing and implementing policies and strategies to improve that position and in changing management systems to ensure ongoing improvement and effective management'. The functions covered under the environmental management are environmental reviews, policy and objective development, life cycle assessment, standards-BS7750, eco-audit, ISO, regulations compliance, environmental assessment, waste minimisation and research & development in cleaner technologies. Environmental reporting is possible when environment management is sound and where the above areas are accounted for because environmental accounting is a product of environmental management. Hence, management can thoroughly report to interested parties if it manages its environment.

The early literature like Mobley (1970), and Estes (1972), emphasised the need to account for all costs of a corporation's activities. They argued that reporting only activities with monetary value is narrow and is an inadequate measure of an entity's impact on the society since it ignores the social factors. This is based on the grounds that each firm is under a social contract with the community and that its activities are constrained by concern for the welfare of the community (Ramanathan, 1976). A corporation is accountable not only to its owners but to many other interested groups as well (Bedford, 1973; Medawar, 1976). Despite this sound rationale for reporting, it is only within the last five years that accounting for the environment has become prominent. It is now taking a centre stage in the world-wide accounting profession where environmental accounting is now seen as an essential element in an organisation's environmental response (Gray, 1993).

3.2.2 Conflict over Social Disclosure Legislation

There is one setback to progress where accounting is taking a centre stage. This setback results from conflicting views on legislature for social disclosure. While there is high public demand for environmental information, there is some reluctance on the part of accountants to disclose (AICA, 1998). There is some degree of uncertainty among accountants over their roles and duties in reporting environment performance. This uncertainty is due partly to the lack of logically derived concepts to use in reporting (AICA, 1998). This prompts some to favour government legislating a standard set of minimum disclosure requirements (Gray et al 1987, 1988 and Gray 1991), but others like Parker (1986, 1991) claim that accounting standards contain enough requirements and further legislation is unnecessary.

The call for legislation is further supported by Tilt's (1994), evidence. Ninety-two percent of respondents, the majority of whom are environmental groups, felt further legislation is necessary. They maintain that current disclosure is deficient. Their argument is that more legislation will increase environmental disclosure. These groups are key users of environmental reports and argue that standards are needed to ensure companies disclose relevant information. To give an environmental report credibility, the report ought to be audited. (Eco-audit is one approach recommended in the final section.)

Although political solutions are not always the best, in the absence of legislation polluting firms will continue to pollute and destroy the environment (Chapman and

Barker, 1991). Given the environmental impact in chapter 2, environmental disclosure legislation is necessary to encourage sustainable development. The proposals of the Eco-audit and the Award system are to promote the overall objective of minimising environmental impact through disclosure. Eco-audit ensures compliance and full disclosure while the award system both challenges all to make an effort and rewards those who exert extra effort because current accounting requirements caters only for extractive industries only under AAS 7 and AASB 1022. Since there are different types of industries, each should be guided by specific disclosure codes. Better still, the requirements should be standardised to avoid creating loopholes. Especially, when there is significant resistance to developing legal requirement for financial accounting and reporting (Gray et al,1993).

It is anticipated that the above conflict over environmental reporting will be solved with the guidelines or standards which the AICA (1998) is developing to facilitate the measurement, reporting and auditing of an environmental performance report. Unlike the other accounting standards, which were derived from a piecemeal approach, environmental reporting guidelines are being developed more systematically. A conceptual framework is being developed which will provide guidance on the roles and duties of accountants of environmental reports (AICA, 1998). With such provision of guidelines, more and better environmental reports are anticipated.

3.2.3 Environmental policies, adoption, implementation and monitoring

The counter argument to legislation is that fewer probing questions will be raised if more information is disclosed as RTZ experienced in their 1996 annual meeting cited below. Such full disclosure is possible if MNCs conduct regular environmental impact assessment, (EIA). However, before an EIA can be carried out, an EP must be implemented. The assumption here is that the MNCs in PNG are not implementing their EPs because if they do, then the adverse impacts would be minimal. There are various stages of implementing EPs.

Elkington (1989) has an expanded set of steps known as the 'ten steps to environmental excellence'. The ten steps are:

1. Develop and publish an environmental policy
2. Prepare an action programme
3. Arrange organisation and staffing including board representation
4. Allocate adequate resources to implement policies
5. Invest in environmental science and technology to overcome obsolescence and/or inefficiency
6. Educate and train personnel
7. Monitor, audit and report to shareholders
8. Monitor the evolution of the green agenda
9. Contribute to environmental programmes and

10. Help build bridges between the various interests⁹ to maintain good relationship

Gray et al's (1993) summarised implementation and management of EP into six stages.

These are:

MNCs first need to assess the impact of their activities. This, MNCs would have done before they lodged their development proposals.

1. Their assessment should contain policy statements and guidelines of how the impacts will be monitored.
2. Then develop behavioural objectives to implement their respective plans of action. It will only succeed if environmental plans are approved by the entity's board and everyone is actively involved. Key personnel who must be active participants are the Chief Finance Officer and an environmental board member who will lead out.
3. Implement the plans by delegating responsibilities to different officers
4. Regularly carry out an environmental impact assessment
5. Disclose reports of assessments carried out in 5. to the public. To give such report credibility engage auditors to certify them.

Both approaches of implementing EPs outlined above begin with policies emerging from likely impact of corporate activities. That is what an EP should be, a proactive strategy to contain the impact. Most MNCs develop basic policies and add to it depending on the demand of the society they are in. Their level of commitment varies with the local

⁹ Source: *The Green Capitalists* as adapted by Gray et al 1993, 44

environment which creates inconsistencies. Very few accept world standards for fear of committing themselves too much. As one company official admitted, 'they do not know what environmental standards are applied by their subsidiaries' (Gray et al, 1993).

Three separate surveys¹⁰ reveal that up to the end of the last decade, less than 40 percent of companies disclosed environmental policies. The UNCTC survey of 222 world wide companies revealed only 39 percent had environment policies. Roberts (1991) surveyed 110 European companies and found only 30 percent had environmental policies. Of the 670 UK company reports analysed, only 5 percent had environment policies. Therefore there is a need to promote environmental policies as a proactive approach to minimise environmental impacts because policies have to be in place for implementation to take place.

Adopting and implementing policies are only a beginning. These policies ought to be regularly monitored to ensure their effectiveness. This is because 'all aspects of a company's operations, from accounting and purchasing, to product design, manufacturing, sales and marketing and distribution, will have an impact on the environment' (Business-in-the-environment, 1991a). Therefore each company should embark on environmental policies that permeate all its operations. This promotes good public relation (PR) from the outset.

¹⁰ All from Roberts (1991) Company reporting and UNCTC papers

Of those who implement policies, there are certain constraints which cause deficiencies in reporting. The main ones are environmental costs and concern. These become the major ingredients in the enterprises' investment decisions. It was revealed in an earlier, (environmental accounting), survey by Nikolai, Bazley and Brummett (1976) that accounting systems identify and emphasise costs more than the benefits, thus discouraging the adoption of environment accounting. Since then a lot of investment is going into improving environmental accounting. The current message is that benefits are exceeding costs, so much that those who invest in environmental accounting are excelling over their opponents (EcoTec, 1991).

Cost is a minor issue if environmental aspects in an investment proposal are considered. Environmental costs include regulations for clean up with allowances for waste disposal, and controls. Many of these cannot be ignored because they can add up to crippling a business even when only a PR is affected. Even banks consider environmental issues as part of their collateral (Houldin, 1993). This can be contrasted with benefits such as savings on litigation charges if environmental impact is accurately assessed. Equally important are non-financial benefits such as the protection of habitat, the ecosystem and the MNC's good reputation.

Disclosure requirements of environmental information began with information on the potential hazardous chemicals under Seveso Directive (1974). The focus has since widened to include fauna and flora (Woods, 1994). This is due to demand from a wide range of interested groups. The focus of reporting widens to include such issues as movement of

waste, vehicle emissions, protecting the ozone layer, hazardous waste incinerators, trade in endangered species and climate change (Gamble, Hsu, Jackson and Tollerson, 1996). Catering for such a wide range of interested parties compounds the enterprises' dilemma, but it does not mean they are insurmountable.

The Intergovernmental Working Group of Experts on International Standards of Accounting and Reporting (ISAR) have all addressed the wide range of environmental issues and conclude that environmental disclosures are important to both internal and external users (Gamble et al, 1996). This confirms Anderson and Frankle's (1980) discovery that firms which disclose social information out perform those which do not. That is why it will be in the MNCs best interest to produce environmental reports, unfortunately not everyone perceives these internal benefits.

Gilkson (1995) classifies benefits into four main areas. Environmental reporting :

1. will improve an entity's PR and enable it to gain market advantage;
2. will get a corporation into the practice of disclosing & makes it easier for it to adapt because some countries require compulsory disclosure;
3. changes attitudes to use/misuse of natural resources to promote sustainable development which eventually leads to;
4. environmental excellence where businesses become efficient because pollution equates to wastefulness.

Other industrial benefits are discussed below from the experience of developed countries which implement environmental disclosure. Prior to this, a brief mentions of factors that hinder current environmental disclosure.

3.2.4 Hindrance to Environmental Disclosure

Environmental reports up to this point (1995), has been the corporation's privileged document (Gilkinson, 1995). This present study is suggesting they should face public exposure. Once corporations start disclosing, 'increasingly sophisticated and better informed customers will start asking probing questions', says New Zealand's environment minister-Simon Upton (1995). This is illustrated by RTZ's Annual General Meeting in London May 1996. Shareholders walked out when the Chairman, Derek Birkin barred further questions from the floor about environmental activists attempting to storm the podium over 'RTZ's crime against the planet'. The Chairman then used the proxy votes of 354 million shares out of 355 million to quash campaigns for extended questions¹¹.

Until recently, very few companies made environmental disclosures. Bebbington and Walter (1993) highlight two main reasons for this. First, only certain aspects of social disclosure are demanded by legislation. That is why, although social disclosure laws urge corporations to disclose, not everyone complies (Epstain and Freeman, 1994). Secondly, since social disclosure is voluntary, only a few shareholders demand it. The percentage of shareholders demanding environmental reports have since increased as Tilt's (1994)

¹¹ Land Rights News Vol. 2, No. 39, July 1996, p. 8

survey shows. The Environment Accounting Task Force (EATF) found that only 25 percent of Australian MNCs currently disclose environmental information although two thirds of users seek it (AICA, 1998). The difference is a surplus demand for environmental information against a shortage of reporting.

It now appears that the social disclosure requirement will expand to encompass environmental disclosure whereby environmental information will no longer remain the company's privileged document. The environmental reporting requirement covers a wide area with compensating benefits. Since it is a global issue, the next sections will discuss approaches in other countries in order to adopt appropriate strategies in PNG.

3.3 Global Developments of Environmental Reporting

Environmental disclosure guidelines are being developed (AICA, 1998) as a result of the increasing demand for environment reports (EATF, 1996). Those industries who respond to the demand are benefiting. The cotton industry (mentioned below) illustrates that responding to social issues (including environmental) earns the entrepreneur financial rewards. This section briefly traces the development of environmental reporting on a global scale which will eventually encourage, if not challenged Australian MNCs to overcome their reluctance to report environmental issues. General environmental reporting developments on a global scale will be discussed in an attempt to learn from their experiences. This study is attempting an inductive approach. It is useful to compare developments of environmental issues reporting in developed countries such as

the US, UK and Canada, before concentrating on developments in Australia highlights the need for an environmental disclosure requirement.

3.3.1 Challenges of Environment Reporting

According to the ICAE (1992), environmental issues pose three major challenges to the development of environmental accounting. There is, first of all, a need to integrate scientific and technical environmental information with financial information in matters of expenditure, liabilities, asset valuation and future profitability. Next, is the question of where to place environmental information in the annual report. A third related issue is whether the current accounting policies are sufficiently distinctive to require separate disclosure.

Integration of Environment and Finance Information

Vinten (1993) argues that traditional accountancy will only make substantial contributions to green accounting when its assumptions and boundaries are defined. As an example, the author cites the Going Concern concept which implies continuity for the organisation over an indefinite period. Therefore threats of environmental impacts caused by pollution against an organisation which is meant to continue indefinitely is not traditionally catered for. Vinten (1993) presents two alternative solutions. The first alternative is to incorporate environmental information in the traditional accounting

framework. Such incorporation does not require much change. Therefore this approach is likely to be adopted. The alternative approach is to consider the environmental issue important enough to disclose it separately. The Asia-Pacific leading gold miner, Placer Pacific (1997) claims to be the first mining company to provide such a separate environmental report. Extra cost is required to integrate scientific and technical environment information with financial information. Vintem (1993), prefers the later approach although it is costly because key environmental information gets reported in the accounts which are scrutinised by most readers in annual reports. The author adds that it is unfortunate that most companies treat key environmental information as common news and place it in the least sought places of annual reports. Worst still, material information is omitted and the public is deprived of essential information.

These three problems the ICAE (1992) highlighted are being addressed by AICA. AICA (1998) is developing a conceptual framework, to provide guidelines for disclosing environmental disclosure. These guidelines will enable correct classification and reporting. AICA is beginning with a conceptual framework because previous standards were developed in a piecemeal manner (AICA). When these guidelines are in place, then it will be easier to report environmental information. The next concern is what to report as accountants will have guidance and direction on where to report it.

3.3.2 Where to report

Although Corporate Social Disclosure (CSD) has been the subject of research to address various issues, there is little coherence in the results. While the guidelines are being developed, there is no agreement on what to report. Gray et al (1995) blame the inconsistency on the fact that the subject is not enshrined like the Companies Act. There is no legislature requiring environmental disclosure. That is why CSD is either voluntarily reported in the annual reports or reported elsewhere by a third party. Even the provision of guidelines by the accounting profession, such as the AICA, does not guarantee complete environmental disclosure because CSD is voluntary.

In the meantime two approaches are being used in Europe to report environmental impacts. The first is the eco balance sheet approach developed in Austria and Germany (Jasch, 1993; Jorgensen, 1993). This approach traces all inputs and outputs including emissions and wastes. It is proving very useful for internal management as well as external accountability and transparency (Gray et al, 1993). The second approach is based on the value added system which deducts an estimated environmental value lost (Gray and Symon, 1992b). This was developed by a Dutch company which attempted to integrate financial and environmental reporting. The concern here though, is the accuracy and validity of the measurement of value lost. These two approaches might work for manufacturing entities in PNG but would be difficult for other industries such as mining.

Irrespective of approaches employed for treating environment information, annual reports are the principal source of financial information for interested parties (Neimark, 1992; Hines, 1988). Therefore it should contain *all relevant information* for the interested parties so they do not have to seek other sources. After all, an annual report ought to disclose all information as the General Purpose Financial Report (GPFR) should. This is because all forms of data reaching the public can be considered as part of accountability- discharge activity (Zeghal and Ahmed, 1990).

3.3.3 Separate Reporting

Roberts (1991), points out from the two European approaches that most sensitive sectors needs honest disclosure. While annual reports are 'One stop shop' for all integrated information, environmental issues are best reported on a site by site basis (Owen, 1994). Although it is costly, it will project the genuine position of the organisation. This practice also satisfies individuals who may be interested in single projects or sites. There is also a potential clean up cost by the owner or occupier of the contaminated site in reporting on a site by site basis. (The clean up cost applies in the US.) This is irrespective of whether the occupant caused it or not (Resource Management Act 1991, ss. 322(b)(iii)). Clean up cost is best illustrated by the Love cove case of New York. When Incidental Oil acquired the Hooker Corporation, it became liable for a \$250 million clean up bill from Hooker's operation. The cleanup cost only surfaced after the take over.

Where a corporation like Incidental Oil is required to meet the clean up cost, investors see potential liabilities. This constitutes uncertainty because their investment faces a risk. Investors will naturally be interested in anything that increases their return while minimising potential risks. An item that causes investors to revise their investment is said to be of information content (Gonededs, Dopuch and Penman, 1976). Although environmental information is information content as Incidental Oil experienced, companies either omit it or report it in the least sought places in the annual reports.

Part of the reason for such company action is that practical accounting has a narrow view. It consists of compliance and control with a focus on prescribed rules about organisational activities (Williams, 1987). Thus reports reflect only compliance and controls. The underlying reason in reporting should be to provide information for decision making that also satisfies accountability to all parties. That is why Rawls (1971) argues that voluntary self-interest reporting will not achieve optimal outcomes. His argument is that accounting is a moral discourse based on social justice.

The social justice concept is further developed by Chen (1975) who includes the concept of stewardship. He contends that a firm's management is not only the steward for its owners but also of employees, customers and society as a whole. Therefore any information that impacts on other entities or society ought to be reported. Bean and Fetig (1971) who were among the first to suggest that accounting should measure and report the impact as well as the cost of pollution.

How to get every MNCs Ticking

To entice those MNCs who are not complying with environmental reporting requirements, the European Union (EU) has introduced an Eco-Management and Auditing Scheme Logo. This logo will be awarded only to those who exceed the established standards and excel in their economic management. The logo is a prestigious symbol of environmental excellence and those who attain these awards will display them on their premises (Willits and Mitl, 1996).

A major component of the European Union's (EU) Environmental Management and Audit Scheme (EMAS) adopted in 1993, requires companies to make information about their environmental performance available to the public. This information is to be in a concise and comprehensible form. Furthermore, it must be externally verified (Barnes, 1994). EMAS began as a voluntary action to progressively improve environmental performance and provide information to the public. Unfortunately, corporations could not see the benefits of complying and were sceptical over its use. Since then EMAS has become an enforced regulation. The companies are now required to prepare and present externally audited reports (Barnes, 1994). The Eco-Management and Audit Scheme Logo is still being awarded to those who excel in their reporting. It is one of the contributing factors to the recent surge in social accounting.

3.3.4.Factors contributing to the Surge in Social Accounting

While various attempts are made to encourage reporting, four factors contributed to the surge of the social accounting in the 1990s. Gray et al (1993) attribute the surge to:

1. The concern about greed of entrepreneurs. It was reasoned that accounting should not be a tool for assisting greedy entrepreneurs but rather hold them accountable.
2. A rise in public interest and awareness among academics to develop social accounting. For instance, there should be research to seek solutions for problems such as those raised by Vintem (1993).
3. A surge of alternative/unsustainable economic activities. The previous chapter (2) covered unsustainable rates of resource usage.
4. The launching of environmental accounting has seen a corresponding increase in regulations on disclosure of environmental issues.

EATF (1996) and Trevor and Frost (1998) have confirmed that there is surplus demand for environmental reporting. However, the urge to supply environmental information is minimal or lacking (AICA, 1998). This creates a problem on how to get all MNCs to disclose environmental information without legislation. The Financial Sector Working Group of the Advisory committee on Business and the Environment's report (February, 1993) shows that the public is not satisfied with the lack of development. Public pressure is gaining momentum to force corporate bodies to report environmental information. There is a desire among the public to make all companies publish environmental reports. Such a development would mean standards and legislation may

also be necessary (Owen, 1994). The Business Advisory Committee Report (BAC, 1993) recommends that accountancy and insolvency professionals should provide guidance and input into developing legislation/regulation on environmental issues affecting accounting matters.

The BAC recommendation is timely because the increase in environmental awareness is pressuring organisations to account publicly for their activities and their impact on the environment. To promote environmental disclosure, eco audit and the award system as used in Europe seem effective in responding to current public demand. An environmental audit is a monitoring technique used to ensure corporations comply with environmental protection legislation. It also ensures that what is reported is objective. Goodfellow and Willis (1991, p.44) define environmental audit as 'a management tool comprising a systematic, documented, periodic and objective evaluation of how environmental organisations, management and equipment are performing.'

Goodfellow & Willis' definition of environmental audit is adopted by the International Chamber of Commerce (ICC) working party (ICC, 1989). The objectives of environmental audit is to help safeguard the environment by :

- (1) facilitating management control of environmental Policies and
- (2) assessing compliance against company policies, which would include meeting regulatory requirements. The reports can also be attested to verify its contents. Both eco-audit and the award system will be adopted in PNG from this section and are

discussed in the last section of this chapter. This will be preceded by a discussion on developments in other developed countries besides Australia.

It can be deduced from the global development that there is a public outcry for greater environmental information. Various attempts to respond to this public demand are beset by three vital questions: what to report (Content), where to report (venue of disclosure), and how to report (standards and guidelines) ICAE (1992). These issues are being addressed by different countries using different approaches. This thesis proceeds next to analysis of developments in the US, UK and Canada with the intention of adapting some of their strategies to contain their MNCs.

3.4 Development in the US, UK and Canada

Developments of environmental disclosure in the US, UK and Canada are important because there are MNCs from these countries among those causing adverse impacts in PNG. For example, Placer Pacific is a Canadian company operating in a joint venture with 2 Australian companies in the Pogera mine. While two approaches (eco-audit and award system) are selected from those used in Europe, environmental disclosure concepts must be sold to the MNCs in PNG to get quality environmental reports from them. The emphasis here is on the benefits of environmental reporting to draw both quality and quantity of reporting from the MNCs in PNG. This section discusses factors which increase environmental reporting in the developed countries in order to adopt them in

PNG. The conclusion is that PNG cannot adopt all of the developed countries strategies because it cannot afford to do so.

3.4.1 Survey of Current Reporting

The large surveys were carried out by Roberts (1990, 1991); UN (1992, 1993); and Gray (1993) to keep abreast of global developments, reveal diverse results. These surveys found that voluntary reporting is predominantly the practice of large MNCs. Approximately 50 percent of large corporations disclose voluntarily but the percentage decreases with size of MNCs. Currently environmental disclosure is by large companies only (size effect), mainly for PR reasons with low quality reportage. For example, Robert's (1991) survey disclosed that the majority of large companies' environmental disclosures were mainly descriptive. Only 40 percent produced quantified reports.

There will be closer probing under 'Public has the Right to Know' if information is not voluntarily disclosed. A company official reported that the political climate is changing and unless they begin now, it will be a more painful exercise later (Gray et al, 1993). Therefore, it will be to the corporation's advantage to voluntarily disclose environmental information because legislation is being drafted.

The Tenth UN session (1992), survey of the World's largest companies reveals a strong reluctance among large corporations to reveal environmental issues. The survey found 86 percent disclosing environmental data only, 40 percent provided environment related

financial data, 19 percent provided quantitative information on emissions and only 3 percent disclosed information on contingent liability. This survey contradicts earlier discussions that environmental disclosure has size effect because even the world's largest conglomerates are reluctant to reveal environment information which might jeopardise their own operation and survival.

In another survey, KPMG Peat Marwick (1992) specifically surveyed environmental reporting practices of the top 100 companies in the US, UK and Canada. They found US companies provide considerable more financial data than those of UK or Canada. This is due to US companies being subjected to SEC regulations S-K relating to disclosure of cost and expenditure figures. No country beside US uses its SEC to enforce standardised requirements. The other two countries were not subjected to such regulations, therefore their companies' voluntary disclosure was deficient.

Evidence from the UK's reveals that the continuance to rely on voluntary disclosure may prove inadequate. First evidence comes from surveys conducted by Tonking (1991) and Kirkman and Hope (1992). These surveys found reports of medium listed and large unlisted companies to be patchy. Only large listed companies fully disclosed environmental issues. This confirms KPMG Peat Marwick (1992)'s survey result. A further study by Tonking (1993) noted that although the number of organisations addressing environmental issues is slowly increasing, the quality of disclosure in providing specific details shows little improvement. Most UK disclosures were narrative

with only few producing systematic performance reports (Owen et al, 1992, and Gray and Owen, 1993).

3.4.2 Quality of Environment Reporting

The UN survey (UN 1992a) of 222 transnational corporations, found MNCs to be aware of environmental issues but their disclosures were mainly qualitative, and partial. This made it difficult to make comparisons. While the report format was familiar, its quality was poor and inconsistent. The KPMG (1992) survey, found US companies had more quantitative data on environmental issues and considerable more financial data than Canadian or UK companies. Only a quarter of MNCs set targets to improve their performance. There is little evidence in all three countries (US, UK and Canada) of environmental auditing. This raises questions about the quality of information content. A general conclusion, with some exceptions is that environmental reporting is still in its infancy, even among leading nations such as US, UK and Canada (KPMG, 1992).

Such findings of deficient environmental disclosure provide further evidence for studies such Roberts (1990, 1991); UN (1992, 1993); and Gray (1993), all of which noted that the disclosure was mainly patchy and descriptive. These findings also complement Tonking (1991); and Kirkman and Hope (1992). Most UK company reports were narrative with only a few producing systematic performance reports (Gray and Owen 1993, Owen et al, 1992).

Although increasing number of MNCs are disclosing environmental impact reports, they are unsystematic and are reported on an ad hoc basis (Fayers, 1998). Most lack independent attestation (ICAE, 1994). They are largely narrative and lack integration with the main accounts. The quality of disclosure mainly concerns the accountant. Environmental information ought to be disclosed under the principle of user pay, where environmental legislation impacts on organisations with financial consequences.

Poor quality of environmental information may be attributed to the cost factor. It was pointed out, in an earlier section (3.2.3) that extra effort of incorporating environment reporting incurs costs. Therefore unless there is a monetary reward to offset the cost incurred, there will not be any extra effort. After all, there is no legislation to enforce disclosure. To induce environmental accounting will require some tangible incentives. Section 3.4.3 suggests that there is benefit in implementing/complying with environmental reporting. The inducement here is that an environmental management system has its advantages. So far the emphasis has been on the disadvantages. Therefore the next section discusses the advantages.

3.4.3. Benefits of Environmental Disclosure

Environmental disclosure does not only beget a good PR but also increases financial returns. Relationship between social disclosure, performance and economic performance is best described by Alexander and Buchholz (1978, p.479) as 'being socially aware and concerned, enabling management to run a superior company making it an attractive

investment.' That is, those who disclose ought to outperform those who do not. This contradicts the commonly held view that extra expenditure of improving working conditions and/or of collecting data on environmental issues, recording and reporting them incurs costs, which reduce profits.

One industry that gained from complying with environmental disclosure is the cotton industry. The cotton industry was labour intensive with a very low return and was a less attractive investment. It was argued that a cleanup and new equipment costs would be unaffordable. This was maintained until a US Supreme Court Decision (AMTI v Donovan, 1981) allowed the Occupational Safety and Health Administration (OSHA) to enforce a stricter standard for reducing dust emissions from cotton in the workplace. Schmidt (1985), maintained, that decision was a turning point in the cotton industry because it had a major economic impact on it. Since the verdict, the industry has been modernised into a capital intensive industry and has since become efficient. The cotton industry experience reveals that firms with new equipment and the latest technology appear to be stronger financially. This experience may never have eventuated if there had been no strict enforcement on dust reduction. There is therefore a relationship between environmental requirements compliance and economic benefits.

There are also other benefits besides efficient operations for complying with environmental record keeping and reporting requirements. Compliance can improve the company's ability to manage environmental issues effectively. There is also the security and assurance of less litigation with civil and criminal liabilities. This results from

complying with requirements to promote a sustainable economic growth and a safer community (Coopers & Lybrand 1993). Ok Tedi's \$3 billion lawsuit, would have been avoided had OTML complied with environmental requirements. UNCTC's Ninth Session (1992), found German and Swiss companies had a high level of environmental disclosure. They were able to keep track of the high level of expenditure as well as avoid the tight scrutiny in their annual general meeting from concerned shareholders.

3.4.4 Quality of Disclosure

Where the costs are material, they need to be disclosed separately (ICAE, 1994)¹². The later argument is expressed in the UK Accounting Standards Board's (UKSB) 1991 exposure draft that requires an item to be presented separately if it is significant (material) enough, to influence stewardship decision. SEC release 6835, requires management to disclose any environmental problem of known potential significance that is likely to have a material effect. Both UKASB (1991), and SEC release 6835, deal with the question of disclosing what is 'material'. Current accounting standards AASB 1031 and AAS 5 define materiality as 'a piece of information, if omitted or misstated, has the potential of adversely affecting decision about the allocation of scarce resources made by users of financial report or the discharge of accountability by the management or governing body of entity.' The attempt here is not to deprive any decision maker by the lack of, or misstatement of information. This will ensure that all interested parties receive ample information to make well informed decisions.

¹² ICAE Environmental Research Group 1994, p.73.

The Canadian Institute of Chartered accountants (CICA, 1993) recommends that new recognition, measurement and disclosure standards for environment costs should be included in a separate section of the CICA handbook. This will ensure that there are clear guidelines to follow in preparing reports. There will be guidelines on measurement to determine materiality of items for disclosure. Their Australian counterpart (AICA) has already embarked on the preparation of guidelines for measurement, recording and reporting of environmental information. However, the question still remains, whether the guidelines will improve environmental disclosure, because the whole process is a vicious circle of regulation, litigation and community reaction which leads to further regulation.

While the accounting profession is developing its guidelines to improve reporting, investors are becoming wary of bad environmental practises because it increases liabilities and risks that soak up profits (Coopers & Lybrand, 1993). Others, such as employees, suppliers and even consumers are also interested in how environmental issues are being handled. Bad environmental practices have in some instances prompted action from groups such as environmentalists who work to minimise environmental degradation.

Tilt (1994) presents the first empirical evidence about the community lobby or pressure groups' influence on corporate social disclosure. The literature he surveyed of US and UK origin, shows that most of the pressure groups are environmentalists who are very effective. Of their effectiveness, an executive was quoted as saying, 'environmentalists

are becoming more penetrating in their analysis and more skilled to change conditions they think should be improved'. So much so that 'when the environmental lobbyist speaks, the company bosses tremble' (The Economist 1990, p. 90).

Tilt (1994), distinguishes pressure groups in the US as lobbyists aiming to create legislation while those in Europe as publicisers of issues. Pressure groups are rare in Papua New Guinea. Any form of lobbying is done by Australian NGOs like Aid/Watch or the ACF. There is therefore a need to establish local pressure groups. The partnership between ACF and MEF (chapter 2) bridges the gap to enforce environmental disclosure requirements in member countries.

Pressure groups are vital in the US because concerns and actions by various groups has led to the establishment of the US Environment Protection Authority (USEPA). Under the USEPA, record keeping, reporting and disclosure requirements have become a fundamental part of environment management. For this reason, the USEPA has increased its regulatory activities for developing rules for recording and reporting. In some industries, the issuing of certificates is used to promote effective and continuous checks. Coopers & Lybrand (1993) report that the USEPA's attitude is changing. It is now committing all its resources into enforcing record keeping and reporting violations.

Some form of enforcement is essential as the US surveys show. Since the USEPA authorities use the S-K rules, their reporting has quality disclosure and is better than that in the UK which relies on voluntary reporting. US disclosure has both qualitative and

quantitative information. It would be excellent to legislate for environmental disclosure in PNG but there is the risk of driving away the MNCs and they are important to developing the resources in the country. Therefore, it would be better to work along with developments in Australia whose MNCs are studied here. Their current developments are analysed next.

Size affects environmental disclosure. Large corporations disclose more. These MNCs come from developed countries, as referred to earlier, it is appropriate therefore that any developments among them be observed. These developments are more advanced in some countries than others, however the common sentiment is that the need for greater disclosure of environmental information is becoming evident. The process will be faster if every stockholder is provided with environmental information of the adverse impacts from MNCs' operations.

3.5 Development in Australia

Australia is currently responding to public demand to incorporate environmental disclosure in company annual reports (AICA, 1998). It is a flow on effect. Kahill and Kane (1994) claim that environmental management initiatives are exploding worldwide as a response to demand for disclosure. However, Australian current environmental reporting is deficient (Deegan and Gordon, 1996) despite every state having environmental laws enforced by the Environment Protection Authority (EPA). This section discusses recent developments like the AICA's conceptual framework and

guidelines, and the public demand for environmental information which the Australian MNCs should address in PNG to minimise the current adverse impacts there.

3.5.1 Current Australian Reporting

While quality of environmental disclosure is improving in the above countries (section 3.4), it is not the same for Australia. Current environmental reporting by Australian accountants is deficient. However, if there is any increase, then it is not related to industry, nature of operation or size - measured by total sales or assets. Evidence from Deegan and Gordon (1996) suggests that environmental disclosure is self-laudatory. These reports appear in the chairman's or the managing director's reports and are mainly qualitative.

This is due to lack of support for the provision of environment information in financial statements. A survey conducted by (Deegan, Geddes and Staunton, 1996) shows that there is only marginal support for environmental disclosure. It appears that accountants consider environmental issues to be irrelevant to investors. This attitude may stem from lack of guidelines on how to treat environment issues but this is soon to change, when the AICA (1998) develops the conceptual framework and guidelines for environment management systems and reporting, which will be imposed on the accountant.

The AICA's (1998) effort in developing guidelines complements the Australian government's adoption of green accounting. While some are debating the introduction of

green accounting, Australia is one of those countries busy implementing it to achieve sustainable development (Atkinson, 1995). It was unveiled when the environment minister announced the incorporation of green accounting with an injection of \$3.5 million into the project. Green accounts are to be developed according to UN specifications over a period of four years in Australia (Wallis, 1995).

3.5.2 Environment Management System and Reporting

Green accounting will begin with the national government and permeate into the private sector of the economy. Therefore Wilmshurt and Frost (1998), urge accountants to play a leading role in successfully implementing environment management system into the traditional accounting function. So far, various accounting practices have already been adopted. These include: accounting for energy usage; rehabilitation or restoration; production costs; cost of legal requirements; contingent liabilities, and waste management. Despite the adoption of these practices, the information is not distinctly categorised and reported externally. The authors claim that important environment information is lost within the total information reported.

Unless the environmental considerations mentioned above are incorporated into both the accounting and financial systems, they will prevent environmental advancement (Gray et al, 1993). Essential prerequisites of 'greener' management and accounting systems are not in place. This delay is caused by the lack of what Elkington, Knight and Hailes

(1991) term, the language of finance. The language of finance has not developed fast enough to keep pace with the environmental pressures.

Despite the lack of a finance language, some improvements in reporting have been observed among Australian firms. A survey by Coopers and Lybrand (1992), found 21 percent of the companies in Australia disclose environmental issues compared to 52 percent in US and only 14 percent in UK. While Australian environment reporting may be 7 percent higher than UK, Australia has lagged behind its many overseas counterparts (Kestigan 1991). These studies are obviously out dated. Since then various experimental approaches have been carried out to incorporate environmental factors within the financial framework (Gray et al, 1993). EATF (1996) reported that almost 25 percent of Australian MNCs now disclose environment information (AICA, 1998). Thus Australian MNCs have improved by 4 percent over the 4 years as compared to Coopers & Lybrand (1992) survey.

However, evidence from Deegan and Gordon (1996) suggests that little has improved. Environmental reports appear in the Chairman's or Managing Director's report. They are mostly qualitative and self-laudatory. Current environmental reporting by Australian accountants is still deficient. This deficiency in environment reporting may explain why we have environmental problem in PNG: the majority of the MNCs come from Australia and they are not currently providing environment information about their operations in PNG. It appears that voluntary accounting disclosure will not solve environmental problems because not everyone discloses, as shown by the studies above. The industries

may need to be informed about the advantages of environment reporting or regulated because environment disclosure will be less objective in an unregulated environment.

Deficiency is partly due to the accounting profession treating environmental issues lightly. This was evidenced in Deegan, Geddes and Stauton's (1996) survey which suggests that accountants give only a marginal support for environmental disclosure. Based on these studies, this study proposes its two hypotheses: that Environmental Reporting for Australian MNCs has not increased since 1991 (H₁) and if there was any increase it was time and event specific (Walden and Schwartz, 1997), therefore it will not persist, hypothesis 2 (H₂).

For Corrigan (1998), the current environment accounting is centred on environmental reporting and scarcely touches performance and measurement. The author is reflecting on a recent International Federation of Accountants (IFAC)'s study-*Environment Management in Organisation: The Role of Management Accountant*. The contention is the notion that management accountants should take a leading role to promote sustainable development. The outcome was that four major elements were adopted from the Society of Canadian Management Accountants. They are: cost accounting, financial management, risk assessment, and information systems. The adoption poses a challenge for management accountants to incorporate these four elements to be eco-efficient, incorporate environment considerations into financial decisions, identify environment related risks and financial liabilities and develop an information system which will enable greater quality of reporting.

3.5.3 Timely Developments

Experience from the developed countries reveals that the policing of environmental requirements follows a vicious circle (Coopers & Lybrand, 1993). While it may appear hopeless for developing countries with limited resources to act on any requirement, each litigation and community reaction leads to enacting new regulations to strengthen weak areas. It is considered here that MNCs should be made to disclose environmental information. This relates to two developments. Firstly, the public/shareholders' demand for environmental reports from their companies (Placer Dome, 1997). Some shareholders of Australian MNCs live outside PNG. Therefore requiring environment reporting is in line with company owners (shareholders) calls. It seems timely to incorporate the environmental disclosure requirement with the recent upsurge in the publics' demands for environmental disclosure.

Steve Schueth, who is the president of Calvert Distributors Inc, Bethesda MD., a mutual fund that only invests in responsible companies commented that MNCs are beginning to realise that the more they tell the public, the greater respect they earn from it. When environmental information reaches the investors through the accounting disclosure, they will redirect their investments. This will eventually impact on businesses and force them to become 'green'. After all, adopting best environment practices is cost effective and increases profitability (McCafferty, 1996).

Already businesses are improving their accounting disclosures. They are doing better at accounting for environmental liability by both recording and disclosing them. A survey by Price Waterhouse (1994) reveals a remarkable change over two years. Seventy percent of the respondents with significant environmental involvement reported disclosing it in their financial statements compared to a survey completed two years earlier where 62 percent with known environmental involvement did not disclose them (McCafferty, 1996).

Secondly, the Australian accounting profession is developing guidelines to meet public demand for environment reporting. AICA is developing guidelines to guide the preparation and the presentation of environment reports (AICA, 1998). This is where environmental accounting will become a reality. However, coercion does not work because environmental problems are social problems (Ludwig et al's, 1993). This is a rational argument because many of these problems are caused by human greed to deplete resources for wealth maximisation. Meyer (1979) warned about problems that cause irreversible damages. No amount of expost analysis will solve the problem.

Vogel (1993) directs a warning at the accounting profession that environmental legislation will soon affect the profession. The ramifications may be severe, especially for those ignoring environmental legislation. It will affect the reliability of their financial reports. Information like product improvement, waste reduction and other innovative environmental disclosure can be a showcase to attract investors (Krueze et al, 1996). Besides, disclosing environmental policies, practices and obligations are required to

satisfy its full disclosure requirement. The main issue is how to incorporate the above developments into MNC operations in PNG. This is addressed next.

Studies on the development of environmental disclosure in Australia reveal a mixed result. Even though Deegan and Gordon (1996) observed some improvements between 1983-1991, Fayers' (1998) assessment is that environmental disclosure is still self laudatory. So much so that, Fayers concludes that environmental disclosure currently is a 'greenwash'. Nonetheless this thesis envisages an improvement in line with the current global development. The AICA is already preparing a conceptual framework and guidelines for its members' use to meet the current demand for environmental disclosure in Australia.

3.6 Application in PNG

This section draws the relevant materials together from the discussion of various environmental disclosure developments. It considers the advantages and disadvantages of applying the concepts or approaches of environmental disclosure to address the environmental issues in PNG. The chapter then concludes with the application of the two approaches from the European developments: the eco-audit and the award system, to promote environmental disclosure among Australian MNCs in PNG.

