

University of Wollongong - Research Online

Thesis Collection

Title: A study of environmental disclosures made by Chinese mineral extraction corporations

Author: Ying Jun Lu

Year: 2008

Repository DOI:

Copyright Warning

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following: This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of this work may be reproduced by any process, nor may any other exclusive right be exercised, without the permission of the author. Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material.

Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

Unless otherwise indicated, the views expressed in this thesis are those of the author and do not necessarily represent the views of the University of Wollongong.

Research Online is the open access repository for the University of Wollongong. For further information contact the UOW Library: research-pubs@uow.edu.au

University of Wollongong Thesis Collections

University of Wollongong Thesis Collection

University of Wollongong

Year 2008

A study of environmental disclosures
made by Chinese mineral extraction
corporations

Ying Jun Lu
University of Wollongong

Lu, Ying J, A study of environmental disclosures made by Chinese mineral extraction corporations, M.Accy.Res thesis, School of Accounting and Finance, University of Wollongong, 2008. <http://ro.uow.edu.au/theses/1521>

This paper is posted at Research Online.
<http://ro.uow.edu.au/theses/521>

NOTE

This online version of the thesis may have different page formatting and pagination from the paper copy held in the University of Wollongong Library.

UNIVERSITY OF WOLLONGONG

COPYRIGHT WARNING

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site. You are reminded of the following:

Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material. Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

A Study of Environmental Disclosures Made by Chinese Mineral Extraction Corporations

A thesis submitted in fulfillment of the requirements

for the award of the degree of

Master of Accountancy (Research)

From the

University of Wollongong

By

Ying Jun Lu, MPA

School of Accounting and Finance

2008

Certificate

I, Ying Jun Lu, declare that this thesis, submitted in fulfilment of the requirements for the award of Master of Accountancy by Research, in the School of Accounting and Finance, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Ying Jun Lu

18 October 2008

Abstract

This thesis investigates environmental disclosure practices of the mineral extraction industry in China by analyzing annual reports of companies listed on both ShangHai Stock Exchange and ShenZhen Stock Exchange.

The population of this study is all listed firms classified into mineral extraction industry by both ShangHai and ShenZhen stock exchanges over a three year period from 2005 to 2007, yielding a sample of 80 usable observations. Content analysis is used to provide an evaluation of corporate environmental disclosures. The quality of corporate environmental disclosures is measured by an environmental disclosure index adopted and modified from Wiseman (1982) index, covering 18 items in four categories.

The results indicate that there is an increased tendency in terms of the quantity as well as the quality of corporate environmental disclosures by mineral extraction corporations in China during the period 2005 to 2007.

Despite some limitations, this study provides preliminary evidence on corporate environmental disclosures made by the Chinese mineral extraction industry. Further research is suggested to explore the possible associations between potential determinants and the level of environmental disclosures made by Chinese enterprises.

Acknowledgements

Writing this thesis has been a long journey and many people have contributed in one way or another to the realization of this thesis.

First, a very special and enormous thank you to each of my supervisors: Dr. Jane Andrew and Dr. Corinne Cortese, for their guidance, invaluable expertise, friendship and support throughout this journey.

I also want to express my gratitude to other members of the School of Accounting and Finance, and other people I have met along the way, for their support and encouragement.

Finally, thanks to my families, especially my parents and husband for their endless support and love all the time.

Table of Contents

Certificate.....	I
Abstract.....	II
Acknowledgements.....	III
1. Introduction.....	1
2. Background.....	7
2.1 Economic development and its impact on the environment in China.....	7
2.2 Environmental protection and sustainable development in China.....	10
2.3 Environmental legislation in China.....	14
2.3.1 An overview of Chinese legal system for environmental protection.....	14
2.3.2 Specific clauses related to information disclosure in environmental laws.....	18
2.3.3 Provisions and regulations relevant to environmental disclosure by State Environmental Protection Administration (SEPA).....	19
2.3.4 Regulations relevant to environmental disclosure by China Securities Regulatory Commission (CSRC).....	20
2.3.5 Regulations relevant to environmental issues by the Ministry of Finance (MOF).....	21
2.3.6 Regulations relevant to environmental disclosure by local governments.....	22
3. Literature Review.....	24
3.1 A briefly historical review of social and environmental accounting literature.....	24
3.1.1 The period prior to 1980.....	26
3.1.2 The period of the 1980s.....	27
3.1.3 The period of the 1990s.....	28
3.1.4 The period post 2000.....	30
3.2 Empirical findings of environmental disclosure studies in developed countries	32
3.2.1 Managerial decisions to disclose environmental information.....	34
3.2.2 Value relevance of environmental disclosure.....	37
3.2.3 Reliability of environmental disclosure.....	40
3.3 Social and environmental disclosure studies in developing countries.....	44
3.4 Environmental disclosure studies in China.....	47
3.4.1 A brief introduction.....	47
3.4.2 Empirical findings from extant studies.....	49
3.4.3 Future directions.....	52
3.5 Environmental disclosure by mining industry.....	53
4. Theoretical Framework.....	56

4.1 A general introduction to institutional theory.....	57
4.2 Mechanisms of institutional isomorphism.....	59
4.2.1 Coercive isomorphism.....	59
4.2.2 Mimetic isomorphism.....	60
4.2.3 Normative isomorphism.....	61
4.3 The application of institutional theory to accounting research.....	62
4.4 Corporate environmental disclosure as institution-driven.....	63
4.5 Institutional practices in corporate environmental disclosure.....	64
4.5.1 An introduction to the institutionalization process.....	65
4.5.2 Mimetic processes in corporate environmental disclosure.....	66
4.5.3 Corporate environmental disclosure as a routine.....	67
4.6 Chinese mineral extraction industry context.....	68
4.6.1 China specific context.....	69
4.6.2 Mineral extraction industry specific context.....	70
5. Research Method.....	73
5.1 Sample selection.....	73
5.2 Research method.....	76
5.2.1 Units of analysis.....	77
5.2.2 Coding categories.....	80
5.2.3 Environmental disclosure index.....	84
5.2.4 Pre-testing for reliability and validity.....	85
6. Results and Discussion.....	90
6.1 General descriptive statistics of environmental disclosures made by the mineral extraction industry.....	90
6.2 Environmental disclosure index analysis for the mineral extraction industry.....	92
6.3 Inter-firm comparisons of environmental disclosures in the mineral extraction industry.....	100
7. Conclusions.....	107
References.....	110
Appendix One - Specific clauses related to information disclosure in environmental laws.....	127
Appendix Two - An example of EIA report.....	132
Appendix Three - Provisions and regulations relevant to environmental disclosure by the State Environmental Protection Administration (SEPA).....	133

Appendix Four - Bulletin on information disclosure of corporate environmental performance.....	138
Appendix Five - Regulations relevant to environmental disclosure by the China Securities Regulatory Commission (CSRC).....	140
Appendix Six - Regulations and measures relevant to environmental disclosure by local governments.....	142
Appendix Seven - Shandong's rating system of corporate environmental credit.....	143
Appendix Eight - Sample companies list.....	144

Table of exhibits, figures, and tables

Figure1. The legal system for environmental protection in China.....	15
Table1. Environmental accounting papers published in the Journal of Accounting Research by year (1995—2005).....	48
Table2. Classification of research methods used by environmental accounting papers published in the Journal of Accounting Research (1995-2005).....	49
Table3. Mineral extraction companies listed on two stock exchanges for each year...	75
Exhibit1. Index categories and items of information.....	83
Exhibit2. Basic rules for coding.....	87
Table4. Number and percentage of companies with environmental disclosures.....	90
Table5. Descriptive statistics of environmental disclosure line counts for sample companies.....	91
Table6. Descriptive statistics of environmental disclosure indexes for sample companies.....	92
Table7a. Environmental disclosure scoring for the mineral extraction industry – 2005.....	93
Table7b. Environmental disclosure scoring for the mineral extraction industry – 2006.....	94
Table7c. Environmental disclosure scoring for the mineral extraction industry – 2007.....	95
Table8a. Environmental disclosure index and line counts for each disclosing company – 2005.....	101
Table8b. Environmental disclosure index and line counts for each disclosing company – 2006.....	102
Table8c. Environmental disclosure index and line counts for each disclosing company – 2007.....	103
Table9. Comparisons of environmental disclosures by sample companies from the Shan Xi province between 2006 and 2007.....	105

CHAPTER ONE - Introduction

This chapter deals with the background to the research, research issue and an overview of theoretical framework and methodology. The thesis layout is presented for the reader to see the structure and follow the main thread of the thesis.

Growing environmental problems are of concern to countries worldwide. China, as the largest developing country, is likewise confronted with the dual tasks of economic development and environmental protection. Since opening its doors to the outside world in 1978, great achievements have been made in Chinese social and economic development. At the same time, the natural environment has deteriorated due to a variety of pollutions resulting from industrial production and people's living. As a result, China's development has been tainted by serious threats from environmental pollution, energy shortages and ecological deterioration. To face these troubles, the Chinese government has identified environmental protection as one of its basic national policies. Sustainable development is regarded as an important national strategy, and powerful environmental statutory system has been established to take large-scale action for the prevention and control of pollution and the economization on energy throughout the whole country.

The mining industry plays a very important role in supporting national

economic development. As a heavily polluting industry as well as energy supply industry, the mining industry is the focus of environmental protection work. The country actively takes measures to promote the clean production and utilization of mining resources. Practice has proved that the policies and measures adopted by the Chinese government to harmonize the relationship between economic development and environmental protection are effective (Information Office of the State Council, 1996).

Along with the development of environmental protection policies, social and environmental practices have drawn scholars' attentions in the field of accounting research. Social and environmental accounting has been defined by Gray et al. (1987, p.ix) as:

...the process of communicating the social and environmental effects of organizations' economic actions to particular interest groups within society and to society at large. As such it involves extending the accountability of organizations (particularly companies), beyond the traditional role of providing a financial account to the owners of capital, in particular, shareholders. Such an extension is predicated upon the assumption that companies do have wider responsibilities than simply to make money for their shareholders.

In western countries, the development of social and environmental accounting research has a history more than three decades, which can be divided into four time periods: prior to 1980, the 1980s, the 1990s and post-2000. During each time period, western scholars made great contributions to the social and environmental accounting research from theories, research methods and research questions. The empirical research on environmental disclosure is at the

core of this research field. The existing literature in environmental disclosure is mainly classified into three categories: managerial decisions to disclose environmental information, value relevance of environmental disclosure and reliability of environmental disclosure (Berthelot et al., 2003). As a heavy pollution industry, the mining industry is often the focus of environmental accounting research and some scholars have done special studies on environmental disclosures by the mining industry (see, for example, Frost, 1999; Tilt and Symes, 1999; Peck and Sinding, 2003).

Although there is a great deal of social and environmental accounting research in western countries, there is a shortage of social and environmental accounting literature in the context of developing countries in general, and China in particular. In China, social and environmental disclosure research is still in its infancy. Most existing studies only focus on whether or not firms made environmental disclosures and do not provide deeper analyses on corporate environmental disclosure activities (see, for example, Geng and Jiao, 2002; Xiao and Hu, 2005; He and Li, 2007). China is one of the largest producers, consumers and traders of the world's mineral products, and the mining industry is also very significant to China's social and economic development. Against this background, this thesis attempts to bridge the gap by conducting a longitudinal study on the environmental disclosure practices of Chinese

stock-listed companies in the mineral extraction industry from 2005 to 2007.¹

The purpose of this study is to investigate environmental disclosures made by the Chinese mineral extraction industry in terms of the quantity and quality of disclosures. Based on such research purpose, the research question for this study is proposed as follows:

What is the general trend of environmental disclosures made by the Chinese mineral extraction industry over time?

So far, there are no definite regulations and accounting standards to guide or structure corporate environmental disclosures in China. This empirical study is undertaken in the framework of institutional theory, which is used to suggest that corporate environmental disclosures are institution-driven (Cormier et al., 2005). Under this theory, the decision by some influential firms to adopt environmental disclosure policy pushes other firms in the same industry to adopt a similar policy so as to be recognized as legitimate within the industry. As a result, more and more firms begin to disclose environmental information and an increasing homogeneity of environmental disclosure activity occurs within the industry over time.