3.6.1 Problems Associated with Environmental Disclosure Legislation

Environmental consciousness has been rising since 1972 with greater pressure from developed countries (Cairncross, 1992). This may be because developed countries have better technology to employ in environmental management. They also have legislation which regulates and minimises environmental impact. In complete contrast, 'a developing country cannot legislate because legislation is too cumbersome to manage, time consuming and costly to enforce. Government intervention therefore, is necessary because the voluntary action by MNCs is neither realistic, nor fair' (Cairness, 1992, p.17).

However, Wescott (1992) advises against government invention even though it may be necessary. The author further discourages authorities, in particular those from developing countries from launching complex programs to protect the environment. Such complex legislation impairs more than solves the problems. Wescott specifies three pitfalls devising complex legislature in developing countries to address' environmental issues:

1. Since the programs are complex, there is no flexibility and hence there is no uniformity in enforcement in the related industry, country or even in the region. PNG faces this problem in the mining industry where each mine operates under separate agreement. This was discussed in chapter 2.
2. There is no rigorous enforcement. Since arrangements vary, major acts cannot be enforced. Some requirements may even be inappropriate. For instance, Thailand's

extensive environmental program was not enforceable. Accordingly it was labelled, 'Paper Tiger'. Lack of enforcement eventually led to the Bangkok Chemical Explosion in 1991.

3. If there is no uniformity and enforcement on companies, then there is also no consensus among regulators, agencies and enforcers of regulations. Eventually the legislation loses its effectiveness and those who enforce it become powerless. The forestry industry in PNG faced this problem where forest legislation was ineffective and even the leaders were involved in corrupt deals (Barnett Commission, 1987).

When local legislation becomes ineffective, there is the danger of borrowing 'ready made kit' programs to solve local problems. KPMG (1992) warns developing countries to be wary lest they fall into a trap like Taiwan. Taiwan borrowed USEPA programs to combat hazardous waste sites. Unfortunately USEPA programs were not only ineffective but were costly to administer.

3.6.2 Ethical Investors

It is not within the scope of this study to propose legislation but rather encourage the provision of environmental disclosure through the accounting profession. Therefore the above discussion is focussed only on developments of environmental reporting. This study capitalises on EATF a (1996) study which found a mounting demand for environmental information by interested parties in Australia. Disclosure of environmental information is intended to expose MNC activities and direct pressure

from ethical investors to MNCs to minimise the adverse impacts currently experienced in PNG.

However, Perkes et al (1992), who studied UK ethical investors argues that annual reports do not provide ethically related information. Ethical investors claim that the contents of annual reports are too general. This is because ethical investors voice their concern over degradation based on information they receive from annual reports (Perkes et al, 1992). Those who seek funds while upholding environmental codes, will have access to ethical funds. Social or ethical funds were first launched in 1970s in US around the time environmental issues emerged. Within the last ten years it has reached \$50 billion (Chastain, 1983). This boosted an upsurge in environmental issues in the 1980s and greatly influences investment decisions up to \$US 400 billion (Bromige and Partners, 1989).

Perkes et al (1992) are supported by Hatte et al (1991) that 10 out of 12 ethical investors base their decisions on annual reports. Unless these ethical investors are adequately informed, they can make wrong decisions. Perkes et al (1992) expressed concern over annual reports containing very little information for ethical investors. As a remedy, the authors suggest legislation to improve this deficiency. Their argument was that ethical investors when combined will be a powerful force to correct environment degradation.

A counter argument based on a EIRIS (1989) study, calls ethical investors, hypocrites. EIRIS claims that ethical investors live a double life. They profess to be ethical in some areas, while investing in others. This must be why Hatte et al (1991) claim only 10 out of 12 base their decisions on annual reports (Perkes et al, 1992). On the surface it is difficult to judge unless the claims are empirically tested. Wiseman (1982) and Rockness (1985) advise caution is needed this area. Their study found that those who make the most noise are the poorest environment performers.

Hollingworth (1998) presents a more balanced view on ethical investors. The researcher observed that environmentally conscious investment is moving into the financial stream. They have two objectives: 'To invest their money in a manner which will contribute to a sustainable environment and society as well as earn a good return. Ethical investors stress that their funds are not charity funds. Hence they will not lose money in ethical investments' (Hollingworth, 1998, pp.28-29). Their earning will be reinvested into other ethical investments of lower returns so they should earn appropriate returns.

For PNG, ethical investors may be the country's hope for a while yet, to raise concerns about MNCs unethical practices and reduce their impacts. To this end Australian MNCs will be required to implement EP including environmental disclosure within their annual reports through the use of the two approaches used in Europe: Eco-Audit and the Award System. Each one is discussed below.

3.6.3 APPROACH 1: Eco- Audit

This section discusses Eco-Audit which is the first approach this study proposes to address the environment issue in PNG. It coincides with environmental auditing which is becoming a 'buzz' word of the 1990s (Welford, 1994). MNCs need to keep records for regular monitoring after they implement an EP to see how effectively they are achieving their objectives. (This study will not deal with setting up environmental accounting. It is confined to disclosure). Results of regular monitoring and assessment will be reported in the annual reports. It shows corporations commitments and will be the tool to improve the environment.

Environmental audit is defined by the Conference of the British Industry (1990) as 'the systematic examination of the interactions between any business operations and its surroundings. This includes all emissions to air, land and water; legal constraints; the effects on the neighbouring community; landscape and ecology; and the public's perception of the operating company in the local area. Environmental audit does not stop at compliance with legislation but a total strategic approach to the organisation's activities' (Gray et al, p.96). Eco audit encompasses an effective implementation of an EP. It begins with an environment policy with targets under an environment management system. This system is monitored, and its reports verified independently before it is presented.

Environmental audit is a major component of environmental management. While the terminology is borrowed from traditional accounting, different knowledge, experiences, laws and approaches are needed for an environmental audit. Major components are environment impact assessment (EIA), environmental survey, environmental review, monitoring and surveillance, environmental investigation, the eco-audit and BS7750 as well as the independent attestation. Other forms of audits are compliance, site, waste, activity, process, safety, quality, takeover/merger audit and energy (Gray et al, 1993).

Of these, EIA is the major process. Fuller (1991, p.12) defines EIA as 'an essential process that seeks to identify and predict the impacts of a new development on the environment in order to mitigate them where possible and to monitor the actual impacts'. Fuller adds a reminder that the environment is not a one off issue with a single solution for all problems. Therefore it needs a continuous assessment (audit) and monitoring of all aspects of the organisation in order to achieve its goals.

To be effective, a company initially undertakes a SWOT (Strength, Weakness, Opportunities and Threats) audit which will reveal strengths, weaknesses, opportunities and threats highlighting the areas to concentrate on (Gray et al, 1993). For those who do not wish to loose trade secrets, new legislation is being passed in US which gives privileged cover for the audited environment management information. Australia may wish to adopt it for their companies. Cover is also provided for the auditor, but such cover can only be retained if the status is maintained. If there is any weakness or problem, it must be fixed to claim privilege cover (Rosemarin and Ballesteros, 1995).

Any organisation that ignores its environmental audit does so at its own risk because a good audit will help a company become efficient (Gray et al, 1993). A thorough environmental audit begins with a simple survey of the organisation. Such a preliminary survey will also reveal the organisation's strengths, weaknesses, opportunities and threats. Often this will require external expert assistance although many prefer to do it in-house while others use both. Drawing a flow diagram of the organisation with its activities will highlight inputs, operations and outputs. This survey will reveal leakages, refuses, emissions and repeat sites. These results will assist corporations to develop a monitoring and surveillance service to minimise impacts and meet the requirements of both existing and potential legislation.

While the recommendation of this study is for MNCs to incorporate environmental impact plans into their accounting system, it would not be complete without an eco-audit. To ensure that such reports have credibility, they ought to be audited by independent auditors and if possible published separately. Excellent examples of separate verified reports from developed countries are, the Caird Group and British Airways. Both British companies published audited environmental reports, British Airways provided its report

as a supplementary booklet with the annual report. The airline even admitted that it was lagging behind best practice and pledged to continuously monitor their operations to improve (British Airways Environmental Review, 1991).

Most striking is Norway's largest Industrial Group Norsk Hydro, which began publishing comprehensive environmental reports to correct its image following some adverse publicity. The corporation published a comprehensive report of all its activities in Norway and worldwide. It was the first company to do so and it was more than a PR exercise. These reports were thorough with emissions targets and their framework of operations. The disclosure contained both good and bad reports (Thomas, 1990)¹³.

Both British Airways and Norsk Hydro were rewarded with Environmental Reporting Awards in March 1992 for their innovative reporting. This was to encourage the self reporting these companies demonstrated. Four criteria were used in the selection of an awardee:

1. The corporation has reliable information well communicated in the report,
2. The information is easily accessible by the public,
3. The aims are achievable because they are practical, and
4. The process of the company activities promote sustainability

Various methods are being developed to accommodate environmental accounting into annual reports. These annual reports are independently attested through environmental audit.

Environment legislation varies between countries and corporations respond accordingly. A survey for the Ninth UN (1991) session, examined 20 German and Swiss companies which were mainly chemical, pharmaceutical, metal and mining industries. It revealed a high level of quantified environmental disclosure. Their reasons were:

¹³ Financial Times October 20

1. Their environmental expenditure was high and will continue to be so. Therefore they need to keep a record of them and disclose them.
2. Publishing environmental information reduces the number of environmental questions raised by stockholders.

Interestingly, their subsidiaries from Brazil had less in their environmental reports and these were of a lower quality. This is expected from a developing country where there are lax environmental laws as indicated earlier. MNCs in PNG may behave in the same way. However, this will be discussed in chapter 6. Much depends on environmental disclosure requirement and its enforcement.

Environmental reporting may be compulsory regulated, industry prompted, voluntary or even self generated. The Body shop took a lead in UK, voluntarily disclosing by publishing '*Another year in our lives*' with their annual report detailing actions, activities and steps taken in environment management in 1990. Two years later (1992) Body shop published a comprehensive report of environmental performance with independent attestation. Progressive information of targets were included. It provided a better perspective of actions towards sustainable environmental management without legislation. However, the Body shop is unique, because voluntary or self reporting is usually deficient, causing adverse impacts as repeated on several occasions chapter 2.

Within the Australian context, few like the State Electricity Commission of Victoria (Annual Report 1990/1) have excellent targets and performance reports on Dust

emission, water intake, salt discharge and carbon dioxide emissions (Table 3-1). Table 3-1 below shows the Victorian State Electricity Commission's target for each of the above and the organisation's aims to improve in each area. Annual performance is compared against the targets and necessary adjustments are made. This example should be adopted by the mines in PNG to control their disposals of wastes including hazardous chemicals. They can set targets and work to improve on their past and reduce the impacts.

Table 3-1. Extract from SEC's aims & Performance

Environment:	Target 1990/1	Actual 1990/1	Target 1991/2	Actual 1994/5
Dust (g/cuM)	<0.11	0.10	0.10	0.09
Water intake from Latrobe catchment (MI/GWh)	3.8	2.9	3.0	3.0
Salt discharge in Latrobe river (t/GWh)	0.950	0.092	0.920	0.850
CO2 emissions (Mt/annum)	42.0	43.3	42.0	42.0

Source: State Electricity Commission of Victoria Annual Report 1990/91
as adapted by Gray et al 1993, p.245.

Although the benefits of efficiency, avoidance of litigation, community safety, healthy financial position are ample reasons to encourage anyone to try, there will always be some who will only comply with the basic minimum. The example of PJV was cited in the last chapter, as revealed by CSIRO (1996), show that MNCs stay within the minimum legal requirement. The Dutch experience reveals that the passing of laws and issuing of operating licences are not enough to protect the environment (Husing and

Dekker, 1992). Corporations need to be persuaded to incorporate environmental issues as part of their objectives and activities. MNCs act after they evaluate moves, in the light of cost versus benefit analysis. So environmental management has to be presented as a means of accruing benefits to the organisation. Awards can be used for attempts in environmental management schemes. This will prompt further actions by the organisation in managing environment better. The next approach, which is the award system discussed below, entices those who will not be persuaded by the general benefits.

3.6.4 APPROACH 2: Award System

This section discusses the award system because the above advantages will not mean much those MNCs who are only 'transiting' in developing countries. Other incentives are necessary to encourage them to disclose environmental issues. One effective system used by British Airways and Norsk Hydro is the award system. New Zealand is also using the award system effectively. An award is issued to a corporation if it:

1. has a comprehensive environmental policies in place,
2. expresses commitment to comply with legal and statutory requirements,
3. presents performance measures and trends and importantly,
4. discloses audited reports of actual consistent implementation of their policies from
(1) like British Airways and Norsk Hydro.

A survey of UK corporations revealed that although regulations are a concern, damage to public perception was the most feared threat, registering 93.6 percent of responses

(Ghobadian et al, 1987). Good reputation can be ruined overnight but, it will cost more to rebuild. Corporations comply with regulations mainly out of fear for PR damage and not because the legislation is strict. The majority of businesses in UK, for example, find existing legislation 'toothless'. Since the EP requirement in PNG is ineffective, some incentives for self regulation like an award system may be effective. It may even be better therefore to expose the MNCs' environmental degradation to make them work to guard their PR. Better accounting and disclosure are just part of the solution. It is difficult to determine what to disclose (Mulcahy, 1995). Determining the problem, the extent of damage and preventing it from recurrence, will contribute to better disclosure.

In the absence of environmental legislation, disclosure is voluntary. Unfortunately, voluntary disclosure is not effective, as pointed out earlier. Since studies like Deegan and Gordon (1996) reveal that voluntary environmental reporting is brief, mainly qualitative and self-laudatory; an award system may encourage more constructive reporting. This study does not specify any particular type of award. However, each industry can issue an award for excellence. A prestigious logo was used in Europe (Willitis and Mitl, 1996) while a simple award was issued to British Airways and Norsk Hydro. Companies in each industry can compete for a prestigious award which will build them a good PR. PNG needs MNCs to develop the resources and stimulate economic growth but their operations need to be controlled to minimise their impacts.

3.7 Summary

Since only a few countries have legislation on environmental accounting, this does not mean that PNG does not require environmental disclosure. However, this study notes Westcott's (1992) advice against launching into complex environmental protection from scratch which proves ineffective. Already PNG is enforcing the requirement for an EP to be lodged with proposals, an addendum can include a clause which requires a disclosure of their EP in their annual reports. All they are required to do here is to implement their EP, audit and report it. This audited report is to be incorporated in their annual report. This can be further enforced by the PNG stock exchange where public companies are required to include environmental disclosures in their annual reports to be listed.

Already MNCs are producing annual reports, and it should not be a problem to add environmental disclosure to them. Just leaving it there is inadequate. It may only result in qualitative and patchy reports, as noted by Fry and Hock (1976). They studied 135 firms in 15 different industries and noted a negative relationship between social disclosure and social performance. The authors found firms with poor images make the longest social disclosure only in order to deflect attention. They disclosed more, partly to legitimise their activities but more to deflect attention from the real issues.

On the contrary, less profitable firms rationalised by focusing on external causes which were beyond their control for their results (Frazier, 1983). Since the focus here is on the

environmental impact caused by MNC operations, the latter group will present a better picture. They will be able to disclose what was beyond their control after eliminating controllable causes. Since the emphasis is on activities, impacts and targets, such requirements will be useful to carry out a site by site audit and disclose the results in their annual reports, especially where the PNG government has entered into individual arrangements for different developers.

However, no solution is without problems and this solution is no exception. The analysis of past corporate disclosure reveals critical problems. Lessem (1977) classifies these problems into three categories. Firstly, whatever is disclosed concentrates only on conventional areas like the environment. Second, disclosures are defensive in that what is disclosed are those which favour them (self laudatory and deflectory). Third, disclosures are too general and qualitative. They are not specific and therefore are not useful for decision making. Since this study is capitalising on Australian companies and their development of green accounting, PNG is not able to develop guidelines on the types of disclosure because it will depend on the guidelines the Australian Institute of Chartered Accountants and the Certified Practising Accountants provide for their members. It will be better developed in Australia than any PNG attempt because Australia has the money and the expertise to develop a suitable system of surveillance. PNG's problem will be enforcing it.

Investment Promotion Authority is the key office to enforce it. The same office enforces EP requirements and with the registrar of companies can ensure MNCs comply when

they lodge their annual reports. The Registrar of companies, Anthony Beven, reported in the PNG's IPA Trade and Business News Update (November 1996), that twelve companies have been successfully prosecuted for failing to lodge their annual returns. Convictions were also entered against forty-six directors and secretaries of those companies. These defaulting companies and their directors were fined K25,850. In addition, any company that did not comply with the companies act will be deregistered. While the fine might not be crippling because developing countries need to be cautious, it is a step closer to enforcing disclosure requirement. Alternative policing is through the PNG stock exchange, where those companies wishing to be listed, will have to include environment information in their annual reports.

Since the impacts are severe, there is a need to minimise them. Stanko and Zeller (1995) suggest that environmental issues will continue to plague society as industrialisation and technology advances with hazardous waste emissions into the air, land and water unless some action is taken soon to minimise their effects. The next step is to support environmental disclosure with a theoretical framework as a means of minimising adverse impact. Chapter 4 looks at a possible theoretical framework which support this study.

Chapter Four

Theoretical Support

4.1 Introduction

Chapter three recommends MNCs to account for environmental impacts and include them in their financial reports. This is based on the Legitimacy theory that environmental disclosure is reactive to factors such as social, economic or political. Corporate disclosure appears to be an act of legitimation (Cooper, 1980). This chapter discusses Legitimacy theory as a theoretical framework to support the accounting approach to monitor, control and minimise environmental impacts caused by MNCs in PNG.

Purpose of this chapter

The purpose of this chapter is to present the theoretical framework which supports the approach to examining the environmental disclosure issues that is adopted in this thesis. From the 1970s, researchers have explored different options for promoting environmental accounting. However the relative appeal of these options often depends upon the theoretical perspective taken to substantiate their research. Within an accounting context, a theory often performs two roles. It may help to explain an observed relationship. Then, from this observed explanatory relationship, it may provide a basis for both generalisation and future prediction (Watts and Zimmerman, 1986).

The Theoretical perspective supporting the empirical analysis in this thesis is provided by the Legitimacy theory. Legitimacy theory treats corporate disclosure as a reaction by corporations to social, economic or political factors which appear to threaten the organisation in some way. Under the Legitimacy theory, environmental disclosure can therefore, be largely seen as attempts by corporations to minimise the impact on the reputation, financial standing or shareholder value (Cooper, 1980). The major elements of potential threat, defensive response and legitimation are particularly appropriate for the impact of specific environmentally-related events on the patterns of environmental disclosure by MNCs over time. In particular, we wish to investigate the potential impact of significant events which may be perceived by MNCs as threatening their legitimacy in some way.

A researcher collects data to initiate, refute or support theories adopted. However, a collection of data is meaningless unless a theory explains the relationship among them. Only then will any observations make sense. May (1993) elaborates further that a theory or the ability to interpret and understand any research resulting within a conceptual framework is evidence of a discipline that aims to systematically study a phenomena. Ullmanm (1985) blames inconsistencies that occur in studies between social performance, social disclosure and economic performance on the lack of an appropriate theory, inappropriate definitions and deficiencies in the empirical data base.

Structure of the chapter

The structure of the chapter is as follows. Section 2 discusses paradigms and their related theories before choosing legitimacy theory. The main theories which have been used to support environmental accounting can be classified according to a general paradigm. Three paradigms are identified here. They are the Functionalist, Radical and Interpretive paradigms. These paradigms represent the fundamental models or schemes that are used to organise questions and provide guidance in seeking solutions on environmental accounting issues (Babbie, 1986). Since legitimacy theory is commonly placed within the Interpretive paradigm, a short explanation is given here, prior to further discussion.

Section 3 examines Legitimacy theory in greater detail and specifically looks at its relevance to a study of the environmental disclosure patterns contained in the financial reports of Australian MNCs operating in PNG. The limitations of Legitimacy theory are also identified.

4.2 Classification of Major Theories

Different theories come under a few major paradigms which contain sets of major theories. The three paradigms considered here are: functionalist, radical and interpretive. Their classifications are briefly discussed below. This study then settles on Matthews' (1987) classification, which is the result of research and debate, among a number of researchers as shown below. It also has paradigms which are relevant to this study. Out

of the three paradigms, theories under interpretive paradigm are explored further, because they relate to various aspects of social disclosure. The focus will be centred on Legitimacy theory which provides the framework for this study.

Functionalists, Radical and Interpretive Paradigms

Social accounting has become the focus for a number of researchers such as Burrell and Morgan (1979); Hooper and Powell (1985); Chua (1986); Matthews (1984, 1986); Gray et al (1988); Goia and Pitre (1990); Laughlin (1990); Puxty (1986, 1991); and Parker (1986a, 1991). This list is not exhaustive but shows the amount of recent research that has been carried out in the area. The paradigms classified below are a product of this research. Although Chua (1990) acknowledges researchers experienced difficulties, a number of theories have been deduced from these studies. In enhancing accounting research further Matthew (1987) classified major theories into three paradigms: functionalist, radical and the interpretive. Each one is briefly outlined below.

4.2.1 Functionalist Paradigm

Studies such as Gray (1992); Hooper and Powell (1985); Cooper and Sherer (1984); Tinker (1980); and Cooper (1980) use the functionalist theoretical framework on which to base their work to suit the neo-classical economics or classical management theories of Taylor and Fayol. Neo-classical theory describes utility and profit maximising behaviour of firms and individuals.

Neo-classical theory has become the mainstream of economic thinking. Its key feature is that all decisions are motivated by a desire to maximise utility for individuals and profits for the entrepreneurs. Emphasis is on individuals as either consumers or entrepreneurs. Keim (1978) contends that neo-classical theory is consistent with corporations maximising their wealth although MNC activities are influenced by the society's norms. The relevance of the paradigm to this study is that, corporations desiring to maximise the utility often drives them to use unsustainable means to achieve their aims.

4.2.2 Radical Paradigm

The Radical paradigm suggests that society reflects the basic organising principles and institutional structures like the capitalist. The dominant theory here is Political Economy Accounting. This theory rejects market related solutions contending that the structure of society shapes all that goes on within (Cooper 1980; Tinker 1980). Cooper and Sherer (1984) are of the opinion that social environments have political and economic structures with their own inherent conflicts which are changing. As Commonwealth Economic Development (CED, 1971) reports, contracts between society and businesses have changed substantially. Businesses are no longer confined to just producing goods, services and employment to raise the standard of living. They are now required to broaden their responsibilities to provide a quality of life. MNCs are not achieving this in PNG, otherwise their actions would have produced only minimal harmful impacts (discussed in chapter 2).

4.2.3 Interpretive Paradigm

While the previous two paradigms concentrate on the structured world and institutions, the Interpretive paradigm recognises the existence of societies and human nature as paramount. This paradigm appears to be humane which may be an appropriate paradigm to address the adverse impact on environment in PNG. Gray et al (1987) consider this paradigm as a middle of the road approach because current capitalist structure is accepted without any comment on its desirability. This paradigm also recognises the interaction between institutions and societies and their impacts. Embedded in this paradigm are theories such as Accountability, Decision Usefulness, Social Contracting and Legitimacy. Each of those briefly described below because each contributes to the CSD, of which Environment is a part. A greater emphasis is placed on Legitimacy theory because the proposition is that the legitimacy theory supports this study.

4.2.3.1 Accountability Theory

CC Macquarie Dictionary (1997), defines accountability as the obligation to provide certain information or perform certain functions as dictated or implied by law or an agreement. In the accounting context accountability carries the responsibility to provide information to enable users to make an informed decision. Accountability is related to Agency Theory where the steward comes under obligation to account for resources he manages. Under this arrangement, the stewards render an audited account for their actions.

In the context of this study, the agents are the MNCs while the principals are the shareholders to whom the MNCs are to account for their operations including reporting environmental degradation. They have a duty to supply information and shareholders have a right to receive it. Such development increases the organisation's transparency which can be painful, because it causes conflict with external parties (Gray, 1992).

Deegan and Rankin (1996) explored the question of accountability in their study entitled, 'Do Australian companies report environmental news objectively (as stewards)?'. They investigated prosecuted companies to establish whether they account for their misdemeanours to the public. Their study investigated annual reports of 20 companies prosecuted by the NSW and Victorian Environmental Protection Authority (EPA). Only 15 provided any environmental information even after prosecution. Of the 15, only 2 made brief references to the prosecutions. The prosecution may not have been effective enough to prompt any disclosure from the rest, or else they were protecting their companies' PR not reporting the prosecution. Over all, reporting was not objective, the MNCs were not being made accountable to their principals who had the right to the information.

Since accountability theory holds that corporations are responsible for their actions, this implies that MNCs should disclose objectively. Their responsibility extends beyond social contract to compliance with corporate legislation which becomes the core reason for social reporting (Gray et al, 1992). This theory therefore blends in well with this study. MNCs are urged to report objectively on their operations in PNG to their

Australian shareholders which should expose their environmental impacts. Such exposure will hold them accountable because, as Deegan and Rankin (1996) noted, accountability for environmental information is lacking among Australian MNC.

There are some corporations which will not disclose even if they are aware of exposures. A Price Waterhouse (1992) survey, found 62 percent of its 236 respondents with no written records of known exposures. Therefore, they will not be discovered until the issues come to light. Those who are not disclosing environmental issues are keeping investors in the dark until there is a clear financial liability. Such companies are not honest stewards, depriving their shareholders of material information for decision only delaying cumulative liability. Their investors will be in for an unpleasant surprise (Anand, 1993).

Traditionally, corporations were only accountable to shareholders and their immediate society. This has since expanded as an aspect of legitimacy. As Estes (1976) and Abt (1977) observed, social accountability, including environmental issues, are extending out to reach external parties. Thus, reporting to external parties can be unpleasant but there is a duty to supply information. Since corporations receive power from society to operate, they are accountable for their actions to the source of power (Benston, 1982). Despite this possible unpleasantness, accountability can knit parties into a closer social relationship and increase the openness and transparency of organisations. Besides providing useful information to external parties for decision making, such openness creates trust and minimises confrontation.

4.2.3.2 Decision Usefulness Theory

MNCs' management reports to shareholders will enable them to make informed decisions. Chambers (1955) was the first to highlight the importance of an information providing system. Such a system was to assist decision makers to both make future decisions and review past decisions. His proposition was that a system was necessary to channel all logical discourse of relevant information. Shareholders who will benefit from such a system include customers, employees, both current and potential shareholders, creditors and even state authorities such as the revenue department. This is based on voluntary disclosure which may be only self laudatory (Guthrie and Parker 1989, 1990; Hine 1991; and ICAEM 1992). Since voluntary disclosure is deficient, compulsory disclosure is necessary to meet the needs of other interested parties.

However, on the international level, there is still no single code, rules or even self-regulating practices covering global business activities despite OECD guidelines, International Chamber of Commerce Environmental Guidelines for World Industry (1989); World Bank's Legal framework for FDI (1992); Agenda 21 (1992); Haynes (1993). This is how the MNCs escape censure without providing ample information on the impact of their operations on the environment. Although they must be accountable, there is no legal enforcement to deter them deflecting from the real issues. Where there is legislation, their disclosure in compliance, will be exhaustive.

There is a danger though that corporations can escape by disclosing just enough to avoid confrontation. This is implied in Mintzberg's (1983) conclusion. After reviewing societal demand for disclosure, Mintzberg concluded that 'it pays to be good but not too good'. Although the accounting profession requires the disclosure of all material information whose omission will affect decisions, there is the danger of emphasising positive environment information to deflect attention from the main issue. Major issues include environmental policies and practices which are important to shareholders but are currently not adequately disclosed (Ernst and Young, 1978).

Whether environmental issues are being disclosed is the aim of Ernst and Young (1978) who analysed 645 Forbes 500 Corporations' 1991 annual reports. Observed disclosure was as follows:

- 477 companies (74 percent) did not disclose environmental issues,
- 58 companies (9 percent) disclosed environmental issues only in letters to shareholders, and
- 110 companies (17 percent) provided environmental issues but in varying degrees in the footnotes.

Those who did provide information were in the following industries: energy; steel; chemical; paper; pulp and utilities. The rest did not. This is defeating the purpose of decision usefulness which should be the paramount reason for disclosure. Although the study lacks a theoretical base, it still raises non-economic and non-financial issues in organisations to make reporting more informative (Arrington, 1990; Cooper and Sherer,

1984). This study relies heavily on (ethical) shareholders to influence MNCs to minimise the environmental degradation. Such a decision is not possible unless the MNCs account fully to shareholders, because only fully informed shareholders will make value judgements.

4.2.3.3 Social Contracting Theory

Social Contracting Theory is based on the notion that companies are under a social contract with society to perform duties within the bounds of justice (Matthews, 1987). Therefore they are obliged to disclose their operations to the community. As Shocker and Sethi (1974) explain, every organisation, including businesses, operate in societies via a social contract. They elaborate further that the growth of any organisation depends largely on fulfilling their obligations which emerge out of either expressed or implied contracts.

While businesses are engaged in these contracts, society is demanding that social issues be addressed. Tinker and Niemark (1987) predict that such demands will increase as people become aware of the consequences of business activities. The Greenpeace movement is cited later in the chapter as an example of this increased awareness. Until recently, profit was the main focus of any economic activity with everything else becoming secondary. Today, whenever the public is dissatisfied with an organisation, it exerts pressure until the organisation meets their expectation or face the full force of the law (Post, 1978). Therefore corporations have to adapt to both legal and social

environments (Patten (1992). Heard and Bolce (1981) suggest that public policy appears to be the only solution to address this problem. They cite the passing of more than 100 pieces of legislation between 1965-1980 as their evidence of what society is doing to solve social problems.

Corporations' response to society's demand is the provision of an environmental report but the amount of disclosure varies with society's demands or pressures. It is partly due to the problem of quantifying social issues. Unlike economic activity, social issues cannot be easily quantified and harnessed into the market system. The best corporations can do, is to provide a complete coverage to legitimise its actions. The Exxon Valdez oil spill 1989 demonstrates this aspect. Following the spill Exxon devoted 3.5 pages covering the spill and another 2.5 pages covered social issues resulting from the spill. This contrasted greatly with the previous year's report which allocated only 0.6 of a page for social reporting. Such extensive coverage was fulfilling its social and legal obligation because the effect of the spill was far reaching. Business Week (1989) reported that the vote to open up the Artic National Wildlife Refuge to oil exploration was deferred indefinitely after the spill. In addition, plans to expand offshore drilling in California and Florida were also laid aside.

Patten (1992) traced the effect of the Valdez spill on oil companies' disclosures. He studied 21 out of the 23 publicly listed oil companies of Fortune 500's disclosure following the spill. He noted through content analysis that their average environmental disclosure increased from 0.61 page to 1.90 pages. While the study is limited, it illustrates legitimising. Legitimacy theory states that where there is a threat (both genuine

and perceived) to a firm's future, it will induce greater social disclosure to legitimise its actions. Legitimising is the process of making one's action(s) appear legitimate or socially acceptable.

4.2.3.4 Legitimacy Theory

Legitimacy Theory is defined by Lindblom (1994, p.2) as 'a condition or status which exists when an organisation's value system is congruent with the value system of the larger social system of which the entity is a part. When a disparity, actual or potential, exists between the two value systems, there is a threat to the organisation's legitimacy.'

Lindblom suggests four approaches to correcting any threat to an organisation's legitimacy. If the threat arises out of corporate failure to perform, then the relevant approach is to inform the public about company activities and performance. Where there is misconception among the public, public awareness campaigns and the provision of information will address the problem. A subtle and manipulative approach is where the organisation deflects public attention from the issue. This is a common approach seen in Australian company annual reports analysed by Deegan (1996). The reports were self laudatory because of fear of reprisal from those affected if negative impacts are disclosed. The final approach involves the organisation seeking to change external expectation where these external expectations are considered unrealistic.

A literature survey by Gray et al (1995), reveals that the first three approaches are common, while only a minority of organisations utilise the final approach. Corporations are under immense pressure from concerned parties to improve their performances. However, it was also noted in the same review that environmental disclosure has been employed to deflect attention from real issues when the MNCs come under scrutiny. The anticipation is that the deflectory use of legitimacy will cease among MNCs when AICA's guidelines are implemented. Such guidelines will ensure uniformity and consistency to enable comparisons to be made with other annual reports.

Social disclosure can be employed in each of the four approaches to legitimise corporate operations and narrow the legitimacy gap. This study aims to utilise this aspect of legitimacy theory by suggesting that all MNCs include environmental reports with their annual reports to legitimise their operations. Each project is commissioned with an acceptable EP in PNG. Therefore, an adverse environmental impact reveals a disparity between their value system as depicted by their activities and that of the society they operate in.

Under its social obligation, legitimacy theory is concerned with negotiations between organisations and societies to rectify situations (Gray et al, 1995b). Hogner (1982); Guthrie and Parker (1989); and Patten (1992) view legitimacy as a mediative theory between concerned parties. Mediation comes when corporations disclose to legitimise or mediate with society so that their operations are acceptable. Alternatively, MNCs have to alter their performance to minimise the adverse impacts of their operations. This

mediative role makes legitimacy theory more appropriate for this study because MNCs' increased environmental disclosure is based on legitimisation.

Legitimacy is succinctly expressly as a societal perception of a corporate behaviour rather than an abstract measure of a corporate rightness. Because legitimacy measures society's attitude towards corporate behaviour based on society's cultural norms (Suchman, 1995). Thus, the key factors to manage, which change over time, are the corporate image and the societal expectation because society's judgement is based on their perception of what the corporate image is (Nesa et al, 1997).

According to Sethi (1979, 1978, 1977 and 1975) legitimacy problems arise when there is disparity between societal expectation and the corporate image. Sethi terms the disparity as a 'legitimacy gap' and alleges that the gap exists with varying width, because the gap is continuous rather than discrete. This gap is created when there are changes to the two key factors named in the last paragraph: societal expectation of the corporations (corporate image) and the corporate behaviour. Firstly, changes in societal expectations without any changes in the corporate behaviour will create and widen the legitimacy gap. Miles and Cameron (1982) cite the example of tobacco companies in the US during the 1970s. When the American public became aware of the consequences of smoking, the societal perception changed dramatically against the tobacco companies without any changes in the corporate behaviour.

Secondly, the legitimacy gap may also widen if a new piece of information about a corporation's behaviour becomes available to the public, especially when the information creates a disparity about the corporate image. This gap may be created either accidentally or through exposure by some lobby group. This study aims to utilise this second cause of creating a legitimacy gap by requiring MNCs to include environmental information within their annual reports. It is anticipated that such disclosure will expose unsustainable practises to create a legitimacy gap (Nasi et al, 1997). A continuous widening would damage the corporate image. Therefore, businesses would strive to narrow this gap, desirably through correcting their behaviour.

Sethi (1978) proposes four possible strategies which are identical to Lindblom's (1994) to narrow the legitimacy gap. The first proposal is to change public perception through education and information without changing performance. The second approach is to change societal expectation of corporate performance through education and information. If the production of information and education do not work, then corporations ought to change the symbols used to describe business performance under a third approach to suit public perception. Finally, if the three approaches fail, then the corporate bodies have to change their business performance to meet societal expectation and thus bridge the legitimacy gap. This is illustrated by BHP during the 1800s (Guthrie and Parker, 1990).

Guthrie and Parker (1990) studied BHP's disclosure practise between 1885-1985 to assess whether social disclosure is a reaction to environmental pressure to narrow the

legitimacy gap. Pressure could be economic, social or political. BHP disclosed community involvement, energy, human resource, its products and others. These disclosures were compared with major corporate events to test their proposition that the disclosure was prompted by existing pressures at the time of reporting. Their conclusion was that although BHP's peak disclosure levels match periods of significant corporate events, there was not enough evidence to support legitimacy theory (Guthrie and Parker, 1990). Unlike the current self-laudatory disclosures, bad news such as strikes were reported and others omitted such as the board of inquiry into lead poisoning in 1892 and the earlier case of fibrosis of the lung.

Closer analysis of their disclosure reveals that human resources and community involvement were the focus of BHP's disclosure then. Of the 212 social issues reported by Guthrie and Parker, (1990) there are 105 to human resource issues, followed by 83 issues of community involvement. The period under study was riddled with strikes. The most bitter industrial dispute in Australia was in 1892 which lasted 18 weeks (Bailey, 1968). Because strikes were a regular occurrence, they appeared in the reports even though strikes are bad news. It appears that BHP disclosed strikes to show that concerns are being acted on and/or to justify the financial results of that period because legitimacy, until recently, was considered only in terms of economic performance (Patten, 1992).

While Guthrie and Parker's conclusion is that evidence does not support legitimacy, there is some indication that it does. Much like the Exxon disclosure above, major events

of the time influenced disclosure. High human resource disclosure appears to be influenced by strikes, unions and workers forcing management to legitimise its actions in an attempt to quell further disputes. Cadenhead (1970), sees disclosure being influenced by circumstantial variables and the management's immediate objectives. Contingency theory complements the legitimacy theory when management chooses accounting methods which are influenced by the immediate environment including uncertainty (Thomas, 1981).

Preston and Post (1975) allege that social disclosure is a response to the changing perceptions of corporations. Until recently, legitimacy was only considered from an economic perspective. As long as the corporation is making profit, its actions are legitimate. This resulted in adverse consequences. Unfortunately MNCs in PNG still interpret their actions as legitimate because they are making profits with cheap raw materials while degrading the environment. Cheap labour and environment degradation were both discussed in chapter 2. Therefore, if MNCs can disclose more, then exposure will minimise degradation.

Both BHP and Exxon (cited above) disclosed more to deflect and/or counteract imminent opposition. In the same BHP reports from 1885-1985 there were only 8 reports of environmental disclosure. This suggests that environment was not a prominent issue then, otherwise lead poisoning or the fibrosis would have been disclosed in greater detail including any preventative measures taken. There was no social pressure then on environmental issues. Therefore environmental reporting was inconsistent and only

picked up in the 1970s when oil, mining and steel industries were attacked by conservatists. Trotman (1979) examined a segment of the above period (1967-1977) and reported that Australian corporations' environmental disclosure increased over that period. The author's explanation was that companies were attempting to avoid confrontation with lobby groups when coming under the spot light.

Legitimacy theory is gaining support in the area of morality because it means corporate bodies will be responsible for their operations. Since this has gained prominence, understanding corporate legitimacy may be essential for management, especially in the light of social/economic changes (Sutton, 1993). Legitimacy has to do with the way power is perceived because of its political and economic implications. An action is right, legitimate or acceptable if it conforms to some moral principle. While shareholders perceive legitimacy differently, businesses are permitted to maximise profit as long as their actions do not conflict with society norms.

Community Expectations & Reactions

Hogner (1982); Lehman (1983); and Lindblom (1983) hold the view that corporations disclose to legitimise their existence and their activities. This legitimising is necessary because corporate operations influence society. Ullman (1976); Lehman (1983); Guthrie and Parker (1990); and Gray et al (1995) support the above view because business operations and reporting do influence, and are being influenced by, the local society. Hurst (1970) argues that institutions which use power to accomplish their objectives must be accountable for its actions.

Where corporations lack accountability, increasingly environment lobby groups will influence businesses to be more responsible. Environmental lobby groups have swelled as society's understanding of corporate activities increased. Their impacts have adversely affected business performance (Cooper & Lybrand, 1993). This is in direct fulfilment of Tinker and Niemark's (1987) prediction mentioned earlier. The best example is the Greenpeace movement. It started with 3000 members in 1985 and tripled to 9000 in three years. By 1991, its membership exploded to 97000. This is due to the change in society's perception of what is a MNCs' legitimate and appropriate behaviour. Greenpeace lobbys and exerts pressure on the various green issues such as the forestry policy in PNG as discussed in chapter 2.

While there are allegations of external lobby group pressures on corporations for social issues, only a few studies have examined them. Tilt (1994) investigated these pressure groups' influences on social disclosure and noted that most pressure groups are engaged in lobbying either directly or indirectly through government bodies. Of those lobby groups who responded, 92 percent indicated that legislation is necessary. Fifty-four percent of respondents acted against companies which do not disclose. So much so that it is claimed, lobbies are mostly on the offensive approach. (The Economist, 1990).

Tilt's (1994) study is the first and primarily exploratory study on pressure from lobby groups and the author did not seek to find how pressure was exerted. However, it did establish that lobby groups analyse annual reports for information on corporate activities. Thus lobby action supports the view that societal pressure contributes to greater social

disclosure and that current circumstances do influence disclosure through pressure groups. Since lobby groups analyse annual reports, it is essential that MNCs are required to disclose environment information to legitimise their actions.

Since the focus on environmental management is mounting, sensitive industries need to take extra care. Various organisation have gone as far as producing manuals as guides for their employees to be aware of and conform to guidelines. Examples of these organisations include Australian Manufacturing Council, The Institute of Engineers of Australia and the Chamber of Manufacturers. Although they have guidelines, these organisation have yet to translate them into environmental disclosure (Deegan and Gordon, 1996). Irrespective of pressures, corporations should account to shareholders for their actions and the aim of this study is to achieve this by requiring MNCs to report environmental issues.

Summary of the paradigms

All three paradigms acknowledge the presence of external pressure which influences corporations' decisions to disclose social information. Gray and Perks (1982) assert that society has certain expectations of corporate responsibility under the current social contract. Both the society and the corporations have values and expect each other to operate within their respective boundaries. Any deviation creates a legitimacy gap and the deviating party acts to legitimise its actions. Sethi (1978) suggests four approaches to bridging the gap. Gray et al (1987) and Gray (1991) see society directly influencing accounting policies of companies by holding them accountable. This study adopts the

suggestion that accounting may be examined as a 'Legitimizing institution' (Cooper, 1980; Guthrie and Parker, 1989). This is a recent attempt to recognise the role of accounting in organisation, and society to link actions and values. Cooper (1980) suggests that accounting may be viewed as a means of legitimising to current social, economic and political pressure for sustenance.

Tinker et al (1991) views social accounting as a reflection of social conflicts between the MNCs and society. This conflict occurs between corporations and others such as environmentalists, employees, consumers, women and other minority groups when the congruence in their values is upset (Tilt, 1994). Such conflicts create a legitimacy gap which needs to be narrowed. Narrowing the legitimacy gap can be achieved through one of the four approaches Lindblom (1994) or Sethi (1978) presented. The appropriate approach will depend on the cause of the gap.

4.3 Lack of Agreed Theoretical Perspective

There are inequalities in the society-corporation relationship. Consequently this is reflected in corporate attitudes. Under social contracting theory, companies should perform within the bounds of social justice (Matthews, 1987). Most often they do not and Legitimacy theory corrects this shortfall. Legitimacy does not only fulfil the social obligation of disclosing information but it exceeds to legitimise corporate actions. Such a feature is relevant for this analysis because the current study investigates the sample MNCs annual reports for their current degree and pattern of disclosure. This section

reviews the selection criteria for legitimacy theory, its enforcement, its suitability in PNG and concludes by highlighting the limitations of legitimacy theory to minimise the adverse environmental impacts in the country.

4.3.1 Proposed Theoretical Framework

Overall research in CSD has fluctuated as researchers enter and leave the field (Parker, 1986). Preston (1983) and Ullmann (1985) attribute this fluctuations to firstly, a lack of theoretical perceptive which should be at the centre of serious research. Secondly, the lack of systematic reporting makes traditional positive research difficult and even attracts doubts as a legitimate area of study (Gray et al 1987, 1988, 1991; Parker, 1986, 1991). After analysing 13 years of UK social reporting, Gray et al (1995) concluded that CSR is a complex activity. They argue that the proactive and reactive arguments of Guthrie and Parker are too simplistic. There is no one theory which can adequately or fully explain it.

Gray et al (1993) allege that this subject has become more political. Within the subject of social reporting they see two different research approaches emerging. What follows in the next two paragraphs is derived from their exposition. One approach is to take CSD as an addendum to mainstream accounting and pursue research as a conventional accounting field. The problem with this approach is that the focus is narrow and caters only for the financial community.

The alternative approach places environment and social reporting at the centre of organisation and society dialogue (Preston, 1975, 1981 and 1983). This approach is relevant, given that the legitimacy gap is created by conflict between the corporations and societies. While conventional accounting considers this as too ambitious, it has enhanced public's understanding of CSD without theorising in the society-organisation relationship (Puxty, 1986, 1991; Tinker et al, 1991).

Gray et al (1987, 1988) argue that there is a core mainstream research which can be theoretical without the theorising process affecting other forms of CSD. This is through self reporting whether required by legislation or as part of a code of practice. The reports can be released through the annual reports. Their focus is on organisation-society interaction in areas of social concern such as natural environment, employees, communities, customers and other social areas. Such self reporting is voluntary, it does not solve the social problem. Therefore the problem perpetuates. Some attempts are being made to investigate them empirically.

4.3.2 Basis for Legitimacy Theory Selection

All forms of disclosure or reporting promote decision making. Therefore accountability seems to be the theory applied when corporations disclose as a gesture of accounting for their past actions. However, management can be selective in reporting to promote their ends by applying the Contingency theory. Unless shareholders obtain the correct information, wrong decisions are inevitable and that is defeating the purpose of

accountability. For this reason accountability theory is eliminated because management can be selective.

As pointed out earlier adverse impacts perpetuate despite current voluntary reporting. Voluntary reporting to interested parties does not minimise impacts. Current reports are self laudatory to deflect the attention of the recipients. Thus external pressure is necessary to enforce societal contracts. This is where legitimacy theory becomes appropriate for PNG. Corporate bodies are held responsible for their actions and are required to legitimise both their existence and their activities. There is a legitimacy gap that needs bridging wherever MNCs perceive an imminent threat or PR damage, they will increase environmental disclosure. Since the impacts are adverse in PNG and the corporations image is marred, they need to change their performances rather than inform to educate. It is on this basis that the legitimacy theory is recommended to support this research.

Social contracting theory will not work in PNG because the existence of social contracts between MNCs and the society in PNG are non existing. If some exist, they are vague, therefore they cannot be enforced. This is due firstly to ignorance because of the low rate of literacy (57 percent) (AusAid, 1996). Secondly, local communities do not participate in decision making and thirdly, there is conflict of interest on the part of the state. Each of these have been discussed in chapter 2.

Stewardship theory is a possibility, but has a narrow approach in that it is accountable only to the immediate entrepreneur or principal who has entrusted resources to the agent. Unless they are ethical, entrepreneurs measure success in economic and not social terms as pointed out earlier.

4.3.3 Enforcement of Environmental Disclosure

Of major concern is the lack of environmental information because its disclosure is voluntary. As Deegan and Gordon (1996) concluded, in an unregulated environment, management will be less objective in environmental disclosure. While annual reports as a 'one stop shop' ought to cater for all needs, they do not contain adequate information for shareholders. Therefore interested parties are not able to make useful decisions without adequate and appropriate information especially in relation to sustainable development.

Analysis of annual reports (chapter 6) will reveal the current quality and quantity of environmental reports among Australian MNCs under voluntary disclosure. Given the above deficiency in voluntary reporting and the adverse impact, the only solution for PNG is to require compulsory environmental disclosure. This will enable shareholders in the MNC's country of origin to exert pressure on the MNC to legitimise its operations. They can only do this if they know what is demanded of them. MNCs ought therefore to be held accountable to disclose all social issues via environmental accounting.

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They ought to legitimise both their existence and their operations to the shareholders. Although this theory is also subjected to, or influenced by, management applying the contingency theory, PNG has a standards for comparison. This standard is the EP requirement which MNCs lodge with every proposal. They have to be accepted before projects are commissioned therefore, MNCs have to legitimise any deviations from their EPs. It is at this point that the external pressure can be applied to force the MNCs into acting strictly within the EP proposal.

4.3.4. Limitations of a theory to minimise adverse environmental impacts

Having proposed the Legitimacy theory, this study acknowledges that post-modern social scientists even attack attempts to use a theoretical framework. They argue for example, that you cannot use a theoretical framework to solve a carbon dioxide problem (Green, 1992; Jaeger, 1993). They recommend strategies that stress caution, reversibility and plausible hypothesis because even the best theory does not work. While this is true, much depends on the strategies used and their timing. The climate is now right for change because demand for environmental information is increasing globally (discussed in chapter 3). It is during this time of global demand that it is suggested that MNCs disclose environmental information using guidelines being developed by AICA.

Timing for this change is also appropriate in Australia. The commonwealth government has already introduced green accounting under the directives of the UN. Even a professional body such as the AICA is preparing its members to supply their service of providing environmental reports. ACIA has developed a framework and guidelines to assist the preparation of environmental reports. Thus the suggestion of introducing compulsory environmental disclosure is timely to minimise the adverse environmental impacts now experienced in PNG.

4.4 Summary

Environmental issues are a new development in the organisation-society hegemony and legitimacy offers better disclosure in this area. It may be only marginal in some countries but in other countries the development in environmental issues are advanced. What is still vague is whether researchers can do more in CSD and create opportunities to develop a counter hegemony. No single theory is able to explain fully the complexity of CSD (Gray, Kouhy and Lavers, 1995).

Although Gray, Kouhy and Lavers (1995) point out that no single theory is adequate, Legitimacy theory is appropriate in that it is ensuring EPs are implemented by requiring MNCs to legitimise deviations from their EPs. The assumption here is that MNCs are not implementing their EPs. Legitimacy theory will support this study in its attempt to minimise adverse environmental impacts.

The survey by Ernst and Young (1978) suggests an increase in social responsibility accounting. Among other influential factors, Preston (1981), lists social pressure and management objectives as influencing social disclosure. The author argues that firms facing risks are more likely to disclose to reduce risk. So will large firms, especially those under pressure. The most important factor is the management objective because disclosure affects an organisations future. Since the Ok Tedi lawsuit, those MNCs in the sensitive industries have come under scrutiny with risks of confrontation. Therefore they are more likely to disclose for legitimacy.

Environmental issues are now becoming dominant and the public are demanding corporations disclose their activities. Every corporate activity is coming under heavy scrutiny especially after the disasters named earlier. Faced with the dichotomy of corporations pursuing to maximise profits and society's need for a balanced ecosystem, a corporation has to legitimise both their presence and activities through disclosure. While using discretion management attempts to balance the various conflicting demands of the stockholders. Often parties such as lobby groups wield power with their demands and it is the most powerful that prevails. Nonetheless, management is under obligation to disclose information on its activities. Since anything disclosed affects the corporate future, management is selective in its disclosure. To ensure that adequate and appropriate disclosure is practised, eco-audit will be necessary. Then to encourage everyone to make an attempt, an award system may be adopted as a complementary approach. It is hoped that both approaches will enable MNCs to disclose environmental accounts in full. This disclosed information will enable stockholders to

make informed decisions towards sustainable resource development. The next chapter investigates into the current extent, pattern and degree of environmental disclosure of Australian MNCs operating in PNG.

Chapter Five.

Research Method and Data Collection

5.1 Introduction

This chapter presents the research methods and the actual data collection process for the empirical section of this study. A major purpose of this empirical investigation is to collect information from the MNCs' financial reports over five consecutive years to study their disclosure trends and any influence of significant events which occurred during that period in their disclosures. The section below, defines for this study the population, discusses the methods used to collect the sample of MNCs, collection of data from the sample and discusses the method of analysis. Both the instruments and the methods for analysis are trialed in a pilot study using some of the data collected before the main analysis begins.

This chapter discusses the research methods employed to observe the current environmental disclosure in the MNCs' annual reports. The chapter begins by identifying and isolating Australian MNCs as the population for this study from other MNCs that operate in PNG, followed by the sampling of Australian MNCs, justifying the selection of an analysis method and the eventual collection of the data. Data in the form of annual reports will be collected from the selected sample MNCs for the period, 1992-1996. The contents of these annual reports are examined for the degree, pattern and extent of their current environmental disclosure through the use of content analysis.

This chapter concludes with a pilot study trialing content analysis to refine the techniques to be used on the main analysis.

The approach taken to achieve the above objectives is to investigate a sample of Australian MNCs' annual reports. These annual reports will be analysed for their different attributes and their quantity of environmental disclosure. The attributes include: environmental regulations; company policies; conservation; environmental expenditure; awards; recycling; EIA and, environmental audits and litigation. Their presence will confirm the existence of an environmental reporting. Disclosure of environmental features will be quantified, using a word count. The quantity of the annual disclosure will enable this study to observe any trends and establish whether there is adequate disclosure among the four selected industries to address environment issues.

A sample of the MNCs is selected from an identified population of Australian MNCs whose annual reports for 1992-1996 are collected, for the above analysis. This investigation will establish their current reporting practices. Information disclosed in these annual reports should contain details of their operations, their current impacts and expose any practises that are detrimental to the environment. Since five years of the MNCs annual reports will be analysed in this study, they are likely to depict disclosure trends. These reports should also reveal any changes in reporting prompted by the recent scrutiny on the mining industry (Placer Dome Annual Report, 1993).

Structure of the Chapter

In this section the following issues are considered: identification and definition of a population of interest; attributes of interest in the population that is appropriate to this study; sampling techniques to be used; contact and responses of those MNCs sampled; information collected from the respondent MNCs and, a pilot study to trial the instrument of analysis.

Section 5.2 identifies and defines the population of interest. The allegations of MNCs degrading the environment in PNG did not identify the MNCs, nor their country of origin. MNCs in PNG come from a number of countries including Australia, the US, the UK, Malaysia, China, and others (refer to Table 2-1 in the appendix). From this group of MNCs, Australian MNCs are isolated for this study. The rest of the section explains the reasons for making this choice and identifies the relevant attributes of the population. From this population of Australian MNCs, 2 samples are selected. One sample operates in PNG, the other does not. The choice of Australian MNCs is largely based on the accessibility of their annual reports which will be analysed to attain the study objectives.

A second group of MNCs, which do not operate in PNG, is selected as a control group for comparison with those that operate in PNG. These MNCs are involved in the same four industries, namely: mining; forestry; manufacturing, and oil & gas. Both samples are selected through different methods.

The selection methods will be discussed in section 5.3. Only certain industries are implicated in degrading the environment. The types of sampling used in this study are discussed along with their advantages and disadvantages. This section also discusses how the Australian MNCs, operating in the four sensitive industries (mining, forestry, oil & gas and manufacturing) were chosen. The main reason for their choice was that they are alleged to be degrading the environment in PNG.

Section 5.4 discusses data collection methods from the sample of Australian MNCs operating in PNG and in Australia. The data collected are from the MNCs' annual reports for the five years, 1992-1996. The MNCs chosen for the sample were contacted through the mail, requesting annual reports for the relevant period.

Section 5.5 reviews the content analysis used to analyse the annual reports for the degree, the extent, and the quantity of environmental disclosure to address the current environmental degradation issue. Content analysis is a well established method of analysis. Three phases (attribute, assertion & semantic) of content analysis will be carried out to trial the instruments (tables) of analysis and tabulate their results. Attribute analysis identifies the features of environmental disclosure to establish whether MNCs disclose environmental information. Assertion analysis notes the location of their disclosure. Although the literature is not clear on the issue of location of reports (Gray, Kouhy and Lavers, 1995), this study identifies their locations throughout the annual reports. The final phase of the analysis is semantic which quantifies the quantity of

disclosure. Section 5.6 summaries the chapter highlighting the time constraints on seeking additional data.

5.2 Population of Interest

This section discusses the clustering and the selection of a population for this study.

From the 37 different countries represented by those MNCs operating in PNG, Australian MNCs are chosen for this study using the three criteria listed below. Two groups of Australian MNCs were contacted in order to collect the required data. One group is comprised of those which operate in PNG, the other group which does not, are selected as a control group. Unlike Niskala and Pretes (1995) and Gamble et al (1996) who chose nine industries for their study, Australian MNCs in only four industries (mining, forestry, oil & gas and manufacturing) are selected by this study, because these industries are alleged to be environmentally sensitive in PNG.

Population

The IPA Certification (1996), reports that MNCs in PNG come from a number of developed countries. MNCs, operating in PNG during the period 1992-1996, originate in 37 different countries (Table 5-1). Many of these MNCs invest in large projects. The main investors, based on the number of MNC investments (Table 5-2) and monetary value of their investments (Table 5-3) are: Australia, Malaysia, the US, UK, Singapore, NZ and China.

This study focuses only on Australian MNCs. Three important criteria used in selecting the Australian population are:-

1. Since the testing of the hypotheses involves the analysis of annual reports, MNCs of other countries are omitted because their annual reports are not easily obtainable. There is a form of purposive sampling practised here, as was applied by Niskala and Pretes (1995) when they discarded from their sample companies without annual reports. Purposive sampling isolates Australian MNCs from other MNCs for this study (sampling is discussed in the next section). Australian MNCs are chosen because they possess the desired characteristics of accessible annual reports for analysis (Sproull 1988).
2. Besides Australian MNCs' annual reports being readily accessible for analysis, Australian MNCs are chosen because of their dominance in the PNG economy. They are found in every industry in the country. However, this study concentrates only on four industries that are alleged to be environmentally sensitive in PNG.
3. Finally, both Conzinc Riotinto Australia Limited (CRA) which operated the Paguna mine before it closed (1989) and BHP (OTML) are Australian MNCs. Both are at the centre of the debate over environmental issues in PNG. The Paguna mine ceased operation when compensation demands for environmental destruction were not resolved (Young, 1992). This underlying cause of the crisis was later confirmed by the Australian Parliamentary Delegation to Bougainville during April 18-22, 1994. The Bougainville Revolutionary Army (BRA) leader, Francis Ona demanded inter alia, greater environmental protection (Commonwealth of Australia 1994). Both the Paguna and the Ok Tedi conflicts stirred up antagonism among resource owners

against the MNCs and created anxiety among all the MNCs in the country. This situation was the motivation for this study, namely: to investigate an accounting aspect to address the issue of environmental degradation for the mutual benefit for all the parties.

The population for this study is therefore defined as being all those MNCs in the top 500 Australian companies by market capitalisation that operate in PNG. Wallace (1991) rates population, from which a sample is selected, as the most important determinant for valid results. The author reasoned that a sample will represent the population if the population has homogenous characteristics. The sampling method must be one that will ensure that the sample represents the population. The sampling frame, however, is the population of MNCs in the four environmental sensitive industries. McDaniel and Gates (1993) define a sampling frame as the list or a group of population elements from which units to be sampled are selected. Unlike Deegan and Gordon (1996), not every company in the top 500 is analysed. The focus is only on those companies in environmental sensitive industries.

Sampling from the Australian MNCs is narrowed down to those MNCs in just four environmentally sensitive industries. Of these, forestry and mining are two environmentally sensitive industries which are reported (chapter 2), to have adverse impacts on the environment. Two others (petroleum hereto classified as oil & gas) and manufacturing are included. The oil & gas industry is included because of its extractive nature, which like mining, degrades the environment. Manufacturing is included,

contrary to the AusAid report (1996), which rates it as small, because of a number of large projects just commissioned (a meat cannery in Port Moresby, a cement factory in Lae, fish and meat canneries in Lae and Madang, timber chips at Madang) and others about to be commissioned (a veneer factory in Daru, an oil refinery in Port Moresby, and a tuna cannery in Wewak). The manufacturing industry discharges wastes from its production into rivers, seas and air which pollute the environment (Elston, 1995). Two groups of samples are drawn from these four environmentally sensitive industries.

5.2.1 Group 1-Australian MNCs which operate in PNG

The first group of Australian MNCs are those which operate in PNG. Issues affecting or involving Australian mining companies operating abroad is not a new issue. Durkin (1995), investigated human rights violation allegations involving Australian mining companies in Indonesia. The author concluded that Australian MNCs were operating consistently with the MNCs in Australia. However, two Australian MNCs have been alleged to cause adverse environmental impacts in PNG. They are CRA in Paguna (Bouganville), now closed, and BHP in the Ok Tedi mine. Young (1992) traces the current Bouganville crisis back to the Paguna mine's environmental degradation. The Ok Tedi case has been given a detailed coverage in chapter 2. Mining operation, by its very nature, has significant impact on its surrounding communities and the ecosystem (Rosenbaum, 1995).

Besides the mining impacts briefly described above, the logging industry is just as destructive. From 1992-1996, the Australian Conservation Foundation (ACF) has been exposing environmental impacts by logging (and mining) MNCs in PNG. Logs are clearfelled and sprayed with preservative chemicals before being floated down the rivers to seaports for loading. In addition, bark peelings are also dumped in the river with preservatives which block local river transportation. Besides the destruction and extinction of wildlife and blocking the river transport, Rosebaum (1998) reports the chemical spray from logging operations affecting the food chain, which local communities depend upon, in the Fly river area. Although it is not known the exact impact this is having on the area, there are reports of birth deformities, beach erosion, discolouration of and malodour of sago, inexplicable diseases and death among crabs and fish along the Fly river.

Inclusion of the oil & gas and manufacturing industries is necessary because their nature of operations makes environmental degradation inevitable. For instance, oil & gas is an extractive industry like mining. The only difference is that excavation is limited to clearing land for drilling but in mining, it is much more extensive. Nevertheless, wild life is destroyed in clearing land for drilling for oil & gas.

The manufacturing industry is just as destructive. Although the AusAid (1996) report classified the manufacturing industry in PNG as small, Table 2-5 shows that this industry received the third largest number of applications with sizeable investments and employment opportunities. The manufacturing industry appears to be expanding and it

will have a greater impact on the environment. Elston (1995), reports that rubbish from factories, thrown into the canals, finds its way into the rivers, lakes and seas turning them into cesspools. Worse still, are the refuse and wastes, including poisonous chemicals, washed out into lakes, rivers and seas from factories. These foreign matters destroy marine life much like the mining waste disposals. Whilst it can be argued that emissions from the transport and energy industries also pollute the air, it is nothing compared to the volume that flows from the chimneys of manufacturing industries operating 24 hours a day.

5.2.2 Group 2- Australian MNCs who do not operate in PNG

Another group of Australian MNCs which do not operate in PNG were chosen as a control group to avoid making inferences about Australian MNCs based solely on the sample selected from those under scrutiny. This second (control) sample of Australian MNCs were picked at random from the four targeted industries with an inclusion of some representing the service industry. Inclusion of the service industry MNCs should assist in confirming or refuting the arguments that environmental issues are industry related (Niskala and Pretes, 1995). The inclusion will also ensure there is consistency in environmental reporting among Australian MNCs. This (control) sample of MNCs not operating in PNG is chosen to provide a disclosure benchmark against which to compare the disclosure practices of the sample of MNCs which do operate in PNG. As Ferrara et al (1995) reported, some MNCs seek countries with lax legislation to practise what they cannot practise in Australia. This control group will enable the study to determine

whether Australian MNCs are consistently and environmentally careful in their operations as claimed for Indonesia (Durkin, 1995).

Comparing the results from the two groups will enable this study to establish

1. whether disclosure practises have improved in Australia since Deegan (1996) noted it lagging behind other developed countries,
2. whether Australian MNCs operating in PNG are reporting consistently, as their counterparts in Australia and those in Indonesia (Durkin, 1995). Disclosure from abroad will affirm or refute allegations raised by other studies such as Ferreria et al (1993) that MNCs take advantage of lax environmental rules in developing countries, and
3. whether the OTML lawsuit and its subsequent scrutiny in PNG has any impact on Australian MNCs' disclosure practises.

Since a population is now identified, sampling issues are discussed next, in order to select the sample of MNCs. Whatever type of sampling is used, samples will be restricted to the four environmentally sensitive industries plus some taken from the service industry to maintain consistency of reporting.

5.3 Sampling Issues

This study requires the collection of information from sample annual reports of MNCs operating both in PNG and Australia for analysis. This section looks at five important

issues connected with selecting samples from the population of Australian MNCs for the collection of annual reports. The issues to be discussed in this section are: definition and reasons for sampling; advantages of sampling techniques; problems in sampling; reliability and validity of samples; methods of sampling used in this study, and selection of the sample MNCs.

5.3.1 Definition and reasons for sampling

Sampling is the process of selecting adequate subjects (single members) into a sample so that it will enable the study to draw a valid conclusion about the population from which the sample group is drawn. This is because the sample choice depends on the purpose of the study, desired conclusion, reliability and accuracy of outcome (Wallace, 1991). In addition, the selection and the analysis of a sample is less time consuming, more economical and provides more informative details (Sarantakos, 1997).

Sampling is undertaken because although a survey of the total relevant population is necessary for complete validity of results, it is usually not possible or too expensive. A complete coverage of all MNCs is not possible. This is because not all MNCs are implicated in causing environmental degradation and not all annual reports are accessible. Environmental degradation is alleged to be industry related. Therefore, sampling is necessary where a saturation survey is not possible. Sproull (1988, p.107) defines saturation survey as 'involving the study of the whole population'. Since a saturation survey is not possible, the MNCs will be sampled using the methods discussed below.

5.3.2 Advantages of Sampling

Chaudhary (1991) adds other advantages to those presented by Sarantakos above:

Sampling:

1. obtains the maximum information with minimum cost in time, money and energy. This is by far the most important aim of sampling. It is also efficient.
2. enables an accurate measurement of values of parameters, precision of estimation and the degree of reliability of estimates to be found.
3. is the only method of enquiry especially when the population is infinite and the research requires representation.
4. is the only choice when testing involves destruction. This is applied in testing quality of products on the production lines.
5. enables researchers to estimate sampling errors through various methods of sampling theory.

5.3.3. Problems (Disadvantages) of sampling

Despite sampling being economical and informative, it requires time in planning, programming and its administration. Even then, the results may not be as valid as saturation surveys. In applying sampling principles, samples need to be selected systematically and objectively. Subjects need to be independent and identifiable; once chosen, they cannot be discarded. This is to keep all subjects so that they all have an

equal chance of being chosen and to keep a complete list, especially when samples are selected based on a sound criteria (Sarantakos, 1997).

5.3.4 Reliability and Validity

Reliability and validity depends on valid sampling. That is why sampling based on a sound criteria is essential. Inferences will be made if the selection is reliable and the sample is acquired through a valid sampling process. A result is valid if the process measures what is required. The result is reliable if the same result is consistently attained when the process is repeated. Reliability is confirmed if consistency is maintained where measurement is replicated (Elinson, 1963). Elinson (1963) and Graziano (1996) each listed four types of validity. Elinson lists construct, consensual, criterion and predictive while Graziano lists statistical, construct, external and internal validity. While they are all important, for the purpose of this study, external and internal validity are considered vital for making inferences. External validity depends on internal validity. Inferences cannot be made unless it is certain that what is intended is measured and that, under replication, the same result will be attained. This is possible if the two tests of random selection listed below (Tai, 1978) are satisfied and the sample is representative.

5.3.5 Methods of Sampling Used

Random sampling results are representative provided two conditions are met:

1. every subject in the population is independent and the selection of one does not influence the selection of others.
2. each subject has an equal chance of being selected for the sample.

When these conditions are met, sampling becomes more representative and reliable (Tai, 1978).

Selection of subjects for this study began with a cluster sampling where Australian MNCs are isolated into a cluster from the other MNCs operating in PNG. Cluster sampling is used where a researcher divides the population into clusters and samples out clusters for study. It is a variation of random sampling. However, not all Australian MNCs in the Australian MNC cluster are studied as a cluster sampling should be (Hartmen and Hedblom, 1979). Only companies in four industries are selected under multi-stage clustering. Clustering, in stage one, groups MNCs into a homogenous group of all Australian MNCs with an equal opportunity of being selected. The second stage clustering secures a heterogenous cluster of Australian MNCs in the four sensitive industries under observation which increases the economic efficiency of the sampling. This is essential in research where cost and time are important determinant of sampling method(s) (Tai, 1978).

Only those in the four industries were selected through purposive sampling for the actual sample of those which operate in PNG. Purposive sampling requires the arbitrary selection of samples in pursuit of desired characteristics (Sproull, 1988) Desired characteristics for this study are:

1. only MNCs in the four sensitive industries,
2. those who operated continuously over the specified period of 1992-1996, and
3. have a complete set of annual reports for the period.

This sampling is modelled after Niskala and Pretes (1995), who used a double sampling by first selecting nine industries using UN guidelines and categorisations (1992). In the second move, they selected the top 100 firms based on sales. After eliminating purposively those firms which did not publish annual reports, 75 firms (both listed and unlisted) were selected for their analysis.

Random, and a variation of random sampling, are used in this study. The second (control) group of Australian MNCs were chosen under random sampling. This capitalises on the strength of random sampling where the MNCs in the top 500 have an equal chance of selection and hence, will be representative of the Australian MNCs. However, complete listing is rarely possible which is a limitation of random sampling (Tai, 1978).

5.3.6 Sample MNCs

Actual sampling began with a list of all Australian companies operating in PNG. This list of companies was obtained from the IPA register which ensures a fair representation of all Australian MNCs in PNG. Sampling must be representative in order to draw valid inferences on the population of Australian MNCs (Sproull, 1988). Of these Australian MNCs in PNG, only those in the four named industries were targeted and purposively sampled in the first group which results in double sampling.

The choice of only Australian MNCs in this study may appear as biased but it was done for the reasons stated above. The action was necessary to narrow down choices of the desired subjects, ie, to include those in the four industries with both the potential to degrade the environment (oil & gas and manufacturing) and those degrading by their very nature of extractive operations (mining and forestry). All Australian MNCs in those industries are listed and are independent. This gives every subject a fair chance of being selected. Then, to avoid further bias, Australian MNCs in mining, forestry, manufacturing and oil & gas were randomly selected into the second group. The process may be replicated if necessary.

The only exceptions were those MNCs which did not have complete annual reports for the period, 1992-1996. These were discarded in the same way as Niskala and Pretes (1995). These authors analysed the annual reports of Finnish MNCs but discarded those with incomplete annual reports, arguing that a full set of reports is essential. The

discarding in this selection may violate the first condition of random sampling where full listing is required for full representation (Sarantakos, 1995). However, it is unfair to compare quantity of disclosure between MNCs which provide five years annual reports with those that only provide some of the required annual reports. Those with five year reports will display a much greater disclosure than those with less. Furthermore, where there is incomplete information, trends may not develop and changes will not be observed. Such inaccurate comparisons will contribute to wrong conclusions and inaccurate inferences.

Eventually a total of 120 MNCs were chosen for the study. Due to an error, one company was wrongly identified as being involved in two industries. This was not discovered until the responses were received, therefore Table 5-4 has only 119 MNCs. While the MNCs in the second (control) group (Table 5-4A) were selected randomly, those in the first group (Table 5-4P) were chosen purposively to incorporate the objectives of the study. The next section proceeds with the collection of data from both groups of chosen MNCs. Data in the form of annual reports will be collected from both groups for analysis.

5.4 Data Collection

To ensure that the MNCs are actually disclosing their operations fully, the collection and analysis of annual reports is necessary. This section discusses the collection of annual

reports from both groups of Australian MNCs in the industries named. The discussion begins with the period of study, MNCs contacts, their responses and data collection.

5.4.1 Period of Study

The period covered by this study is 1992-1996. There are two main reasons for starting in 1992. Firstly, in a similar study Deegan and Gordon (1996), analysed Australian MNC annual reports up to and including 1991 to assess whether there was an increase in environmental reporting. Therefore, by commencing in 1992, assessment of environmental disclosure by Australian companies will be further extended. Secondly, this study begins around the approximate time (1992) when environmental issues were emerging in PNG (Young, 1992). Even the Ok Tedi lawsuit which went to court in 1994, only did so, when earlier negotiations with BHP failed. The environmental degradation in the Fly River area began much earlier than this when a barge carrying sodium cyanide capsized in 1984 (Eaton, 1986) but the period, beginning in 1992 and ending in 1996, encloses the consequent lawsuit. Therefore, the effect of the lawsuit will be observed by comparing the years before (1992-1993) and after 1994 (1995-1996), the year in which the two writs were issued in the Melbourne supreme court against BHP.

5.4.2 Contact for Annual Reports

Individual MNCs were contacted with a formal written request for copies of annual reports. The request letter explained the reason for the research. It was planned that where responses were not sufficient or were below 50 per cent from the first contact, then second and third follow up contacts will be made as Deegan and Gordon did (1996). If some annual reports were out of print, especially for 1992-1993, then the accounting and finance department collection at the University of Wollongong will be searched and the necessary copies borrowed.

However, the overall response from the MNCs contacted was very good (Figure 5.5a). This figure is based on Table 5-5 (appendix) which has the results of an initial check on the total sample to determine whether there was ample environmental disclosure to warrant a content analysis. Responses from Table 5-5 are summarised into Table 5-5a¹⁴.

Response of MNCs

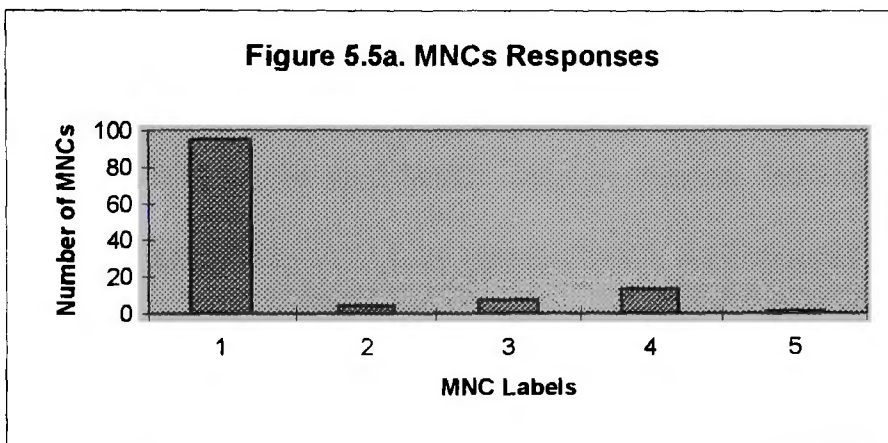
Out of the 120 contacted, 95 MNCs responded with a total of 394 annual reports which gives a 79 percent response rate (Table 5-4). However, only 347 annual reports were useful because the other 47 were either for 1997 or 1991 or earlier years. A number of MNCs sent in an incomplete set of reports for various reasons. One, for example, became a public company in 1994. Two (Bridgestone and Caltex) only submitted 1996 reports with explanations that they did not include environmental reports in their annual reports prior to 1995. This is considered an honest admission. It appears here that

¹⁴ Table with lower case letters (a, b, c etc) are summaries from another in the thesis.

environmental disclosure began after the critical event. The majority of annual reports missing were for the period before 1994 because they were out of print and some MNCs courteously included a note to that effect. Some had since wound up operations in PNG. Their responses are summarised below in Table 5-5a and also depicted in Figure 5-5a.

Table 5-5a **Responses on MNCs Contacted**

Responses		Labels	Number	Percent
Response	with Reports	1	95	79
Nolonger	operate in PNG	2	4	3
Letters	reurn to Sender	3	7	6
Did not	Respond	4	13	11
Error in	Classification	5	1	1
Total			120	100



Analysis of the above responses show that only 4 (Table 5-5a), informed the researcher that they were no longer operating in PNG. Some letters (7) were returned because the addresses had changed. A second attempt was made to contact those (13) who did not respond to the first contact as well as readdressing those with wrong addresses. Only one responded from this attempt. They (the MNCs) were informed about the study when the annual reports were requested. Out of the 95 respondents, 83 sent in annual reports in

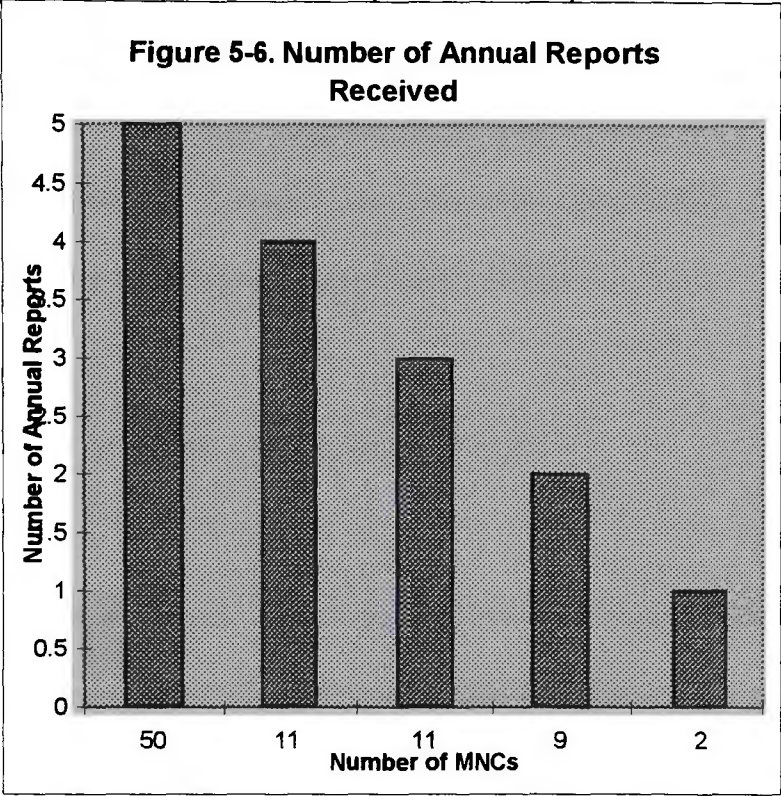
the proportion shown in Table 5-6 and by figure 5-6 below. This table (5-6) lists the number of companies which submitted annual reports from 5 each down to only 1 each.

Sample

Finally seventy-two MNCs with 3 or more annual reports were selected for the sample. Discarding those (11) with less than 3 reports conflicts with the sound selection criteria of Sarantakos (1995), who opposes this practice. The author argues that the omission influences decisions, and that all subjects should be included once they come under the cluster. However, since this study compares the period before and after the lawsuit, comparisons will not be complete if some reports are not available. Without those annual reports, inferences will not be statistically reliable, because they will be based on an incomplete sets of annual reports. Like Patten (1992), who omitted two of the 23 oil companies observed after the Valdez oil spill because they did not have annual reports, respondents with less than three reports were discarded.

Table 5-6

Number of MNCs	Number of Reports	Total Annual Reports
50	5	250
11	4	44
11	3	33
9	2	18
2	1	2
		347



This sample (72) is larger than that of Guthrie and Parker’s (1990), who analysed annual reports of only 50 companies for CSD. The sample is also greater than Deegan and Rankin’s (1996), who analysed 20 companies which were prosecuted by the Australian Environment Protection Authority (AEPA) or Patten’s (1992) 21 companies. The present sample of 72 MNCs is equal in size to the Blacconiere and Northcut’s sample (1997). They examined stock price reactions to Super Fund Amendments and the Reauthorisation Act (SARA) of 1986 and environmental information. The 72 firms in

their sample were chemical and allied products, whose data from 1992 onwards was available on the Research Centre-NYSE/AMEX.¹⁵

The annual reports collected will now be analysed for their degree, extent and pattern of environmental disclosure. The selection of Content analysis is discussed below. The discussion (below) looks at the definition content analysis, its history of evolvement as a research technique, how it works, its operational contribution, a literature review of its application and its advantages as a research method.