In this study, content analysis is employed to examine the level of corporate environmental disclosures. Content analysis is a method of codifying the text

¹ The reason why this time period is chosen will be explained in chapter 5.

(or content) of a piece of writing into various groups (or categories) depending on selected criteria (Weber, 1990). In this research method, the selection and development of analytical categories and units of analysis is very crucial. In order to use the content analysis in a reliable way, this study uses sentences as context units for coding the environmental information conveyed by the sample companies' annual reports and lines as recording units for counting the amount of environmental disclosures by sample companies. The selection of units of analysis considers the characteristic of the Chinese language. The selection and development of particular coding categories are based on a number of previous researchers' approaches. A list of 18 items of information by four categories is compiled. In order to examine the quality of environmental disclosures made by sample companies, a content analysis disclosure index is used, which is adopted from Wiseman (1982).

The remainder of this thesis is organised as follows. Chapter two provides background information for the research. China's economic development and its impact on the environment are described. The development of environmental protection in China is reviewed and the environmental statutory system is introduced in detail. In chapter three, accounting literature on social and environmental disclosure issue is reviewed. Through reviewing literature from western countries, China, and other developing countries, findings of previous research are summarized. The theoretical framework for this study is

developed in chapter four. Institutional theory is used to explain the development of corporate environmental disclosure in China. Chapter five describes the methodology of this study. Content analysis is used to examine the level of environmental disclosures made by sample companies. Empirical results for this study are presented in chapter six, followed by a discussion of the results. Finally, conclusions of the research are presented in chapter seven. The limitations and contributions of the study are discussed and opportunities for future research are considered.

CHAPTER TWO - Background

Chapter one provided an introduction to this research. The research question was established and a layout of the thesis was presented. In this chapter, the background to the research is introduced. Economic development and its impact on the environment in China are described. This is followed by a detailed discussion of environmental protection and environmental legislation in China.

2.1 Economic development and its impact on the environment in China

Since the reform of economic system as well as opening its doors to the outside world in 1978, China has made great progresses in social and economic development. Over the past three decades, the average annual growth rate of GDP has been close to 10 percent, which was much higher than the world average level at the same period (Wei, 2004). This economic growth is mainly due to the dominant status of industrial development in China's national economy. Currently, China is located in the medium phase of industrialization and there is still a long way to go in the future. The Asian Development Bank estimates that, in order to reach the medium term target of economic development, i.e. China's GDP would be quadrupled in 2020 compared to 2000, the average annual growth rate of GDP should be kept over 7.2% (Wei, 2004).

The expanding economy has increased the demands of various kinds of resources and products. Energy in particular, which fuels industry, is even more indispensable for economic development. Although China's total energy reserves are considerable, the kinds of energy are not sufficiently diverse, the distribution is highly uneven and the pattern of consumption with heavy dependency on coal is relatively unitary (Voon, 2007). Following the rapid economic development, China's energy consumption has ranked the second top position in the world in 2007 (National Energy Administration, 2007). Estimated by the US Department of Energy, between 1997 and 2020, China's energy consumption will increase by 4.3% per annum, compared with 0.9% for industrialized countries and the world average of 2.1% (Klare, 2001). Rapid economic growth and escalating demand for energy have caused a shortage in domestic supply. Hence, Chinese government has adjusted its import and export policies to no longer encourage the export of energy (Voon, 2007).

Rapid economic development has not only caused energy shortages but has also had an adverse effect on China's natural environment. Air emission, water discharge and solid wastes resulting from industrial production have badly polluted the natural environment and even resulted in many abnormal ecological phenomena. As mentioned above, China is a country with coal as its main energy source. Smoke, dust and sulfur dioxide emission coming from burning coal have heavily impacted the air quality. As a result, acid rain has

occurred in cities with concentrated industries and population. Domestic living and industrial production have also polluted the water. Conventional pollutants like solid particles and wastes are found in the water. Many factories dump non-conventional pollutants like dissolved metals, both toxic and nontoxic into the water as byproducts of their production process (China Water, 2008). The most devastating type of non-conventional water pollution is oil spill. Non-conventional pollutants are difficult to remove because they are dissolved in the water. Consequently, the water becomes unusable to humans and animals. Industrial and municipal solid wastes like tailings, coal ash, and cotton dust, contain a large number of chemicals, some of which are toxic (United Nations Economic and Social Commission for Asia and the Pacific, 2000). Pollutions have affected human health through skin contact, inhalation or ingestion. For example, more than one hundred villagers in southern China have been poisoned after drinking water apparently contaminated by arsenic from industrial waste (Xinhua News Agency, 2008).

The mining industry plays a very important role in supporting national economic development. It provides products including minerals, metals and energy that are essential to economic development and social prosperity. However, the mining activities have a strong, adverse impact on the environment. The exploration, excavation and processing of mineral resources is connected with images that include the depletion of a limited stock of natural

resources and the discharge of potential pollutants. The mining industry not only causes air pollution (e.g. sulfur dioxide emission), water pollution (e.g. dissolved metals discharge) and solid waste pollution (e.g. tailings), but gives rise to the surface of the earth sinking and ecological destruction to mining areas.

In the long term, many issues such as environmental pollution, energy depletion and ecological destruction arising in the process of industrialization will have a strong effect on the sustainable development of human beings, society and economy. To face these issues, environmental protection becomes especially significant for China.

2.2 Environmental protection and sustainable development in China

In China, the government has made environmental protection as one of basic national policy and regarded sustainable development as an important national strategy in order to solve environmental problems in the process of industrialization development. Practice has proved that the policy and strategy adopted by Chinese government to harmonize the relationship between economic development and environment are effective (Information Office of the State Council, 1996). In the condition of rapid economic growth, the tendency towards environmental deterioration has been slowing down (Information Office of the State Council, 2006).

The Chinese government pays great attention to environmental legislation work and has enacted and put into effect many laws and regulations regarding environmental protection. The government also continuously improves the statutes on the environment, formulates strict law enforcement procedures and enhances the intensity of law enforcement so as to ensure the effective implementation of environmental laws and regulations. Environmental protection authorities are established under governments at all levels, which forms a complete environmental control system and strengthens the government's role in environmental supervision and administration. The Chinese government also provides environmental education to citizens so as to enhance the whole nation's awareness of the environment. Specific measures include: widely undertaking environmental publication work, gradually popularizing environmental education in secondary and primary school, developing vocational education in environmental protection and training specialized personnel in environmental science and technology as well as environmental administration (Information Office of the State Council, 1996). Moreover, the country also encourages research in environmental science and technology, develops and popularizes practical technologies for environmental pollution prevention and control and fosters the growth of environmental protection industries. In addition, the Chinese government actively promotes international communication and cooperation with other countries and international organizations in the field of environmental protection through

participating international environmental activities and signing a series of bilateral or multilateral environmental conventions and agreements. For example, China is a member of the UN Committee on Sustainable Development, and has played a constructive role in this high-level political forum on the global environment and development (Information Office of the State Council, 1996).

The government treats the prevention and control of industrial pollution as the key to environmental protection. Governments at all levels and enterprises are aware of their environmental obligations. A series of measures are taken such as readjusting the industrial structure; closing up factories with laggard technology, heavy pollution and high energy consumption; raising efficiency in the use of raw materials and energy; reducing pollutant discharge and technical transformation. Consequently, although industrial production has increased year by year, the pollutant discharge has declined steadily in recent years (Information Office of the State Council, 2006). Across all sectors of society, investments in environmental protection have increased. According to the principle “those who makes pollution should treat the pollution; those who discharges pollutants should pay fees”, Chinese enterprises increase investments in pollution abatement and pay fees for pollutant discharge (State Development Planning Commission, 1995). Those fees paid by polluting enterprises are then used to finance projects for the comprehensive abatement

of environmental pollution. When constructing new projects, all enterprises strictly carry out “three synchronizations” system, which requires that facilities for preventing and controlling environmental pollution should be planned, constructed and put into use at the same time as the main body construction projects (Information Office of the State Council, 1996) so as to ensure that there will be no new pollution sources.

Facing the energy shortage issue and global climate change, the Chinese government also values energy conservation. Energy conservation work is developed in a variety of ways: optimizing energy structure, enhancing the utilization efficiency of energy, developing recycling economy, undertaking energy substitution, and exploiting new renewable energy (Wei, 2004). The government works out relevant favorable financing and tax policies for encouraging energy suppliers and users to actively take energy saving actions. At the same time, the government also actively develops energy substitution and renewable energy. In order to reduce pollution and greenhouse gas emissions, natural gas and nuclear power are considered to be feasible options for replacing coal. Moreover, China continues to strengthen the research and application of renewable energy such as solar energy, wind energy, geothermal energy and biogas, so as to reduce the greenhouse gas emissions (Wei, 2004).

The mining industry as a heavy pollution industry, as well as energy supply

industry, is the focus of environmental protection work. China actively promotes the clean production and utilization of energy resources especially coal, establishes and improves the compensation mechanisms for the exploitation of mining resources, strengthens the restoration and rehabilitation of mining sites, and restricts the exploitation of high-sulfur and high-ash coal. At the same time, the country also actively develops clean coal technology, such as coal washing, clean burning, smoke purifying and desulfurizing so as to reduce the pollution emission (Information Office of the State Council, 2007). In addition, the government strictly enforces the environmental impact assessment system for the construction of new mining projects. For example, according to the environmental impact assessment law, when exploiting and utilizing new mines, environmental impact assessment reports of new projects are required to be submitted to the competent authorities.

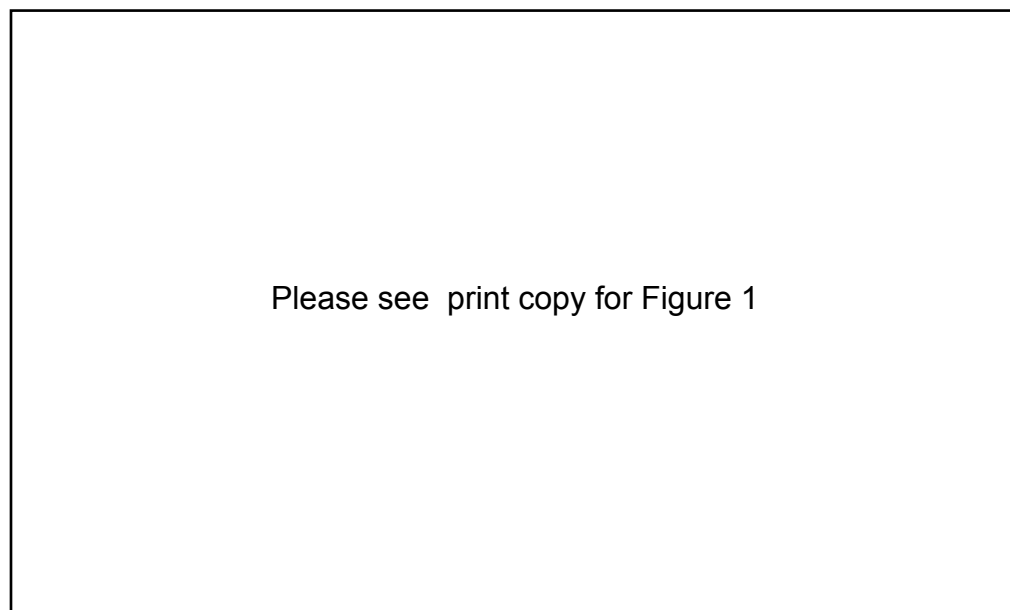
All measures and actions taken by governments at all levels and enterprises for environmental protection and energy saving have made significant contributions to China's environmental protection and sustainable development. These achievements cannot be made without a powerful environmental statutory system.

2.3 Environmental legislation in China

2.3.1 An overview of Chinese legal system for environmental protection

In order to fulfill the sustainable development of China's economy and construct an environment-friendly society, a series of laws and regulations related to environmental protection have been enacted, and an environmental statutory framework has been established, which treats the Constitution of the People's Republic of China as the foundation and the Environmental Protection Law of the People's Republic of China as the main body. This statutory framework can be summarized as follows (SEPA, 2006) (and portrayed in Figure 1):

Figure 1 The Legal System for Environmental Protection in China



1. The Constitution of the People's Republic of China (1982, revised in 2004)
The Constitution is the fundamental law of China, and provides the legal foundation and guide principles for enacting the basic law and specialized laws on environmental protection. Article 26 stipulates that, "The State protects and

improves the environment in which people live and the ecological environment. It prevents and controls pollution and other public hazards.”

2. The Criminal Law of the People’s Republic of China (1979, revised in 1997)

Chapter 6 Section 6 states that “who violates environmental protection regulations should take the penal liability.”

3. The Environmental Protection Law of the People’s Republic of China (1989)

The Environmental Protection Law is the basic law of environmental protection in China. It provides the general principles and requirements for environmental protection and lists 14 environmental factors to be protected by law.

4. Specialized laws on environmental protection

Laws in this category aim at special pollution prevention and special natural resources conservation. They include the Prevention and Control of Air Pollution Law, the Prevention and Control of Water Pollution Law, the Prevention and Control of Solid Wastes Law, the Prevention and Control of Noise Law and the Marine Environmental Protection Law.

5. Laws on resources conservation

Natural resources are the necessary conditions for human beings’ living and growth. In order to exploit, use and protect natural resources in a reasonable way, China has enacted the Forestry Law, the Grassland Law, the Fishery Law, the Land Management Law, the Mineral Resources Law, the Coal Industry Law,

the Water Law, the Water and Soil Conservation Law, the Wildlife Protection Law and the Energy Conservation Law.

6. Laws closely related to environmental protection

Laws in this category mainly include the Environmental Impact Assessment (EIA) Law, the Cleaner Production Promotion Law, the Construction Law, the Flood Control Law, the Desert Prevention and Transformation Law, the Fire Control Law and the Meteorology Law.

7. Administrative provisions and ministerial regulations for environmental protection

These provisions and regulations are promulgated by departments under the State Council, like the State Environmental Protection Administration (SEPA), the Ministry of Finance (MOF), China Securities Regulatory Commission (CSRC), to provide guidance and supervision on implementing environmental laws.

8. Local provisions and regulations for environmental protection

It refers to those provisions and regulations released by local governments to deal with particularly local environmental problems.

9. Environmental standards

Environmental standards are guidelines for controlling the effect of human activity upon the environment. China has established a series of environmental standards at both national and local levels. These standards can be classified into environmental quality standards, pollutant discharge standards, product

quality standards, and technical standards. In addition, the international environmental standards ISO14000 are also widely enforced by SEPA to improve environmental management.

10. Multilateral environmental agreements (MEAs)

China has taken an active part in the multilateral environmental cooperation over the past three decades. SEPA, on behalf of the Chinese government, has signed over 30 MEAs and promised to take the liability of global environmental protection through these agreements. The main international environmental agreements approved by the Chinese government include the Vienna Convention, the Montreal Protocol, the Basel Convention, the Convention on Bio-Diversity, the Rotterdam Convention and the Stockholm Convention.

2.3.2 Specific clauses related to information disclosure in environmental laws

In order to effectively undertake environmental protection work, environmental information disclosure to the public by enterprises should be required. There are a series of clauses in the environmental laws that regulate environmental information disclosed by enterprises (see Appendix One). These clauses in legislation provide some mandatory requirements for environmental management and environmental information disclosed by Chinese enterprises. Mineral extraction enterprises are heavily regulated by a series of pollution

prevention and control laws and special laws for the mining industry such as the mineral resources law, the coal industry law and the energy conservation law, to manage their activities' impacts on the environment and resources. For example, *The Mineral Resources Law of the People's Republic of China (1986, revised in 1996)* provides mandatory requirements for mineral extraction enterprises to operate with the prospecting and mining licenses, and to exploit and utilize mineral resources with resource tax and compensation fee payments. It is the legal basis for mineral extraction enterprises to disclose information such as prospecting and mining rights, resource tax and resource compensation fee. As mentioned above, China's energy consumption is heavily dependent on coal, so the coal mining industry accounts for a considerable proportion in the mining industry. *The Coal Industry Law of the People's Republic of China (1996)* is expected to have an important impact on coal mining enterprises' environmental management. In addition, *The Energy Conservation Law of the People's Republic of China (1997)* is also expected to influence mineral extraction enterprises' energy management and energy-related information disclosure.

2.3.3 Provisions and regulations relevant to environmental disclosure by the State Environmental Protection Administration (SEPA)

SEPA is the competent authority for environmental protection in China. The main missions for SEPA include formulating policies and regulations for

environmental protection, supervising the implementation of environmental laws, coordinating nationwide environmental pollution disputes, and participating international cooperation and exchanges on environmental protection. So far, SEPA has formulated a series of policies and regulations related to environmental protection. These provisions and regulations relevant to environmental disclosure and reporting are summarized in Appendix Three. The regulations from SEPA provide specific measures for governments at all levels to implement environmental management and supervision of Chinese enterprises. For instance, *Interim Measures on the Collection of Pollution Discharge Fee (1982)* provides a legal basis for enterprises to pay pollutant discharge fee as well as disclose this information to the public. *Provisions on the Administration of Report and Registration of Pollution Discharge (1992)* also provides a legal basis for enterprises to disclose information related to pollutant discharge and abatement. Further, *Bulletin on Information Disclosure for Corporate Environmental Performance (2003)* is expected to have an impact on corporate mandatory environmental disclosures as well as voluntary environmental disclosures.

2.3.4 Regulations relevant to environmental disclosure by the China Securities Regulatory Commission (CSRC)

CSRC, as the competent authority of Chinese securities market, has also issued some legal documents with environmental concerns (see Appendix Five).

These regulations from CSRC provide mandatory requirements for Chinese listed companies applying for IPO to disclose environment-related information to the public.

2.3.5 Regulations relevant to environmental issues by the Ministry of Finance (MOF)

The MOF is the competent department in charge of drafting and formulating accounting regulations and standards in China. The Accounting Law of the PRC (1985, revised in 2000), which is the highest authority for accounting in China, empowers the MOF to supervise accounting affairs and to establish uniform accounting regulations and standards. So far, the framework for Chinese accounting system mainly includes the Financial Accounting and Reporting Rules for Enterprises, the Accounting System for Enterprises, the Accounting Standards for Enterprises and other accounting pronouncements issued by the MOF. Among them, only a few clauses are relevant to environmental issues, mainly focusing on pollutants discharge fee and income tax benefit from environmental protection activities. According to the Financial System for Industrial Enterprises (Cai Gong Zi, 1992, No.574) (MOF, 1992), pollutants discharge fee should be separately listed under “general and administrative expenses”. In accordance with the latest pronouncement (Cai Jian, 2006, No.318) (MOF, 2006), the central government will establish the special fund for environmental protection projects during the eleventh

“five-year” period. The enterprises applying for the special fund need to submit a series of relevant documents including basic information form, bank loan application form, feasibility report for the proposed project, EIA report and other accessorial documents to the competent authorities above provincial level.

The above regulations from MOF are expected to have an impact on corporate environment-related information disclosures such as pollutants discharge fee, environmental financing from government and tax benefit from environmental protection.

2.3.6 Regulations relevant to environmental disclosure by local governments

Local governments also play important roles in the maintenance and development of Chinese legal system for environmental protection. Many of the regulations promulgated by local governments are to carry out national policies and regulations. Nevertheless, local governments also adjust measures to local conditions. Some examples of regulations and measures relevant to environmental performance and disclosure by local governments are provided in Appendix Six. Regulations and measures mentioned in Appendix Six explicitly present that environmental performance rating system and public disclosure have been widely used by local governments to improve

environmental management over the past several years. The rating system of corporate environmental credit by Shandong Province is listed in Appendix Seven. Local environmental regulations and requirements also provide effective basis to mandate or encourage enterprises to disclose environment-related information to the public.

Although a comprehensive environmental statutory system provides basis for the development of environmental protection work in China, the enforcement of environmental laws and regulations is a complicated process and may have problems. For example, SEPA agencies have the right to issue punishment to polluting companies, but they do not have the right to compulsorily implement punishment measures except asking the legal departments for help. As a result, the implementation of environmental laws and regulations has some difficulties and the extent to which environmental laws and regulations affect companies may be rebated.

Along with the development of environmental protection work, environmental accounting becomes more and more active in the field of accounting and the demand that enterprises are required to disclose environmental information to the public becomes more and more intensive in China.

CHAPTER THREE - Literature Review

The previous chapter introduced the background to this research. In this chapter, prior studies on social and environmental disclosure in accounting literature are reviewed and empirical findings from prior research are summarized. This review includes four parts: western countries, developing countries, China and the mining industry.

3.1 A briefly historical review of social and environmental accounting literature

Over the past three decades, the accounting literature has accumulated a substantial number of studies regarding organizations' social and environmental disclosures. Gray et al. (1995) showed that these studies involved many different issues and perspectives (such as managerial motivation, reliability of environmental disclosure) (see, for example, Guthrie and Parker, 1989; Tilt, 1994; Clarkson et al., 2008), used many different research methods (such as content analysis, case study) (see, for example, Wiseman, 1982; Patten, 1992; Deegan et al., 2002), and covered many different countries (such as USA, UK, Australia, Canada and New Zealand) and time-periods. The majority of the studies come from western industrialized countries (see, for example, Ullmann, 1985; Guthrie and Mathews, 1985; Zeghal and Ahmed, 1990; Gray, 1993). Among them, American, European and Australian studies are the most frequent, mainly due to the nationality of the empirical investigators (Campbell, 2004).

According to chronological division, the time periods of studies can be classified into prior to 1980, the 1980s, the 1990s and post-2000. The early studies prior to 1980 were exploratory in nature (O'Connor, 2006). The representative outcome of many studies during this period was a "yes" or "no" to the existence of a disclosure of information regarding the social dimension of accounting, especially related to employees or products (see, for example, Grojer and Stark, 1977; Ernst and Ernst, 1972-1978). Environmental interests were not detected at that time, whether by managers, professional accountants, or the majority of other observers (Ernst and Ernst, 1972-1978). During the 1980s, the number of social and environmental accounting studies declined as a whole (O'Connor, 2006). However, there have been many changes to the focus of the social and environmental accounting literature since 1980, with an increasing interest in environmental accounting (Mathews, 1997). The third period (1991-2000) experienced a remarkable advancement in the publication of social and environmental accounting empirical studies (O'Connor, 2006). This period was characterized by the domination of environmental accounting over social accounting (Mathews, 1997). The empirical research in the social and environmental accounting field post 2000 has been booming. The academic papers published during the 2000-2006 period almost doubled the number that had been published during the preceding decade, and at the same time there has been a significant increase in the depth of empirical research being done (O'Connor, 2006).

3.1.1 The period prior to 1980

This period started from the introduction of the social accounting subject (see, for example, Mobley, 1970; Ross, 1971; Linowes, 1972; Dilley and Weygandt, 1973; Barnett and James, 1974) to the end of the decade (Mathews, 1997). Mobley (1970) first mentioned the concept of socio-economic accounting in the 1970s. Thereafter the concept of social accounting (see, for example, Ross, 1971) was loosely defined and frequently interchanged with the term social responsibility accounting (see, for example, Anderson, 1977) and socio-economic accounting (see, for example, Belkaoui, 1980) in the earliest literature (Kaya and Yayla, 2007).