5.5 Method of Analysis - Content Analysis

Content analysis is chosen as the appropriate technique because it is an established method and its results can be replicated. This method is widely used in social disclosure analysis. It will be employed to analyse the MNCs' current environmental disclosure. Examples of studies that employed content analysis to analyse annual reports include Guthrie and Parker 1990; Patten 1992; Niskala and Pretes 1995; Hackston and Milne 1996; Deegan 1996; and Deegan and Gordon 1996.

¹⁵ The result also supports the claim that investors seek environment news in annual reports. Blacconiere and Northcut found companies with extensive environment reports have less negative reaction than those with less. Extensive reporting by MNCs was interpreted by investors as a sign of management handling the company's exposure to environmental regulatory costs. While the study is US oriented, it is consistent with Tilt (1994) that investors actually seek out environment news in annual reports. Therefore this study analysis the annual reports of MNCs to observe the extent and pattern of environment reporting.

Content analysis is defined by Berelson (1952, 14), as ‘a research technique for an objective, systematic and quantitative description of manifested content of communication’. It is a technique which aims to improve the quality of the inference(s) a researcher makes based on analysing a form of communication. This form of communication can be verbal, written or even pictorial. The analysis involves a systematic and objective identifying of characteristics in specific parts of those communications (Carney, 1961).

To Krippendorff (1980) content analysis is a research technique for making replicable and valid inferences from data to their context. It is a research tool that provides knowledge, new insights and a representation of facts. Weber (1988), further adds that content analysis is a method of codifying text into categories based on a selected criteria.

The above definitions focus on content. Chaudhary (1991, p.87), adds a definition on the actual process-analysis. The author defines *analysis* as ‘a measure taken to search for patterns or relationships among the data group’.

Thus, content analysis is defined in this study, as a technique which will systematically analyse annual reports with an objective of determining the quality and quantity of environmental disclosure. This analysis will search through MNCs’ annual reports for features of environmental information to establish patterns of the extent and the degree of environmental disclosure. Features of environmental reports located will be codified into units of analysis to enable comparisons to be made between groups of MNCs,

industries and previous studies. This will provide the basis for proposing an accounting solution for the current environmental impacts being experienced in PNG.

5.5.1 Classical or Theory Oriented

Content analysis can be either classical or theory oriented. Classical content analysis inductively uses word count frequency from a descriptive manifest. Its sample is selected through multistage sampling. In contrast, theoretical content analysis unities on theme as a measure from a purposively selected sample, and makes comparisons indirectly, based on a theoretical framework. Of the two, classical content analysis is objective and possesses greater validity than theoretical content analysis.

This study integrates features of both classical and theoretical forms. Words are used as a unit of measure on a purposively selected sample. Word count is conducted on the content of annual reports manifest, however, its basis is the legitimacy theory framework. This is based on Carney's (1972) assertion that the theoretical framework of reference sets the standards or norms and the logic of inference.

Content analysis is useful for hypotheses testing and making inferences (Krippendorff, 1980). Making an inference is the major purpose of content analysis. Cause and effect analysis of communication content leads to inferences and these inferences may be direct or indirect. A direct inference may be drawn by relating changes to specific event(s) which may have influenced the changes. An indirect inference requires a longer chain of

events and changes. Content analysis' other potentials are discussed in the next section.

5.5.2 Unit of Analysis

It is essential to settle on a unit of analysis, having justified the use of content analysis. Unit of analysis refers to the level of aggregation of data to focus on in the issue. Unit of analysis varies and depends largely on the type of study. Gray, Kouhy and Lavers (1995) list three preferred units of analysis as words, sentences, and pages of report. All three: word, sentence, page count or a combination of them have been used by different studies. For instance, Ernst and Ernst (1976) and Deegan and Gordon (1996) used word count in their analysis; Hackston and Milne (1996) and Buhr (1998) employed sentence count while Guthrie and Parker (1990); Patten (1992); PMPG (1994) and Niskala and Pretes (1995) expressed the amount of disclosure in the number of pages. This study employs a combination of all three.

This study searches for attributes of environmental disclosure and counts the number of words used to describe them. A common number of words per line and number of lines per page, will be determined to calculate the total number of words to a page. This total word count will be used to determine the number of pages of environmental disclosure. Final results will be expressed in the number of pages (as did Patten, 1992) although only the number of pages are equated. Expressing them as page numbers will enable comparisons between the two groups and other previous studies.

Previous Application of the three units of Analysis

The three units of analysis were employed by a number of studies to determine the extent of social disclosure. A few, with similar characteristics to this study are summarised below. The summary commences with those which unitised with a word count and concludes with a page count. It appears from these studies that word count is the most used.

Word Count

Several studies including Ernst and Ernst 1976; Ng (1985); Zeghal and Ahmed (1990); Deegan and Rankin (1996), and Deegan and Gordon (1996) used word count to determine the quantity of disclosure. Ernst and Ernst (1976) merely counted the number of times an event was recorded. This study, similarly counts the number of words used to describe a feature of environmental information reported. Zeghal and Ahmed (1990) conducted an exploratory study analysing annual reports along with advertisements and company brochures for 1981-1982. Their word count analysis revealed that banks and petroleum companies disclosed more social information in advertisements and brochures than in annual reports. This implies that the choice of a medium depends on the target (Zeghal and Ahmed, 1990).

Deegan and Rankin (1996) used a word count to analyse 20 prosecuted companies' reports for the disclosure of their prosecution. The authors maintain that their use of a word count was not for precision but to study systematic variations in a company's disclosure. The authors were observing for an increase in environmental disclosure

following the companies' prosecution. To counter the argument that a word count is a crude approach, the total word count will be equated to pages based on Ng's counter arguments (presented below). These arguments make word count comparable with the page and sentence count.

While a number of researchers use page and sentence count, Ng (1985) prefers to use word count. The author points out that there three problems with sentence counts:

1. problem of various print sizes cause content to be spread differently in addition to content differences between pages,
2. some report pages contain pictures, some have columns and shorter sentences and the actual
3. size of the annual reports also vary.

There is consistency between studies that use the word count method. For instance, Deegan and Rankin's (1996) negative mean disclosure of 5.55 words is consistent with Deegan and Gordon's (1996) mean of 5.7 words. This negative report is from 6 companies which disclosed a total negative reports of 133 words. Their word count analysis revealed that those companies in sensitive industries disclosed more, with a positive mean of 180 words, compared to only 5.7 words for negative disclosure from 14 companies. They surveyed a sample of 197 companies from 50 industries. The negative mean in both studies is consistent, even though the later study analysed a large sample of companies, which could have easily influenced the mean.

Those who oppose word count question the subjective choosing of words which disclose environmental information. Hackston and Milne (1996) claim that the word count is subjective. However, Ng (1985) and other word count proponents standardise the word count in their analysis. Their opponents argue that sentence count is superior, because it eliminates the standardising problem (Hackston and Milne, 1996). This study's choice of word count is to ensure thoroughness with the use of the smallest unit. Every word which describes an environmental report will be counted to make the analysis comprehensive.

Sentence Count

Sentence count as a content analysis unit is less popular than word count. Only two are summarised here. Hackston & Milne (1996) analysed 47 companies in the top 500 by market capitalisation using a sentence count. They opposed a word count because it is subjective and requires an extra step to standardise. Unlike other studies, Buhr (1998) conducted a case study of Falconbridge's mining and smelting of nickel at Sudbury (Ontario-Canada). The objective of the analysis was to assess the company's response to the state legislation on lowering sulphur emissions and how it disclosed its responses in its annual reports. The author, in this case study, analysed annual reports using the sentence count which found technology being reflected as the driving force of disclosure. Over time, company discussion covered legislature and the change in technology, corresponding to a decrease in economic cost, which ultimately reduced sulphur emissions.

Page Count

Other researchers have opted for a page count. It is easy to determine pages of environmental disclosure while the previous units eventually conclude in pages of reports. However, quality of disclosure may not be accurately determined because the emphasis is on the amount of disclosure. This is not the issue here, but it is note worthy that studies on corporate social disclosure (CSD) have employed page count.

Guthrie and Parker (1990) used page count in their analysis of CSD. They studied the social impact disclosure of the 50 largest corporations by market capitalisation in the US, UK and Australia. Their weighted average social disclosure was 1.26 pages, 0.89 of a page and 0.70 of a page respectively for the three countries. Thus the US had the most while Australian corporations disclosed the least.

Patten (1992), who examined the effect of Exxon's Valdez oil spill in the Alaskan gulf in 1989, recorded his findings in the number of pages. His study was based on Preston and Post's (1985), legitimacy theory. Patten analysed 21 of the 23 public traded oil companies. General disclosure increased from 0.61 page (1988) to 1.90 pages in 1989 after the spill. Exxon made substantial disclosures from 0.60 of a page in 1988 to 6.0 pages in 1989. This disclosure provides evidence that Exxon was legitimising to deflect publicity (Patten, 1992). Patten's study has two corresponding similarities with this study. Firstly, this study was the result of a critical event, much like Patten's oil spill incident. Secondly, both studies are based on Legitimacy theories.

Given the wide application of content analysis in sociology and because its features and methods is well established, it is used here for the analysis. Content analysis is objective and systematic in its application. The studies this thesis is modelling, also used content analysis, which ensures consistency. The results can be replicated where necessary.

The main body of analysis will be preceded by a pilot study of 50 annual reports from 10 MNCs which operate in PNG. This is to both rehearse the analysis approach and test the effectiveness of the analytical instruments to ensure they accomplish their intended purposes (construct validity). The pilot study will also test the suitability of the instruments. Any necessary reconstruction or amendments will be made before the actual analysis. This will allow any deficiencies or problems which emerge to be rectified before the main analysis is begun.

5.5.3 Potential of Content Analysis

Content analysis has the potential to ensure that all relevant material is collected from the analysis. It commences with a check on content manifest (Attribute Analysis) for analysis. Content analysis is useful when:

1. an analysis of voluminous and complicated source material is required and where reliability is important. Only content analysis can extract relevant data from such a volume (Carney, 1961), and
2. where a writer's language is intensively analysed.

It is a form of analysis and extraction of communication with intentions to draw inferences.

Content analysis has an important role as an investigative tool because it is capable of:

1. accepting large unstructured symbolic communication as data, and
2. analysing unobserved phenomena through the medium of data connected with the phenomena (Carney, 1961).

5.5.4 Wide Application

Content analysis has been used in a wide range of sociological studies such as: Patten 1992; Niskala and Pretes 1995; Hackston and Milne 1996; Deegan 1996; Deegan and Gordon 1996; and Deegan and Rankin 1996. These studies are classified according to their unitizing method. Some use word count while others use page count.

Paten (1992) analysed the content of 21 oil companies' annual reports for environmental disclosure following the Valdez oil spill in Alaska. Hackston & Milne (1996) analysed and compared the development of environmental disclosure in New Zealand to other developed countries. Deegan and Rankin (1996) investigated annual reports of prosecuted companies to establish whether their prosecution by the EPA in Victoria and NSW were disclosed. Others, like Guthrie and Parker (1990) analysed Australian companies' social disclosure to monitor improvements in reporting.

In each case content analysis was employed with a specific objective. The authors systematically conducted their analysis and recorded their results in various units of measure. Eventually, results were quantified and inferences made on the population

which provided the samples. Similarly this current study's objective is to determine the extent, degree and pattern of current environmental disclosure. The study systematically sampled MNCs whose annual reports are analysed for environmental content. Features reported are quantified to determine the quality and quantity of disclosure. Based on the results thus derived, inferences will be made from the MNCs disclosures in the respective industries from which the sample is drawn.

Reasons for adopting content analysis

There are several reasons why content analysis is used here. Its features of:

1. objective measurement- it will measure the quantity of environmental disclosure because environmental features can be unitized,
2. systematic analysis - it will process disclosure systematically to determine the degree, pattern and trend of current environmental disclosure,
3. quantifying the results- the amount of disclosure will be quantified, and
4. making inferences- inferences will be made to the population of MNCs from the results to address the environment issue.

Content analysis accommodates individual objectives. Patten (1992), analysed to observe oil companies legitimising their existence. Deegan and Rankin (1996), observed for honesty among those prosecuted companies in revealing their prosecution to interested parties. Hackston and Milne (1996) compared the New Zealand experience or development of environmental disclosure with other countries. These authors systematically analysed for environmental attributes. The features were unitized using

words, sentences or pages. Their results were quantified and the results inferred on the population from which the samples were taken.

Content analysis is a popular technique in social disclosure analysis. Although there are objections (listed below), there are no alternative technique(s) presented by those who object to its use. Their main argument against content analysis is that it is subjective. However, the benefits of content analysis outweighs its weaknesses. Therefore content analysis will remain in use until a better approach is found.

5.5.5 Benefits of Content analysis

Content analysis is widely used by researchers because of its benefits:

1. A researcher is assured of obtaining the objective because it requires an objective collection of information from a secondary source,
2. the study can be checked or be replicated,
3. different studies can be conducted once the researcher is familiar with the technique (wide application), and
4. can draw different kinds of conclusions depending on the criteria used (Carney, 1972).

Objections to the use of content analysis

Content analysis is not without its shortcomings. Its alleged shortcomings include:

1. It lacks the rigour of other methods. That is why more than one form is used here to compensate for this. However, a better alternative method has yet to be found.
2. It does not ensure absolute objectivity although it is more objective than impressionistic approaches. Much depends on objectives and whether benefits can be balanced with costs.
3. Content analysis obtains the best results, which compensates for the hard labour involved, ie it is tedious (Carney, 1972).

5.5.6 Application of content analysis to this study

Although content analysis is tedious and lacks rigour, this study uses content analysis for its empirical section, based on the above discussions of content analysis' wide application, its potential and advantages. Janis' (1965) classification of attributes and assertion analysis, as part of semantic content analysis, will be applied to the analysis of the annual reports.

Janis¹⁶ (1965) defines Semantic content analysis as a procedure which classifies signs according to their meaning. That is, counting the number of times the word 'recycling' is referred to in an annual report, irrespective of the words used in making the reference.

There are three types of semantic content analysis:

- a. *designations analysis* -provides the frequency with which certain objects, persons or things are referred to. This is subject matter analysis.

¹⁶ The full text of her work is in Italian in the book, *Language of Politics* as edited by Lasswell et al

- b. *attribution analysis*-provides the frequency with which certain characterisations are referred to.
- c. *assertion analysis*-provides the frequency with which certain objects are characterised in a particular way -thematic analysis.

Of a possible three types of semantic content analysis, attribution and assertion analysis are adapted for this study. The attribution analysis is adapted here because it will identify the attributes of environmental reporting in the annual reports. It is used firstly to identify the characteristics of environmental disclosure to establish their presence, these are then grouped into classes. Assertion analysis then records the characterisation and placements of the attributes identified under attribute analysis.

In the context of this study, assertion analysis affirms the disclosure of attributes cited in attribute analysis. The affirmation of disclosure is conducted in the different groups and in different sections of the report. Since the attributes are sought in different locations under particular groupings, there is a form of designation analysis where the frequency of attributes disclosed is analysed. The attributes are the subject matter and the study objective is to systematically identify and quantify them. In the final phase, semantic analysis quantifies the attributes disclosed to determine the quantity of environment disclosure.

In summary, all three applications of content analysis have restricted definitions (Janis, 1965) and are used here only as content analysis technique. The attribute analysis

establishes the existence of environmental features. It does not analyse attribution theory studies in the widest sense, for cause and effect. Assertion analysis proceeds then to affirm the presence of environmental attributes (and does not analyse assertion theory) in different locations while semantic analysis quantifies the total disclosure. Neither does semantic analysis analyse for the philosophical problem of truth.

Although content analysis is widely employed in corporate social disclosure research, Gray et al (1995b) argues that it is less common in more conventional areas of accounting research. However, since this analysis of annual reports includes financial accounts, the approach is appropriate. It's usage here is especially relevant because this study aims at assessing the MNCs' motives, attitudes or values on environmental issues. The method has wide application and the literature reviewed above have all engaged in content analysis.

5.6 Pilot Study

This section discusses the pilot study and its results. The pilot study involves the application of the three phases of content analysis: attribute, assertion and semantic. The section begins with a statement on the instruments of analysis, and the sample for the pilot study before beginning the attributes analysis. Assertion and semantic analysis follow on in sequence of the environmental disclosure to affirm the attributes and quantify the pilot study sample disclosure.

Instruments

The instruments of analysis will be tables to record results of the annual reports analysed. Tables will be constructed to record the MNCs responses and their respective industry classification. On completion of the pilot analysis, tables (Table 5-6a to 5-6c) will record the results. Tabulated data are easier to comprehend and graphs give a convenient visual impact.

5.6.1 Sample Data for Pilot Study

The sampling frame of the pilot study will be confined to the MNCs who operate in PNG. MNCs in the pilot study constitute approximately 13.89 percent of the total sample of Australian MNCs from the four industries. Attributes or features of environmental disclosure, extent and quantity of disclosure found in the pilot analysis will resemble those in the main analysis.

5.6.2 Features of Environmental Disclosure in annual reports

The presence of features in annual reports is deemed as environmental disclosure. After establishing which instruments and data to analyse, the next step is to consider what to search for in the annual reports. Those studies named above, had different objectives and sought different features of social reporting. Even their classifications of environmental features are different.

Guthrie and Parker (1989) sought environment, energy, human resources, products, community involvement and others. Environment was a minor component of social disclosure at that time. However, Gamble et al's (1996) recent study was more environment oriented. They sought data under short quantitative discussion (SQD) and extended quantitative discussion (EQD). Under the former class was information on environmental policy, legal compliance and restrictions, changes in environmental regulations, operating and capital expenditure and environmental impact on other activities. Under EQD were items such as future plans for improvements and costs, environmental oriented assets, and environmental audits.

Niskala and Pretes (1995) also analysed voluntary disclosure of environmental information by Finnish companies. However, their emphasis was the entities' environmental policies and the features sought come under two groups: environmental policy and finance, and environmental protection activities. The first group (policy and finance) has policy activities and financial information which are classified in the same manner as Gamble et al (1996). The second group (environmental protection) had items such as pollution, wastes, recycling, safety, products and energy saving.

The Association of Certified Chartered Accountants (ACCA)'s disclosure requirement is much more comprehensive than those used above. While offering annual awards, the ACCA requires a detailed criteria for environmental reporting. This includes 'details of environment policies, environment management statements (EMS), auditing, setting targets, legal compliance, material inputs, energy consumption, water consumption,

wastes, emissions, environment expenditure and liabilities and benefits of environment policies' (Deegan, 1996, p.130). This is not an exhaustive list but shows those seeking guidance on how to improve their environmental reporting.

Any one of the above studies' features and classification could be adopted for this analysis. However, Wiseman's (1982) classification is adopted here for two reasons. First, the classes of features are broader than Guthrie's and Parker's (1990). Second, they neatly classify the main areas even though they are not as comprehensive as the ACCA's. The ACCA has an extensive list because there is an award on offer. Environmental disclosure is voluntary in Australia and there is no incentive to demand very much, especially while the practice is in its infancy.

Patten (1992), who adopted Wiseman's (1982) classification, was analysing environmental disclosure following Exxon's Valdez's oil spill to study changes in reporting following a critical event. This study sought to analyse the possible impact on MNCs' environmental reporting following the Ok Tedi lawsuit. Therefore, Wiseman's (1982) classification, as adapted by Patten (1992), is adopted here. Listed below are Wiseman's classification.

A company will be deemed to have environmental disclosure if its annual report contains any of the following:

1. Discussion of any environmental regulation or requirement which will impact on their operations or activities.
2. Outline of Company's environmental policy or concern for environment

3. Efforts to conserve nature including setting targets for achievements
4. Environment related Expenditure
5. Awards received by the company or any issued to its employees to promote environmental care
6. Recycling Effort
7. Litigation for environmental degradation
8. Environmental Audit Program in place or planned

5.6.3 Locations of attributes or features of environment

In previous sections the concern was how and what to analyse, this section is concerned with the attributes placement in annual reports. Location analysis becomes necessary because accessibility to information is essential. As Deegan and Rankin (1996) reported, 73.3 percent of their (67 percent) respondents actually seek out environmental information because they rate them as material for their investment decisions. Investors ought to be able to access relevant environment information, read, understand, compare and make well informed decisions. Unless they can access them, wrong decisions will result because not everyone has the time, education (as in PNG) or the expertise to retrieve the information that is glossed over in annual reports.

Thus the location of a news item is significant because it determines the accessibility of information. Kirkman and Hope (1992) argue that location is important and list these four reasons for their stand:

1. information is more likely to be read if it is included in the chairman's statement because it is ranked higher than and important than those elsewhere,
2. reporting on a separate page indicates that the issue is prominent enough to stand alone,
3. its inclusion in the auditor's report shows it is verified or independently attested to, hence it can be trusted, and
4. having an item under the director's report or the annual review is incorporating it in the mainstream for emphasis.

Gray, Kouhy and Laver (1995) contend that the locations of information is insignificant. They allege that it is only speculation that information in one location is better accessed than other locations. There is nothing definite in the literature on this point. There is a need for further empirical work to substantiate both claims.

Meanwhile, this thesis adopts Kirkman's and Hope's view that location is important for the reasons given above. This is because the current study aims to expose environmental degradation practices in order to mitigate them. The study is not soliciting for one location for all environmental information. Rather it is arguing that information is better accessed if its location is easily accessible because important material may be missed if it is located in a poorly accessible spot. This analysis will only assess the quantity of information disclosed under the different locations and categories because richness of data might be lost by imposing all into a location (Guthrie and Parker, 1990).

The list of locations for environment information presented in Table 5-7b, column 1 is adopted from Niskala and Pretes' research (1995). The analysis will seek the above named features in these locations and quantify them. Since all disclosure will be quantified and tabulated, it is necessary to test out instruments of measurement. The next section conducts the actual pilot study with the ten sample companies.

A pilot study trialed the instruments using content analysis. Attribute analysis used to analyse the ten sample companies' (Table 5-7) fifty annual reports, for features of environmental disclosure. Table 5-7 contains the 10 MNCs whose selection criteria appears below for the pilot study.

Table 5-7 Industries and Companies

Forestry	Mining	Manufacturing	Petroleum & Gas
Boral	Placer Pacific	Coca Cola	NZOG
Howard Smith	Placer Dome	Annotts	Command
ANI	MIM		

Sample

A sample of Australian MNCs which operate in PNG is selected (Table 5-7) subjectively for the pilot study based on two criteria:

1. Companies must have been in PNG before the 1994 Ok Tedi lawsuit and for the full 5 years from 1992 to 1996. This will enable this study to determine MNCs' disclosure practices and the effect of the lawsuit.
2. Companies must have a full sets of (5) annual reports to enable complete coverage.

The analysis seeks for a number of environmental attributes disclosed in the annual reports. Attribute analysis will then be followed by assertion analysis which affirms their location of disclosure and assesses their frequency. Each mention of a feature will be counted and tabulated, their frequencies calculated and expressed as percentages. Unlike Japan which is regulated to produce a 'Business Report' (Yamagami and Kokubu 1991), Australian companies disclose them voluntarily. Therefore, semantic analysis will determine the quantity disclosure which largely depends on the MNCs' willingness to disclose.

Results of the pilot study analysis is recorded in tables 5-7a to 5-7c. Table 5-7a contains the features of environmental reports while Table 5-7b records the location of the features and the Table (5-7c) gives the total disclosure. The three analysis are discussed separately below, although at times, they are covered together under the three phase of content analysis: Attribute, Assertion and Semantic.

5.6.4 Attribute Analysis

Attribute analysis involves the identifying features of environment issues which are reported in the financial statements. They are classified into major groups for easier management. Table 5-7a contains the major environmental attributes as classified by Wiseman (1982) which are sought in the 50 annual reports. Each attribute is discussed separately going from left to right (Table 5-7a) except for the first two. These are combined because company policies reflect and accommodate regulations.

Environment Regulations and MNC policies-

Every industry appears to be aware of, and complies with environment regulations to some extent, by incorporating them into its company policies (Table 5-7a, column 2). All four industries have environmental policies varying between industries from 47 percent for forestry to 80 percent for mining (Table 5-7a, column 3). A number of companies have also achieved ISO 9200 Quality Accreditation. The *Oil & Gas* industry boasts of making the environment a priority through pro-active self regulation. This industry even pledges to 'work in advance of government standards' (Command Annual Report 1993, p.20); however, their disclosure is low (Table 5-7c). Their pledge appears to be self-laudatory.

Table 5-7a Frequency of attributes of Sample Companies in Pilot Study

Environment Features:	Regu- lation	Company Policies	Conserva- tion Evidences	Environ- ment Expenditure	Awards	Recycling Efforts	Lawsuits & Litigation	EIA & Audits
Industries	Freq. & %	Freq. & %	Freq. & %	Freq. & %	Freq. %	Freq. & %	Freq. & %	Freq. & %
Manufacturing	4/10* 40	6/10 60	0 0	0 0	1/10 10	3/10 30	0 0	4/10 40
Mining	8/15 33	12/15 80	5/15 33	10/15 66	6/15 40	6/15 40	4/15 27	2/15 13
Oil & Gas	3/10 30	5/10 50	2/10 20	0 0	0 0	0 0	0 0	0 0
Forestry	7/15 47	7/15 47	3/15 20	4/15 27	1/15 7	5/15 33	4/15 27	2/15 13

* Number of companies in the industry for this analysis

The *manufacturing* industry claims to be taking 'the initiative in developing policies and procedures in anticipation of needs and requirements of environmental responsibility into the next century' (Arnott's Annual Report, 1995, p.23). International companies like Arnott in this industry are aware of the global demands for environmental disclosure. However, it disclosed the least, just 25 words, for the whole five years. Coca Cola (Annual Reports, 1993) prides itself for contributing to the multilayer Repete PET packaging which is widely accepted in Australia and aims to exceeded state compliance regulations (Annual Report, 1995). Coca Cola reported more regulation and company policies whpich substitutes for the manufacturing industry.

The *mining* industry admits that the industry is subjected to stringent environmental legislation (Placer Dome Annual Report, 1993, p.11). All phases of their operations from exploration to reclamation are scrutinised by some form of legislation. They know it is necessary because, as it states, 'protecting the environment is not only a prerequisite to profitability, but is the right thing to do'. Because the industry comes under heavy

scrutiny, mining recorded the highest disclosure in all attributes, except environmental audit, where manufacturing leads (Table 5-7a). Based on attributes alone, mining disclosure is extensive while under scrutiny. The other three industries, while pledging to exceed the state regulations, were only making self-laudatory remarks.

The *Forestry* industry professes to commit itself to strict compliance with environmental regulation. It claims to meet 'both the spirit and the letter of the law' as well as community expectations (Boral Annual Report, 1996, p.9). This, it implements by harvesting timber on a sustainable yield basis, unlike those cited in the literature review (chapter 2). The industry justly states that caring for the environment is not only a social responsibility but an essential part of business practice. Unfortunately forestry's good record was tarnished in 1994 when Boral was charged \$85, 000 for breaching health, safety and environmental legislation (Annual Report, 1995).

Conservation & Restoration-

Only three industries have made provisions for restoration and conservation. These are *mining, oil & gas and forestry* (Table 5-7a, column 4). *Every mining* company has a restoration and rehabilitation provision in its notes. A possible reason for greater disclosure here, is the legislation which requires a separate disclosure of restoration obligations to be recognised as a liability in the financial reports (Urgent Issues Group (UIG) Abstract 4, 1995). However, it was noted on the overall disclosure, that in 1995, the quantity of disclosure was the highest. Therefore greater disclosure is not only in compliance to UIG abstract 4 requirement. It is also attributed to the scrutiny reported

by (Placer Dome Annual Report, 1994). As cited earlier, this was one year subsequent to OTML facing litigation charges. Although there are fluctuations over the five year period, with the exception of 1993, disclosure after 1994 exceeds 1000 words or 2 pages (Table 5-7c).

Even though *Oil & Gas* reported cooperating with the department of conservation as early as 1994, reports of provisions for restorations only appeared after 1995 (New

Zealand Oil & Gas (NZOG) Annual Report, 1994). This corresponds to the total disclosure in Table 5-7c which has a high increase after 1995. This again supports an earlier claim that critical events have an impact on environmental reporting.

Forestry treats site management and beautification (Boral Annual Report, 1992) as a priority. Major forestry reports of conservation is water treatment and recycling for reuse. A conservation effort involves recycling water through ponds and storage dams to conserve the local habitat (Boral Annual Report, 1996).

Environmental Expenditure-

Only *mining and forestry industries* register some environmental expenditure. In 1995 Placer Dome Inc estimated its environmental expenditure to be \$92 million. Of this, \$4 million was spent on Pogera and Misima mines to improve tailing discharges to minimise environmental risks. Therefore, those who operate the Pogera mine deny that discharges are causing health hazards. They maintain the discharges are not even toxic to fish. As

revealed by the literature review (Chapter 2), the DEC does not have the resources to verify assertions with its own EIA and is therefore forced to accept the MNC reports at face value. Since the MNCs environmental expenditure is sizeable, the reports should be reliable except for incidents such as Marcopper mines with its waste leakage and its consequent enormous legal liability.

Marcopper Mine in the Philippines was charged \$43 million for tailing leakage. This incident along with the Goldfields mining company lawsuit, the Kidston water release

(Placer Dome Annual Report, 1993) and even Pogera (CSIRO, 1996) caution against hasty conclusions. The Marcopper incident occurred despite Placer Dome Inc receiving a number of awards just a year earlier (Annual Reports, 1992). An independent report¹⁷ by CSIRO obtained from Placer Pacific recommends that PJV should monitor for impacts because PJV's current environmental management and monitoring program is *'narrowly focussed on compliance monitoring and reporting'*¹⁸ (CSIRO 1996, pp. ES-5, 10). This is confirmed by RGC's (Annual Report 1993, p.11) admittance that JVC's monitoring *'confirms that levels of trace metal remain within compliance limits'* set by the PNG government. They are merely complying with DEC requirements.

¹⁷ A letter of Request was sent to BHP for a copy of the independent report on Ok Tedi which was to be released late 1997. The company did submit their annual reports but did not respond to the request for the independent report. Its non response was taken as negative or abstaining as with request for annual reports.

¹⁸ Emphasis is added

Neither the oil & gas, nor manufacturing industries recorded any environmental expenditure to indicate any attempt has been made to minimise degradation. Oil & gas companies did not add any further reports under the other features. This poses some questions about their earlier pledges.

Environmental expenditure for *forestry* is incurred in the construction and operation of converting wastes to energy projects, soil decontamination, flue gas desulphurisation (Australian National Industries (ANI) Report, 1996). Unfortunately, heavy expenditure led to the company making losses which has eventually led to the industry's scaling down its operations. Consequently, environmental reports declined in 1996 (Table 5-7c).

Awards

The mining industry dominates the awards tally while the manufacturing and forestry industries only received one each. All Awards are for environmental excellence outside Australia and PNG. Three mining awards were awarded to Placer Dome (Annual Report, 1992) in Canada, and one each in the US and the Philippines. The *manufacturing* industry award was a Green award for outstanding environment efforts in Indonesia (Coca Cola Annual Report, 1996). The same company's plants in Brisbane and Perth were only commended by Australian authorities for their conservation in waste water recycling and reuse. Australian companies' pledges to be more careful in Asia has borne fruit. *Forestry's* award for container care was issued by the US from the state of Washington in July 1996 (ANI Annual Report, 1996).

It appears that extra effort is made where the environmental legislation is stringent. As Gray et al (1996) noted, the country of ownership and the country of domicile have significant influence on disclosure. These companies must have done well to earn the awards in these countries where environment legislature is well established. Only two local awards: Osborne's Premier award (Placer Pacific Annual Report, 1995) and an employee award (Placer Pacific Annual Report, 1994) were reported.

Recycling

Under recycling, the manufacturing and forestry industries should excel because their products are recyclable. On the contrary, *the mining industry leads* from practising reclamation. Reclamation includes the conversion of water to energy, soil decontamination, waste water treatment, coal beneficiation and flue gas desulphurisation. The manufacturing industry only records the recycling of water (Coca Cola's Annual Report, 1996).

Waste recycling efforts by the *forestry industry* is due to the development of environmental engineering, which is advanced in Europe, compared to the US, Australia or Asia (ANI annual report, 1994). This is in compliance with strict European guidelines on land, air and water pollution (ANI annual report, 1993). The underlying support is public demand for a cleaner environment which is forcing European governments and businesses to be environmentally aware.

While most mines recycle water, MIM (Annual Report, 1992) applies ISAMELT technology to recycling copper and lead in Mount Isa. Lead is also recycled in the UK by

MIM which is considered the best in the world. The recycling process is to improve the quality of the air. New baghouse filtering systems have also reduced emissions into the air considerably. The mining industry, especially MIM (Annual reports, 1995), prides itself on having the world's best environmental measures at the zinc-lead-silver mine at the McArthur river-Northern Territory, Australia.

Litigation & Lawsuits-

Only mining and forestry registered lawsuits. Interesting enough, they are the two industries with the most publicity over environmental degradation according to the literature review. Their total disclosure exceeds the other two industries. As mentioned earlier *mining* has come under stringent regulations (Placer Dome Annual Report, 1993). This scrutiny may have been the result of the different lawsuits being reported. Even the Mabo decision is causing a lot of anxiety among the mining companies in Australia as does Ok Tedi in PNG. While Placer Pacific (Annual Report, 1996) is defending some minor claims, Placer Dome (Annual Report, 1996) faces a large liability of \$104 million for its group of companies. Of this, \$43 million is for the Marcopper mine.

Boral's (forestry) litigation charge of \$85 000 is for a 'small number of prosecutions for breaching occupational health, safety and environmental legislation'(Boral Annual Report 1995, p.42). The mining industry is given a much heavier penalty. Marcopper mine for example was fined \$43 million in 1996 for the accidental release of tailing. The Ok Tedi case, which prompted this study, faced a \$3 billion lawsuit in 1994. Overall, Australian mining companies operating abroad came under scrutiny in 1995 (Pacific

Placer, 1995). The industry was aware of the problems because Placer Dome (Annual Report, 1992, p.9) predicted that 'mining is and will be a far more sensitive, complex, difficult and demanding business than it has been in the past'. This constitutes further evidence of scrutiny because of the industry's sensitive nature.

Audits & EIA

Audit as a control mechanism should assist to improve environment disclosure. The *manufacturing industry* leads convincingly in this attribute because one of them (Coca Cola Amatil) as an international company maintains its credibility for its international franchise industry. It claims to boost its environmental management program with rotating audits radiating from Australia out internationally and promotes an intensive personnel training program to encourage employees to be environment conscious (Coca Cola Annual Reports, 1996).

The mining and forestry annual reports mention audits briefly. Mining integrates in a single audit: safety, quality and environmental standards (MIM Annual Report, 1996). This is incorporated into advanced risk management techniques. Annual audits are also conducted (Placer Pacific Annual Report, 1993). The forestry industry shows the benefit of auditing which reduced its legal liabilities substantially by its improvements in management practices (Boral Annual Report, 1992). Boral's example should promote environmental auditing for good management among MNCs.

There is an indication that the MNCs report on environment issues. These are noted in the attributes reported. However, not MNC did so. This is shown by the number of '0s'

in columns 4-9. Some only featured selected issues, omitting others. Assertion analysis in the next section will identify locations based on the argument that location influences access to information.

5.6.5 Assertion Analysis

Assertion analysis classifies the attributes located in the annual reports into categories. Only major locations such as the chairman's report, annual review, financial statements, future review, notes to the accounts and separate reports are discussed. Where appropriate, new major locations will be added and those considered irrelevant will be deleted in the main analysis.

While attribute analysis identifies the features, assertion analysis affirms their disclosure by identifying their location in the annual reports. This analysis proposes that location is significant. Environmental reports appeared in all sections for both forestry and mining companies as anticipated, except in a separate report (Table 5-7b, columns 3&5). Table 5-7b has a list of possible locations in the first column and expresses the pilot study result in percentages. Frequency results reveal the locations of environmental reporting. Both forestry and mining industries disclosed more, as was anticipated. Oil & gas reported only in three sites while manufacturing featured reports in only two locations. Within the chairman's reports are the highlights of the year and plans for future projects and the impact of regulations. The chairman's report summarises the whole report with emphasis on the highlights except for the mining, whose report is fairly spread out in

(Table 5-7b). The annual report section contains the bulk of the disclosure because it presents the last twelve months operational review. The annual report elaborates on the Chairman's brief summary while Future Review deals with regulations, policies, targets, developments and training which are a repetition of what is already covered under a Chairman's report. Therefore the Future Review section is omitted in the main analysis, to avoid a double count. Annual report section should be omitted for the repetition except its disclosure includes those items not covered by the major categories. The major categories should retain consistency with previous studies. Reports in the actual financial statements (accounts) are brief since the financial statements contain consolidated accounts with notes to the accounts presented elaborating on them. Items in the notes are mainly litigation charges and provisions for restoration or reclamation.

In summary, environmental reports appear in three main locations. Firstly, they may appear together with appropriate headings. This is the best disclosure method because everything is together in one place and easy to locate. However, only few companies such as Pacific Placer have a separate 0.5 page, full page or 2 pages for all environmental information. The second form of presentation is providing environmental information on a site by site basis with pictorial presentation of activities and places. This approach has its merits. It gives interested parties easy access for analysing projects of special concern to them. Different projects are subjected to certain risks such as political, currency or other related risks. Therefore, each one should be considered individually.

The third form lumps all environment information under one heading 'health, safety and environment'. This creates problems in isolating and quantifying environment information. While health and safety are related to the environment, the combination constitutes social reporting. This study has a narrow focus on environmental degradation. Therefore the environment related information will be isolated from the rest. There is also a fourth form, one that scatters environment information indiscriminately anywhere in the report. Only a fervent searcher will locate these items. It is not the intention of this study to pass judgement on the best location for reporting environment information.

Thus far, attribute and assertion analysis have located the features and identify their locations only. Semantic analysis actually quantifies the disclosure. Common measures used in semantic analysis are word count, sentence count or page count of the environmental reporting. This study uses word count to quantify the environmental features reported.

Table 5-7b. Location of Environmental Disclosure of Sample Companies for Pilot Study

Industries:	Manufacturing		Mining		Oil & Gas		Forestry	
Possible Locations	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Within Chairman's Report:	2/10	20	7/15	47	2/10	20	5/15	33
Within Annual Report:	4/10	40	6/15	40	6/10	60	12/15	80
Future Review:	0	0	7/15	47	6/10	60	3/15	20
Financial Statements	0	0	5/15	33	0	0	4/15	27
Notes to Accounts:	0	0	6/15	40	0	0	4/15	27
Separate Report:	0	0	0	0	0	0	0	0

5.6.6 Semantic Analysis

The final phase of content analysis quantifies the actual environmental disclosure of the pilot study. Of the three units, the pilot analysis results are expressed in word count. Quantified disclosure per site is summed up for each company and totalled for each industry. Final disclosures are expressed as total words per industry, and per annum. The total disclosure will assess each industry's disclosure level and annual disclosure will assist in the evaluation of the critical event's impact.