As indicated by Mathews (1997), early empirical studies had a variety of motivations (see, for example, Linowes, 1972; Bowman and Haire, 1975; Grojer and Stark, 1977). Linowes (1972) intended to quantify the interaction of the organization with people, product and the environment. Bowman and Haire (1975) was one of the earliest investigators who sought a relationship between social responsibility disclosures and corporate income. Grojer and Stark (1977) showed explicit consideration to develop a socially oriented report with several constituencies, especially employees.

During this period, the environmental consideration was not separated from other social matters (except Ullman, 1976; Dierkes and Preston, 1977). Ullman

(1976) introduced a model known as the corporate environmental accounting system to describe non-financial disclosures aimed at reporting environmental impacts. Dierkes and Preston (1977) critically reviewed several proposals for social accounting and firstly identify three uses of environmental impact costs.

3.1.2 The period of the 1980s

During the 1980s, empirical studies conducted had a prominent change in both direction and complexity. There was a perceivable shift from studies describing what companies were reporting towards studies seeking to determine the type, materiality and drivers of social accounting disclosures (see, for example, Trotman and Bradley, 1981; Guthrie and Mathews, 1985; Belkaoui and Karpik, 1989) (O'Connor, 2006). As noted by Mathews (1997), attempts to explain the motivation behind corporate social accounting disclosures began to introduce concepts like organizational legitimacy to justify the development of corporate social reporting (see, for example, Richardson, 1985, 1987; Guthrie and Parker, 1989).

As O'Connor (2006) noted, the public concern of environmental protection had increased significantly during the 1980s and this was reflected in some authors broadening of the term 'social accounting' to 'social and environmental accounting' (see, for example, Gray et al., 1987). The volume of published literature dedicated to social accounting decreased with an expansion of that

dealing with environmental matters (Mathews, 1997). Empirical studies in environmental accounting focused primarily on how companies measured and reported environmental issues via their annual reports (see, for example, Wiseman, 1982; Rockness, 1985).

Although there were many attempts to build theoretical models during the 1970s (see, for example, Linowes, 1972), there were no such endeavors published in the 1980s, except in the environmental area (see, for example, Mathews, 1984; Logsdon, 1985). Mathews (1984) put forward a conceptual model for the classification of various socially oriented disclosures, which might be an early proposal to separate environmental accounting from social accounting. Logsdon (1985) built a model to predict organizational responses to environmental issues through a specific study related to the oil refining industry in the USA.

With the flourish of social and environmental accounting literature, critical theorist literature also began to pay attention to what some authors had perceived to be the shortcomings of previous studies in the social accounting area (see, for example, Tinker, 1985; Puxty, 1986).

3.1.3 The period of the 1990s

The 1990s saw a continuation of growth of environmental accounting studies.

There was a significant increase in both the number and the depth of empirical studies being undertaken. As noted by Mathews (1997), the special issues of *Accounting Auditing and Accountability Journal* (1991) and *Accounting Forum* (1995) provided opportunities for environmental accounting researchers to report their findings (see, for example, Harte and Owen, 1991; Roberts, 1991; Gibson and Guthrie, 1995; Deegan et al., 1995). The increased depth was evidenced by more studies using theory to seek to explain their results (see, for example, Patten, 1992; Neu et al., 1998).

During this period, corporate social and environmental disclosure practices were discussed within the widely theoretical framework of political economy theory (see, for example, Arnold, 1990), legitimacy theory (see, for example, Patten, 1991) and stakeholder theory (see, for example, Roberts, 1992). At the same time, as Mathews (1997) indicated, other research interests also occurred, which included sustainability (see, for example, Batley and Tozer, 1993) and environmental auditing (see, for example, Tozer and Mathews, 1994).

Although there are many limitations of content analysis (see, Krippendorff, 2004), it has always been the main research method used by corporate social and environmental disclosure studies. As noted by Kaya and Yayla (2007), most studies using content analysis as a research method only analyzed social and environmental disclosures in corporate annual reports. As to how to

measure disclosures by content analysis method, many studies (see, especially, Hackston and Milne, 1996; Milne and Adler, 1999) considered this, but no uniform method of measurement was evolved.

During this period, critical writers noticed that new studies often failed to challenge the status quo and were institutionalized by accounting profession (see, for example, Power, 1991).

3.1.4 The period post 2000

This period saw rapid growth of empirical research in the social and environmental accounting field. As O'Connor (2006) indicated, there had once again been a significant increase in the depth of empirical studies being undertaken, which was supported by following evidence: (a) a growing number of studies seeking to explain social and environmental reporting practice; (b) a growing number of studies looking for investigating the faithfulness of social and environmental reporting practice; (c) the emergence of a number of studies seeking to ascertain the degree to which social and environmental accounting was leading to organizational change; and (d) a significant increase in the number of studies using multiple sources of data.

During this period, the augmentation of theoretical frameworks for social and environmental accounting has been continuing and the overlapping of a number

of social and environmental accounting theories was identified (see, Deegan, 2002). Nevertheless, Parker (2005) has noted that the social and environmental accounting field has developed a range of compatible interpretations of different theoretical perspectives that operate at the deep philosophical level and at the policy implementation level.

Numerous studies have been continuing to explore managerial motivations and determinants for social and environmental disclosure practices. As noted by Owen (2008), further studies point to factors such as unfavorable media attention as a catalyst for positive information disclosure (Deegan et al., 2002), size and ownership status (Cormier and Gordon, 2001), strategic position represented by press release activity (Magness, 2006), and public profile (Campbell et al., 2006) as influential disclosure drivers.

A more radical campaign between mainstream social and environmental accounting researchers and critical theorists commenced. As indicated by Owen (2008), while critical theorists adopted a more interventionist stance in advocating practical accounting change (see, for example, Cooper et al., 2005), a growing number of mainstream social and environmental accounting researchers fundamentally revalued the ethical, social and political beliefs driving their efforts in response to critical theorists. Nevertheless, a growing level of mutual accommodation between mainstream social and environmental

accounting researchers and critical theorists has been perhaps evidenced by a joint literature (see, Tinker and Gray, 2003).

3.2 Empirical findings of environmental disclosure studies in developed countries

Empirical research is at the core of the field of social and environmental disclosure studies. Early empirical studies prior to the 1980 were not specific in focus. Many researchers only attempted to measure the incidence of information disclosure by organizations. For example, Trotman (1979) examined social responsibility disclosures made by Australian corporations during the period 1967 to 1977 and found them to increase across the period. Ernst and Ernst (1972-1978) produced a series of analyses of the annual reports of Fortune 500 companies from the year 1971 to 1977 and found that disclosure rates for socially-oriented information achieved about 90% of the annual reports, but the average volume was only about half a page.

Some scholars started to seek to examine the value relevance of information disclosed by firms (see, Belkaoui, 1976; Ingram, 1978). Belkaoui (1976) examined the stock market reaction to the disclosure of pollution control expenditures and found that the distribution of monthly abnormal returns of firms voluntarily disclosing pollution control expenditures was significantly different from that of firms not disclosing such expenditures. Belkaoui (1976)

deemed that this was the positive effect of voluntary disclosures of pollution control expenditures on firms' values. A similar study was undertaken by Ingram (1978), but he did not find, on average, any significant difference in mean returns and variances between firms that did and did not disclose environmental information in their annual reports.

Since the 1980s, with the surge of environmentalism, the empirical research in environmental disclosures has been enriched gradually. Many companies have increased the level of environmental disclosure (see, for example, Harte and Owen, 1991; Patten, 1992; Gray et al., 1995; Deegan and Gordon, 1996). An increase in corporate environmental disclosure seems to be directly connected with the increase in societal concern about environmental protection, and the extent of corporate environmental disclosures also seems to be positively correlated to environmental lobby groups' concerns about a firm's environmental performance within a particular industry (Deegan and Gordon, 1996). According to Berthelot et al. (2003), the existing literature in environmental disclosure research can be classified into three broad groups. The first group of studies examines the factors affecting managerial decisions to disclose environmental information. The second group is related to the value relevance of environmental disclosure. The third group explores the relation between environmental disclosure and environmental performance, i.e. the reliability of environmental information disclosed by firms. Each of these

categories is discussed in the following sections.

3.2.1 Managerial decisions to disclose environmental information

Voluntary environmental disclosure largely depends on managerial decision-makers' will. As Guthrie and Parker (1990) stated, corporations might adopt disclosure strategies in order to respond to various social pressures and avoid further regulations of their disclosures. On the other hand, Verrecchia (1983) and Dye (1985) argued that decision-makers might refrain from disclosing some information if they perceived that investors did not need it or could easily find it from other alternative sources or such information could lead to further sanctions by third parties. Several studies found that firms typically provided positive disclosures of their environmental performance, but failed to disclose negative aspects (see, for example, Hogner, 1982; Guthrie and Parker, 1989; Deegan and Gordon, 1996; Deegan and Rankin, 1996).

Managerial decisions to disclose information are subject to many determinants (see, for example, Trotman and Bradley, 1981; Li, Richardson and Thornton, 1997; Neu et al., 1998; Cormier and Magnan, 1999, 2003; Bewley and Li, 2000). Findings from several studies indicated that there was a positive correlation between firm size and the level of corporate environmental disclosures, as well as the environmental sensitivity of industry and the level of corporate environmental disclosures (see, for example, Patten, 1991, 1992;

Deegan and Gordon, 1996; Neu et al., 1998; Alnajjar, 2000; Bewley and Li, 2000; Campbell, 2004). In other words, large firms made more environmental disclosures than small firms, and companies in environmentally sensitive industries were more inclined to disclose environmental information. This was because large firms and environmentally sensitive industries were more likely to be targeted by environmental pressure groups (see, Bewley and Li, 2000). When a firm faced serious environmental problems, it might hesitate to disclose information about these problems due to the further potential costs caused by reporting those information (Li, Richardson and Thornton, 1997). This finding was supported by Cormier and Magnan (1999) who discovered that firms in good financial condition were more likely to provide environmental information because the potential costs and financial implications of disclosures were expected to be relatively less than that of firms in bad financial condition. However, firms had to increase environmental disclosure after media exposure of environment-related lawsuits or fines incurred under environmental legislation (see, for example, Deegan and Rankin, 1996; Neu et al., 1998). Regarding media exposure, several studies found that higher levels of environmental disclosure were associated with higher levels of media attention (see, for example, Brown and Deegan, 1998; Neu et al., 1998; Bewley and Li, 2000; Cormier and Magnan, 2003).

Most researchers attempted to explain their findings with legitimacy theory

(see, for example, Hogner, 1982; Guthrie and Parker, 1989; Patten, 1991, 1992; Gray et al., 1995; Deegan and Gordon, 1996; Deegan and Rankin, 1996; Neu et al., 1998; Brown and Deegan, 1998; Wilmshurst and Frost, 2000; Cormier and Gordon, 2001; Deegan et al., 2002; Magness, 2006). According to legitimacy theory, corporate environmental disclosures were provided as reactions to environmental pressures and in order to legitimize the corporation's existence and actions (Guthrie and Parker, 1989). Hence, corporate decision-makers had to consider environmental disclosure in response to the public pressures. The relevant public requiring environmental disclosure included financial stakeholders, government regulators and environmentalists, who could have an influence on the level and type of corporate environmental disclosures contained in annual reports (Neu et al., 1998). The legitimization efforts made by firms were proved by findings from some studies, which showed that specific ecological accidents or socio-political events (e.g., Exxon Valdez accident, lawsuits, and environmental lobby group pressures) certainly appeared to influence managerial decisions to disclose environmental information (see, for example, Patten, 1992; Tilt, 1994; Deegan and Rankin, 1996).

In general, the extant studies in this field provide abundant findings for managerial motivations and determinants of corporate environmental disclosure practices, some of which are consistent. However, the specific

socio-political context drives differences in corporate environmental disclosure (Patten, 2000) and impedes generalizations. Therefore, it is expected to be valuable for the environmental disclosure literature to study environmental disclosure practices made by Chinese enterprises.