Word count (Table 5-7c) reveals each industry's quantity of disclosure by word count of environmental disclosure per industry and per annum. Total disclosure is also equated into page equivalents. Each page is equal to 576 words (refer to next page). Therefore, the number of pages is complementary to total disclosure. For example, the manufacturing industry has the least disclosure because companies did not disclose enough. One company disclosed only one paragraph of 25 words in one year's annual report for the five years observed. Therefore their total is the least. The oil & gas industry made brief self praise references about compliance to the requirements without any accidents, ie reporting more good news boosts their total. Their annual reports are the thinnest of the sample, 40 pages or less. Both manufacturing and oil & gas reported on average less than a page, 0.18 and 0.26 of a page respectively (Table 5-7c, column 8).

Table 5-7c Measurement of Disclosure of Sample Companies in Pilot Study

Industries/Year	1992	1993	1994	1995	1996	Mean	No of Pages*
Manufacturing	85	123	80	110	112	102	0.18
Mining	1386	2307	1957	2801	3014	2293	3.98
Oil & Gas	81	124	148	167	237	151	0.26
Forestry	391	1476	1674	2142	1282	1393	2.42
Mean	483	1007	940	1304	1161		
No. of Pages ¹⁹	0.84	1.75	1.63	2.26	2.02		

Forestry and mining disclosed extensively: 2.42 and 3.98 pages respectively. The extra disclosure for forestry was the report of environmental engineering development by Australian National Industries Limited (ANI). It was felt that this report is part of their environmental disclosure because there were examples of the developed process being implemented. The water recycling at Taranga Zoo (ANI Annual Report, 1994) is an example of waste water treatment and recycling. Cost of treatment and recycling are environmental expenditure. Both industries faced litigation charges and came under scrutiny, therefore, they legitimised their actions with greater disclosure. This assumption may be confirmed from the main analysis.

¹⁹ Number of pages is based on 12 words = 1 line and 48 lines to a page or 576 words to a page (48*12)

Data Collection

In order to test the relevant hypotheses given in chapter 3, and to provide descriptive statistical results about financial disclosure and disclosure trends over the period, the following information is collected from the pilot study:

1. the amount of environmental disclosure in each sample for each year as measured by:
 - (1) 1=yes and 0=no indicator (Table 5-5), to see whether environmental matters were raised or not; (2) attributes of environmental disclosure (Table 5-7a); (3) location of environmental attributes (Table 5-7b) and 4) quantity of environmental disclosure in total words (Table 5-7c) were all obtained through content analysis,
2. environmental disclosure by industry and per annum (Table 5-7c),

This information will be incremented from the main analysis in the next chapter to test two hypotheses.

The pilot study concludes that of the four industries, namely mining, forestry, manufacturing, oil & gas, two industries (mining and forestry) alleged to degrade the environment have legitimised their existence by a high level of environmental reporting. This appears in Table 5-7c, column 8. Both industries disclosed in two pages while the other two (manufacturing and oil & gas) did not even disclose as much as 0.5 of a page. It is noted that an increase that exceeded two pages began in 1995, after the critical event. The main analysis of the remaining annual reports will commence with the above background from the pilot study.

5.7 Summary

In conclusion, the purpose of this chapter to discuss the research methods. The chapter identified those Australian MNCs out of the 37 countries represented in PNG and through multistage and random sampling, selected two groups of MNCs which were operating both in Australia and PNG. Companies were restricted to those in mining, forestry, manufacturing and oil & gas. These sample companies were contacted and responded favourably with their annual reports. Ten companies were chosen out of the respondents whose annual reports were trialed in a pilot study. Three phases of content analysis was used to analyse the result of the sample MNC annual reports. The results suggests that those, alleged to be causing adverse impacts, disclosed more in legitimising their operations. Conclusions, and inferences are premature until the main analysis is completed.

All forms of environment disclosure will contribute to determining the adequacy of disclosure. The final outcome of the analysis will be expressed in both annual average words and average pages of disclosure per industry per annum. These average annual disclosures will enable this study to observe the trends. An industry average will either confirm or deny whether environmental disclosure is industry related. From the quantity of annual environmental disclosure, it will be established whether the companies are willing to objectively disclose environment information. Where this has happened, it can be deduced that environment disclosure by the MNCs has increased. If there is

insufficient disclosure, then it will be necessary to propose ways of effectively promoting the need for greater environmental disclosure.

Limitations

Originally it was planned to interview lobby groups such as Australian Conservation Foundation (ACF), Melanesian Environment Foundation (MEF) and Greenpeace; state departments such as DEC and IPA; Accounting bodies CPA and ICA as well as the participating MNCs about the practicality of enforcing environmental disclosure. Unfortunately, time constraints prevented this. However, some were contacted such as the ACIA, CPA, and the Australian Green Party Senator: Bob Brown. For Lobby groups, their views are sufficiently expressed in the literature reviewed. AICA provided a discussion paper (Booklet) outlining its efforts to prepare its members to satisfy the increasing public demand for environmental information (AICA, 1998). AICA is preparing a conceptual framework and guidelines to meet environmental accounting demand. It is difficult to determine what the CPA is planning because they responded with one conference paper presented by Roger Burrit on environmental disclosure. There is no mention of future developments, unlike their counterpart, the AICA.

A contact with ACF (Melbourne Office) provided copies of environmental impact studies conducted on mines in PNG. There were guidelines developed by ACF for all Australian companies overseas. These are attempts to assist MNCs to develop resources in a sustainable manner for the mutual benefits for both the developer and the host country.

The Australian Green Party Senator, Bob Brown was contacted for the Green's view on environmental disclosure. His reply contains the Greens' stand on MNCs. They are currently opposing Multinational Agreements on Investments (MAI) by MNCs. Their argument is that MAI will benefit MNCs which, in their view, promotes human rights violation and environmental degradation. This argument supplements ACF's as presented by Rosenbaum (1996), that MNCs target developing countries for their operations. Once inside, they exploit the weaknesses.

The next chapter will conduct the main analysis and discuss the results of the main analysis. The hypotheses formulated will also be tested based on the results of the main analysis. The main analysis is a replica of the pilot study but will not show details. Only descriptive results will be derived and discussed with their implications.

Chapter Six

Data Analysis, Results & Discussion

6.1 Introduction

The purpose of this chapter is to analyse the annual reports collected from the sample of MNCs, tabulate the results obtained, and discuss them. The analysis seeks to determine the extent, pattern and quantity of current environmental disclosure of the MNCs in the four environmentally sensitive industries: forestry, manufacturing, mining and oil & gas. Although Guthrie and Parker (1990) and Deegan (1996) earlier noted environmental reporting among Australian companies to be deficient and lagging behind other developed countries, Deegan and Gordon (1996) noted some improvements in the period of 1983-1991. This study will note, in part, what has happened since that period to the Australian companies concerned. Deficiency in environmental reporting is partly due to lack of interest and action in Australia over environmental disclosure, in complete contrast to increased government and public calls for additional disclosure in other parts of the world (Gibson and Guthrie 1995).

This chapter will:

1. analyse the sample MNCs' annual reports for current environment disclosure. The analysis seeks features such as environment regulations, company environment policies, conservation efforts, including targets, training, environment expenditure,

awards, recycling, litigation, and audits. These features will reveal the extent, patterns, and trends of the current MNCs environmental disclosure practices.

2. tabulate the descriptive results of the above analysis. Results of the analysis include the identification of the features mention in (1), affirming their location and quantifying them into the number of words used. The number of words used in reporting the above named features will be counted and tabulated. Their descriptive data (median, mean and standard deviations) will also be computed where appropriate and compiled.
3. test the two hypotheses formulated and discuss their results. Descriptive results complied with (2) will be used in testing the hypotheses and results discussed in relation to the objectives of the study. Inferences will be made, based on the results of the tests.

This analysis is intended to establish the current extent of MNCs' environmental disclosure from their operations that impact on the environment. The analysis will also enable the investigation to observe whether MNCs characteristics such as industry, size and their operation have any influence on the extent of their disclosure. Any trends and changes, along with their causes will be noted. All this is built around the premise that accounting disclosure has a positive role to contribute in the environmental degradation debate.

This chapter deals with the descriptive results of the study. Tabulated summaries of the main analysis are used to compile the descriptive information that will enable hypotheses testing and inferencing. This section contains the description of the three phases of content analysis (attribute, assertion and semantic) used for this analysis. The rest of this section outlines the chapter's specific aims and its overall structure.

Method of Analysis

Content analysis is defined (chapter 5) as a research technique for making both replicable analysis and valid inferences from data to context (Krippendorff, 1980). It is popular, with wide application in sociology (Adams et al, 1998), however, four criteria must be complied with for its effectiveness (Guthrie and Gibson, 1995):

1. analytical characteristics must be clearly and operationally defined,
2. categories must be objectively defined so there is no ambiguity in classification,
3. information must be quantitative, ie choices must be made in ways of quantifying them, and
4. it needs a reliable coder given the weaknesses it has, eg. arbitrariness.

There are three phases of content analysis these are, attribute, assertion and semantic. Attribute analysis establishes the presence of the environmental features reported. Assertion analysis then affirms their locations and categorises the features into Wiseman's (1982) classification. Location is rated as significant because the information content accessibility may be influenced by its location. Semantic analysis quantifies the

environmental disclosure. The quantity of the environmental disclosure is determined by an actual word count of environmental information.

The analysis identifies features of environmental reports such as company environmental policies, recurrent or non-recurrent expenditure, training programs, rehabilitation programs, awards and litigation information, notes their locations and quantifies the features for each industry and for each year. Total disclosure will enable this study to determine if the MNCs' disclosures are adequate to address the environmental issues. If their disclosures are deficient, then the accounting proposal (chapter 2) will be applicable and effective. Where there is adequate environmental disclosure addressing adverse environmental impact, then alternative solution(s) need to be explored to address the environment degradation issue.

Specific Aims of the Chapter

The specific aims of this chapter are:

1. To conduct the main analysis using three phases (attribute, assertion and semantic) of content analysis.
2. To summarise the descriptive results of the analysis in 1 (above) into tables. These tables will be concurrently completed during the analysis.
3. To discuss the results of the aims in 1 and 2 which are the central themes of the chapter.
4. To test the two hypotheses using descriptive summaries of the analysis completed in 2 (above).

5. To discuss the results in relations to the ultimate objective of the study. The ultimate aim is to determine whether Australian MNCs are adequately addressing the environmental impact issue in their accounting records and practises.

Structure of the Chapter

To achieve the above specific aims, the structure of this chapter proceeds in the following manner. The next section (2) provides a brief description of sample MNCs contacted and their responses. The description of MNC characteristics includes their industries, their operational and financial size, general characteristics, and their disclosure. This provides the background information for the main analysis.

Section 3 presents the descriptive information collected from the analysis. Section 5.4.2 records the number of respondents either with or without reports. This section draws out the actual amount and pattern of environmental information, factors that influence its disclosure and the location of the environmental issues reported. Other information necessary for analysis are: actual disclosure by different companies, industries, and years in the period observed. The section concludes with a comparison of disclosure quantity and the pattern of MNCs' disclosure of the two groups.

Two hypotheses are tested in section 4. Hypothesis testing is based on the information derived from the analysis in section 3. Hypothesis 1 will need the disclosure figures from 1995-1996 to compare with 1992-1994. Since the lawsuit was filed in May, which is close to the balance day, 1994 is included with 1992-1993. There will have to be

greater disclosure after 1994 to reject the hypothesis. A similar hypothesis testing approach will be used to test hypothesis 2 while pursuing the ultimate aim of assessing the extent, degree and pattern of overall disclosure. The exception will be that specific information will be required for each hypothesis which will come from appropriate data collected and tabled earlier in section 2.

The final section (5) summarises the analysis and the results obtained. Where there is a lack, or a minimal amount, of environmental disclosure, accounting proposals ought to be suggested to address the environmental impact issue. This is not feasible if an increased environmental disclosure is matched by an increased environmental degradation. A different approach is then needed to be taken to solve the environmental impact issue. There is also the limitation that only four environmentally sensitive industries are studied here and these may not be adequate to make any valid inferences to other industries.

6.2 Sample Multinational Corporations (MNCs)

This section provides the background information to the descriptive data collected by describing the sample MNCs responses, their operational and financial size, their general characteristics and the industries they represent. Their general characteristics includes capital structure, parent/subsidiary status, their operations and ranking.

6.2.1 Sample Responses and Number of Annual Reports Received

Requests for annual reports were mailed to one hundred and twenty companies. As outlined in section 5.4, the response from the sample MNCs was good. Of these MNCs, 95 responded to the request for their annual reports. Table 5-4 (appendix) presents the actual responses of the contacts. Of the 95 respondents, 83 submitted annual reports (figure 5-5a), however only 72 MNCs were purposively selected. These 72 MNCs had three or more annual reports in sequence and operated from 1992-1996 continuously. The total of annual reports for analysis is 347. These annual reports are analysed and summarised in the next section (6.3).

6.2.2 Size of Sample MNCs

The sample MNCs are in the top 500 Australian companies by market capitalisation (Shareholder Huntley, 1997) with 36 in the top 100 Australian companies. The overall size of the sample is measured in operational size (sales and profit) and financial size (assets) as presented in Table 6-1 (appendices). Sales, assets and profitability have been categorised into ranges (Table 6-1a) to determine whether any relationship exists between size and environmental disclosure. All size measures are 5 year averages. The study analyses for the extent and pattern of disclosure over a 5 year period because observations over an extended period are more reliable (Hackston and Milne, 1996).

Table 6-1a. MNC Size measured in Sales, Assets & Profits

	Sales		Assets		Profits	
Ranges	MNCS No.	%	MNCS No.	%	MNCS No.	%
Made Losses					10	0.14
Under \$100m	23	0.32	17	0.24	42	0.58
\$100-200m	8	0.11	7	0.10	12	0.17
\$201-300m	3	0.04	6	0.08	4	0.06
\$301-400m	1	0.01	3	0.04	3	0.04
\$401-500m	3	0.04	4	0.06	0	0.00
\$501-600m	2	0.03	2	0.03	0	0.00
\$601-700m	4	0.06	3	0.04	0	0.00
\$701-800m	1	0.01	2	0.03	0	0.00
\$801-900m	2	0.03	0	0.00	0	0.00
\$901-1000+	25	0.35	28	0.39	1	0.01
	72	1.00	72	1.00	72	1.00

Size and Disclosure Relationship

The size of companies have been interpreted differently in previous studies. For example, (Trotman and Bradley 1981; Patten 1991; UN 1992; Hackston and Milne 1996; Deegan and Gordon 1996) explain size as directly related to environmental disclosure. It is generally asserted that 'larger firms are more likely to disclose more than smaller firms' (Deegan and Gordon 1996, p.188). Watts and Zimmerman (1978) and Trotman and Bradley (1981) attribute the relationship of disclosure and size to political costs. They argue that the large companies are easy targets, therefore large companies increase their environmental disclosure to reduce their costs (Trotman and Bradley, 1981). UN (1992) raised the same belief, that larger firms are more responsive to social and political pressure than small firms. Social pressure threatens their legitimacy and hence induces greater disclosure.

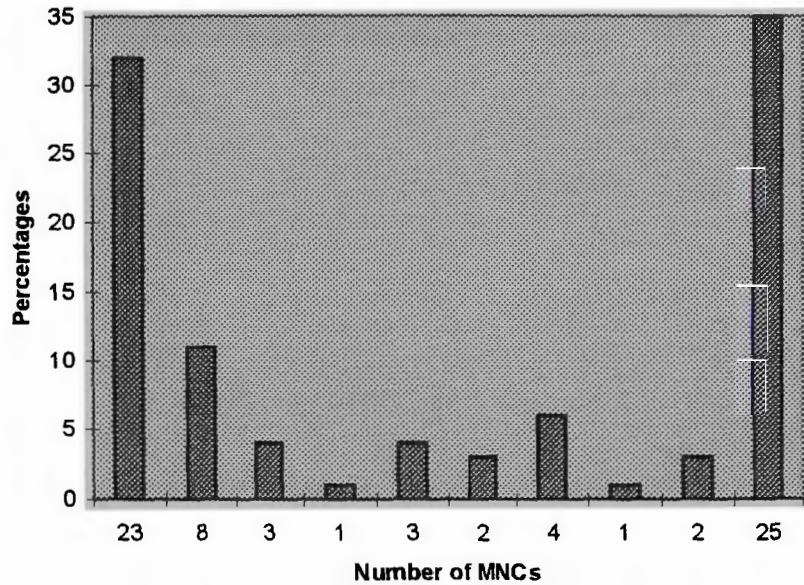
Size differences among the participants is vague since the sample MNCs are all large in the top 500 Australian companies. That is why, 3 features (sales size, assets size and profits size) of the sample are considered individually in Tables 6-2a to 6-2c. These Tables are extracted and modified from Table 6-1a. An interesting feature emanating from the analysis is that both sales and assets display a bimodal distribution with two modes.

Table 6-2a depicts the sales distribution. Of the sample, 32 percent made less than \$100m sales while another 35 percent made sales in excess of \$900m. This leaves 33 percent between the two extremes. Figure 6-2a presents it graphically below.

In a similar formation of distribution, 24 percent of the sample own assets of less than \$100m while another 39 percent had assets greater than \$900m as depicted in figure 6-2b. The rest, 37 percent are spread between \$100m to \$900m. They approximately correspond to the sales' measures and popularity because sales range distribution pattern partly correlates with assets distribution range with some differences. As anticipated of large MNCs, there are more in the top bracket owning assets worth more than \$900.

Table 6-2a Sales Distribution among the 72 Sample MNCs

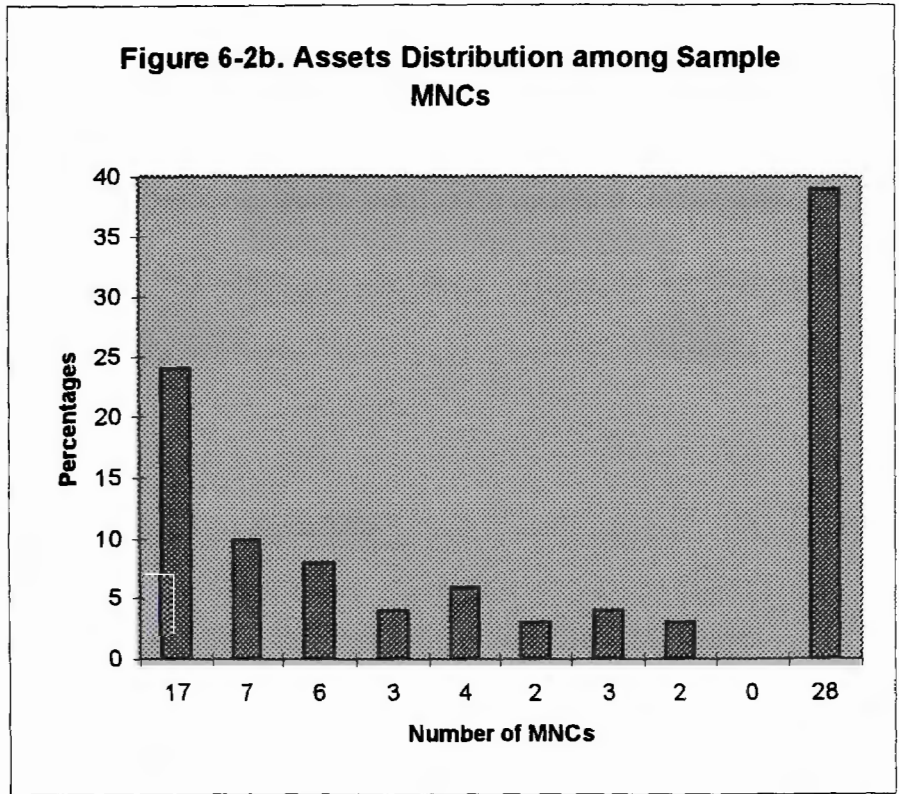
No of MNCs	Percentage
23	32
8	11
3	4
1	1
3	4
2	3
4	6
1	1
2	3
25	35

Figure 6-2a. Sales Distribution among Sample MNCs

Despite the differences, three distinct groups of MNCs emerge from the sales and asset distribution from what is generally the top 500 Australian companies by market capitalisation. There is one group at each end of the range while the third group is loosely spread between them. Data in Table 6-1 does not show any distribution pattern or distinction between the MNCs. Only as the data is reorganised into ranges, does the distribution pattern emerge and ranks the MNCs into their appropriate positions by sales, assets or profit size (figures 6-2a-to 6-2c).

Table 6-2b Asset Distribution among Sample MNCs

No of MNCs	Percentages
17	24
7	10
6	8
3	4
4	6
2	3
3	4
2	3
0	0
28	39



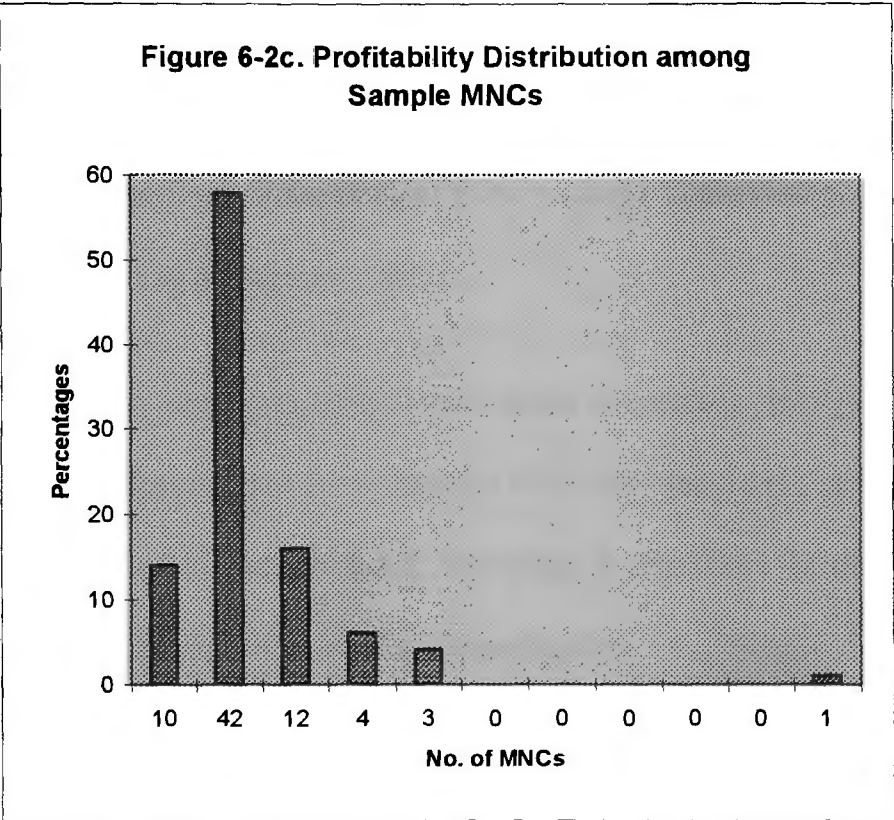
Both the sales and asset size ranking depict a bimodal distribution, the profit size is then analysed to see if a similar pattern of distribution exists. However, profit distribution differs (figure 6-2c) in that its distribution slightly resembles a normal curve. Reclassification of the MNCs according to profits results in 14 percent registering losses. The majority 58 percent made less than \$100m profit while another 25 percent made profits between \$100m and \$400m. Only one made a profit in excess of \$900m. The mean and mode in the distribution appears to be 42 and since there are more MNCs to the right including the extreme case of \$900m, the graph is positively skewed.

As Ullman (1985) posits, high profit increases a firm's visibility with a greater environmental disclosure while a poor economic performance results in low social

disclosure. This suggests that environmental disclosure is related to company profitability. The argument is sound because corporations have a single social responsibility in business to direct all their resources to activities designed to maximise profits (Freeman 1962). However, there are weaknesses with profit as a measure of size as discussed in section 6.3.2. For example, profit is subjected to management manipulation.

Table 6-2c Profit Distribution among Sample MNCs

No of MNCs Percentages	
10	14
42	58
12	16
4	6
3	4
0	0
0	0
0	0
0	0
0	0
1	1



There is conflicting empirical evidence on the relationship between profitability and corporate social disclosure (CSD). Some studies allege a relationship exists between profitability and CSD, while others fail to establish such a relationship. Vance (1975), as cited by Abbot and Mouson (1979), alleged that profitability is inversely linked to

disclosure. However, this is only in the short run and the evidence is based on a 1974 study which was a disaster year for the stock market. Bowen and Haire (1976), and Preston (1978), who used return on equity to examine the relationship empirically provide results that support the existence of a relationship between disclosure and profitability. Brown and Haire who surveyed 82 US food companies noted that those who disclosed environmental information earned a higher return with a mean of 14.3 percent. Those who did not, only earned on average, 9.1 percent. Roberts (1992), also found a positive relationship between lagged profit and CSD while Patten (1991), who also used multi measures, including lagged profit, failed to establish this relationship. Patten is supported by other studies (Davey, 1982; Ng 1985; and Cowen et al, 1987). However, the results of the latter two studies are thought to be caused by small samples and are being re-examined (Guthrie and Matthews, 1985).

Since there is conflicting empirical evidence as cited above on the relationship between profitability and environmental disclosure, the focus remains with sales and asset sizes. The discussion will return to sizes in section 6.3.3, following a discussion of the industries the sample MNCs represent and other MNCs' characteristics.

6.2.3 Industry

As outlined in chapter 2, this study is confined to only four environmentally sensitive industries: forestry, manufacturing, mining and oil & gas. Both mining and forestry are alleged to degrade the environment by the nature of their operations while the other two have the potential to degrade. An exception are the MNCs from the service industry

added to the Australian group to observe for consistency in environmental reporting among Australia MNCs. Table 6-3a lists the number of companies in each industry whose descriptive results and the general information from the analysis are presented in the next section (6.3).

Table 6-3a. Number of MNCs selected per Industry

Industry	No. of MNCs	Percent
Forests	15	20
Manufacturing	17	24
Mining	20	28
Oil & Gas	10	14
Others	10	14
Sample Total	72	100

6.2.4 Other Characteristics of MNCs

This section contains a brief report on three general characteristics of MNCs: parent/subsidiary status, leverage and employees. Sample MNCs are both parent and subsidiaries, operating in both urban and rural areas. Although the sample is comprised of the top Australian companies, a number of them have high leverage. Their number of employees range from less than 20 to more than 100, 000.

Parent/Subsidiary Status & Site of Operation

Thirty-nine are Holding companies while the other 33 are subsidiaries. Except for 6, the rest of the Holding companies are in the top 100 Australian companies. By the nature of their operations, 45 forestry, mining and oil & gas companies operate in a rural environment, while the manufacturing companies operate in urban areas. Only 32 have

environmental committees or have representatives on environmental boards such as the Australian Environment Protection Authority (AEPA). This may shed some light on the pattern, extent and quantity of their environmental disclosure although these characteristics are not discussed in relation to environmental disclosure.

Level of Leverage

The rate of leverage and the number of employees are the other two features of the MNCs noted. Even though the sample is ranked in the top 500 Australian companies by market capitalisation, their leverage pattern is delicate. Only 3 percent have a low leverage of less than 10 percent. The majority, consisting of 87 percent, rely on external debts ranging from 10 to 50 percent, another 7 percent exceeds 50 percent leverage. It is not the intention of this study to discuss what is an appropriate leverage, only to note what the MNCs' leverage levels are. Neither will disclosure analysis be correlated to leverage.

Number of Employees

Apparently, 50 percent of the sample employ less than 1000 employees. The lowest being only 16 by an oil & gas company. The highest is a retail company which employs 148,000 followed by a mining company which employs 49,000. Creation of employment as a benefit of MNCs has been discussed in chapter 2. This section only reflects on the employment numbers in the sample MNCs.

A brief review on these characteristics of MNCs is given in passing but is not meant to be associated with the pattern of the sample's disclosures. Separate studies into each characteristic is necessary to observe their influence on disclosure. For instance, employers were mentioned in the last chapter as lobbying for environmental friendly employers. Given the restricted time frame for this analysis, only two characteristics, industry and operations, and size of companies have been associated with disclosure. These characteristics are isolated above and are discussed as influencing disclosure below.

6.3 Descriptive Results of the study

This section presents the descriptive data collected from the analysis of the sample of 72 MNCs who operated between 1992-1996 in PNG and Australia. The content analysis contains two major sections, in line with the objectives of the study. The first major section (6.3) presents the descriptive statistics related to the amount of environmental disclosure issued and the impact of the MNC operations as reported in their annual reports over the 5 year period. The next major section (6.4) is based on section 6.3 and reports the results of analysing the pattern of disclosure, results of hypotheses testing and the potential influence of significant events on the MNCs pattern of disclosure.

Descriptive statistical results of the empirical survey are divided into four summaries. The first contains the report on the total amount and the pattern of environmental disclosure within MNCs annual reports. The analysis describes the total environmental

disclosure by the sample MNCs, their averages and pattern of environmental disclosure. The pattern of environmental disclosure is described by the average disclosures and their dispersion.

The second describes two characteristics of MNCs identified in the literature as potentially influencing environmental disclosure. These are the nature of operation/type of industry and the size of MNCs. For each factor, its total disclosure, average disclosure and its dispersion are recorded in order to draw any significant differences in their disclosures.

The third gives the total disclosure of environmental issues, affirms their location within the annual reports and analyses the characteristics of the MNCs that may influence disclosure patterns. Such a breakdown forms a matrix with many cells. Ideally, every cell and its interdependencies should be analysed for an exhaustive description of results. However, insufficient data in some cells prevents an exhaustive analysis. Consequently, the analysis will concentrate only on areas where there is ample data in order to make statistically meaningful inferences.

The fourth summary compares and contrasts the results of the disclosure quantity and pattern between the MNCs that operate in PNG and those that operate in Australia. The purpose of including an Australian group is to provide a control group to compare with those operating in PNG.

6.3.1 Amount and Pattern of Environmental Disclosure

Content analysis as outlined in section 5.4 determines the total amount and pattern of environmental disclosure for part 1. This analysis is conducted in three stages using: attribute, assertion and sematic analysis (Janis, 1965). Environment features are identified under attribute analysis and categorised into Wiseman's (1982), classification (stage one). Assertion analysis follows on (stage two) to affirm the location of the classes before quantifying them in the third stage (semantic analysis) through a word count of environmental attributes per company, per industry and per annum. This is intended to provide the total environmental disclosure for the sample MNCs, their average disclosure, dispersion and their pattern. The pattern of disclosure will be deduced from their average disclosure and its dispersion.

Total Disclosure

Of the four units of quantifying environment attributes reported, this study selects word count to ensure that the quantification of environment information is thorough. The choice is not necessarily for accuracy because there is the likelihood of committing errors of omission in using the smallest unit of the four possible counts for quantification.

Word count disclosure of each individual MNC in the sample is shown in Table 6-1. It was observed that the quantity of disclosure among the 72 sample MNCs varied from a minimum of 19 to the maximum of 5276 words. Since the range (19 - 5276) is wide,

total disclosure is classified into an interval of 1000 words range (column 1 of Table 6-4) for a convenient analysis. Total disclosure, mean, standard deviation and an average page for the five year period (1992-1996) are computed and tabled in columns 2-5. Mean disclosure is derived by dividing total disclosure by 5, which is the number of years in the period.

Finally, an average page disclosure is calculated for comparison with other studies. Average page is determined by dividing the average number of words by 576 words. (The rest of the formula is given under the graph (figure 6-4a).) The average pages range from 1.83 to 6.94 pages. It was found that the highest range of greater than 5000 words had the lowest average pages because there is only one MNC in that sample which provided more than 5000 words (5276) of environmental information. Thus NA appears in the standard deviation column of that response size.

Standard deviations were also calculated to observe the pattern of the dispersions from the mean. Since the quantity of disclosure varied, the standard deviation dispersed accordingly, in the group. However, deviations were narrow or minimal. The highest dispersion is 280.46 words from a mean of 3756 words and the lowest is only 70.17 words from a mean of 2500.8. This suggests that the disclosure in this range varied little. A general observation is that disclosures above 3000 words have a lower dispersion rate. Because the group is small, variability is minimal.

It appears from table 6-4, and figure 6-4a in particular, that there are two groups of respondents. One group discloses below 3000 words and another group discloses above 3000 words. Each group has a mode (bimodal), those below 3000 have a 1001-2000 words range while the second group have a 4001-5000 range. Despite this observed bimodal distribution, the majority of the response size are between 1001-2000 and 2001-3000 words which are equated to 6.94 and 6.52 pages, respectively.

The overall mean of the whole sample is 2460.7 words which is equated to 4.27 pages. An average of 4.27 pages is higher than any of the other studies on Australian MNCs environmental disclosure. This growth appears to be associated with the remarkable growth in the early 1990s which Gray et al (1995) observed, especially among environmentally sensitive industries (Deegan and Gordon, 1996). Guthrie and Parker (1990) who studied 50 Australian companies observed a low percentage increase compared to the US and UK. The US had the highest disclosure of 1.26 pages compared to Australia's 0.70 page.

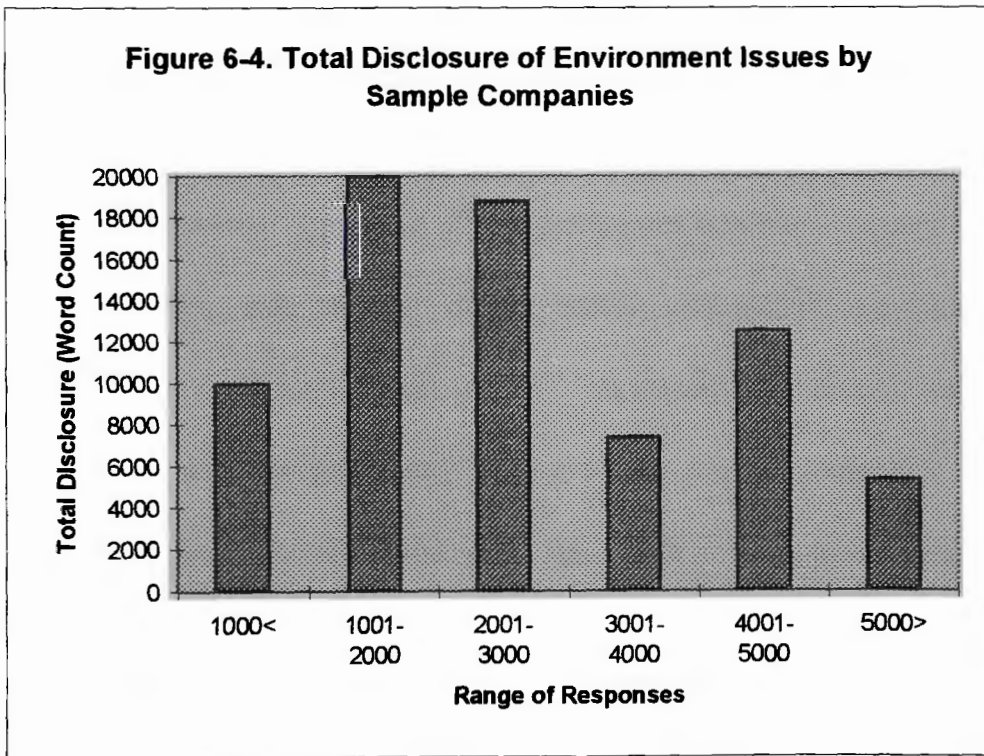
Although Patten (1992) found Exxon reporting 6.0 pages of environmental information following the Valdez's oil spill in 1989, this is an exception. Exxon was legitimising its existence which was under threat following the spill (Patten, 1992). Exxon's report appeared in two parts: a 3.5 pages report on the Valdez incident and another 2.5 pages on other environmental issues. Further, Exxon's high disclosure represents just one company's environmental disclosure whereas the 4.27 pages represents an average of 72 MNCs. Irrespective of these differences, 2 industries (mining and forestry) in this sample

came under scrutiny and the concerned companies may have increased their environmental reporting to legitimise their existence and operations. Where the increase is attributed to

this, the high disclosure of 4.27 pages will provide evidence of legitimization.

Table 6-4 Total Disclosure of Environmental Issues for all Sample Annual Reports by Amount of Disclosure (Word Count)

Size of Responses	Total Disclosure	Mean for 5 years	Standard Deviation	Average Pages
1000<	9943	1988.6	251.47	3.45
1001-2000	19980	3996.0	273.76	6.94
2001-3000	18783	3756.6	280.46	6.52
3001-4000	7335	1467.0	154.86	2.55
4001-5000	12504	2500.8	70.17	4.34
5000>	5276	1055.2	NA	1.83
Overall		2460.7		4.27



Avg page is based on: 1 line=12 words and 48 lines per page. Therefore 1 page=576 words (48*12)

6.3.2 Influential Factors for Environmental Disclosure

The literature reviewed on environmental disclosure reveals that different factors influence environmental disclosure. Niskala and Pretes (1995) for example, observed Finnish companies for voluntary environmental disclosure. Their study observed that overall environmental disclosure increased by 20 percent over a 5 year period. Notable increases were among oil, forests and energy industries. Energy companies' disclosures doubled over the observed period. Thus the authors concluded, that environmental disclosure is *industry* related, because increased disclosure was more prevalent in some industries than others.

Patten (1992) was prompted by the Valdez oil spill to observe environmental disclosure among oil companies. The author investigated the effect of the spill on the companies in the industry. The annual reports of 21 oil companies analysed revealed that disclosure increased after the spill. As cited earlier, Exxon increased its disclosure by 10 times from 0.6 page in 1988 to 6.0 pages in 1989. A strong relationship was noted between social disclosure and the legitimacy theory where the oil companies increased their disclosure to deflect the environmental issue and reduce what Miles (1987) calls *exposure*. Exxon devoted 3.5 out of the 6 pages to report on the oil spill incident alone, this appears to have been an attempt to legitimise and/or deflect attention from the exposure (spill). This leads to the conclusion that the nature of the operation and the resultant external pressure influences environmental disclosure, thereby prompting companies to deflect exposure and legitimise their operations. This is also being

observed in PNG with the mining and forestry industries which disclose more only when they come under scrutiny for environmental damages.

6.3.2.1 Industry & Nature of Operations Influence Disclosure

Industries, and the nature of their operations are related, in that the type of industry determines the nature of its operation. For instance, the Valdez incident brought all major oil companies under the spotlight because they all transport oil and have the potential to spill it causing environmental damages. The mining and oil & gas industries' nature of operation is extractive. As such, they are bound by the same or similar requirements, eg the UIG 1995 Release, for all extractive industries discussed earlier. In the current study both mining and forestry industries came under scrutiny, not because they are extractive industries but because of their alleged destructive nature of operations.

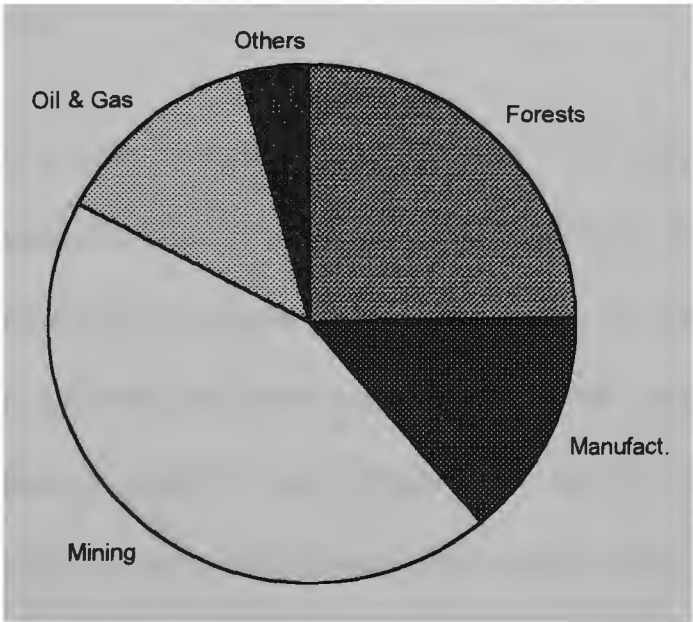
UIG (1995), cited above, requires disclosure of restoration and rehabilitation with reclamation commitment and contingencies. UIG Abstract 4 contains the requirement called: *Disclosure of Accounting Policies for Restoration Obligations in the Extractive industries*. The requirement is for companies to disclose the amount of restoration obligations recognised as liability, and the accounting method applied to recognise it. Schedule 5 of the corporations law, also requires companies to disclose within the notes any material liabilities. In compliance, all the extractive industries among the Australian sample disclosed more environment information with averages greater than 1000 words.