3.2.2 Value relevance of environmental disclosure

Studies on the value relevance of environmental disclosure aim to explore the financial implications of environmental information disclosed by firms. This issue has been investigated by some empirical researchers (see, for example, Jaggi and Freedman, 1982; Shane and Spicer, 1983; Blacconiere and Patten, 1994; Cormier and Magnan, 2001; Richardson and Welker, 2001; Magness, 2002; Clarkson et al., 2004; Murray et al., 2006).

Jaggi and Freedman (1982) examined the content of environmental information disclosed in annual reports and 10K reports, and found that there was no significant difference in abnormal returns between firms that disclosed and did not disclose environmental information in the month when their 10K reports were filed. However, the cumulative mean abnormal returns for the ten months prior to the filing of 10K reports were significantly different. This finding was consistent with Ingram (1978). Again, Shane and Spicer (1983) investigated the relationship between stock price movements and disclosed environmental performance and showed that stock prices of polluting companies proclaimed

by the Council for Economics Priorities (CEP) went down and the extent of drop depended on companies' pollution records. Cormier and Magnan (2001) also evaluated the relationship between corporate environmental disclosures and stock market value. They did not find a direct relation between environmental information disclosed in a firm's annual report and its stock price, but they did discover an association between environmental disclosures and stock prices for firms with fines and penalties and with the level of pollution exceeding the allowed limits.

Results from the above studies are inconsistent. It suggests that assessing the impact of a firm's environmental disclosure on its stock market performance is rather difficult as most of them are not immediately visible.

Many studies on the value relevance of environmental disclosure focused on specific events that might or might not influence firms' overall environmental disclosure strategy. For instance, Blacconiere and Patten (1994) and Magness (2002) analyzed how ecological events affected firms' stock market performance. Magness (2002) examined the association between environmental disclosure and stock market value for Canadian listed companies following the Placer Dome mine leak. Her findings suggested that the ecological accident did cause the stock prices of Canadian gold mining firms to go down, but firms disclosing some information about environmental management experienced a

less severe drop in share price.

Furthermore, using a more comprehensive measure, Richardson and Welker (2001) found a positive relationship between social disclosure (including environmental disclosure) and the cost of equity capital. Hence, managers had an incentive to provide reliable and relevant socially-oriented information. With respect to environmental disclosure, Clarkson et al. (2004) indicated that many information items had a direct impact on a firm's future earnings: environmental capital expenditures, contingent environmental liabilities, fines and penalties.

In a more recent investigation, Murray et al. (2006) explored whether there was any relationship between social and environmental disclosure and the financial market performance of the UK's largest companies. They did not find direct relationship between share returns and disclosure, but the longitudinal data showed a convincing relationship between consistently high returns and the propensity to high disclosure.

From the above review, the findings of extant studies in this field are still relatively inconclusive (Murray et al., 2006). The only general conclusion that can be made is that the value relevance of environmental disclosure is related to circumstances surrounding the disclosures (Berthelot et al., 2003).

3.2.3 Reliability of environmental disclosure

As to the reliability of environmental disclosure, that is whether a firm's environmental disclosure can fairly reflect its environmental performance, many studies find that voluntary environmental disclosures are not significantly correlated with firms' environmental performance measures (Ingram and Frazier, 1980; Wiseman, 1982; Rockness, 1985; Freedman and Wasley, 1990; Fekrat et al., 1996; Hughes et al., 2000).

Ingram and Frazier (1980) examined the association between the content of corporate environmental disclosure in annual report and corporate environmental performance. They used a performance index devised by the Council for Economic Priorities (CEP) to represent corporate environmental performance. The results indicated there was no significant association between environmental disclosure and environmental performance.

With a very similar research design, Wiseman (1982) also examined the association between corporate environmental disclosure and environmental performance. The author designed an environmental disclosure index covering 18 items in four categories and assigned a score to each item based on whether the disclosure was quantitative or qualitative. The results indicated no association between the CEP environmental performance rankings and the Wiseman (1982) environmental disclosure index rankings. The Wiseman (1982)

index is widely used in later environmental disclosure studies (see, for example, Choi, 1999; Patten, 2002). This index puts more weight on quantitative disclosures, which is expected to easily identify the quality of corporate environmental disclosures. The Wiseman (1982) index is therefore closely aligned with the aims of this research and is employed in this study.

Most studies mentioned above used quite similar methodology (except for Rockness (1985), who employed field experiment). They used the CEP rankings as a proxy for environmental performance and measured the extent of environmental disclosure by means of content analysis of the disclosed information. Since the environmental performance rankings published by the CEP was restricted to specific types of pollution, industries and geographical area, reliance on the CEP for sample selection might be problematic (Ilinitich et al., 1998).

Although previous studies failed to find an association between environmental disclosure and environmental performance, further investigation by some researchers indicated a negative association between corporate environmental disclosure and environmental performance (see, Bewley and Li, 2000; Hughes et al., 2001; Patten, 2002). Bewley and Li (2000) examined factors associated with voluntary environmental disclosures by Canadian manufacturing firms. They found that firms with more news media coverage of their environmental

disclosures, higher pollution propensity (i.e., environmental performance) and more political exposure were more likely to disclose general environmental information. This finding suggested that there was a negative association between environmental disclosure and environmental performance.

Hughes et al. (2001) also examined environmental disclosures made by US manufacturing firms and then evaluated whether environmental disclosures were associated with environmental performance ratings (good, mixed and poor) by the CEP. They found no difference in environmental disclosures between good and mixed groups, but firms rated with poor performance by the CEP were inclined to make more environmental disclosures.

Furthermore, Patten (2002) identified three issues existed in the previous studies in this field (i.e., failure to consider other factors, inadequate sample selection, and inadequate measures of environmental performance). In order to overcome the limitation of environmental performance measures by the CEP, Patten (2002) employed the Toxic Release Inventory (TRI) data as a proxy for environmental performance. He found that controlling for firm size and industry classification, two factors influencing the extent of disclosure, there was a negative relation between corporate environmental disclosures and environmental performance, i.e., the more a firm disclosed, the worse its environmental performance.

In contrast, some researchers found a positive association between corporate environmental disclosure and environmental performance more recently (see, Al-Tuwaijri et al., 2004; Clarkson et al., 2008). Al-Tuwaijri et al. (2004) explored the relations among environmental disclosure, environmental performance and economic performance using a simultaneous equations approach. Similar to Patten (2002), Al-Tuwaijri et al. (2004) also used TRI data to assess corporate environmental performance, and they found a positive relation between environmental performance and environmental disclosure.

Clarkson et al. (2008) revisited the relation between environmental performance and environmental disclosure by focusing on purely discretionary environmental disclosures. They developed a content analysis index based on the Global Reporting Initiative Guidelines (GRI) to assess the level of discretionary environmental disclosures in stand-alone environmental and social responsibility reports. This index differed from the Wiseman (1982) index, focusing on disclosures related to firm's commitment to protect the environment. They found a positive association between environmental performance and the level of discretionary environmental disclosures, and suggested that socio-political theories were not robust in predicting the level of discretionary environmental disclosures.

In conclusion, the existing studies provide mixed results on the association

between environmental disclosure and environmental performance. The main reason for the inconclusive findings may be due to the different choices of environmental disclosure index and the different proxies for environmental performance.

3.3 Social and environmental disclosure studies in developing countries

Most social and environmental disclosure studies have concentrated on the developed countries. Only a handful of studies are available from the developing countries, especially focusing on the newly industrialized countries (see, for example, Singh and Ahuja, 1983; Teoh and Thong, 1984; Andrew et al., 1989; Savage, 1994; Hegde et al., 1997; Choi, 1998; Disu and Gray, 1998; Kisenyi and Gray, 1998; Tsang, 1998; Belal, 2000; Dasgupta et al., 2006; Smith et al., 2007).

The studies by Singh and Ahuja (1983), Hegde et al. (1997) and Belal (2000) investigated the practices of South Asia. Singh and Ahuja (1983) and Hegde et al. (1997) examined the entire social reporting practices of public sector companies in India. Hegde et al. (1997) indicated that public sector undertakings operated for the purpose of social gain rather than profit maximization in India, so they published social balance sheets, social income statements and human resources accounts. These two studies did not focus on

environmental disclosure practices. In order to bridge this gap, Belal (2000) examined environmental reporting practices of Bangladeshi companies by analyzing 30 recent annual reports of Bangladeshi companies for the year 1996. The study showed that the quantity and quality of disclosures seemed to be inadequate and poor as compared to the environmental disclosures in the developed countries.

The studies by Teoh and Thong (1984), Andrew et al. (1989), Tsang (1998) and Smith et al. (2007) made significant contributions to the social and environmental disclosure literature from the South-eastern Asian context. Teoh and Thong (1984) investigated corporate social responsibility reporting of Malaysian companies based on a personal interview questionnaire survey. They found that corporate social reporting lagged behind social involvement and that companies paid most attention to activities relating to employees and products or services. In addition, the results also indicated that corporate size and national origin of corporate ownership were relevant in reflecting the extent of social commitments undertaken by companies. Andrew et al. (1989) examined 119 annual reports of listed companies in Malaysia and Singapore for the year 1983. They found that the overall number of companies disclosing social information was only 31 (26%). Again, it was found that a higher proportion of large or medium sized companies made social disclosures compared with small companies. Another study by Tsang (1998) made a longitudinal study of social

and environmental reporting by 33 listed companies in Singapore over the period from 1986 to 1995. The results showed that although only 17 (52%) companies made social and environmental disclosures, a steady increase in social and environmental disclosures was captured during the late 1980s and then a stable level of disclosure since 1993. More recently, Smith et al. (2007) examined the extent to which environmental disclosures in annual reports of Malaysian listed companies were associated with corporate characteristics. They found a significant inverse association between environmental disclosure and return on assets. The findings suggested that environmental disclosure was negatively associated with corporate financial performance.

A Korean study by Choi (1998) indicated that 64 (8.3%) out of 770 Korean listed companies made environmental disclosures in their audited semi-annual financial statements for the year 1997. The average amount of disclosure per company was 7.5 lines. More recently, Dasgupta et al. (2006) examined the reaction of investors to the list of enterprises failing to comply with national environmental laws and regulations published by the Ministry of Environment of the Republic of Korea. They found that enterprises on the list experienced a significant reduction in their market values, and that the larger the extent of coverage by newspapers, the larger the reduction in market value.

In addition, some researchers undertook studies on the social and

environmental disclosures in the African context. In a study of 115 South African companies, Savage (1994) found that approximately 63% companies made environmental disclosures, and that the average length of disclosure was half a page. Disu and Gray (1998) made a study of 22 large multi-national corporations (MNCs) in Nigeria for the years 1994 and 1995. They reported that less than a quarter of companies made disclosures in the areas of environment, equal opportunities and consumer concerns. In another study of social and environmental disclosure in Uganda, Kisenyi and Gray (1998) noted that none of four surveyed companies made any environmental disclosure. Although the sample size of this study was low, the result still suggested that social and environmental disclosure was scant and low level in Uganda.

In general, social and environmental disclosure research is still in its infancy in the developing countries. Most studies focus on whether companies make social and environmental disclosures and the quantity of disclosures. Very few studies explore the determinants of managerial decisions to disclose social and environmental information, and even the value relevance and reliability of environmental disclosures.

3.4 Environmental disclosure studies in China

3.4.1 A brief introduction

As the largest developing nation, China has been experiencing extremely rapid

economic growth. At the same time, environmental problems are exceedingly severe. Environmental accounting studies have become more and more active with the development of economy and the increase in public environmental consciousness since the middle of 1990s. According to Zhu and Xue (2007), there were 26 environmental accounting papers published in the journal *Accounting Research* (one of the top accounting journals in China) from 1995 to 2005, with 10 in the year 2002 — see Table 1. As indicated in Table 1, the year 2002 became the research peak due to the environmental accounting seminar held by Accounting Society of China in the end of the year 2001.

Please see print copy for Table 1

As noted by Zhu and Xue (2007), among these papers, most focused on the introduction of environmental accounting theories and conference records, and there were only ten studies related to environmental accounting practices (38%). Most studies employed normative research method (81%) rather than empirical research method (19%) (see Table 2).

Table 2: Classification of Research Methods Used by Environmental Accounting Papers Published in *Accounting Research* (1995-2005)

Please see print copy for Table 1

3.4.2 Empirical findings from extant studies

Environmental accounting research is still in the early stages in China. Over the past decade, there have been few empirical studies. However, some scholars have made some efforts on the empirical research of environmental accounting practices especially environmental disclosures (see, for example, Wang et al., 1998; Li and Xiao, 2002; Geng and Jiao, 2002; Xiao and Hu, 2005; He and Li, 2007; Li, 2007).

Wang et al. (1998) conducted the first investigation into the environmental accounting practices in China through sending questionnaires to 500 enterprises in 1998. A low response rate of 5% inhibited the generalisability of results, but still gave a basic outlook of environmental accounting practices of Chinese enterprises. The results showed that most of respondent questionnaires came from heavy pollution industries and near half of respondent enterprises provided environmental information disclosures, and that the most important driver of environmental disclosures came from environmental legislation or

government policies. This finding was supported by Li and Xiao (2002) who also conducted a survey to determine the use of and demand for environmental reporting by Chinese enterprises in 2001. The results of the survey showed that both mandatory reporting and voluntary reporting were in use, and that government regulators were the primary users of environmental reporting with investors and financial institutions being secondary users. They also noted that environmental legislation and government policies had significant and long-term impacts on corporate financial performance.

As to environmental disclosures, the two studies using questionnaires mentioned above (Wang et al., 1998 and Li and Xiao, 2002) failed to give specific analysis of the quantity and quality of environmental disclosures. According to *Standards for the Content and Form of Information Disclosure by Companies Issuing Securities to the Public (Guideline No. 1) – Prospectus* issued by China Securities Regulatory Commission (CSRC) in the year 1997, stock-listed companies should disclose information about environmental restriction factors and high dependency on limited natural resources when developing in their prospectuses. For this reason, Geng and Jiao (2002) undertook a study of environmental disclosures by analyzing the prospectuses of 30 stock-listed companies from heavy pollution industries during the period 1992 to 1999. They found that there was a total increase in environmental disclosures during that period. The content of disclosures varied from only

general environmental obligations to more detailed information about environmental policies and environmental performance. The results also indicated that environmental disclosures were typically qualitative in form and only 17% included monetary figures related to pollution control expenditures.

Another empirical study regarding environmental disclosure is Xiao and Hu (2005) who undertook an analysis on the annual reports of 1195 stock-listed companies both in Shanghai and Shenzhen Stock Exchange for the year 2002 and 2003. They found that the proportion of companies disclosing environmental information was generally not high (34% in 2002 and 37% in 2003) and that the level of environmental disclosures was related to industry environmental sensitivity, which meant that most companies providing environmental disclosures came from heavy pollution industries like mineral extraction, pulp and paper, chemicals and electric power. This situation has been mirrored in developed countries' empirical studies (see, for example, Deegan and Gordon, 1996; Neu et al., 1998; Campbell, 2004). Xiao and Hu (2005) also noted that companies disclosed environmental information mainly in the notes to the financial statements or the report of the board of directors. The results also showed that most disclosures concentrated on environmental investments, environmental financing and allowances from governments, pollutant discharge fees, and taxation and compensation fees of resources.

There have been some studies that focus on environmental sensitive industries, such as the pulp and paper industry. He and Li (2007) analyzed the annual reports of stock-listed companies in the pulp and paper industry for the year 2005. They found that the proportion of companies providing environmental disclosures was 77.78%, and that most companies disclosed information focusing on environmental investments, only 41% of companies disclosed environmental policies and strategies. However, no one has yet focused on the mineral extraction industry. This study is to examine environmental disclosures made by the Chinese mineral extraction industry.

Some studies have looked at extraordinarily hazardous events. Li (2007) examined the value relevance of environmental expenditure disclosures based on a chemical leak event. She found that there was no significant association between environmental disclosure and corporate abnormal returns during the event period, but abnormal returns were significantly associated with environmental disclosure after the news media exposure post-event.

In summary, environmental disclosure studies of China are more descriptive and less analytical, similarly to those of other developing countries.

3.4.3 Future directions

When discussing the status quo of environmental disclosures by Chinese

companies, Li (2004) indicated that the barriers in disclosing environmental information by companies included: legislation issues, the lack of environmental accounting standards, the proper measurement of environmental information and the proper allocation of environmental costs. These barriers also exist in the developed countries (see, for example, Mathews, 1997; Berthelot et al., 2003). Nevertheless, we have seen the growth in Chinese environmental legislation as discussed earlier, so it is likely that this will be matched in corporate environmental disclosures.

3.5 Environmental disclosure by the mining industry

As a heavy pollution industry, the mining industry and its individual members have increasingly been required to justify their existence and report their performance in order to get access to all kinds of resources (Peck and Sinding, 2003). One solution adopted by the industry to improve public image in recent years has been the environmental report (Peck and Sinding, 2003). Corporate environmental reporting is viewed as a means by which companies can demonstrate their practical implementation of the goals of sustainability in the industry. A major finding shows that companies in the mining industry are by far the greatest disclosers of environmental information (see, Dierkes and Preston, 1977; Gray, 1994; Tilt, 1997). KPMG (2006) reported an increase in the number of companies who include sustainability disclosures in their annual reports or provide separate sustainability reports in the Global Mining

Reporting Survey 2006.

Among the four major mining regions in the world (Australia, Canada, USA and South Africa), mining groups from Australia (e.g. BHP, WMC and Rio Tinto) are the best environmental reporters (Peck and Sinding, 2003). This is attributed to high environmental consciousness from Australian citizens and the effect of the Australian Minerals Industry Code for Environmental Management (Peck and Sinding, 2003). Frost (1999) conducted a study on environmental reporting by Australian extractive companies based on content analysis of annual reports. The results indicated that the larger companies were, the more environmental information they disclosed. Moreover, companies with better financial performance disclosed more environmental information, and companies provided more environmental disclosures if they received greater media coverage (Frost, 1999). According to Tilt and Symes (1999), a large proportion of environmental information disclosed by Australian mining companies was related to the rehabilitation of mine sites — this disclosure was encouraged by income tax advantages. Tilt and Symes (1999) declared that this finding might have implications for other countries with a dominant mining industry and similar taxation policy.

China is also one of the largest producers, consumers and traders of the world's mineral products. Although the mining industry plays an important role in the

development of Chinese economy, environmental disclosure studies focused on the mining industry are still rare in China.

As mentioned above, there is a shortage of social and environmental disclosure literature in the context of developing countries in general and China in particular. Even in extant literature from the context of China, most studies only focused on whether firms made environmental disclosures or not and failed to examine the quality as well as the quantity of corporate environmental disclosures. Some studies have focused on environmental sensitive industries, such as the pulp and paper industry, but no one has focused on the mineral extraction industry so far. Again, most studies used one year observation period, and therefore could not indicate the tendency of corporate environmental disclosures over time. Against this background, this study attempts to bridge the gap by a more recently longitudinal study to examine the quantity as well as the quality of environmental disclosure practices of Chinese stock-listed companies in the mineral extraction industry. It is expected that this would make a significant contribution to the environmental disclosure literature from the Chinese context.

CHAPTER FOUR - Theoretical Framework

Chapter three reviewed the extant literature on social and environmental disclosure research. In this chapter, the theoretical framework that is used to engage in this research is presented. Institutional theory is employed to explain corporate environmental disclosure practices.

The empirical investigation of corporate environmental disclosures is usually undertaken in some sort of theoretical context. As Gray et al. (1995a) argued, western-developed theoretical frameworks for explaining corporate social and environmental disclosures can be summarized into two groups. One regards social and environmental disclosure as an addendum to conventional accounting and its reports, with relevant theories including decision-usefulness, economic agency theory, stakeholder theory, legitimacy theory and institutional theory (Gray et al., 1995a). The other treats social and environmental disclosure as “residing at the heart of the role of information in the organization-society dialogue” (Parker, 2005, p.845), discussed in terms of political economy theory, deep green ecology theory and feminist-based theory (Gray et al., 1995a). Although different theories have different analytical insights and understandings, a number of theories overlap and provide mutually compatible interpretations of the same empirical evidence (Gray et al., 1995a). Both commonality and difference to common research problems have enriched the social and environmental disclosure literature.

Among those theories mentioned above, social and political theories, such as legitimacy theory or stakeholder theory, provide more comprehensive and insightful perspectives on environmental disclosure since they explicitly recognize that organizations evolve within a society which includes many political, social and institutional frameworks (see, for example, Patten, 1991; Roberts, 1992; Cormier and Gordon, 2001; Deegan et al., 2002).

4.1 A general introduction to institutional theory

Reflecting the overlapping nature of many theories, the concept of legitimacy is also central to institutional theory, which focuses on corporate environmental disclosures as an institutionalized practice (see, DiMaggio and Powell, 1983; Cormier et al., 2005). According to Dillard et al. (2004, p. 508), “an institution is an established order comprising rule-bounded and standardized social practices, and institutionalization is the process whereby the practices expected in various social settings are developed and learned.” Further, institutional theory is chiefly concerned with an organization’s interaction with the institutional environment, the impacts of external expectations on the organization, and the combination of these expectations as reflected in organizational practices (Martinez, 1999). Hence, under this theory, organizations will change their structures or operations to comply with external expectations about what structures are seen as appropriate (legitimate) (Deegan, 2002). In order to achieve legitimacy, organizations do not necessarily consider

only what one organization is actually doing, but also the need to accommodate what potentially influential publics are doing. This is one reason why organizations can be so similar. DiMaggio and Powell (1983) argue that a large part of similarity of organizations could be explained not as a result of competitive or efficiency pressures, but because of the fact that organizations need to be recognized as legitimate within an organizational field.

An organizational field consists of a group of organizations (suppliers, consumers, regulatory agencies, and other organizations that produce similar products or services) that constitute a recognized area of institutional life (DiMaggio and Powell, 1983). Once the organizational field is established, institutions with similar rules, norms and beliefs will create pressures for other organizations to seek legitimacy and strive for social conformity. For example, if the majority of other organizations in an industry have particular governance structures, there will be institutional pressure on an organization to also have such structures in place. As a result, an increasing homogeneity of organizational structures occurs. This can be regarded as an institutionalization; the process by which societal expectations of appropriate organizational behaviors influence the structuring and behaviors of organizations in specific ways (Meyer and Rowan, 1977). According to DiMaggio and Powell (1983, p. 148), the institutionalization process consists of four parts:

- an increase in the extent of interaction among organizations in the field; the emergence of sharply defined inter-organizational structures of domination

and patterns of coalition; an increase in the information load with which organizations in a field must contend; and the development of a mutual awareness among participants in a set of organizations that they are involved in a common enterprise.

These institutional processes exert influence through a series of mechanisms such as the imposition of organizational structure by coercive power, inducements created by resource dependence relationships, imitation and professionalization, and tend to induce isomorphic reflection in organizations (Aerts et al., 2003).

4.2 Mechanisms of institutional isomorphism

The process of homogenization of organizations is best described as “isomorphism” (DiMaggio and Powell, 1983). One type of isomorphism emphasized by DiMaggio and Powell (1983) is institutional isomorphism, which is the process of struggling for political and institutional legitimacy. DiMaggio and Powell (1983) further identify three mechanisms: coercive, mimetic and normative, through which institutional isomorphism occurs.

4.2.1 Coercive isomorphism

Coercive isomorphism results from the pressures exerted on organizations on the one hand by other organizations on which they are dependent and on the other hand by cultural expectations of the larger society (DiMaggio and Powell, 1983). Such isomorphism is usually driven by political power and legitimacy. The existence of a common legal environment affects many facets of an

organization's behaviour and structure, and organizational change is sometimes a direct response to governmental mandate (DiMaggio and Powell, 1983). For instance, mining companies develop recycling technologies to meet governmental energy saving requirements. As a result, organizations are increasingly homogeneous on the governmental arena. On the other hand, an existing resource dependence relationship between organizations and their dependent subsidiaries also compels subsidiaries to be subject to accounting practices of the parent corporation.