Some MNCs such as Placer Dome, had litigation charges brought against the Marcopper mine in the Philippines. Those under scrutiny disclosed both to legitimise and comply. Other MNCs however, disclosed very little.

Table 6-5 Total Disclosure by Influential Factor-Industry
per word count of 72 sample MNCs

Industries	No of MNC	Total Disc	Mean	Std Dev.	Avg Pages
Forests	15	19554	1303.6	630.31	2.26
Manufact.	17	11276	663.3	401.56	1.15
Mining	20	34539	1727.0	1882.55	3.00
Oil & Gas	10	10402	1040.2	702.79	1.81
Others	10	3270	327.0	302.27	0.57

Figure 6-5a. Total Disclosure by Influential Factor-Industry as per word count of 72 Sample MNCs



The mining industry (Table 6-5) shows the highest amount of disclosure with an average of 3 pages. By this action, the industry is complying with the ‘only specific Australian requirement (UIG) to provide environmental information within a company’s annual

report' (Deegan, 1996). This is represented by the largest sector of the pie graph in figure 6-5a. Their mean word average is 1726 with a wide dispersion (standard deviation) of 1882.55 words. This high dispersion is due to variations in reporting, where some reported more than others.

The forestry industry has the second highest mean of 1303.6, with a standard deviation of 630.31 words in the sample. It also has the second highest average of 2.26 pages of reporting over the period. This is because it is an industry that is alleged to be causing environmental degradation in PNG. While it is not an extractive industry like mining, the industry is still alleged to be causing environmental damage by its activities of harvesting logs. Table 6-5 shows those companies under scrutiny disclose more, followed by those with potential to degrade while the 'others' group disclosed the least.

The oil & gas has an industry average of nearly 2 pages (1.81 pages) which supports the argument that extractive industries disclose their liabilities and their method of determining their liabilities. The manufacturing industry discloses the lowest average of the group. The least industrial disclosure average is from the 'others' group although they have the same number of subjects as oil & gas. Their industry average is only 0.57 page. This is consistent with other Australian studies that show environmental disclosure is industry related. Those in the sensitive industries disclose more.

Total disclosure, as influenced by an industry, is contained in Table 6-5. Unlike Table 6-4, the mean is calculated by dividing the industry total disclosure by the number of industrial representatives in the sample (Table 6-3a) to determine an industrial average.

The industrial average is indicative of each industry's quantity of environmental disclosure. Industry is just one of two influential factors for environmental disclosure.

The next section observes size as another influential factor for disclosure.

6.3.2.2 Size influences Disclosure

Sales made, assets owned or even number of workers employed are some of the ways of measuring size (Tilt, 1997). Deegan and Gordon (1996) noted that environmental disclosure is a feature of large public companies where *size* is the determinant factor. Size has been consistently associated with environmental disclosure by studies such as, Kelly 1979, 1981; Trotman and Bradley 1981; Pang 1982; and Cowen, Ferreri and Parker 1987.

Although size was discussed at length under organisational, financial and operational levels (section 2); content analysis was not conducted under each of these size measures directly. However, from the list of characteristics (Table 6-2) of sample MNCs, Tables 6-2a - 6-2c were constructed showing operational size (sales made and profits earned) and financial size (assets owned). Data for size, as an influential factor, is drawn from both Tables 6-2 and 6-2a. Table 6-2 provides disclosure per sample MNC while Table 6-2a enables grouping.

Whilst the size of the MNCs in the sample has been measured by both operational and financial sizes in Table 6-2a, Table 6-6 is based only on operational size. Data for operational size (Table 6-6 and Figure 6-6) are derived from Table 6-2a, columns 1 and

2 and its accompanying discussion. MNCs are categorised into three groups or ranges: less than \$100m, greater than \$100m but less than \$900m and greater than \$900m.

Operational size includes sales made and profit earned by the MNCs in the sample, however, only sales made is selected here. There are two main reasons for this choice. First, disclosure by MNCs as measured by size will enable this study to be compared with Deegan and Gordon (1996) which is a secondary objective of this study. This study begins in 1992 to extend the investigation where Deegan and Gordon ended their study. Their study assessed whether environmental disclosure has increased among Australian companies. The authors used sales as a measure for size. The choice of sales here is to enhance consistency and comparability. Further, Niskala and Pretes (1995) who studied voluntary environmental disclosure also used sales as their measure for size. These authors choose Finnish companies who were ranked in the top 100, based on sales made. Therefore, the choice of sales as a measure of size is consistent with previous studies.

Second, profit is not chosen as an influential factor because it has several weaknesses. Profit is not an accurate measure for size since it is subjected to manipulation as pointed out above. Profit is not internally valid, therefore it is not an objective measure of operational size. Using Table 6-2 as an example, a number of MNCs made losses and the majority (58 percent) made less than \$100m profit although they are large with diversified operations and own huge assets. Only one made in excess of \$900m profit.

Thus, size by profit will not produce any significant differences as most MNCs made less profit and there is not much dispersion to indicate a correct profit distribution.

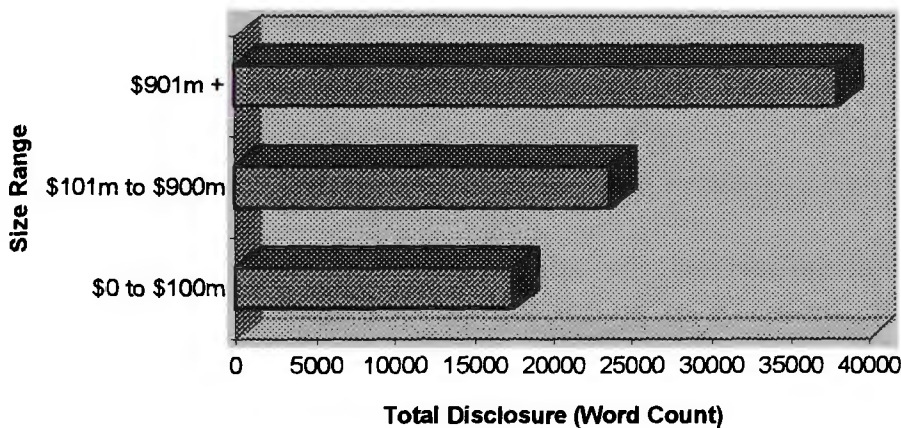
Total environmental disclosure in this sample of the MNCs increased with their operational size. Under a normal distribution, the middle range (more than \$100m and less than \$900m) should contain the bulk of the population and display greater disclosure. On the contrary, disclosure depicts size. The mean, standard deviation and the average pages also increased with their size. (Average pages are determined as in other tables; mean is divided by the number of words (576) to a page). Standard deviation in each range varied in proportion to the disclosure size. Such a result is consistent with studies named above as well as others like Trotman and Bradley (1981), Cowen et al (1987); UN (1992); and Kirkman and Hope (1992) that environmental disclosure is a feature of large firms. Those in the top group disclosed more, although the dispersion is high among them.

Organisationally, MNCs are large and are easily visible in their operations and consequently become easy targets. Affected MNCs react to reduce political costs by increasing their environmental reports. Trotman and Bradley (1981) noted a relationship between size and disclosure where large firms disclosed more than the small ones to legitimise their existence.

**Table 6-6 Total Disclosure by Influential Factor:Size
per word count of sample (72) MNCs**

Operational Size Range	Total Disclosure	Disclosure Mean	Standard Deviation	Average Page
\$0 to \$100m	17379	789.95	842.35	1.37
\$101m to \$900m	23689	911.12	1095.2	1.58
\$901m +	37962	1581.7	1485.5	2.75

Figure 6-6. Total Disclosure by Influential Factor:Size



Financial size, measured in assets owned, is not used here for two reasons. First, the studies named above observed environmental disclosure in relation to sales made rather than assets owned. This is not to deny that assets owned was not used as a measure of size. Deegan and Hallam (1991) used sales made, assets owned and profits earned as measures of size and found them to be highly correlated. Second, assets owned has a similar pattern of distribution (Table 6-2a, column 4& 5) observed by means of sales made and this is likely to result in a similar disclosure pattern. Like sales distribution, three ranges exist: there are 24 companies (33 percent) in the lower end with assets worth less than \$200 million, a second group of 20 companies (28 percent) with assets

worth between \$200 million and \$900 million and the last group of 28 companies (39 percent) own assets worth more than \$900 million. The bulk of the MNCs fit into the category of sales greater than \$900m. This disclosure pattern in figure 6-6 correlates with the sales made (figure 6-2a) and assets owned (figure 6-2b) disclosure patterns where those with higher sales or more assets disclosed more.

6.3.2.3 Other Influential Factors

From the discussion in the forgone paragraphs, it is concluded that the major influential factors can be summarised as size, and nature of operation/industries. There are other factors such as regulatory requirements and pressure from lobby groups which influence environmental disclosure. Although both of these factors do influence environmental disclosure in PNG, they are not investigated for two reasons. First, this study is an accounting approach to the environmental issues which both the legislature and lobbyists are battling with in PNG. PNG has environmental legislation, such as the Environment Planning Act 1978, which does not seem to be containing the problem of environmental degradation. That is why the PNG environmental lobby groups are exerting pressure on MNCs to make the legislation work.

Second, environmental lobbyists reports are self complied and not empirical. As such, they may be biased. Two lobby groups working in PNG are the Australian Conservation Foundation (ACF), and Greenpeace International. Greenpeace International contributed towards the environmental issue by drawing up the PNG Forest policy. ACF's reports

centre on environmental impact focussing on the Fly River and the Pogera mine. Although their efforts have been effective, they are time and event specific. This study suggests that accounting as a long term approach to address the problems is a more effective approach to the total problem.

There are a number of other 'minority' lobby groups whose influence induces greater environmental disclosure. In one pioneer local empirical study on the role of lobbyist in environmental disclosure, Tilt (1994) discovered that *environmental lobby groups* actively seek information from companies' annual reports. Backed up with information extracted from different companies annual reports, they lobby for improvements in environmental issues. *Employees* lobby for clean, safe and innovative companies thus compelling companies to legitimise with greater pressure on environmental disclosure. Even *customers* pursue producers with environmental credentials (Coopers & Lybrand, 1993). Coopers and Lybrand also note *investors* 'becoming wary of bad environmental practices' because it creates liabilities and reduces their profits.

Contrary to coerced disclosure, some companies provide voluntary environmental information (Deegan, 1996). Of 197 companies from 50 industries which Deegan studied, 71 firms (36 percent) provide environment information voluntarily. Companies in Australia disclose environment information without legislation. The problem is that their voluntary environmental disclosure is too general and predominantly qualitative in the interest of the providers (Table 6-11).

Regulatory requirements for companies to provide an environmental report amends what is generally qualitative environmental disclosure (Deegan, 1996). Several countries have legislation on environmental disclosure. Among the US's initiatives is the Superfund Amendments and Reauthorisation Act (SARA) which requires all companies to report all emissions. Along with that, is the Organisation of Economic Cooperation and Development's (OCED) current preparation of a guidance document for governments considering the establishment of national pollutant inventories. In the UK an environment Business forum has been established with a membership of more than 200 companies. Member companies are urged to provide an environment performance report. The Canadian Securities Commission (CSC) requires public companies in Canada to report on both current and future financial and operational effects of environmental protection requirements.

Regulatory influence is not as developed in PNG or Australia, as Deegan (1996) observed, as in Canada, the US, UK or Germany. However, their representative MNCs in PNG ought to implement the regulatory requirements that they are subjected to in Australia. This will eventuate when these MNCs operations are effectively policed by PNG's DEC. The restraint is that PNG's own environmental legislation must be effectively policed before the DEC can enforce any external legislation.

6.3.3 Disclosure of Environmental Issues

This section identifies the main issues reported and notes their locations. Using Wiseman's (1982) classifications, the following environmental issues are discussed: environmental regulations, company environmental policies, conservation or rehabilitation, environmental expenditure, awards, recycling, litigation or lawsuit, eco-audit and environmental committee representation. Although Roberts (1991) has similar classifications, of environmental issues, Wiseman (1982) categorises the main environmental issues MNCs address. Less frequently addressed issues which are omitted in the above list, include employee training to be environmentally friendly, sponsoring community members to tertiary institutions, and conducting short courses. For example, courses on how to response to an accidental oil spill.

The main environmental issues are sought in the following locations of annual reports: tables of content, separate pages, mission statements, chairmans' reports, annual reviews, health, safety and environment, financial statements and notes, and separate reports. Such a break down forms a matrix with many cells (Table 6-7). Ideally every cell should be analysed along with their interdependencies for an exhaustive analysis. However, there is insufficient data to complete every cell and time constraints prevents such a comprehensive analysis. Therefore this thesis will not attempt to do a comprehensive analysis of all cells.

Table 6-7 Environmental Issues & their Location in the Annual Reports

Issues>	Statutory Regulations	Company Policies	Conservation Rehabilitation	Environment Expenditure	Litigation Lawsuits	Waste & Recycling	Awards/ Eco-audit
Locations:							
Table of Content							
Mission Statement							
Separate Page							
Annual Review							
Health, Safety & Environment							
Financial Statements & Notes							
Separate Report							

The nearest attempt to analyse these issues is in Table 5-1a and Table 5-1b for the location of environmental reports. Both of these tables were constructed and compiled during a pilot study. What is common to both tables is that only mining and forestry disclose some features of the above issues in the various named locations, except for the issuing of separate reports. The information collected in Table 5-1a & 5-1b was expressed as percentages and as a word count. Even then, many cells are still blank. Consequently, there is incomplete information and this analysis will only comment on areas where there are data on location and environmental issues based on Table 6-8.

Table 6-8 which appears on the next page has a word count of environmental disclosure in the different locations of MNC annual reports. The mean, standard deviation and an average page count are computed from the observed disclosure. Figure 6-8 is constructed based on data from Table 6-8. (Column 2 has numbers

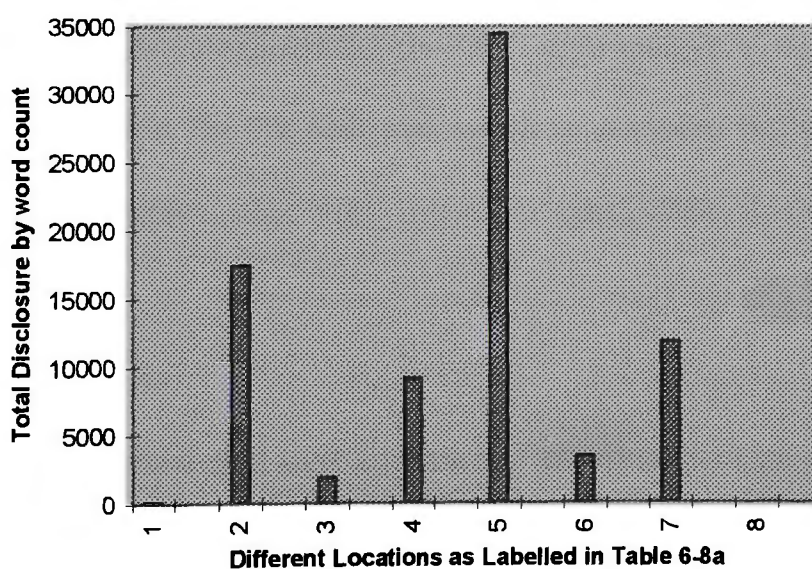
headed labels to enable smooth plotting on the x'axis.) The rest of the classifications of issues and the locations in table

6-8 are similar to those in Table 6-7.

Table 6-8 Location of Environment Issues in the Annul Reports of Sample MNCs Expressed in Word Count

Location	Graph Label	Total	Mean	Std Dev	Avg Page
Table of Conten	1	127	14.11	13.93	0.02
Separate Page	2	17402	1933.60	1873.30	3.36
Mission State- ment	3	1855	206.11	153.21	0.36
Chairman's Report	4	9131	1014.60	1021.40	1.76
Annual Review	5	34439	3826.60	2702.00	6.64
Health, Safety & Environment	6	3386	376.22	333.63	0.65
Financial Statement	7	11720	1302.20	1409.50	2.26
Separate Report	8	0	0	0	0

Figure 6-8. Location of Environmental Issues in Sample MNCs Annual Reports



Unlike Finland (Niskala and Pretes, 1995), the provision of separate environment reports is not practised in Australia (Deegan, 1996). Thus the separate report is eliminated from possible locations. Separate environmental reports is an indication that the issue is very important for it to stand alone (Kirkman and Hope, 1992). Only one of the sample MNC (Burns Philip - manufacturing industry) claims to issue separate environmental reports on request. However, the company only dispatched their environmental policy leaflet when requested. Only one mining company (Placer Pacific) issued a separate report in 1997 called '*Towards Sustainability*'.

Placer Pacific Ltd (1997) became the first company to issue a separate environmental report in response to the public's demand for sustainable economic development. According to their managing director, theirs is the first in Australia and in the global mining sector. The report was compiled to meet the current stockholders' demand for sustainable and collaborated business operations (Placer Pacific, 1997). Although the report is presented subsequent to the Ok Tedi lawsuit, it is outside this study's time frame (1992-1996). The Ok Tedi case may have instigated its compilation because the company's executives claim that it was to meet public demand, another form of legitimisation.

Actual environmental disclosure appears mainly in financial statements and notes to the accounts, separate pages, within annual reviews and under the chairman's reports. Extractive industries report on their conservation/rehabilitation efforts and liabilities in

the financial statements and the accompanying notes. These notes contain litigation liabilities, provision for restoration and reclamation as stipulated by the UIG 1995 Release. Disclosure in the financial statements has a mean of 1302.2 words with a substantial dispersion of 1409.5 words from the mean.

The rest of the disclosure appears on separate pages, under the chairman's report and under the annual review. Separate page reporting appears to be the best of the three options with everything together and therefore easy to locate. Unfortunately, not every MNC presents environment reports in separate sections. What is presented separately is easy to quantify and that is why it has the second largest quantity of disclosure after the annual review. This is in complete contrast to Niskala and Pretes (1995) where Finnish companies presented less than one page of separate page reports.

Within the chairman's reports are the highlights of the year. Items discussed there include regulations with their impacts on their organisations. Future projections also appear in this section. Their successes are highlighted with greater emphasis on profits made, awards received, and projects commissioned. The problems reported are quickly deflected by comments such as, 'the incident will not have any material impact on the operation of the company'. Positive disclosure outweighs negative disclosure (Table 6-11). Table 6-11 analysed for positive as against negative disclosure and found positive disclosure dominating among the sampled MNCs. Since this section is a brief review, total disclosure, mean, standard deviation, and average page are lower than the above named disclosure locations.

The annual review presents a substantial amount of environmental reporting. Since it covers a wide range of issues, total disclosure is the highest. The mean is high and so is the dispersion. The average page is the highest of all locations. However, there is a down side to the annual review disclosures. That is, repetition of information because it reviews the whole of the year's activities.

Still other MNCs present their report on a site by site basis, summarised under environment, health and safety or just scattered throughout the PR. Site by site presentation has its merits. It meets the individual shareholder's needs, although an overall picture of the entity is essential. Individual projects are also subjected to different risks, such as political, financial (currency) and even social which will prompt disclosure. What is not separated is lumped together under Health, Safety and Environment. The combination constitutes social disclosure and creates problems in quantifying environmental disclosure. Only those relating to the environment are extracted from such sections. In contrast, some environmental reports are scattered throughout the annual reports which only diligent searchers will locate.

This section would have been more exhaustive if it classified environmental issues observed under MNC characteristics. This did not eventuate due to insufficient data. Part of the discrepancy is due to the conflict in imposing environmental issues disclosed into sections. Guthrie and Matthew (1985) and Guthrie and Parker (1989, 1990) argued that such grouping loses their richness. Those who propose sectionalising like Kirkman and Hope (1992) argue that placing them in certain

locations gives status, accessibility and fully integrates environmental issues with the rest of the reports. Despite this difference of opinion, results obtained in this section will now be used in the next section (6.3.4) to contrast the two groups in the sample.

6.3.4 Environmental Disclosure: Quantity & Pattern of MNCs operating in PNG v Australia

The final section compares and contrasts the quantity and pattern of environmental disclosure between the MNCs that operate in Australia and those which operate in PNG. Both groups are represented in the mining, forestry, manufacturing and oil & gas industries. The Australian sample has an extra group of MNCs from tertiary industry to compare for consistency in reporting among the Australian MNCs.

The mining and forestry industries, which are alleged to be degrading the environment in PNG, provide the most environmental information. They disclosed on average more than 3 pages of environment information (rounding off for forestry) in the Australian sample. The rest of the discussion on the quantity of environmental disclosure is based on Table 6-9. This table contains total disclosure measured per industry, per annum, with an extension to include averages and standard deviations. Mean disclosure is equated into the number of papers for comparison.

The PNG sample of mining and forestry's mean disclosure were 4868.8 and 2191.6 words with standard deviations of 1542.2 and 547.99 respectively. The Australian

sample of mining and forestry's means were 2039 and 1719 words with standard deviations of 768.62 and 673.9, in that order. Dispersion among the Australian group is lower, which may be attributed, to the Environment Protection Authority (EPA) laws in every state, and the UIG requirements which ensure consistency. The forestry industry in PNG disclosed the lowest among mining and forestry groups.

The mining industry in PNG reported an average of 8.45 pages compared to 3.54 in Australia. Of the four industries, environmental reporting among the mining industry varied the most with a standard deviation of 1542.2 words. Wide dispersion is caused by some MNCs like Placer Dome reporting more than other companies. MNCs in PNG came under scrutiny (Boral Annual Report, 1994), and therefore, reported more to legitimise their existence and their operations.

Oil & gas and manufacturing in the PNG sample have potential to degrade the environment yet they did not disclose as much as mining or forestry. This was anticipated as the focus was mainly on these two sensitive industries. Oil & gas companies operating in Australia reported more, with a mean of 1211 words and a standard deviation of 568.71 while their counterparts in PNG had a mean disclosure of 869.4 and a standard deviation of 845.55. Oil & gas in PNG is an extractive industry subjected to the UIG 1995 requirements, referred to earlier, and ought to report more. However, it has not faced any major crisis in PNG as its forestry and mining industries have. Secondly, the oil & gas industry has only a few oil fields in PNG with a few MNCs involved.

Interestingly, the manufacturing industry in PNG exceeded oil & gas with its mean word disclosure of 1313.2 and a standard deviation of 499.35. As pointed out earlier, this industry is rated as small by the AusAid Report (1996), however, it is expanding with a number of major projects either just or about to be commissioned (1998). In contrast, the Australian sample's manufacturing MNCs had a lower mean of 942 and standard deviation of 165 words. Contrasting them, based on the number of pages, the sample in PNG disclosed more in 2.28 pages while those in Australia disclosed only 1.64 pages. Those in PNG vary more by dispersion than those in Australia. The amount of disclosure with their mean, standard deviation and average pages, actually reflect the their sensitivity towards the environmental issue, beginning with mining down to 'others' (Table 6-9).

Finally, the MNCs in the 'others' group only reported a little more than a page of environmental disclosure. While they are only among the Australian sample, their quantity of disclosure is consistent with Kelly's (1981) study, where the author noted those in the primary and secondary industries disclosed more environmental information compared to the tertiary industries. Nonetheless they had some social disclosure as they are consumer driven industries with some impact on the environment. These total disclosed information from the three industries discussed will enable the testing of hypotheses in the next section (6.4).

**Table 6-9 Total Disclosure of Environmental Issues by Sample MNCs
from all Annual Reports analysed -Word Count per Industry, per Annum**

Australian Sample

Industries	1992	1993	1994	1995	1996	Total	Mean	Std Dev	Avg Page
Manufact'g	840	821	833	1015	1201	4710	942	165	1.64
Mining	1096	1741	2183	1970	3205	10195	2039	769	3.54
Oil & Gas	1145	784	836	1102	2188	6055	1211	569	2.10
Forests	1763	2233	1583	659	2358	8596	1719	674	2.98
Others	494	257	612	930	977	3270	654	302	1.14
Total	5338	5836	6047	5676	9929	32826	6565		
Mean	1068	1167	1209	1135	1986	6565	1313		
Std Dev	467	800	657	495	908	3327	665		
Avg Pages	1.85	2.03	2.10	1.97	3.45	11.40	2.28		

PNG Sample

Industries	1992	1993	1994	1995	1996	Total	Mean	Std Dev	Avg Page
Manufact'g	980	972	1530	986	2098	6566	1313	499	2.28
Mining	3295	3884	4234	6997	5934	24344	4869	1542	8.45
Oil & Gas	439	367	305	917	2319	4347	869	846	1.51
Forests	1753	2929	2623	1748	1905	10958	2192	548	3.80
Total	6467	8152	8692	10648	12256	46215	9243		
Mean	1293	1630	1738	2130	2451	9243	1849		
Std Dev	1242	1642	1669	2914	1921	9388	1878		
Avg Page	2.25	2.83	3.02	3.70	4.26	16.05	3.21		

In conclusion, this section notes three key disclosure features. Total disclosure among Australian companies, has drastically increased to an overall equated page count of 4.27. This appears to be a response to increased public demand for environmental reports. Since this increase surpasses other earlier studies, it is alleged to be influenced by a critical event especially when MNCs in PNG disclose more than their counterparts.

Two key factors (size and industry) influenced this increase. Although environmental issues were sought against locations, insufficient data prevents a complete matrices analysis. Analysis of available data shows that MNCs in PNG disclose a greater quantity. Overall disclosure is summarised into descriptive results to test the two hypotheses before any valid inferences are made.

6.4 Testing Hypotheses

Section 6.3 examines the results of the overall level and pattern of environmental disclosure among the sample. The analysis then looks at the potential influence which characteristics of MNCs such as, operational size and the type of industry with the MNCs' particular nature of operation might have on the amount and pattern of disclosure. A comparison of quantity and pattern of environmental disclosure is made between the MNCs that operate in PNG with those in Australia. The analysis continues in this section to consider the potential variation in the amount and pattern of disclosure over time. The section begins with the critical event by presenting and analysing the results of the two hypotheses tested to observe whether the critical event has any influence on environmental disclosure.

Time frame, Critical event & Disclosure

The time period is the same, 1992-1996. This period is significant because it contains a specific critical event that could be expected to significantly influence the amount and pattern of environmental disclosure of the MNCs. The event is the Ok Tedi lawsuit in

which people of the Western Province sued OTML (BHP), for a sum of \$3 billion for environmental damages caused by the Ok Tedi mine. This dispute was settled out of court for only \$11 million in 1996 with the PNG government's intervention.

Other studies, such as Patten (1992) and Andrew (1994), indicate that critical incidents like the OTML lawsuit induced significant changes in environmental disclosure behaviour among the MNCs. Patten (1992) observed that oil companies increased their environmental disclosure after the Valdez spilt oil in Alaska, March 1989. Exxon, whose vessel spilt the oil, increased its environmental disclosure ten times from 0.6 page in 1988 to 6.0 pages in 1989. Other oil companies also increased their environmental disclosure although they were not the offenders, in this instance. Subsequent development from this incident is the Valdez principles which promotes greater environmental disclosure.

Andrew (1994), reports that the deadly methylisocyanate gas leak at Union Carbide's Bhopal plant (India) has greatly changed the behaviour of chemical industries towards the public. This incident eventually led to the requirement for increased disclosure about the presence and the release of toxic chemicals. It began with the SARA as the first US piece of legislation for the chemical industry. Since the critical event, the chemical industry has changed its attitude towards environmental disclosure.

Testing the 2 Hypotheses

The general context of this study is to develop ways and find strategies to monitor and control the environmental degradation caused by the MNCs in PNG. It can be shown that

this can be achieved through the use of environmental accounting as a potential tool for monitoring and controlling environmental degradation. The MNCs' current accounting practises, as reflected by their environmental disclosures are investigated to establish the extent, the degree and pattern of current disclosure to which Australian MNCs, in particular those operating in PNG, have incorporated environmental reporting as part of their overall accounting and financial reporting practices. This analysis is intended to observe whether the observed results in the above studies are replicated in PNG as the result of the Ok Tedi lawsuit. Observation thus far (section 6.3), is that MNCs in PNG are disclosing more, despite deficiencies in enforcing environmental legislation.

The purpose of the analysis is to see whether the critical event is associated with the pattern of disclosure in the immediate years before and after the critical event. Two issues are analysed here. The first is whether the critical event is associated with a statistically significant increase in the average levels of environmental disclosure. The second issue is whether the increase was persistent or whether the increase only occurred in the year following the event then reverted back to its former average levels of disclosure.

Hypotheses 1 and 2 are formulated to test these issues. To achieve this, the results from section 6.3 will be utilised for testing the two hypotheses. For the sake of clarity, each hypothesis will be restated for testing. Both hypotheses are given in the form of null hypotheses to permit testing for the statistical significance of any observed differences in average disclosure by the application of the appropriate t-test.

6.4.1 The First Hypothesis is stated as follows: Hypothesis 1:

H₁: Environmental disclosure did not increase among the Australian MNCs following the Ok Tedi lawsuit but rather remained constant over the period of 1992-96.

This hypothesis centres around the Ok Tedi lawsuit of 1994. Two writs were filed by the villagers along the Fly river against OTML (BHP) for environmental damages in the Melbourne Supreme Court. This hypothesis observes whether a major environmentally related event such as a lawsuit have any effect on the MNCs accounting practices and in particular on their environmental disclosure. If the lawsuit has any effect, MNCs will disclose more as a result. This is based on Legitimacy theory which states, that when an entity is under threat, whether genuine or perceived, the organisation will increase their social disclosure to legitimise both their existence and their activities (Lindblom, 1983). The assumption here is that the sampled MNCs practice reporting environmental information. This was observed by Deegan and Gordon (1996). An alternative to the

hypothesis above is that the disclosure will not increase but remain constant throughout the observed period.

Hypothesis 1 is formulated in this manner to assess the MNCs' environmental reporting. PNG has environmental legislation such as, the Environmental Planning Act 1978, which is implemented by requiring every new project to present an environment impact plan. This plan is to outline how the project's impact on the environment will be mitigated. Projects are not commissioned unless their impact plans are acceptable. However, due to lack of effective enforcement a continuous environmental degradation is still experienced, despite the MNCs lodging acceptable impact plans. Effective enforcement will ensure these impact plans are implemented, impacts monitored throughout the project's life span and reported on a regular (annual) basis, in the MNCs' annual reports.

The perpetuating problem is that the environment is being degraded as the result of MNC activities. For instance, typical mining requires the construction of access roads that destroys flora and fauna. Once the mine begins operation, wastes are disposed of into waterways, blocking river transport, as well as polluting clean water used for drinking and washing (Rosenbaum, 1996).

It was alleged that the Ok Tedi Mining Limited caused environmental damages in the Fly river area which resulted in the lawsuit. Therefore this hypothesis seeks to examine the environmental disclosure both before and after the incident to note the effect of the

critical incident on the MNCs environment reporting. Data in Tables 6-5, 6-10, 6-10(a) & 6-10(b), with their accompanying figures (graphs), will be used to test hypothesis 1.

Table 6-10 contains the totals of environmental disclosure for the whole (72) sample of MNCs. Data in this table was compiled from environmental issues, reported by MNCs, to determine whether their total environmental disclosure over the period has increased, especially after the critical event. Besides reporting their total disclosure, their mean and standard deviation are also computed and included in the table. This descriptive statistics will assist in observing variations in the total disclosure.

Data presented in Table 6-10c, shows an increase in environmental reporting among the two MNC groups after 1994. This table contains the individual MNC's pattern and level of environmental disclosure for the period. Some consistently report environmental information while others commenced reporting after the critical event. Those who were in the practise of reporting before the incident, increased their level of disclosure.

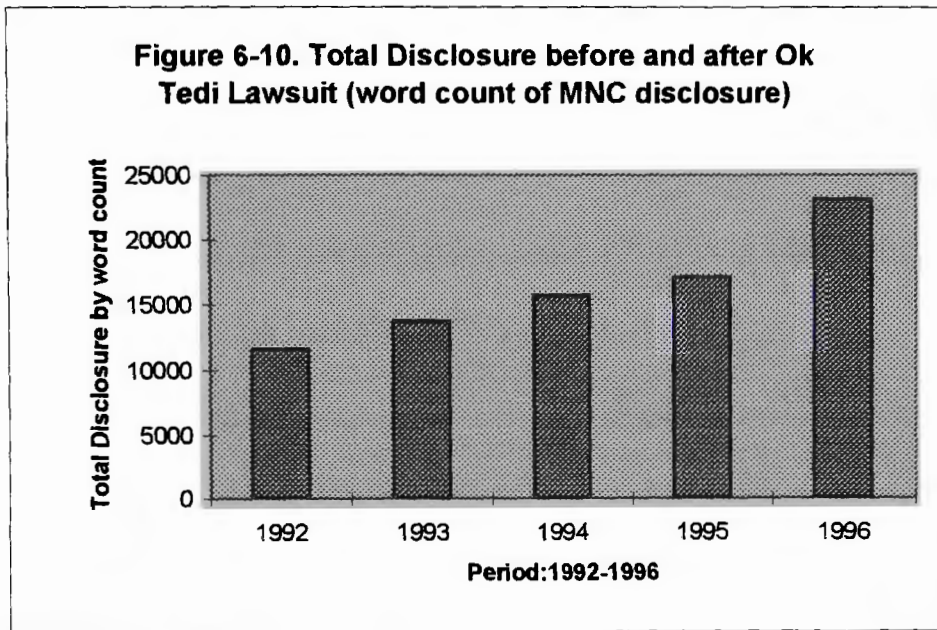
Overall disclosure increased from 11 624 words in 1992, to 23 080 words in 1996. This increase is shown below, both in words (Table 6-10) and in a graph (figure 6-10). While those MNCs Australia only reached a maximum of 9997 words [Table 6-10(a)] in 1996, those which operate in PNG exceed this total with an upper limit of 13083 words [Table 6-10(b)]. Their averages are rather small (161 to 321 words) because a number of the MNCs either did not disclose or provided a minimal environmental report. There was even a slight decline between 1993 and 1994. However in 1995, disclosure increased by 25 percent. This increase has been highlighted several times already in this

chapter. Fourteen MNCs from both groups which did not provide any environmental report during 1992-1994, provided environmental reports during 1995-1996 (Table 6-10c appendix p.354). Many of those who did report prior to the incident began reporting some environment information. Due to these changes, the average disclosure and standard deviation fluctuated accordingly, between 200 and 350 words. This set of data will enable the observation of total disclosure, their mean and standard deviations, both before and after the critical event (The Ok Tedi lawsuit) which may have influenced the MNCs' environmental reporting. The overall pattern of disclosure shows a consistent increase until 1995 after which it escalated by 35 percent²⁰. Even the bars in Figure 6-10 depict this change.

²⁰ (23080-17091)/17091

Table 6-10 Total Environmental Disclosure Before and After Ok Tedi Lawsuit (word count of sample MNC disclosure)

Period:	1992	1993	1994	1995	1996
Total Disc	11624	13760	15687	17091	23080
Mean Disc	161.44	191.11	190.18	237.38	320.97
Std Dev	219.23	315.82	255.41	320.44	343.14



Two other tables [6-10(a) & 6-10(b)] ,are constructed from Table 6-10, separating the MNCs operating in each country to compare and contrast the level and pattern of each group's disclosure. Separate disclosure will first of all make possible the critical event's influence on the MNCs which are all Australian. OTML, which was sued, is an Australian company. Second, it will assist in observing the effect of the lawsuit on the MNCs in PNG. Table 6-10(a) and the accompanying figure represents the sample of MNCs that operate in Australia. Their disclosure shows a gradual increase from 1992-1994 but a decline in 1995 before picking up again in 1996. Variations (Standard Deviation) remains steady in the 200s except in 1995 when it dropped by 6 percent. Increases observed were 8 percent between 1992-1993 (153.1-140.6)/140.6, and only

0.76 percent between 1993-1994 before dipping by 6 percent in 1995. This decline was preceded by a major boost of 77 percent²¹ in 1996, the highest average disclosure for the period.

It appears here that the escalation in the environmental reporting during 1996 among the sample MNCs operating in Australia is associated with occurrences surrounding the critical event. The initial occurrence is the issuing of writs in the Melbourne Supreme Court in 1994. This writ was based on ACF's published report in 1993²². Disclosure, as reported above, increased between 1992-1994 but declined in 1995. This decline was short lived as the ACF stepped up its efforts by forming an allegiance with Melanesian Environment Foundation (MEF) to serve PNG, the Solomon Islands and Vanuatu.

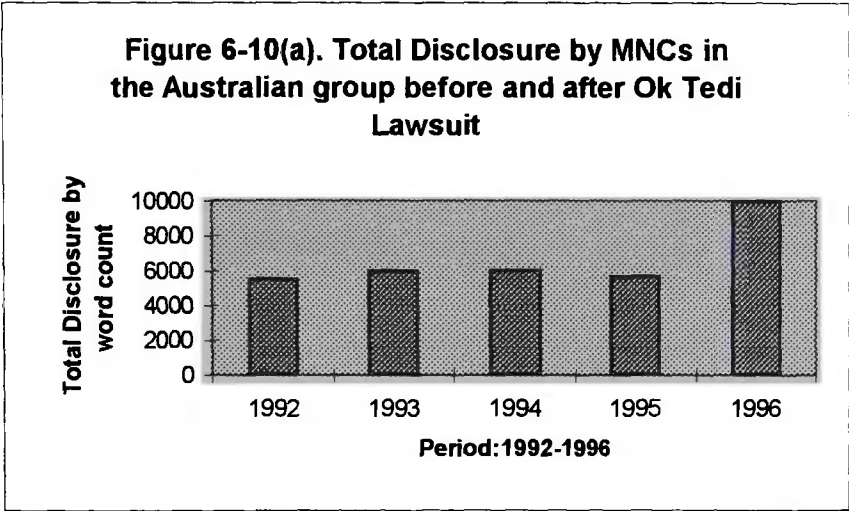
During the period of litigation, the ACF along with other concerned groups such as the Uniting Church, Community Aid Abroad and the Friends of Earth joined forces in a well published protest at the 1995 BHP annual meeting. The huge escalation in Australian MNCs environment reports is noted in the very next year-1996 which may have come as a result of publicity on the protests of the Ok Tedi disaster.

²¹ All percentage changes expressed here are based on the averages.

²² The sequence of events are taken from Rosenbaum & Krokerberg 1996, Habitat.

Table 6-10 (a) Total Disclosure by MNCs in the Australian group by word count for the period 1992-6.