4.2.2 Mimetic isomorphism

DiMaggio and Powell (1983) argue that uncertainty is also a powerful force to encourage institutional isomorphism. Mimetic mechanism is especially described as a response to uncertainty: when definite solutions are not available, organizations attempt to imitate peers perceived to be more legitimate or successful. Such imitation may be diffused unintentionally through personnel flows within an organizational field or by medi-organizations such as consulting firms or industry trade associations (DiMaggio and Powell, 1983). Governmental recognition and support of key firms or organizations such as industry leader may grant these organizations legitimacy and lead other competing firms to imitate aspects of their structures so as to obtain similar rewards (DiMaggio and Powell, 1983). On the other hand, mimetic isomorphism can also be driven by the kind of social constructionist role (Aerts

et al., 2003). Aerts et al. (2003) argue that once enough social actors do something a certain way, that particular course of action becomes taken for granted or institutionalized and from then on, other similar social actors will imitate them and undertake that course of action without thinking.

4.2.3 Normative isomorphism

The third mechanism of institutional isomorphic change is normative isomorphism, which stems from professionalization as the collective struggle by members of an occupation to set the conditions and methods of work (DiMaggio and Powell, 1983). Professions tend to define explicit normative rules about organizational and professional behaviour through two channels: one is formal education produced by university specialists; the other is the development of professional networks across the organizational field (DiMaggio and Powell, 1983). DiMaggio and Powell (1983) also state that the filtering of personnel is an important mechanism for promoting normative isomorphism, such as the hiring of professionals from firms within the same industry, consequently, key staff of firms within the same industry with a common set of attributes will attempt to make decisions in a similar way and treat procedures of work as normatively approved and legitimated.

Owing to the existence of three mechanisms mentioned above, institutional isomorphic change occurs throughout the organizational field over time.

Organizations become more and more similar to other organizations in their field. This kind of similarity can make it easier for organizations to transact with other organizations, to be recognized as legitimate, to obtain public and private grants and contracts, and to attract professional staff (DiMaggio and Powell, 1983).

4.3 The application of institutional theory to accounting research

Institutional theory has been widely applied in accounting research to study the practice of accounting in organizations. The institutional framework has provided useful insights into the practice of accounting in organizations. The institutional theory based accounting research comprehensively represents accounting as the object of institutional practices and attempts to provide a better understanding of institutions, accounting practices and change processes. Institutional theory has wide applicability, which can be used to analyze all types of organizations because all organizations are institutionalized organizations (Scott, 1995). The extant accounting literature contains a number of institutional theory based studies dealing with various accounting practices. Some of these studies and their particular areas are showed as follows: management accounting change (Burns and Scapens, 2000; Collier, 2001), the accounting profession (Hunt and Hogler, 1993; Fogarty, 1996), accounting regulation (Hines et al., 2001), and accounting for nonprofit organizations (Irvine, 2000). These studies give evidence suggesting the importance of social

culture and environment on the practice of accounting as well as the use of accounting practices as rationalized institutions in order to maintain appearances of legitimacy (Dillard et al., 2004).

Considering that institutional theory can provide a comprehensive conceptual basis for investigating the changes in accounting practices as well as the impacts of these practices on institutional and organizational changes, this study also employs institutional theory as a theoretical framework to guide corporate environmental disclosure research.

4.4 Corporate environmental disclosure as institution-driven

Corporate environmental disclosure, as an accounting practice, can be regarded as a set of structures or practices of environment-conscious corporate behaviors, symbolizing the concept of stakeholder concern, which has become institutionalized over time (Scott, 1995). As an environmentally conscious corporate behavior, environmental disclosure is deemed to be a way to legitimize a firm's continued survival or operations to the outside world. Hence, managers of some firms adopt environmental disclosure policies for legitimacy concerns. On the other hand, the decision to adopt an environmental disclosure strategy by a firm's managers is typically made not only on the basis of legitimacy concerns, but access to the outcome of other firms' disclosure decisions (Cormier et al., 2005). For example, within an institutional context,

the decision by some influential firms (e.g. industry leaders) to adopt an elaborate environmental disclosure policy pushes managers of other firms in the same industry to adopt a similar policy. In this way, corporate environmental disclosure decision is driven by an institutional incentive. Under institutional theory, the evolution of corporate environmental disclosures over time is consistent with what other firms do in the same industry (imitation) and what the firm has done in the past (routine) and regulations, laws and customs (institutions) (Cormier et al., 2005).

In China, although the national government has established relevant environmental laws and regulations to encourage and mandate enterprises to disclose environmental information to the public, corporate voluntary environmental disclosure patterns are to a large extent affected by institutional factors. The incentive of corporate managers to adopt the environmental disclosure policy is likely perceived to be similar to other enterprises so as to cope with inter-organizational comparisons within the same organizational field. This can be regarded as one way to explain the development of voluntary environmental disclosures made by Chinese enterprises.

4.5 Institutional practices in corporate environmental disclosure

So far there seems to be no definite regulations and standards to guide and structure corporate environmental disclosure practices. However, social

environment-consciousness and relevant environmental laws and regulations can help to make corporate environmental disclosure behaviour recognized as an institution within an organizational field.

4.5.1 An introduction to the institutionalization process

From an institutional perspective, there is an institutionalization process for the development of corporate environmental disclosures. Managers of influential firms such as industry leaders are compelled by social pressures or governmental mandates to adopt environmental disclosure policy for the purpose of attaining legitimacy. Managers of other competing firms within the same industry observe the environmental disclosure policy of leaders and follow in their steps. In this way, seeking legitimacy becomes a coercive power to push some influential firms to adopt environmental disclosure policy. Some subsidiaries of these influential firms also follow them to adopt their environmental disclosure policy because subsidiaries' accounting practices must be compatible with the policies of the parent corporation. On the other hand, many competing firms tend to imitate the environmental disclosure policy that has been taken by those influential firms. Mimetic disclosure behaviours are usually subconscious without considering technical propriety only to comply with socially constructed ideas of what is legitimate. When more and more firms undertake imitation, the influential firms' disclosure policy and its contents gradually become the normative pattern of practices. At

the moment, mimetic disclosure behaviours become the performance of institutional scripts rather than a matter of internally grounded and autonomous choice or motivation (Scott, 1995). According to the theory, corporate environmental disclosure policy is adopted taken-for-granted by most firms within an industry. In this way, institutional isomorphism in corporate environmental disclosures occurs within an industry over time.

4.5.2 Mimetic processes in corporate environmental disclosure

Mimetic behaviour plays an important role in accelerating the tendency for environmental disclosure policies to be adopted by firms within an industry. There is difference in the speed with which organizations respond to external pressures and undertake mimetic behaviour. Some organizations are quick to imitate; others change only after many organizations pursue a practice and the legitimacy of that practice is seen to be largely supported. Increases in the volume of imitation can be regarded as indicative of an institutionalized effect (Aerts et al., 2003). Moreover, the extent of imitation differs among organizations. As Aerts et al. (2003) noted, early imitators, motivated by technical rationality, are more likely to customize practices of environmental disclosures to the firms' particular needs and capabilities. In contrast, later imitators are more inclined to adopt the normative model of environmental disclosure practice implemented by other adopting firms (Aerts et al., 2003). Even if there is a difference in the extent of imitation, mimetic isomorphism in

disclosure behaviour helps us understand the increasing environmental disclosures that occur within an industry.

Since mimetic behaviour is regarded as a response to uncertainty, it can be argued that uncertainty driven imitation would stimulate the quality level of corporate environmental disclosure (Aerts et al., 2003). Companies can cope with the uncertainty about the potential feedback consequences of their practices and deflect criticisms regarding their practices by determining environmental disclosure through an imitation process (Cormier et al., 2005). A particular disclosure structure, including the categories of information provided and the elaborate extent of disclosure, used by the influential firms is likely to be followed by imitators afterwards. For example, if an influential firm starts to disclose monetary information on expenditures for pollution control, this would be echoed by the imitators. In this way, owing to the potentially higher sensitivity and demand of quantitative information than that of descriptive and qualitative information (KPMG, 1999), imitating companies are expected to adopt mimetic patterns of quantitative disclosure with higher information quality level.

4.5.3 Corporate environmental disclosure as a routine

Normative practices adopted by imitators are easy to form a kind of routine. Routines, or actions that arise from the force of habit as well as standardized

processes, are well acknowledged to be a cornerstone of institutions (see, for example, March and Simon, 1958). Under institutional pressures, organizations repeat routine actions to reflect their tacit knowledge. For example, companies are likely to replicate their environmental disclosures from a prior period. In this way, companies at least conform to their stakeholders' expectations based on their prior disclosure habit and do not destabilize their internal environmental disclosure process (Cormier et al., 2005). Therefore, in addition to imitation, organizational routines requiring few conscious choices are also sources of institutional isomorphic change in environmental disclosure within the industry.

To sum up, once environmental disclosure policy is adopted by some influential firms, through imitation more and more firms begin to undertake environmental disclosure behaviours within an industry. As this becomes routine practice, firms keep environmental disclosure behaviours over time. According to institutional theory, the isomorphic process will lead to an increased environmental disclosure over time.

4.6 Chinese mineral extraction industry context

Within an institutional framework, corporate environmental disclosure behaviour is very much dependent on the country and industry specific context (see, Aerts et al., 2003; Cormier et al., 2005).

4.6.1 China specific context

Understanding the country specific context is relevant because of the cultural, sociopolitical and legal factors it embodies (Aerts et al., 2003). Social expectation and legal regulations offer cognitive and normative guidance for corporate legitimate behaviours and exert formal pressures on the institutionalization process of environmental disclosure. In China, the national government has issued a series of laws and regulations related to environmental protection and appointed the State Environmental Protection Administration (SEPA), the China Securities Regulatory Commission (CSRC) and their departments or agencies to supervise, inspect and direct corporate works in the field of environmental protection and information disclosure. All these initiatives have had a significant influence on the development of corporate environmental disclosure in China. According to Xiao and Hu (2005)'s survey, 37% Chinese stock-listed companies published environmental information in their annual reports in 2003 compared to 34% in 2002, a trend which is increasing. However, current regulations and governmental initiatives have not yet extended to the enforcement of environmental disclosure by Chinese enterprises. However, despite the lack of enforcement requirements, voluntary environmental disclosure has also increased at the same time accompanied by growing environmental laws and regulations. This increase can be regarded as the outcome of institutionalization of corporate environmental disclosure and be expected to continue to have an impact on the institutional status of

corporate environmental disclosure.

4.6.2 Mineral extraction industry specific context

Corporate environmental disclosure is also industry-specific. Not only is the level of corporate environmental disclosure different among industries, but also the content of corporate environmental disclosure will reflect the particular industry within which the firm operates (Aerts et al., 2003). First, as a heavy pollution industry, the mineral extraction industry has been showed to be more likely to provide environmental disclosures by prior research (see, for example, Dierkes and Preston, 1977; Tilt, 1997; Neu et al. 1998). That is to say, corporate environmental disclosure has a relatively developed tradition in the mineral extraction industry than other industries. This has certainly had an impact on the institutional status of corporate environmental disclosure in the mineral extraction industry. According to Xiao and Hu (2005), 87.5% listed mining companies had environmental disclosure in their annual reports in 2002 and 2003 respectively, which is the highest percentage among all industries in China. Moreover, it is well known that the mineral extraction industry is a kind of resource-scarce industry. Corporate operation and production largely depend on limited and irreproducible mineral resources. According to DiMaggio and Powell (1983), the greater the extent to which an organizational field is dependent on vital resources, the higher the level of institutional isomorphic change. Hence, the institutionalization of corporate environmental disclosure is

more likely to occur in the mineral extraction industry. In China, the national government has set up “mining right” to restrict mineral resources available for enterprises and “resource tax and resource compensation fee” to control the use of mineral resources through legislation. In this way, mineral extraction enterprises are placed under similar pressures to resources available and use, interact with uncertainty and are much more likely to form institutional isomorphism. Further, the institutional isomorphism of corporate environmental disclosure is to a certain extent affected by industry concentration (see, Westphal et al., 2001; Aerts et al., 2006). Firms evolving within highly concentrated industries, dominated by a number of large firms, are more likely to engage in environmental disclosure imitation than those operating in less concentrated industries (Aerts et al., 2006). In China, the mineral extraction industry is relatively concentrated, and is dominated by some large enterprises, such as Sinopec, PetroChina and Shenhua Energy. Industry concentration is expected to enhance the tendency in institutional isomorphism of environmental disclosure within the mineral extraction industry. Therefore, the Chinese mineral extraction industry has a relatively high environmental disclosure level, and has developed a significant tradition in corporate environmental disclosure. In such a context, it is expected that the institutionalization of environmental disclosure will be very pronounced in the Chinese mineral extraction industry and the institutionalization process will lead to an increased environmental disclosure over time.