Year:	1992	1993	1994	1995	1996
Total	5486	5970	6016	5641	9997
Mean	140.67	153.1	154.26	144.64	256.33
Std Dev	228.44	276.6	210.08	140.62	261.22



MNCs which operate in PNG, registered a higher increase in both total disclosure and the mean, in comparison to those operating in Australia. Total disclosure continued to increase annually until it was more than double that of 1992 as shown by the graph [figure 6-10(b)]. A number of events, at different times during the period, also contributed to the increase. Environmental issues received a boost when then Australian Prime Minister- Paul Keating, handed his counterpart, Sir Rabbie Namaliu a letter on the Ok Tedi issue in 1992. This sparked off a number of reactions which eventually led to the issuing of writs. The next year (1993), the ACF published its finding on the Ok Tedi environmental damages. The ACF’s focus has been on PNG which may explain why disclosure in PNG is higher during this period than in Australia. It was at the height of all this activity that the landowners sued BHP which diverted all the attention from

PNG to Australia. Two writs were issued in the following year (1994) based on environmental reports.

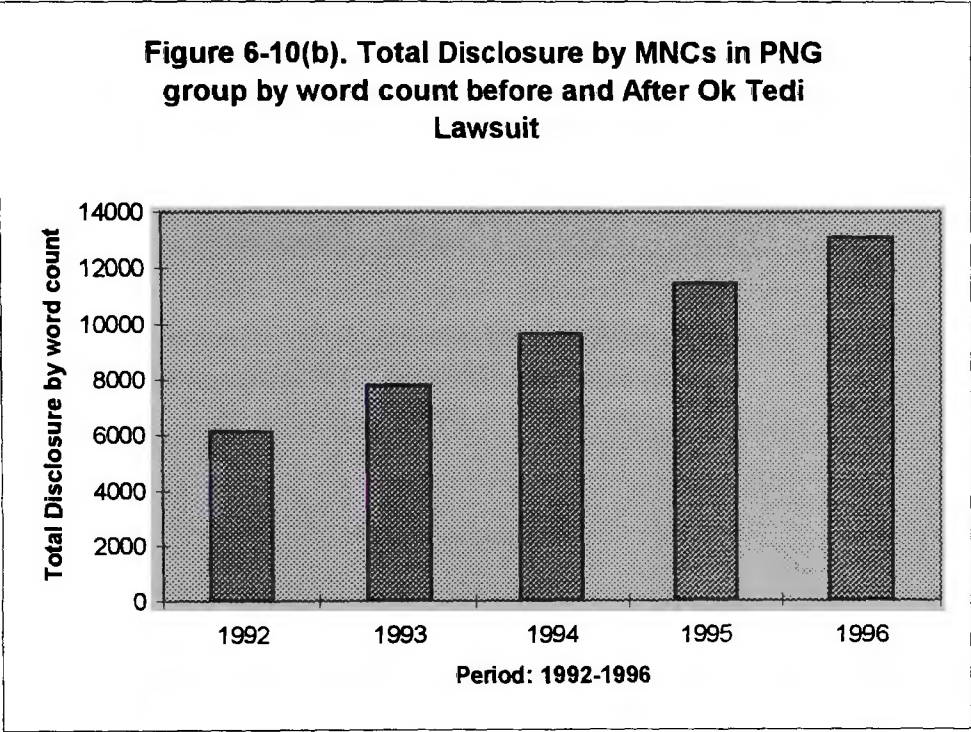
What attracted most attention in PNG during 1995 was the deportation of the Fly river landowners' Melbourne based lawyer. It was alleged that the government acted for BHP to save OTML because the state is a shareholder and the mine is the major source of state revenue. These events appear to have influenced the average environmental disclosure during that period.

The possibility that the critical event was associated with an increase in total average disclosure is tested by comparing the average disclosure by the MNCs in PNG for the years prior to the event, 1992-1994 with the average disclosure by the same 33 companies for the two years (1995-1996) subsequent to the event. The year 1994 is grouped with the years prior to the event because the writs were issued close to the end of the financial year 1993-1994.

Since there are differences in average disclosures, a simple paired t-test for independence was conducted with a null hypothesis that there is no major differences in the means between the two periods: before and after. If there were any differences, they were caused by a sampling error. The t-tests was conducted based on the total MNCs' disclosure in Table 6-10(c) (appendix p.354) comparing the 1992-1994 with the 1995-1996 means. The analysis in this table[6-10(c)] shows the result of carrying out a t-test on the difference between the sample mean of the two periods, before and after the critical event.

Table 6-10 (b) Total Disclosure by MNCs in PNG group by word count for the period before and after Ok Tedi Lawsuit

Year:	1992	1993	1994	1995	1996
Total Disc	6138	7790	9671	11450	13083
Mean	186.00	236.06	232.64	346.97	396.45
Std Dev	208.6	355.86	297.32	426.00	411.58

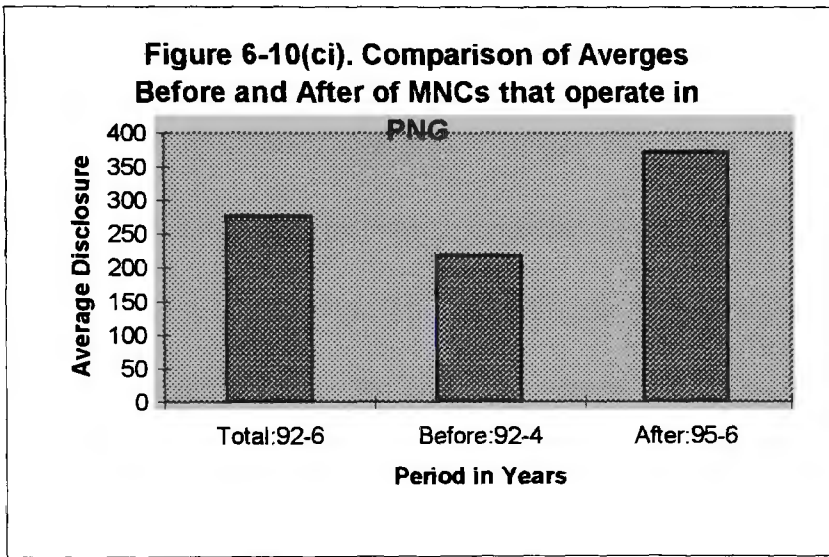


The most important error to avoid is the type one error - saying there is a significant difference between the average levels of disclosure when, in fact that difference is purely due to chance. Therefore, alpha is set high at $\alpha = 0.025$. The critical t value is $t=2.0369$. The observed t-statistic $t= 3.765$ with only 0.000337 probability of obtaining a difference in means as large as the one observed in the two periods: 1992-4 and 1995-1996. The substantial size of the difference in average disclosures before and after the event ,is also obvious from the graph in figure 6-10(d). This figure is based on averages [Table 6-10(d)] of the 33 MNCs in PNG. The first column has an average of 33 averages. The second column contains the average of the same 33 companies 1992-1994 prior to the critical event while the final column contains the averages of

subsequent period 1995-1996. The later period’s disclosure is greater surpassing earlier years and even the total for the five year period. This graph is consistent with figures 6-10, 6-10(a) and 6-10(b) where the later years show a higher disclosure.

Table 6-10 (ci) Comparison of Averages Before and After of MNCs that operate in PNG

Period:	Total:92-6	Before:92-4	After:95-6
Averages:	276.62	218.23	372.71



If $p < 0.025$, then the null hypothesis that the difference is not due to sampling error is rejected. Alternatively, if the $p > 0.025$, then it is accepted that the null hypothesis and the difference is due to sampling error. To establish whether the sample mean difference is significant, a level of significance is set at $\alpha = 0.025$. The test assumes a 97.5 percent confidence interval, ie it will accept a 2.5 percent chance of error. However, a level of confidence such as this ($p < 0.025$) does not provide an absolute statement about the accuracy of the null hypothesis. This is because there is the possibility of making a type 1, or type 2 error in any decision. Type 1 error occurs if the null hypothesis is rejected

when it should be accepted. This study is content with a 2.5 percent chance of erring in this decision. A lower level of significance would be better, because it minimises the chances of committing a type 1 error.

However, the process of lowering a type 1 error increases the chance of committing a type 2 error (Levin and Fox, 1997). The two errors are inversely related. A type 2 error is committed when the null hypothesis is accepted when it should be rejected. One possible solution for a type 2 error is to increase the sample. However, the current sample of 72 MNCs is already statistically large. Whichever decision is made, it can never be certain that it will not be wrong because the decision is based on a sample and the population mean is unknown. The priority is determining which error is more serious, since type 1 and 2 errors are inversely related. Therefore, the 2.5 percent chance of error 1 is accepted in this case.

The difference in the two groups' means is sizeable, so that it is reasonable to assert that the difference is more than a sampling error. There are increases in environmental reporting in the period following the lawsuit, as depicted in Table 6-10(c) which results in varied averages and standard deviations of both groups. Consequently, the null hypothesis is rejected.

Implications and relationship with other studies

The increase in environmental disclosure becomes apparent among the MNCs under scrutiny the following Ok Tedi lawsuit. Unlike Walden and Schwartz (1997), who

noted that oil companies environmental reports which were 'time and event specific', MNCs in this sample, continued to report greater amounts of environmental information into the second year after the lawsuit. Walden and Schwartz's (1997) work extended on Patten's (1992) observations on the Valdez's oil spill in Alaska. Patten noted that environmental disclosure increased following the oil spill in 1989. However, Walden and Schwartz (1997), observed total disclosure was lower in 1990 compared to 1989, although Exxon's annual reports still had two sections: one focussing on the spill and the other on general disclosure. Therefore, they concluded that Exxon increased its environmental disclosure to deflect attention when their vessel (Valdez) spilt oil. Environmental disclosure increased with the specific event (oil spill) which was only temporary (time specific), because disclosure declined just one year later.

The current study's analysis notes that despite a slight decline in 1995, generally there was an increase in environmental reporting. There was a 75 percent increase among MNCs operating in Australia between 1995-1996 after a 6 percent decline over 1994-1995. This general increase fulfils one aim of this study which is to observe if environmental disclosure among Australian companies has improved since Deegan and Gordon (1996) noted an increase from 1983-1991. By commencing in 1992, it extends Deegan and Gordon's study to observe current developments among Australian companies' environmental disclosure. This result confirms that environmental disclosure among Australian companies is increasing. Therefore, it can be deduced, that surveyed reports contradict the first hypothesis. Australian companies in this study, are increasingly disclosing environmental reports voluntarily. Such increases are consistent

with Niskala and Pretes (1995) report that companies do provide voluntary environmental disclosure.

Hence, the hypothesis is rejected. Australian MNCs operating in PNG are no different to those which operate elsewhere. They are responding to the public's demand for environmental reports. Hypothesis 2 is related to hypothesis 1 and will be tested after the first hypothesis' rejection, that is, environmental reporting increased after 1994. Since the disclosure did increase and hypothesis 1 is rejected, this hypothesis needs testing.

The question then is whether this significant increase in average disclosure after the critical event, is limited to just 1 year following the event or whether it persists over a longer period. This proposition is investigated in hypothesis 2 which puts the proposition of persistence in disclosure in a negative form.

6.4.2 The Second Hypothesis restated reads: Hypothesis 2

H2: There is no difference in the average levels of disclosure for MNCs operating in PNG for the years 1995 & 1996.

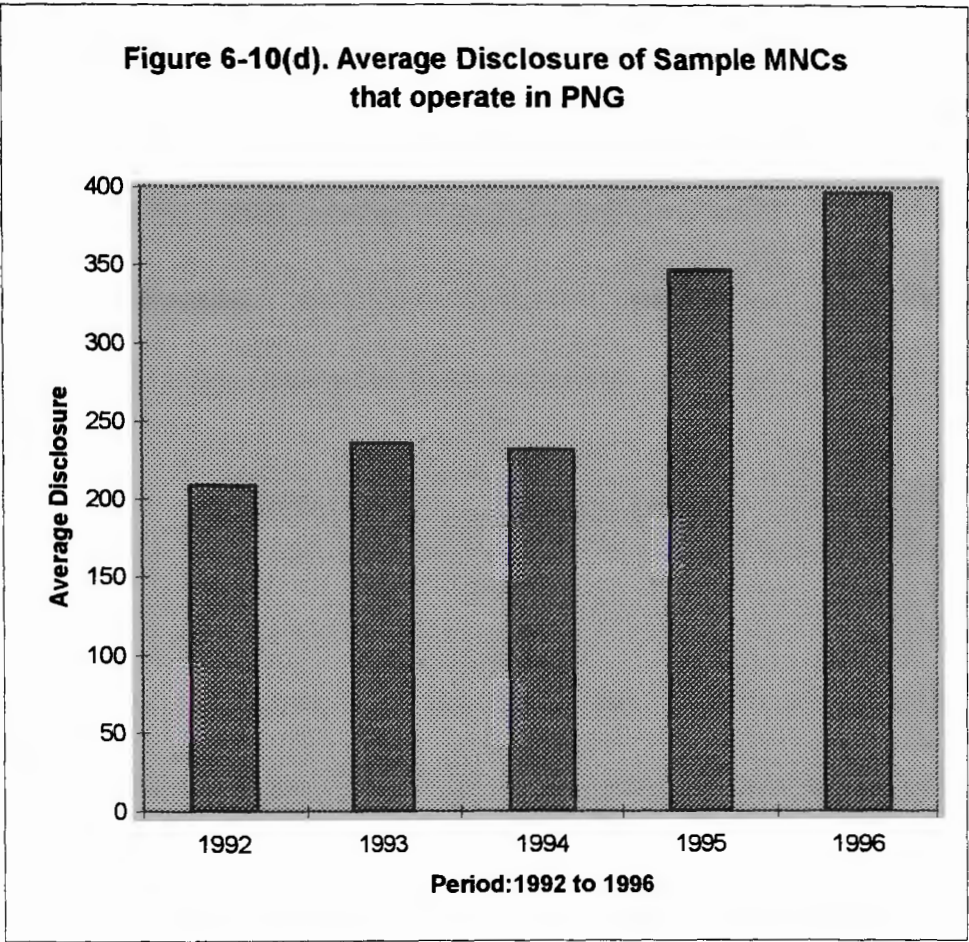
This hypothesis will be tested using Tables 6-10(a) to 6-10(e). From each table, only the differences in averages will be analysed and discussed in relation to hypothesis 2. The overall average in Table 6-10 shows an increase of 35 percent between 1995 and 1996. This is a 10 percent rise over 1994-1995 after a 0.5 percent decrease in 1993/4. Because

the decline over 1994-1995 is very small, it is not noticeable in the graph (figure 6-10). There is a gentle slope in the graph from 1992-1995 in figure 6-10 before the slope becomes steeper from 1995-1996. A similar pattern of disclosure is seen in figure 6-10(a). Although the average disclosure between 1992-1994 showed increases, there was a decline between 1994-1995 of 6 percent $[(144.64-154.64)/154.64]$. Then there was an enormous increase of 77 percent $[(256.33-144.64)/144.64]$ between 1995-1996. This increase is distinct in figure 6-10(a) where the bar representing 1996 is the tallest in the histogram. The rest of the years between 1992-1995 show a similar quantity of disclosure average with the bars in the histogram showing similar heights.

While the Australian sample depicts a sharp increase in 1996, mentioned above, the PNG sample shows the rise earlier in 1995 (Table 6-10e). Figure 6-10(e) shows the increases more distinctly. The average disclosure fluctuated slightly over 1992-1994. The amount of average disclosure increased by 27 percent from 1992 to 1993. This was short lived, as it decreased by 1 percent in the following year 1994. However, average disclosure was heightened by over *198 percent* in 1995. This is evidenced by the sudden rise on the graph (figure 6-10(e) and the range between 1994 and 1995. This was the year after the critical event which brought all mining companies under scrutiny (Boral Annual Report, 1994). The increase was maintained into the second year (1996), after the critical incident, unlike Walden and Schwartz's (1997) observation in the Exxon's environmental disclosure following the Valdez incident.

Table 6-10 (d) Average Disclosure by MNCs in the PNG Sample

Years:	1992	1993	1994	1995	1996
Average	208.6	236.06	232.64	346.97	396.45



Increase in Number of Pages of Disclosure

An increase in above average disclosure is confirmed by the increase in the number of pages of disclosure in the same period. With the exception of the decline among the Australian sample in 1995, the others reveal increases in equated pages of environmental reporting (Table 6-4). The largest being an increase from 1.97 pages to 3.45 pages (75 percent) by the same MNCs that operate in Australia in 1996 after a 6 percent decline (2.10 pages to 1.97 pages) the previous year (1995). Their counterparts in PNG report a constant annual increase in environmental disclosure (even in 1995). This began with 2.25 pages of disclosure in 1992 to nearly double that of 4.26 pages in 1996.

The Australian group of MNCs' disclosure declined over 1994-1995 while the environmental issues were gaining prominence in PNG. This is because only the MNCs in PNG were exposed when ACF and MEF formed a partnership and actively engaged in environmental issues in PNG. These sequences of events were highlighted above. Increases in the actual number of pages are shown below (Table 6-9a) with percentage changes in bracket. These data come from the last rows of Table 6-9.

Table 6-9a. Changes in Disclosure over 1992-6 in number of pages

	1992-3	1993-4	1994-5	1995-6	Overall
Australian	.18(9%)	.07(3%)	(.13)6%	1.48 (75%)	1.6pages
PNG	.58(25.8%)	.19(7%)	.68(22.5%)	.56(15%)	2.01pages

Given the above increases during the period, a t-test is conducted comparing the average disclosure for 1995-1996 of the same 33 sample companies that operate in PNG. This was to test hypothesis 2, that there is no difference between average disclosures over 1995-1996, and that, the increases observed above, are due to mere chance. Although an increase in disclosure is observed after the critical event in 1995, this test is to extend the observance further to confirm whether the increase is temporal or permanent. The results of the t-test are given at the bottom of Table 6-10 c).

A significant difference is observed between the two averages with a level of significance for the one tail set at $\alpha=0.025$. The critical t value is 2.0369. The observed t value for the test was $t=0.9313$ which is lower than the critical value. Therefore the null hypothesis is rejected because there is a significant difference between the average

disclosure of the years 1995 and 1996. The actual probability of obtaining a different mean as those observed in the two years is 0.179325. This also confirms the sizeable difference in the average disclosure of the two means both in Table 6-10(e) and the figure 6-10(e).

Thus the increase in the average disclosure observed immediately following the critical event is not temporary but appears to persist into the second year (1996). It is not only confined to the critical event but persisted longer. Analysis into the subsequent years by another study is necessary to see how long it persisted. It is sufficient to conclude here, that critical events do influence environmental disclosure. This is consistent with studies like Patten's (1992). However, unlike other studies (Walden and Schwartz, 1997) which noticed a decline just after a critical event, this study observed the increased associated with a critical event to persist longer. This persistence appears to be associated with an increase in public demand for environment information from companies (ETAF, 1996).

6.5 Summary

Overseas companies provide fairly high levels of both positive and negative environmental information although they do not all have mandatory requirements (Deegan, 1996). For example, the Emergency Planning and Community Right-to-Know Act (EPCRA) introduced in 1986 in the US, has prompted many companies to provide

environment information voluntarily. It is argued that if the companies do not, voluntary organisations will (Cahill and Kane, 1994).

Many now rate the environment as the number one challenge for business. It is the issue of the 1990s (Bryson, 1993). The author proposes that it makes good sense to both business and government to preserve the environment. A recent Roper Poll (1993) shows 78 percent of Americans rate environment as a serious issue. It was only 56 percent four years previously and it was not even thought of, a decade ago. The Accounting profession is developing different schemes in keeping with the changes. For example, introducing the ACCA's Environmental Reporting Award Scheme in Australia (Gray et al, 1996) to reward those who are making the effort. Companies operate under a social contract either expressed or implied with societies, therefore the public expresses concerns where it sees a need to protect the ecosystem. There is a need for a cooperative effort on the part of all parties.

Australian environmental disclosure is minimal, ad hoc, unsystematic, subjective and predominantly self-laudatory. So much so that it is termed, 'greenwash' (Fayers, 1998). This may be due to what Beder (1997) claims is a counteraction from some corporations on the growing 'green' concern. Resistant companies counter by:

- a. using specialised public relations to promote corporate agenda,
- b. create artificial grass root support by corporations,
- c. introduce laws to deter public involvement, and
- d. fund conservative think-tank to oppose environment regulations

However, this study observed an increase in environmental reporting among Australian companies. While this increase has been influenced by a critical event, increased disclosure persisted in the subsequent years. Such result is consistent with Niskala and Pretes (1995) and Deegan and Gordon (1996) that companies do disclose voluntarily. This appears to be the general trend with the environment becoming a global issue of the 1990s.

Environmental impact in PNG is largely influenced by foreign demand for natural resources. It is considered a strong driving force behind the over-exploitation and underpricing of both renewable and non-renewable resources (Bartelmus, 1994). There are concerns over why MNCs are not adopting the sustainable development approach in the extraction of resources even though their countries of origin have environment legislation for this. As proposed in chapter 3 an environmental audit would be useful, given the current extent and pattern environmental disclosure by the Australian MNCs.

The challenge for PNG is to solve is the task of incorporating sustainable development into the accounting arena. Environmental issues have shed light on economic realities as portrayed by accounting. This is increased by the societal demands on businesses to be 'greener'. However, the present accounting has narrow focussing only on costs, reflected by external markets. Costs that have major social and economic implications are not considered. Consequently, the MNCs produce qualitative reports to legitimise their existence in the country. Therefore, accounting information is at best incomplete and consequently misleading (Hibbit, 1994). Despite this, environmental disclosure is

important because employees prefer companies with a 'green' image, banks use 'green' image as 'collateral' and even consumer lobbyists influence disclosure (Tilt, 1997). Most importantly, the impacts need to be minimised for a sustainable development of resources.

Chapter 7

Summary, Conclusions & Recommendations

7.1 Introduction

In this final chapter, the study is drawn together and conclusions are reached based on the study objectives. The chapter begins with an overview of the whole thesis. This is followed by a review of the analysis and the results obtained. Subsequently, the implications of the results, with regards to the role of MNCs in the economic development of PNG, their environmental impacts, and an accounting approach to address the environmental issues are discussed. It is suggested in conclusion, that MNCs incorporate environmental accounting into their accounting system. This is to ensure MNCs implement their environmental plans, monitor, control and report on them in their annual reports because environmental accounting has the potential to expose and address the environmental impacts.

The purpose of this chapter is to review the study and summarise the discussions on the results from the analysis on the degree, extent and pattern of current environmental disclosure among Australian MNCs operating in PNG. The study begins with an objective of exploring the possibility of using an accounting approach to address the adverse environmental impacts caused by MNCs' activities in PNG. Findings are discussed in this context and conclusions drawn with suggestions for further studies.

For the above purpose, section 1 presents briefly an overview of the study including a summary of the results from the analysis of annual reports. This is followed by the results of hypotheses testing.

Section 2 discusses the implications of the results derived from both the analysis and the hypotheses testing.

Conclusions are drawn in section 3 with limitations and suggestions for environmental impact plans to be incorporated into MNCs' accounting records. MNCs can then monitor, control and report on them annually. Suggestions for further studies concludes this section.

7.2 Overview of the Study

This section restates the issue, its objectives and the theoretical framework that supports it. It then presents the formulated propositions and the steps taken to test them. A brief mention is made of the period that study covers to set the study's time frame.

The environmental degradation issue has revived and rivals that of the 1970s. The issue, which began as a domestic concern in the 60s (Waincymer, 1998) has now become a global issue during this decade the 1990s that especially confronts the MNCs. In particular, environmental costs and investment concerns have entered into the corporate circles. Since the environmental issue has been elevated to this position of importance,

appropriate financial reporting of environmental costs and concerns must be addressed (Gamble et al, 1996). Corporations must provide detailed disclosure on their environmental issues.

Context of the study

There are various attempts being made to address the environmental degradation issue elsewhere, but little has been done to address the degrading of the environment by MNCs in developing countries (through an accounting approach). The general context of this study is to explore in general, possible ways to monitor and control the alleged environmental degradation caused by MNCs operating in developing countries like PNG. In particular, the study considered environmental accounting as a potential tool to monitor, control and reduce environmental degradation now experienced. An accounting approach is taken because unless the environmental considerations are incorporated into the corporate accounting and financial system, they will prevent environmental advancement (Gray et al, 1993).

It is a delicate issue, especially in PNG, which relies heavily on foreign MNCs to develop its resources with little supporting legislation and poor policing to curb environmental degradation. Further, the PNG government constantly faces a conflict of interest because it has equity in large projects that modify and degrade the environment. That is why the state cannot arbitrate independently between affected communities and the alleged foreign MNCs.

Study objectives

This study has three specific objectives in the above accounting context. They are:

1. to investigate and establish the current extent, degree and pattern of environmental disclosure in the recent years by Australian MNCs operating both in PNG and Australia,
2. to observe whether firm characteristics like size or the type of industry they operate in and their nature of operation has any influence on their environmental disclosure, and
3. to examine whether critical events that impact on MNC's image do influence environmental disclosure.

Theoretical Support

The specific objectives are formulated basing on Legitimacy Theory, which is the framework for this study. Legitimacy theory posits that when there is a threat, whether genuine or perceived, corporations will immediately react to legitimise both their existence and actions (Lindblom, 1994). This will result in companies increasing their environmental disclosure. Legitimacy theory is applied because this study assesses the impacts of a critical event (the Ok Tedi lawsuit) on the current extent, pattern and degree of environmental disclosure over time. An annual report analysis tests the legitimacy theory following the critical event.

Propositions for Testing

In order to test whether MNCs are legitimising their operations, two hypotheses were proposed for testing. Since the objective is to investigate the MNCs' current pattern, degree and level of environmental disclosure, the first proposition is that environmental disclosure did not increase.

This first proposition was tested by analysing environmental disclosure of Australian MNCs which operate in Australia and PNG continuously between 1992-1996. Any increased environmental reporting will be the legitimisation of the MNCs actions. Legitimacy is necessary when a disparity between societal expectation and the corporate image arises (Sethi, 1978, 1979). The conflict between OTML and the affected local communities is one example where societal expectation is based on corporate image (Nasis et al, 1997). The analysis reveals that environmental disclosure among Australian MNCs in PNG increased more after the critical event. Since the mining companies in PNG came under scrutiny (Boral Annual Report, 1994), their increased environment reports legitimises both their existence and operations.

The second proposition is an extension of the first where the increased environmental disclosure is observed over an extended period after the critical event to see if the increased disclosure persisted. It was noted that two years after the critical event, environmental disclosure continued to increase, unlike the oil companies whose environmental disclosure declined just one year after Valdez experience (Walden and Schwartz, 1997).

Annual Reports for analysis

To support the suggestion for an accounting approach to address the environment issue in PNG, it needs to be established that the current accounting information provided by MNCs for their shareholders is inadequate. A sample of Australian companies operating in PNG and Australia are selected for this study. These sample MNCs are from the top 500 Australian companies by market capitalisation. Their annual reports were analysed using content analysis to determine their degree, extent and pattern of environmental disclosure based on their current disclosure patterns. Annual Reports are chosen for this analysis because:

1. they are easily accessible,
2. they are essential part of company's public image, portraying what management plans to reveal to the outside world,
3. they represent a surrogate measure of the company's priorities and the attention management gives to various issues, and
4. annual reports are a reasonable surrogate to corporate social performance (Nasi et al, 1997).

The prime reason for using annual reports is that the analysis of annual reports will enable the testing of the hypotheses. These hypotheses are based on quantity of environmental disclosure as contained in the annual reports. This is consistent with other studies (Ernst and Ernst 1978; Patten 1992; Niskala and Pretes 1995; Deegan and Gordon 1996; and a number of others), that have used annual reports for their analysis of social disclosure.

7.3 Results of the Analysis and the Hypotheses Testing

The analysis of the annual report was to satisfy the above three specific study objectives. This section briefly reviews the analysis of the annual reports under the three objectives and their results.

Current extent, degree and pattern of Environmental Disclosure

The current extent and degree of environmental disclosure was determined by semantic analysis. The disclosure among MNCs show a mixed pattern. Thirteen percent of the MNCs reported in less than 1000 words with lowest being only 19 words for the whole period. Fifty-two percent disclosed environment reports in greater than 1000 but less than 3000 words. This leaves 37 percent disclosing more than 3000 words of environment information. Total disclosure was further investigated to determine whether the characteristics of the sample MNCs have any influence on the total disclosure.

Influence of MNC characteristics on Environmental Disclosure

Empirical findings tentatively attribute environment disclosure to be related to company size, industry and nature of operations, the MNCs' country of origin and the country the MNCs report to have a significant effect on its reporting (Gray et al, 1995). The same authors allege that environmental reporting does not relate to profit and without regulations, general CSD will continue to fluctuate. This study focuses on just two characteristics of MNCs from those named above: size and the industry effect. Country

of origin is not considered because the sample MNCs are all Australian. However, reporting back to their head office is linked in the environmental disclosure requirement.

Since the sample MNCs are all in the top 500 Australian companies by market capitalisation, they are all the same size (large). Therefore, they have to be reclassified using operational, financial or organisational size to distinguish size variations of the sample MNCs. Of these, sales as part of operational size, is selected for the reclassification. This is to maintain consistency with other studies which analysed for social disclosure such as Trotman and Bradley (1981); Cowen et al (1987); Patten (1992); Niskala and Pretes (1995); Deegan and Gordon (1996). Industry effect is also chosen for the same reason and is consistent with the above studies plus Freedman and Jaggi (1988); Roberts (1990); and Zeghal and Ahmed (1990).

Influence of Critical Events on Environmental Disclosure

The result of the analysis shows Australian mining companies operating in PNG disclose more than those in Australia especially after the lawsuit. This arises because mining companies have come under the public scrutiny and consequently the industry is attempting to correct its image through increased disclosure. Increased disclosure after a critical event suggests the presence of legitimacy theory. Since the environmental disclosure increased after a critical event, it appears to confirm that companies increase their disclosure to guard their image.

This is consistent with Patten (1992), who observed an increase in environmental disclosure following the Valdez spilling oil in Alaska. Exxon, who owned the vessel Valdez, increased its environmental disclosure ten (10) times from 0.6 page before the incident to 6.0 pages after the spill. The observation also noted that of the other oil companies in the US Fortune 500, significantly increased their environmental disclosure.

Influential Characteristics of MNCs

The characteristics of MNCs also influences environmental disclosure. Two influential characteristics of companies are considered which may have influenced environmental disclosure among the sample Australian MNCs. They are the size of the companies and the type of industries they are in.

Size Effect

The quantity of disclosure by size was measured for the sample MNCs and found it to be consistent with studies named earlier. The result graphically shown in figure 6-5 reveals that larger firms disclosed more. Environmental disclosure increases with size where the operationally larger MNCs disclosed more and disclosure falls as the size of MNCs decrease. This is because larger firms are visible in both their existence and operation. Therefore they become easy targets and are subjected to scrutiny (Cowen et al, 1987; Trotman and Bradley,1981).

Industry Effect

Two industries (mining and forestry) which are alleged to be degrading the environment in PNG disclose more environment information than manufacturing and oil & gas. Although the mining industry was targeted by various environmental groups following the lawsuit, their scrutiny affects all those whose nature of operation modifies the environment (Hackston and Milne, 1996). This explains why mining companies, unlike Exxon (Walden and Schwartz, 1997), in both Australia and PNG, as well as oil & gas companies in Australia disclosed more, persisting into the second year after the lawsuit. Their extractive operations involve large clearing, extracting and dumping into water ways. Their impact on the environment is adverse as discussed in chapter 2. Niskala and Pretes' (1995) study support the argument that environmental disclosure is industry related. The authors found certain industries (energy, forestry, oil) disclosed more even under a voluntary disclosure.

Hypotheses Test Results

Within the context of this study, a close scrutiny was applied to the mining MNCs' activities. Their image is somewhat distorted because all mining companies are considered to be the environment degraders. The scrutiny began when landowners in the Fly river region brought a lawsuit against OTML in 1994 for environmental damages caused by Ok Tedi mine. Although environment degradation began earlier (Young, 1992), it was the writ issued in the supreme court in Melbourne against BHP (who is a major shareholder of OTML) that exposed the adverse impacts in PNG.

In pursuing the objective of assessing the degree and extent of environmental disclosure along with the assessment on the effect of the critical event, two hypotheses were formulated and tested. Hypothesis one: *H₁: Environmental disclosure did not increase among Australian MNCs operating in PNG following the lawsuit, but remained constant between 1992-1996.* This hypothesis tests for the general increase and the effect of the lawsuit showed that environmental reporting increased after 1994. The five year period (1992-1996) was divided into two: the period before the lawsuit (1992-1994) and after the lawsuit (1995-1996). Both groups' averages were calculated and it is noted that increases before the critical event is less than those after the lawsuit. The differences in disclosure results in different means which a t-test of independence found to be unrelated to a sampling error. It was a rigorous test ($\alpha=0.025$) with the t value at 2.0369. The observed t value was 3.765 with a 0.00037 probability of achieving a difference as those observed among the two periods.

Annual increases measured in number of pages also shows a continuous increase each year for MNCs in PNG. Those operating in Australia experienced a decline in 1995 although it increased the following year. There was a genuine difference between the two groups' disclosures as observed by their means. Therefore, the hypothesis which was set at null: that environment disclosure did not increase among Australian MNCs following Ok Tedi lawsuit, was rejected.

Given the above increased disclosure, further observation was necessary to determine whether the increased disclosure was temporary as the Exxon's spill example (Walden

and Schwartz, 1997) or permanent among the Australian MNCs in PNG. This inquiry was hypothesised as: *H₂. There is no difference in the average levels of disclosure for MNCs in PNG between 1995 and 1996.* A second rigorous t-test was conducted on the means of 1995 and 1996 with the same test with $\alpha = 0.025$ and the critical t value $t = 3.0369$. The observed t value was (0.9313) lower than the critical value. While there was a high probability ($p = 0.1793$) of attaining it, however, the t value was low. There was a significant difference between the two years as a result of pressure from society with disclosure persisting into the second year, which led to the rejection of the second hypothesis.

7. 4 Implications

The overall analysis of annual reports suggests that environmental disclosure is increasing among the Australian companies. The increase appears to be influenced by the publicity of the critical event during the period of study (Rosenabum and Krockenberg, 1996). For example, in 1992 studies were carried out by ACF in the Ok Tedi area which appears to influence the increases in environment reporting by MNCs in PNG. The findings of environment degradation by Ok Tedi were published in 1993 which stirred up protests and compensation negotiation in 1994 which eventually led to the issuing of the writ. This corresponds with the high disclosure in PNG during 1994-1995.

When the focus is directed at those in Australia, the MNCs reporting environment issues increased in 1995-1996. Two related events contributed to this increase. First, a well

publicised protest was held at BHP's annual meeting over the environmental issue affecting the Ok Tedi region in 1995. Second, a resolution was passed (early in 1996) supporting Melanesian peoples' draft on codes of conduct for Australian companies in Melanesia during the Consultation for Mining and Indigenous People's Conference held in London²³. Both CRA's involvement in Bougainville and BHP's involvement in the Fly River region were condemned. Such publicity appears to have influenced the increased disclosure in Australia for 1996.

Increased disclosure also demonstrates the application of legitimacy theory which this study draws on to explain the underlying reason for the increased disclosure. The mining industry is employing Lindblom's (1994) third approach of legitimacy theory to correct a threat against its existence. The other 3 approaches are discussed in chapter 4. Lindblom's third approach is a subtle and manipulative approach which involves the promoting of good news to deflect any contentious issue. Negative news will only be disclosed if there is a likelihood of the message leaking out to the public and/or the chance of facing external liability increases (Li et al, 1997). This is a common approach among Australian companies (Deegan, 1996).

Deegan and Gordon (1996) noted environmental reporting increased between 1983 and 1991. This study extends the observation from 1992-1996. Therefore, the establishment that environmental reporting among Australian companies has increased since 1992 fulfils this objective. However, it contradicts Fayers (1998) who claims that Australian

²³ Land Rights News, 1996.

environmental disclosure is minimal, ad hoc, unsystematic, subjective and predominantly self-laudatory. Fayers terms the current environment reporting as 'greenwash'. Since this study did not test for quality of disclosure, it cannot make quality assessment. Its test for quantity is consistent with Deegan and Gordon (1996). If the increase is influenced by the critical event, then the increase will decline like Exxon's experience. However, analysis of the subsequent period following the critical event reveals that disclosure continues to increase two years subsequent to the critical event to 1996.

Disclosure and Unregulated Economy

Increase in environmental disclosure surrounding the Ok Tedi lawsuit appears to correspond with the scrutiny. Although this is only an observation, it appears consistent with the literature that MNCs are reluctant to disclose more in an unregulated economy. The implication is, there is a need to regulate an environmental disclosure to bring out accountability and transparency among MNCs. This is because an essential factor in conventional accounting is that environmental degradation is due to the restriction current accounting practice places on accounting. It accounts only for monetary items at the exclusion of non monetary. Accounting has an important role as a strategy to monitor and control environmental disclosure when the non-financial reporting is promoted. It will be more informative because non-financial accounting is a more powerful form of discharging environmental accountability (Gray et al, 1993).

Companies will only increase their environmental disclosure when forced to by critical event. For instance, Patten's (1992) observation cited above shows how a critical event

(the oil spill) prompted an increased in environmental disclosure although it was only event and time specific (Walden and Schwartz, 1997). The Ok Tedi lawsuit impacts more as does the chemical industry after the Union Carbide's Bhopal incident. The entire chemical industry has been conducted differently as a result of the Bhopal incident (Wood, 1994). The chemical industry maintained their increased disclosure was partly due to a number of pieces of legislation passed subsequent to the incident.

The current approach of legislating whenever a critical incident occurs is a reactive approach. Whenever a crisis is experienced, those concerned react to counter it, preventing any legislation being proposed. If that strategy persists, then regulators need to prosecute more to induce greater care and increase environmental reporting. However, critical events may be fatal, such as those around the Poger mine where the impact of the mine have allegedly caused deaths (Kennedy, 1996). Any subsequent legislation may be too late and the impacts may even be adverse while awaiting for a critical event to prompt action. Regulators need to analysis the causes of critical events and legislate to deter any recurrence.

The more powerful the shareholders, the more companies have to adapt (Roberts, 1992) because the current demand for greater environmental disclosure is increasing. The pressure on corporations for environmental disclosure is considerable and still growing. Such demand places MNCs under close scrutiny in their environmental dealings and saves them litigation, liabilities as well as damaged public image (Gray et al,1993). A number of organisations are already implementing it for their own good.

7.5 Conclusion, Limitations & Suggestions

The general conclusions drawn in this section are based on the study objectives. Two suggestions are presented which could supplement the current PNG Environment Planning Act 1978, and the Environment impact Plan. However, the suggestions are subjected to several limitations.

Environmental disclosure which was reported as an increase in the above analysis is an important part of 'green' accounting. It will require firms to be more open and frank about their operations. The role of Environmental Accounting can be used as a strategy for monitoring environmental disclosure which will force the MNCs to increase their environmental reporting. This is because 'green' accounting has a potential to control, monitor and mitigate environmental degradation.

PNG (Developing country) context

Within the context of PNG, MNCs are 'engines of economic development or growth' (Jenkins, 1987). That is, MNCs bring into the country much needed capital to develop its resources, create job opportunities and 'eliminate poverty'. Sham (1995) reports that evidence in PNG shows that the MNCs' transfer of capital into PNG has boosted exports and earned foreign earnings. However, conflict arises when the MNC operations cause adverse impacts on the environment.

Environmental degradation is a common feature especially among raw material seekers (Anay and Cridder, 1996) because they modify the environment they operate in (Hackston and Milne, 1996). Unsustainable logging destroys fauna, and rare species of bio-diversity of flora (Greenpeace International, 1996). Drinking water is contaminated from sawdust, oil, fuel and toxic preservatives such as arsenic, chromium, boron and dieldrin used for dipping logs (Eaton, 1986). Mine development results in forests logged, roads and tunnels built with tonnes of mined dirt dumped into rivers used for drinking and washing and obstructs river transportation (Rosenbaum, 1995).

Such degradation creates animosity between foreign companies and local communities. Those affected may even gain enough external support to apply pressure on the MNC and sue it (like Ok Tedi mine) or disrupt operations (Paguna mine). Since the MNCs bring benefits in creating employment, transfer technology, earn export earnings and service debt; conflicts ought to be avoided. However, the problem of degradation cannot be ignored as it affects many communities in the country.

Suggested Approaches

Environmental degradation is avoidable if the MNCs implement their EPs effectively. Each project has an EP drawn up before the project is commissioned and all it needs is implementation, regular monitoring and reporting. It appears that EPs are not implemented effectively since policing them is lacking in PNG. This study approaches the environmental degradation issue from an accounting perspective. The suggestion is

for all MNCs to incorporate their EPs into their accounting records, maintain their bookkeeping, conduct regular EIA and include these reports in their annual financial statements.

The study itself is timely. The AICA is currently developing the accounting language in Australia to accommodate the public demand for environmental reporting (EAFT, 1996). The suggestion of incorporating environmental impact plans into corporate accounting records will require a conceptual framework and the guidelines being developed by AICA. Therefore the focus of this study is to investigate whether MNCs are currently incorporating environmental concerns into their accounting records to address environmental degradation and provide detailed disclosure on environmental issues to meet current public demand. This is because although major projects in PNG are required to lodge environmental impact plans before they are commissioned, the country still experiences environmental degradation. It appears that there are limited attempts to implement environmental impact plan into accounting records because environmental reporting, although it increased compared to Deegan and Gordon (1996), was prompted more by the critical event as observed.

Environmental accounting is being implemented in different countries. The Australian Institute of Chartered Accountant (AICA) is drawing up a conceptual framework with guidelines to assist its members to implement it in Australia. This study proposes two approaches as part of the environment accounting strategy:

1. conduct an eco-audit to ensure that EPs are implemented. An eco-audit will also ensure that the environment report in the financial statements are reliable. US Single

Audit Act (SAA) requires independent attestation of environment reports to ensure that EPA requirements are adhered to (Freedman, 1998). Proponents of SAA claim that voluntary disclosure does not provide meaningful environment information (Sutton and Arnold, 1998).

2. use an environment excellence award to reward those who make the effort as well as challenge others. Both approaches are meant to be used concurrently to address and mitigate environmental issues.

The next question is policing because the EPs are not effectively implemented as required by the Environment Planning Act 1978. Lack of effective implementation is due to the DEC's lack of resources to enforce it. There are two offices that can police it. First is the company registrar's office which requires all companies to lodge their annual reports. This office can ensure that environmental disclosure is part of every annual report. Second is the PNG stock exchange which can require environmental disclosure as a requirement for listing. While it may be argued that only large corporations will comply with the stock exchange requirement, the current environment degradation is already size related. Therefore it will at least minimise the extensive environment damages now prevalent with large projects in PNG.

This study suggests that environmental impact plans be incorporated into the MNCs' accounting records. This can be implemented during the period of operation. It will mutually benefit the MNCs and the host country. Host country(ies) will experience a sustainable economic growth while the MNCs save in liability charges. As Anand (1993)

warns, many investors may have an unpleasant surprise when their litigation charges catch up with them.

Limitations and Further Research

The above conclusions are subject to several limitations. Firstly, the study is confined to only four industries and inferences may not be valid for other industries. This is especially so when the environmental disclosure is industry related. It is suggested that other studies be conducted into other industries for comparison. Even the annual reports analysed are all of Australian companies. This raises the question about making inferences to other MNCs in PNG. An alternative study may seek to analyse MNCs in the same (four) industries which originate from other developed countries to determine if MNCs from other countries are complying with their own environmental laws.

Secondly, validity may be affected by errors in categorising of environment features, inaccurate coding and omissions in quantifying actual disclosure. This is because content analysis, although widely employed is subjective.

Thirdly, addressing environmental issue raises further questions about the governance of MNCs that operate in a multilateral context. MNCs' boundary of operations is 'non existing', therefore no single country is able to effectively regulate their activities (UN, 1991).

This does not mean the issue can be ignored because developing countries like PNG will continue to experience adverse impacts from the MNCs operations. The suggestion of

incorporating EP is not stringent, yet it is timely, when environment issue is being addressed globally. Given the potential accounting has, environmental impact will be able to monitor and control to mitigate its impact.

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Appendix: Tables

Source of Applications & Total Value of Investments

Table 2-1

Investing Country	Number of Applications				Total Proposed Investment Values			
	July'92-1993	1994	1995	Total	July'92-93	1994 (000)	1995 (000)	Total (000)
					(*)			
Australia	245	113	74	432	0	455 500 000	515 750 000	971 250 000
Austria	1	1	0	2	0	250 000	0	250 000
Canada	3	2	0	5	0	6 600 000	0	6 600 000
Bahamas	0	0	1	1	0	0	820 000	820 000 000
Bermuda	2	0	0	2	0	0	980	980 000
British Virgin Islands	1	1	0	2	0	0	4 000	4 000 000
China	10	9	5	24	0	7 500 000	12 580	20 080 000
France	2	0	1	3	0	0	410	410 000
Germany	1	2	1	4	0	100 000	1 000	1 100 000
Hong Kong	7	9	5	21	0	30 700 000	119 100	149 800 000
India	5	1	1	7	0	50 000	270	320 000
Indonesia	2	3	1	6	0	0	2 510	2 520 000
Israel	0	0	1	1	0	0	17 000	17 000 000
Japan	7	6	2	15	0	267 100 000	750	267 850 000
Malaysia	45	42	38	125	0	253 000 000	641 060	894 060 000
Netherlands	5	1	2	8	0	200 000	1 440	1 640 000
New Zealand	13	11	4	28	0	790 000	11 800	12 590 000
Philippines	6	2	3	11	0	0	10 200	10 200 000
Russia	0	1	0	1	0	10 000	0	10 000
Singapore	8	14	10	32	0	52 500 000	201 400	253 900 000
South Korea	6	7	3	16	0	4 000 000	2 000	6 000 000
Switzerland	3	2	0	5	0	400 000	0	400 000
Taiwan	0	2	2	4	0	2 500 000	3 600	6 100 000
UK	23	12	9	44	0	20 800 000	9 710	30 510 000
USA	24	13	6	43	0	240 410 000	80 820	321 230 000
Vanuatu	1	1	1	3	0	300 000	0	300 000
Total	420	255	170	845	1257860000	1342710000	2456380	3799090000

(*) Individual figures not available

Table 2-2. Export Value of Commodity (Km)

Export Share Percentage (%)

Commodity	1991	1992	1993	1994	1995	1991	1992	1993	1994	1995
Minerals & Oli	1,005	1,372	1,768	1,783	2,435	72.3	73.6	69.9	67.0	71.7
Gold	667	746	682	702	840	48.0	40.0	27.0	26.4	24.7
Copper	324	314	256	367	755	23.3	16.8	10.1	13.8	22.2
Silver	15	11	12	10	13	1.0	0.6	0.5	0.4	0.4
Oil	0	301	818	703	828	0.0	16.2	32.4	26.4	24.4
Agriculture	205	224	270	375	498	14.7	12	10.7	14.1	14.7
Coffee	80	68	101	205	215	5.7	3.7	4	7.7	6.3
Cocoa	34	34	33	29	48	2.4	1.8	1.3	1.1	1.4
Copra	5	12	14	15	27	0.4	0.6	0.6	0.6	0.8
Copra Oil	13	24	20	20	30	0.9	1.3	0.8	0.8	0.9
Palm Oil	53	64	79	78	142	3.8	3.4	3.1	2.9	4.2
Rubber	2	2	3	3	4	0.1	0.1	0.1	0.1	0.1
Tea	5	7	7	4	5	0.4	0.4	0.3	0.2	0.2
Other	14	13	14	21	27	1.0	0.7	0.5	0.8	0.8
Forestry	90	148	410	494	450	6.5	8	16.2	18.6	13.2
Logs	81	140	400	483	437	5.8	7.5	15.8	18.1	12.9
Other	9	8	10	11	13	0.6	0.4	0.4	0.4	0.4
Marine	10	9	8	11	14	0.7	0.5	0.3	0.4	0.4
Re-Export	80	110	71	0	0	5.8	5.9	2.8	0	0
Total	1,391	1,863	2,527	2,663	3,397	100	100	100	100	100

Adapted from AusAid Report 1996, 128-129.

Table 2-3. Employment By Sector 1996

Sector	First Qtr	Second Qtr	Third Qtr	Fourth Qtr	Total
Agriculture	76	120	0	0	196
Business Activities	9	0	110	175	294
Construction	18	18	10	0	46
Forestry	0	0	70	0	70
Health	0	0	29	0	29
Hotels & Restaurants	0	64	7	7	78
Manufacturing	26	11	15	4	56
Mining	0	0	0	17	17
Petroleum	0	0	0	0	0
Social Services	0	0	12	0	12
Real Estate	36	8	78	43	165
Transportation	0	0	923	0	923
Wholesale & Retail	10	0	68	10	88
Total	175	251	1,322	256	2004

Compiled from IPA Quarterly Reports 1996

Table 2-4 Methods of Disposal of Tailings for Existing and New Mines

Mine (Life)	Method of Disposal	Tonnage per Day	Systems Affected
<u>Existing</u>			
Panguna	Riverine	135 000	Jaba River
Ok Tedi (21)	Riverine	80 000	Ok Tedi/Fly River Systems
Pogera: Deep (7) Open (16)	Some back fill, most Riverine Riverine	17 700 in total for both mines	Strictland River down to Fly River
Misima (10)	Marine & old pits	18 000	Marine
Lihir (37)	Submarine 125 metres below sea level	7 740 design capacity expendable to 15 000	Marine
<u>New Mines</u>			
Tolukuma (7)	Back fill and Riverine	200 each	Angabanga River
Wapolu (5)	Tailing Dam with silt curtain to hold run-off	1 400	Wapolu Island

Table 2-5. Applications, Investments & Employment

Economic Sector	Number of Applications	Proposed Investment Values	Number Employed
	July 1992-1995	July 1992-1995	July 1992-1995
Agriculture	31	668 200 000	7566
Banking & Finance	34	13 130 000	46
Business Activities	89	259 640 000	2358
Construction	54	216 560 000	1035
Education	1	0	0
Electricity	1	0	0
Fishing	8	5 000 000	1000
Forestry	58	597 920 000	4248
Health	9	0	0
Hotels & Restaurants	24	56 010 000	228
Insurance	1	0	0
Manufacturing	107	141 920 000	1279
Mining & Quarrying	76	2087 000 000	2244
Petroleum	16	201 870 000	704
Publishing	1	0	5
Recreational & Sports	0	0	0
Real Estate	151	66 990 000	172
Social Services	17	1 730 000	83
Transport, Storage and Communication	34	287 700 000	96
Wholesale & Retail	146	37 750 000	396
Total	858	4384 120 000	17 757

Adapted from IPA Certification Report 31st March 1996, 16.

Table 5-1. MNCs Country of Origin & Number of Applications Accepted to Operate in PNG

Investing Country	Jul-93	1994	1995	1996	Total
Australia	245	113	74	72	504
Austria	1	1	0	0	2
Canada	3	2	0	2	7
Bahamas	0	0	1	1	2
Bermuda	2	0	0	1	3
British Virgin Islands	1	1	0	0	2
China	10	9	5	6	30
Cook Islands	1	0	0	0	1
Denmark	0	0	1	0	1
Fiji	1	0	0	0	1
Finland	0	0	0	1	1
France	2	0	1	1	4
Germany	1	2	1	0	4
Hong Kong	7	9	5	6	27
India	5	1	1	5	12
Indonesia	3	2	1	2	8
Italy	2	0	0	1	3
Israel	0	0	1	1	2
Japan	7	6	2	1	16
Liechtenstein	2	0	0	0	2
Malayan	2	0	0	0	2
Malaysia	45	42	38	20	145
New Zealand	13	11	4	3	31
Netherlands	5	1	2	1	9
Pakistan	0	1	0	2	3
Philippines	6	2	3	4	15
Russia	0	1	0	0	1
Singapore	8	14	10	8	40
Slovenia	0	1	0	0	1
South Korea	6	7	3	2	24
Sri Lanka	1	0	0	1	2
Switzerland	3	2	0	0	5
Taiwan	0	2	2	2	6
Tanzania	1	0	0	0	1
United Kingdom	23	12	9	10	58
USA	24	13	6	12	55
Vanuatu	1	1	1	1	4
TOTALS:	430	257	171	87	945

Table 5-2. Foreign MNCs in the Different PNG Business Sectors by Countries

Activity	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Total
Agriculture									1								1
Business Activities	6				1			1				1			3	2	14
Construction	1					1				1							3
Financial Institutions				1					1								2
Forestry	2								3				1				6
Health							1				1			1			3
Hotels & Restaurants	1		2										1				4
Manufacturing	1					1							2			1	5
Mining & Quarry	6				1												7
Social Services									1				1				2
Petroleum	1															1	2
Real Estate	7								2		1		1				11
Transport, Storage	3	1							1			2			1	1	9
Wholesale & Retail	11		1			1			3			2					18
Total	39	1	3	1	2	3	1	1	12	1	2	5	6	1	4	5	87

A=Australia

B=Bahamas

C=China

D=France

E=Hong Kong

F=India

G=Indonesia

H=Israel

I=Malaysia

J=New Zealand

K=Pakistan

L= Singapore

M= South Korea

N=Sri Lanka

O=United Kingdom

P= United States of America

Adapted from IPA Certification Report 30th September 1996, 8.

Table 5-3. Value of Proposed Investment by Countries for the year ending 31st December, 1996.

Country	First Qtr	Second Qtr	Third Qtr	Fourth Qtr	Total
Australia	5 110 000	29 372 109	325 100 586	105 503 953	465 086 648
Bahamas	0	0	820 000 000	0	820 000 000
Belgium	0	0	0	5 100 000	5 100 000
British Virgin Is.	0	0	0	190 000	190 000
Canada	0	5 000 000	0	0	1 318 500
China	0	105 727 328	19 000 000	18 430 000	143 157 328
France	0	0	0	0	0
Hong Kong	0	1 200 000	0	0	1 200 000
India	0	0	1 175 000	0	1 175 000
Indonesia	0	0	72 515	0	72 515
Italy	0	600 000	0	0	600 000
Japan	0	0	0	0	0
Malaysia	11 880 000	11 800 000	158 653 000	0	5 640 000
Netherlands	0	0	0	0	0
New Zealand	0	100 000	300 000	60 000	460 000
Pakistan	0	0	2 000 000	0	2 000 000
Philippine	1 250 000	0	0	319 800	1 569 800
Singapore	300 000	20 217 157	3 780 000	4 154 000	28 451 157
South Korea	0	510 000	127 747 000	627 350	128 884 350
Taiwan	0	0	0	0	0
United Kingdom	350 000	156 000	577 772	30 000	1 273 772
USA	0	500 000	13 300 000	325 900 000	339700000
Vanuatu	1 300 000	80 000	0	0	1 380 000
Total	20 190 000	175 262 594	1472 205 873	467 273 603	1 482 172 422

Table 5-4 Responses of Companies Contacted

Companies	No.	P/N	*	Reports for these Years: 1=Rep 0=N-Rep.				
Australian MNCs		C	~	1992	1993	1994	1995	1996
Acacia Resources	1	N	~Address	0	0	0	0	0
Adelaide Brighton	2	P	*	1	1	1	1	1
Allgas Energy Ltd	3	N	*	0	1	1	1	1
Amalgamated Holdings	4	N	*	1	0	0	1	1
Amcor Limited	5	N	*	1	1	1	1	1
Ampolex Limited	6	P	*	0	1	1	1	1
Arnotts Limited	7	P	*	0	1	1	1	1
Ashton Mining	8	N	*	1	1	1	1	1
Astro Mining NL	9	P	*	0	0	0	1	1
Auridim Consolidated	10	P	*	1	1	1	1	1
Aurora Gold Mine	11	N	*	0	1	1	1	1
Auspine Limited	12	N	~					
Australian Chemical	13	P	~					
Australian Gas Light	14	N	*	1	1	1	1	1
Australian Gold Resou	15	N	*					
Australian National Ind	16	P	*	1	1	1	1	1
Beach Petroleum NL	17	P	~Address	0	0	0	0	0
Biota Holdings Limited	18	N	*	1	1	1	1	1
Boral Limited	19	P	*	1	1	1	1	1
Bouganville Copper	20	P	*	1	0	0	0	1
Brambles Industries	21	N	*	1	1	1	1	1
Bridge Oil Limited	22	P	~Address					
Bridgestone Limited	23	N	*	0	0	0	1	1
BHP Limited	24	P	*	1	1	1	1	1
Buderim Ginger Ltd	25	P	*	1	1	1	1	1
Burns Philp & Co. Ltd	26	N	*	1	1	1	1	1
Caltex Australia Ltd	27	P	*	0	0	0	0	1
Camelot Resources	28	P	~					
Carpenters Pacific Res	29	P	~					
Choiseul Investments	30	N	*	1	1	1	1	1
Coca Cola Amatail	31	P	*	1	1	1	1	1
Command Petroleum	32	P	*	1	1	1	1	1

Table 5-4 cont. Responses of Companies Conatacted

Companies	No.	P/N	*	Reports for these Years:				
				1992	1993	1994	1=Rep 0=N-Rep.	1996
Australian MNCs		C	~					
CRA Limited	33	P	~					
CSR Limited	34	N	*	1	1	1	1	1
Coal & Allied Industries	35	N	~Address	0	0	0	0	0
Comalco Limited	36	P	*	1	1	0	1	1
Coplex Resources	37	P	*	1	1	1	1	1
Davids Limited	38	N	*	0	0	1	1	0
Delta Gold NL	39	N	*	1	1	1	1	1
Devex Limited	40	P	*=C					
Eagle Mining Corp.	41	N	~					
Email Limited	42	N	*	1	1	1	1	1
Energy Developments	43	N	*	1	0	1	1	1
Energy Equity Corp.	44	N	*	1	1	1	1	1
Evans Deakins Ind.	45	P	~					
Fletcher Challenge Ltd	46	P	~Address	0	0	0	0	0
Foodland Associated	47	N	*	1	1	0	1	1
Foster Brewing Group	48	N	*	1	1	1	1	1
Gibson Chemical Ind	49	P	*	0	1	1	1	1
Goodman Fielder Ltd	50	P	*	0	1	0	1	1
Great Central Mines	51	N	*	0	0	1	1	1
Harvey Norman Holding	52	N	*	1	1	1	1	1
Highlands Gold Ltd	53	P	*	1	1	1	1	1
Howard Smith Limited	54	P	*	1	1	1	1	1
Hudson Conway Limited	55	N	*	0	0	0	0	0
ICI Australian Limited	56	P	*	1	0	1	1	1
Incite Limited	57	P	*	1	1	1	1	1
Ipoh Limited	58	N	~					
James Hardie Indus.	59	P	*	1	1	1	1	1
John Fairfax Holdings	60	N	*	1	0	0	0	0
Kalamazoo Holdings	61	N	*	1	1	1	1	1
Kidston Gold Mines	62	P	~					
Lang Corporation Ltd	63	N	*	0	0	0	0	0
Macraes Mining Co	64	P	*	0	0	0	1	1

Table 5-4 cont. Responses of Companies Conatacted

Companies	No.	P/N	*	Reports for these Years:				
				1=Rep 0=N-Rep.				
Australian MNCs		C	~	1992	1993	1994	1995	1996
Manettas Limited	65	P	~					
Metal Corporation Ltd	66	N	*Misun.	0	0	0	0	0
Metal Manufacturers	67	N	~					
Mildara Blass Limited	68	P	*=C	0	0	0	0	0
MIM Holdings Ltd	69	P	*	1	1	1	1	1
Mulpha Australian Ltd	70	P	*=C	0	0	0	0	0
National Foods Limited	71	N	*	1	1	1	0	1
National Consolidation	72	N	*	1	1	1	1	1
National Can Industries	73	N	~					
Newcrest Mining Ltd	74	P	~					
Niugini Mining Limited	75	P	~					
Normady Poseidon Ltd	76	P	*=C	0	0	0	0	0
Novus Petroleum Ltd	77	N	*	0	0	0	1	1
NZ Oil and Gas Ltd	78	P	*	1	1	1	1	1
Oil Search	79	P	~					
Pacific BBA Limited	80	N	*	1	1	1	1	1
Pacific Dunlop Ltd	81	P	*	1	1	1	1	1
Petroz NL	82	N	*	0	0	1	1	1
Pioneer International	83	N	*	1	1	1	1	1
Placer Dome Inc.	84	P	*	1	1	1	1	1
Placer Pacific Limited	85	P	*	1	1	1	1	1
Poseidon Gold Limited	86	P	*=C	0	0	0	0	0
P&O Containers	87	P	*	0	0	0	1	1
Qantas Airways Ltd	88	N	*	0	0	1	1	1
QNI Limited	89	N	*	0	1	1	1	1
Queensland Metal Ind.	90	N	*	1	1	1	1	1
QUF Industries Ltd	91	N	*	1	1	1	1	1
Ramsgate Resources	92	P	*	1	1	1	1	1
Rension Goldfields	93	P	*	1	1	1	1	1
Resolute Samantha	94	N	*	1	1	1	1	1
Rhodes Mining NL	95	P	*	1	1	1	1	1
Ross Mining Limited	96	N	*	0	0	1	1	1
Rothmans Holdings	97	P	*	1	1	1	1	1
SA Brewery	98	N	*	1	1	0	0	0
Samantha Gold NL	99	N	*	1	1	1	1	1

Table 5-4 cont. Responses of Companies Contacted

Companies	No.	P/N	*	Reports for these Years: 1=Rep. 0=N-Rep.				
				1992	1993	1994	1995	1996
Australian MNCs		C	~					
Sagasco Resources	100	P	*	1	1	1	1	1
Santos Limited	101	P	*	1	1	1	1	1
Savage Resources	102	N	*	1	1	1	1	1
Siddon Ramset Ltd	103	N	*	1	1	1	1	1
Skilled Engineering Ltd	104	N	*	0	0	1	1	1
Sonic Healthcare Ltd	105	N	*	1	1	1	1	1
Southcorp Holdings	106	N	*	0	0	1	1	1
Spicers Paper Limited	107	N	*(1989-91)	0	0	0	0	0
Tap Oil NL	108	N	~					
Thankral Holdings Ltd	109	N	*	0	0	1	1	1
Ticor Limited	110	N	*	0	0	1	1	1
Union Mining NL	111	P	*Website	0	0	0	0	0
United Construction	112	N	*	0	0	0	1	1
Valdora Minerals NL	113	P	~Address	0	0	0	0	0
Village Roadshow Ltd	114	N	~					
W.D. & H.O. WHM	115	P	*	1	1	1	1	1
Westfarmers Limited	116	P	*	0	1	1	1	1
Wiluna Mines Ltd	117	P	~					
Woodside Petroleum	118	N	*	1	1	1	1	1
Colesmayer	119	N	*	0	0	0	0	0

Keys:

P=Companies that operate in PNG

*= Companies which responded to letters sent out

N=Companies which do not operate in PNG

~=Companies which did not respond

C=Companies that ceased operations their

~Address = letter returned to sender

in PNG

*Website = companies provided website address only

1=An Annual Report received for that year

0=No Annual Report received for that year

1992-1996

1992-1997

TotalExpectedAnnualReports 119x5

Actually Received

347

0.583

0.58

Actually Received

394

95 companies responded

0.798

0.80

Table 5-4P. Australian MNCs Operating in PNG

Companies	Industry	Companies	Industry
Highlands Gold Ltd, HLG	Mining	NZ Oil and Gas Limited ,NZO	Oil
Newcrest Mining Ltd, NCM	Mining	W.D. & H.O. Wills, WHW	Oil
Placer Pacific Ltd, PLP	Mining	W.D. & H.O. Wills, WHW	Manufacturing
Comalco Limited, CMC	Mining	Arnott's Limited, ARN	Manufacturing
CRA Limited, CRA	Mining	Coca Cola Amatil, CCL	Manufacturing
MIM Holdings Ltd, MIM	Mining	Goodman Fielder Waite, GMF	Manufacturing
Renison Goldfields, RGC	Mining	Rothmans Holdings Ltd, RTH	Manufacturing
Broken Hill Proprietary Ltd,BHP	Mining	Gibson Chemical Industries	
Niugini Mining Ltd, NML	Mining	Limited, GCI	Manufacturing
Bougenville Copper Ltd, BOC	Mining	Boral Limited, BOR	Forestry
Devex Limited, DEV	Mining	ICI Australian Limited, ICI	Forestry
Placer Dome Inc, PDG	Mining	Pacific Dunlop Limited, PDP	Forestry
Ampolex Limited, AMX	Oil	Howard Smith Limited, SMI	Forestry
Rothmans Holdings Ltd, RTH	Oil	Australian National Industries	Forestry
Santos Limited, STO	Oil	Evans Deakin Industries LTD	Forestry
Command Petroleum Hold. NI	Oil	James Hardie Industries LTD	Forestry

Table 5-4A. Australian MNCs Operating in Australia to Compare with those in Table 5-4P

Companies	Industries	Companies	Industries
Allgas Energy Limited	Oil & Gas	Amalgamated Holdings	Others
Aurora Gold Mine	Mining	Auspine Limited	Forests
Amcor Limited	Forests	Australian Gold resources	Mining
Ashton Mining	Mining	Brambles Industries Ltd	Others
Bridgestone Limited	Manufacturing	Burns Philp & Co. Ltd	Manufacturing
C.S.R. Limited	Forests	Caltex Australia Limited	Oil & Gas
Choiseul Investments	Others	Delta Gold N.L.	Mining
Email Limited	Manufacturing	Energy Developments Ltd	Oil & Gas
Foster Brewing Group	Manufacturing	Kalamazoo Holdings Ltd	Others
Metal Manufacturers	Manufacturing	National Consolidation Ltd	Others
National Can Industries	Forests	Pioneer International Ltd	Forests
Qantas Airways Ltd	Others	QUF Industries Limited	Manufacturing
Resolute Samantha	Mining	Siddon Ramset Limited	Manufacturing
Skilled Engineering L	Others	Southcorp Holdings Ltd	Others
Ticor Limited	Mining	Woodside Petroleum Ltd	Oil & Gas

Table 5-5. Preliminary Survey Summary of Environmental Disclosure of Sample MNCs

		1=disclose Env. Report	0= Did not Disclose En. Rep.	2=Did not respond	
Number of Companies	1/0/2	Number of Companies	1/0/2	Number of Companies	1/0/2
1	2	41	2	81	1
2	1	42	1	82	1
3	1	43	1	83	1
4	1	44	1	84	1
5	1	45	2	85	1
6	1	46	2	86	2
7	1	47	2	87	0
8	1	48	1	88	1
9	1	49	1	89	1
10	1	50	1	90	1
11	1	51	1	91	1
12	2	52	0	92	1
13	2	53	2	93	1
14	1	54	1	94	1
15	2	55	2	95	1
16	1	56	1	96	1
17	2	57	1	97	1
18	0	58	2	98	1
19	1	59	1	99	1
20	1	60	1	100	2
21	1	61	1	101	1
22	2	62	2	102	1
23	1	63	2	103	1
24	1	64	1	104	1
25	1	65	2	105	0
26	1	66	2	106	1
27	1	67	2	107	2
28	2	68	2	108	2
29	2	69	1	109	1
30	0	70	2	110	1
31	1	71	1	111	2
32	1	72	1	112	1
33	2	73	2	113	2
34	1	74	2	114	2
35	2	75	2	115	1
36	1	76	2	116	1
37	1	77	1	117	2
38	0	78	1	118	1
39	1	79	2	119	0
40	2	80	1		

Table 6-1 Disclosure By Size-Sales, T. Assets & Profitability				
Co. No.	Sales	T. Assets	Profitability	Disclosure
84	994200000	2422200000	66400000	5276
5	5500960000	5818000000	317100000	4246
16	1532040000	1532260000	-15540000	4148
85	544123400	789088200	63996000	4110
93	693987400	1366270800	41510400	3777
24	1.673E+10	2.8581E+10	1051000000	3558
90	25395637	117927183	-598966.7	2987
69	51480000	4.5156E+10	-25380000	2864
36	2138280000	2529920000	152720000	2563
19	3773642400	5359613200	243854600	2530
57	617003400	433109600	161893800	2362
34	5298160000	6758940000	169160000	2331
21	2735400000	3098240000	71360000	2236
101	682160000	2985180000	165780000	1898
14	834387800	1330819600	87507200	1882
83	3696440000	4050720000	232340000	1736
92	10707165.2	8950412.4	-2650050.4	1574
43	13106000	91006500	3997750	1485
56	3097440000	1681220000	167540000	1422
96	43222666.7	47750800	7779600	1413
6	5.6397E+10	4.2276E+10	5273333.3	1409
89	290530500	456205600	48724000	1409
118	565925800	315662000	325497600	1264
11	75246250	138527400	-1040800	1259
116	997602203	1746894750	116189250	1089
81	6570929400	6416380400	150799000	1078
39	71031800	167451400	4628000	1062
91	437063600	273297200	12503000	989
80	404060400	450974400	16135400	805
25	17141800	19668200	1214400	789
115	946340000	488585250	23533750	761
49	3899340000	3078840000	55480000	732
102	117894779	385503602	1210660	700
42	177843200	1200432400	70746600	690
26	2360500000	2895080000	86129400	653
103	117894779	385503602	1210660	584
8	211336200	674228200	26841400	584
59	1575720000	1748780000	36540000	565
64	80004600	217182600	8880000	548
32	15005400	91707600	-6896800	543
78	14268071.6	75484431.4	-6245156.8	475
71	896000000	546478667	31300000	454
31	2594241800	3831747600	115966600	403
106	2364128750	2375010000	90170750	377

Table 6-1 Cont. Disclosure by Size: Sales, T.Assets and Profitability

77	94348500	241292000	16321500	376
51	3899340000	3078840000	5917868.5	372
110	273817500	647405250	-11315000	365
82	33450000	48872000	3982750	333
60	780782200	1891491800	100657000	325
104	190538250	55328000	7820000	321
72	421361200	363422600	-76222200	302
99	92131644.2	185220485	17272966.4	287
97	1549399800	703203000	57635200	267
88	104000000	8192020000	68780000	264
3	75071946.8	72390503	6645205.2	263
10	80814112.4	20449396.4	68602.6	244
48	2704801600	4339213000	25888000	220
54	1378880000	1088980000	60880000	200
50	3899340000	3078840000	55840000	185
44	8036344.6	76148498	1929596.4	174
2	335275800	694486000	2333000	173
94	91914400	151431533	136432136.6	162
23	475732000	262246500	15502500	123
20	4460000	268840000	3320000	80
112	171755000	62032000	5084000	69
4	244533000	404970333	31756000	69
9	25411565.3	2548156.67	382579	58
109	111850000	4845900000	10595333	55
37	105392865	66463769.4	42654117	48
95	1059524.5	3682338.6	-188953	31
7	657244750	526943000	61975250	25
98	2157239000	2181723500	116368000	19

Table 6-5**Environmental Disclosure Before and After 1994**
(word count per MNC per annum)

MNCs in Australia						MNCs in PNG					
Co.No.	1992	1993	1994	1995	1996	Co. No	1992	1993	1994	1995	1996
5	898	1236	564	322	1226	7	0	0	0	25	0
90	754	1099	881	109	144	95	0	0	0	0	31
21	441	257	548	410	580	37	0	0	0	0	48
34	592	626	590	90	433	9	0	0	0	0	58
83	427	371	327	97	517	20	18	46	0	0	16
14	403	246	29	593	561	2	31	39	103	0	0
43	562	11	227	4	681	54	0	28	36	18	118
96	0	0	27	426	960	50	0	33	0	73	79
11	0	140	326	286	401	10	0	74	0	134	36
118	130	413	481	16	208	97	141	0	72	54	0
89	37	177	329	353	513	31	0	82	124	85	112
86	112	100	190	181	222	78	30	0	97	158	190
91	204	242	143	140	260	59	88	245	28	27	177
39	56	215	344	259	188	64	0	0	0	269	279
8	83	90	65	147	199	32	30	130	13	178	192
103	111	63	153	52	206	25	186	73	258	106	166
26	178	76	26	231	142	115	0	0	17	127	578
42	119	198	95	238	50	49	70	209	187	0	266
102	31	69	112	295	193	116	0	209	186	199	414
71	122	113	98	26	117	81	356	246	39	69	418
99	92	41	0	3	151	6	122	133	0	315	839
72	0	0	93	65	144	56	405	489	102	351	123
104	0	0	0	222	99	92	338	48	481	447	261
60	0	0	0	151	174	101	257	104	195	493	849
82	0	0	0	167	167	36	340	370	64	957	832
110	0	0	107	141	117	19	229	411	678	932	380
51	0	0	18	46	308	57	471	383	878	265	365
77	0	0	0	151	225	69	409	346	515	648	946
106	0	0	100	81	196	84	576	1311	582	1478	1329
3	0	114	57	0	92	16	459	1550	817	792	1104
88	53	0	64	147	0	93	551	343	787	847	1249
48	81	49	19	41	30	24	368	154	601	895	1240
44	0	0	0	34	140	85	663	734	817	1508	388
94	0	5	3	46	108						
23	0	0	0	46	77						
112	0	0	0	25	44						
4	0	0	0	0	69						
109	0	0	0	0	55						
98	0	19	0	0	0						
Total:	5486	5970	6016	5641	9997		6138	7790	9671	11450	13083
Average	140.67	153.08	154.26	144.64	256.33		186.00	236.06	293.06	346.97	396.45
StdDev	228.44	276.55	210.08	140.62	261.22		208.62	355.86	297.32	426.00	411.58

Table 6-10c. Disclosure by Sample MNCs that operate in PNG:

Co. No	1992	1993	1994	1995	1996	Increase/ Decrease	Total Avg	Before Avg	After Avg
7	0	0	0	25	0	Decrease	5.00	0.00	12.50
95	0	0	0	0	31	Increase	6.20	0.00	15.50
37	0	0	0	0	48	Increase	9.60	0.00	24.00
9	0	0	0	0	58	Increase	11.60	0.00	29.00
20	18	46	0	0	16	Increase	16.00	21.33	8.00
2	31	39	103	0	0	0	34.60	57.67	0.00
54	0	28	36	18	118	Increase	40.00	21.33	68.00
50	0	33	0	73	79	Increase	37.00	11.00	76.00
10	0	74	0	134	36	Decrease	48.80	24.67	85.00
97	141	0	72	54	0	Decrease	53.40	71.00	27.00
31	0	82	124	85	112	Increase	80.60	68.67	98.50
78	30	0	97	158	190	Increase	95.00	42.33	174.00
59	88	245	28	27	177	Increase	113.00	120.33	102.00
64	0	0	0	269	279	Increase	109.60	0.00	274.00
32	30	130	13	178	192	Increase	108.60	57.67	185.00
25	186	73	258	106	166	Increase	157.80	172.33	136.00
115	0	0	17	127	578	Increase	144.40	5.67	352.50
49	70	209	187	0	266	Increase	146.40	155.33	133.00
116	0	209	186	199	414	Increase	201.60	131.67	306.50
81	356	246	39	69	418	Increase	225.60	213.67	243.50
6	122	133	0	315	839	Increase	281.80	85.00	577.00
56	405	489	102	351	123	Decrease	294.00	332.00	237.00
92	338	48	481	447	261	Decrease	315.00	289.00	354.00
101	257	104	195	493	849	Increase	379.60	185.33	671.00
36	340	370	64	957	832	Decrease	512.60	258.00	894.50
19	229	411	678	932	380	Decrease	526.00	439.33	656.00
57	471	383	878	265	365	Increase	472.40	577.33	315.00
69	409	346	515	648	946	Increase	572.80	423.33	797.00
84	576	1311	582	1478	1329	Decrease	1055.20	823.00	1403.50
16	459	1550	817	792	1104	Decrease	944.40	942.00	948.00
93	551	343	787	847	1249	Increase	755.40	560.33	1048.00
24	368	154	601	895	1240	Increase	651.60	374.33	1067.50
85	663	734	817	1508	388	Decrease	822.00	738.00	948.00

Rests of Tests Based on Table 6-10c,

Results of T-Test		for the:			
	Total:	Period	Before and	Period	After:
Mean	279.62	Mean	218.23	Mean	371.71
Standard	51.65	Standard	45.13	Standard	67.90
Error		Error		Error	
Median	146.40	Median	120.33	Median	237.00
Mode	#N/A	Mode	0	Mode	948.00
Standard	296.68	Standard	259.23	Standard	390.06
Deviation		Deviation		Deviation	
Sample	88018.8	Sample	67200	Sample	152144.
Variance	5	Variance		Variance	36
Kurtosis	0.48	Kurtosis	1.20	Kurtosis	0.08
Skewness	1.20	Skewness	1.40	Skewness	1.08
Range	1050.20	Range	942	Range	1403.50
Minimum	5.00	Minimum	0	Minimum	0.00
Maximum	1055.20	Maximum	942	Maximum	1403.50
Sum	9227.60	Sum	7201.7	Sum	12266.5
					0
Count	33.00	Count	33	Count	33.00
Confidence	105.20	Confidence	91.92	Confidence	138.31
Level(95.0%)		Level(95.0%)		Level(95.0%)	

Table 6-11 Comparison of Positive (Good) News and Negative (Bad) News

Positive/Good News			Negative/Bad News		
MNCs	in	Australia	MNCs	in	PNG
Co. No.	Positive	Negative	Co. No.	Positive	Negative

MNCs	in	Australia	MNCs	in	PNG
Co. No.	Positive	Negative	Co. No.	Positive	Negative
98	29	0	27	122	0
109	55	0	85	3913	30
4	79	0	24	2859	564
112	89	0	93	3670	62
23	123	0	16	3622	121
94	198	0	84	3589	704
44	265	0	69	2800	64
48	250	0	57	556	0
88	264	0	19	1860	595
3	263	0	36	2421	142
106	377	0	101	1784	104
77	362	0	92	949	1425
51	370	0	56	1320	78
110	356	0	6	1263	180
82	336	0	81	979	0
60	405	0	116	915	57
104	321	0	49	732	0
72	355	0	115	707	287
99	485	0	25	771	68
71	554	0	32	643	0
102	672	0	64	598	0
42	690	0	59	565	0
26	653	0	78	435	0
103	884	0	31	553	0
8	645	0	97	350	141
39	1018	0	10	344	0
91	1205	0	50	285	0
80	989	0	54	378	0
89	1369	0	2	573	0
118	1275	16	20	85	0
11	1245	0	9	60	0
96	1507	0	37	98	0
43	1563	20	95	0	40
14	2914	16	7	26	0
83	1989	6			
34	2378	0			
21	1722	1814			
90	2846	195			
5	3998	180			
61	118	0			
Total	35216	2247		39825	4662
Mean	877.62	56.18		1171.32	137.12