In summary, institutional theory can help us to understand the isomorphic change of organizational decision-making. It can be used to explain the institutionalization of corporate environmental disclosures. According to institutional theory, this study intends to find out an increased tendency in corporate environmental disclosure within the mineral extraction industry in China over time.

CHAPTER FIVE – Research Method

In the preceding chapter the theoretical framework for this study was defined. The purpose of this chapter is to give a clear picture of how this study is carried out. The sample selection of this study is introduced. Content analysis is described as the method used to conduct this study.

In each research study, a research method must be chosen to answer the research question. In this chapter, a research design of this study is presented, including the sample selection part and the research method part. They will be discussed as follows.

5.1 Sample selection

The population of this study was all firms classified into the mineral extraction industry that are listed on both ShangHai Stock Exchange and ShenZhen Stock Exchange from 2005 to 2007. As reviewed in chapter three, Chinese environmental disclosure studies were up to 2005, but not much after that. In China, the State Environmental Protection Administration (SEPA) issued “Bulletin on Information Disclosure for Corporate Environmental Performance” to require enterprises that are listed on the non-compliance with environmental requirements list released by local environmental protection bureaus to disclose their environmental performances to the public, and to encourage non-listed enterprises to report their environmental performances on

a voluntary basis at the end of 2003. This regulation is expected to have an important impact on corporate environmental disclosures. Considering that 2004 was a transition period, this study chose 2005 as the beginning year of the observational period. In addition, some annual reports of sample companies prior to 2005 are not available from the websites of two stock exchanges. Considering the availability of data, the year 2005 was selected as the beginning year of this study.

As discussed in chapter three, the mineral extraction industry is widely recognized by previous studies as an environmentally sensitive industry with more obligation to disclose environmental information than other industries (see, for example, Patten, 1992; Deegan and Gordon, 1996; Hackston and Milne, 1996; Neu et al., 1998; Frost, 1999). Thus, environmental information disclosed by firms within this industry is more useful to corporate stakeholders than that of firms in non-environmentally sensitive industries.

A list of specific companies included in the sample is presented in Appendix Eight. There were between 24 and 31 mineral extraction companies listed on the two stock exchanges for each year from 2005 to 2007, giving 80 observations in total. These are summarized in Table 3.

Table 3: Mineral extraction companies listed on two stock exchanges for each year

Please see print copy for Table 3

The annual report was selected as the data source for corporate environmental disclosures study. The annual report is widely regarded as a primary information source for conveying a view of corporate operations to investors, creditors, employees and government regulators (Neu et al., 1998). Further, the annual report has been the source for most previous environmental disclosure studies (see, for example, Wiseman, 1982; Neu et al., 1998; Xiao and Hu, 2005). Annual reports of sample companies for this study were obtained in electronic editions from the two stock exchange websites.

The use of other sources besides the annual report, such as stand-alone environmental reports or web-based environmental reports, exist in the extant literature (see, for example, Cormier et al., 2005; Clarkson et al., 2008). However, in the context of China, these reports are rarely available. In this study, although several sample companies have stand-alone environmental reports separate from their annual reports, these reports are not readily

available from the two stock exchange websites. In order to maintain the consistency of data, this study only considered corporate environmental disclosures from their annual reports.

5.2 Research method

Consistent with previous studies in environmental disclosure (see, for example, Wiseman, 1982; Zeghal and Ahmed, 1990; Deegan and Gordon, 1996; Choi, 1999), this study employed content analysis to examine the level of corporate environmental disclosures. Content analysis is defined as “a research technique for making replicable and valid inferences from texts to the contexts of their use” (Krippendorff 2004, p. 18). It is a method of codifying the text (or content) of a piece of writing into various groups (or categories) depending on the selected criteria (Weber, 1990). Following coding, quantitative scales are derived to permit further analysis (Milne and Adler, 1999). According to Krippendorff’s definition, the potential contribution of content analysis is that it can empower researchers to work over the text to make valid inferences about hidden or underlying meanings and messages of interest (Weber, 1990). In the social sciences, where meanings and interpretations are crucial to the understating of social phenomena, content analysis has been commended as possibly one of the most important research techniques (Krippendorff, 2004).

Content analysis involves codifying qualitative and quantitative information

within the text into pre-defined categories, so the selection and development of analytical categories and units of analysis is an essential element of research design in content analysis.

5.2.1 Units of analysis

As mentioned above, the selection of appropriate units of analysis to use when gathering data is an important element when conducting content analysis. It is a matter of judgment, and individual researchers must exercise subjective choice in selecting units of analysis (Krippendorff, 2004). As Gray et al. (1995b) reported, there were some debates on this matter in the social and environmental disclosures literature. These debates on the units of analysis confused the issues of what should constitute the basis for coding the text and what should constitute the basis for measuring or counting the amount of disclosures (Milne and Adler, 1999). In other words, some authors failed to distinguish between the unit for coding the text and the unit for counting the amount of disclosures, but referred only to a single unit of analysis without explicit interpretation.

In content analysis two principal kinds of units need to be defined, separated and identified: recording units and context units (Krippendorff, 2004). Recording units are defined as the specific segments of content to be counted and placed in specified categories (Holsti, 1969; Carney, 1972; Krippendorff,

2004). The literature suggested that the recording units may be words, phrases, sentences, paragraphs, pages or even images (Carney, 1972; Weber, 1990). Although inevitably subjective, the choice of units should always be instructed by the purpose of analysis (Krippendorff, 2004). Recording units cannot be identified without considering the context in which they appear, thus context units are important when classifying a recording unit. Context units are defined as “the passages in which the recording units are set, the contexts which define their meaning” (Carney, 1972, p. 39). Context units are, therefore, of concern to the process of describing the recording units (Krippendorff, 2004). To sum up, it is necessary to clearly employ different unit of analysis as recording unit for counting and context unit for coding in order to use the content analysis in a reliable way.

While the accounting literature’s discussion was confused by the lack of clarity in the description of unitizing approaches, one point was apparent: many different units were used by accounting researchers when analyzing the content of annual reports and disagreement over the most appropriate unit persisted (Steenkamp and Northcott, 2007). As noted, Gray et al. (1995b) reported that pages tended to be the preferred analysis unit in corporate social reporting studies. Guthrie et al. (2004) argued that the paragraph method was more appropriate because meaning was commonly established with paragraphs rather than a word or sentence. Conversely, Milne and Adler (1999) claimed that as a

basis for coding, sentences were far more reliable than any other unit of analysis. Sentences are regarded as a conventional unit of speech or writing (Walden and Schwartz, 1997). The use of sentences as the basis for coding is quite common in social and environmental disclosure studies (see, for example, Wiseman, 1982; Zeghal and Ahmed, 1990; Walden and Schwartz, 1997). In this study, sentences were also used as context units for coding to capture the information related to given categories conveyed by sample companies' annual reports.

When the text is coded, quantification may be done in many ways. In earlier studies, the units used for measuring or counting the amount of environmental disclosures included words, sentences, paragraphs, pages, or even the proportion of page (see, for example, Deegan and Gordon, 1996; Ingram and Frazier, 1980; Patten, 1991). However, the Chinese language differs from English in the amount of information conveyed by each word, phrase, sentence or paragraph. For example, 'environment' is one word in English, but the same meaning is expressed by two words in Chinese. Furthermore, the sample companies in this study were expected to disclose a small quantity of environmental information in general, so the absolute number of lines was considered adequate for objective inter-firm comparisons. Therefore, similar to Choi (1999), this study used lines (including lines in the financial statements) as recording units for measuring the amount of environmental disclosures by

sample companies.

5.2.2 Coding categories

There is no generally accepted guidance on what is the best practice of categorizing text. How to define categories is an art (Krippendorff, 2004). According to Krippendorff (2004), each set of related categories must be exhaustive and mutually exclusive and defined in such a way that identifying an item by a category is not a discretionary process. The selection of particular coding categories in this study was based on a number of previous researchers' approaches (see, Wiseman, 1982; Choi, 1999; Patten, 2002). The specific criteria for choosing and developing the categories and items of environmental information disclosed by sample companies in their annual reports included three key ingredients:

- 1) Categories and items of environmental information used by Wiseman (1982). Wiseman (1982) reviewed environmental reporting literature (Dierkes and Preston, 1977; Estes, 1976; CEP, 1975), which provided proposed formats for environmental reports including items considered essential for complete environmental disclosure. Based on these literature, Wiseman (1982) designed an environmental disclosure rating list covering 18 items in four categories: economic factors (5 items), environmental litigation (2 items), pollution abatement (5 items), and other environmentally related information that does

not fall into the above three (6 items). Of the four categories, however, environmental litigation was ignored in this study for the reason that no data on this category were available from the sample companies.

2) Items of environmental information generally required to disclose by the regulations in China. In China, the extant environmental laws and regulations require enterprises to disclose some information relevant to the environment. The item “compliance with regulations and requirements” was designed to examine whether sample companies disclosed the information that are required by environmental laws and regulations or not.

3) Disclosure items identified by other studies investigating environmental disclosures in China. Some items used by previous studies on environmental disclosure in China were also considered for this study. Such as, environmental impacts of products and services, investment on environment, energy reserves and/or consumption information, and tax advantage due to environmental reasons (see, Li and Xiao, 2002; Xiao and Hu, 2005).

Based on the preceding criteria, a checklist of 18 items of environmental information by category is presented in Exhibit 1. The items used by this study were classified into four categories. Category one focused on a firm’s general disclosures with respect to the environment. For instance, firms disclosed that they had an environmental protection and energy saving policy, that their production had a significantly adverse impact on the environment, that they

obtained governmental awards for environmental protection, and information required by environmental laws and regulations. Category two focused on a firm's financial information disclosures related to the environment. For example, firms disclosed environmental expenditure for pollution control, environmentally related research and development, investing in new environmental technologies, financing for enhancing future environmental performance from the government, and land subsidence, restoration, rehabilitation and environmental cost. Firms' disclosures pertaining to environmental spending as a result of complying with the extant environmental laws and regulations were not included in this category. Category three included items related to pollution discharge and abatement. In this category, firms were assessed for the extent to which they disclosed their actual pollution emissions. Disclosing actual pollution information may convey critical ideas for stakeholders to assess the firm's long-term environmental performance (Clarkson et al., 2008). The final category focused on a firm's disclosures related to environmental sustainability. For instance, firms disclosed their energy reserves and energy use information, their conservation of natural resources and recycling efforts, and their tax advantage obtained for economizing resources.

Exhibit 1: Index Categories and Items of Information

1. General information related to the environment
 - 1.1 Environmental policies or company concern for the environment
 - 1.2 Compliance with regulations and requirements
 - 1.3 Environmental impacts of products and services
 - 1.4 Awards for environmental protection
2. Environmentally financial information
 - 2.1 Past and current expenditures for pollution control
 - 2.2 Past and current operating costs for pollution control
 - 2.3 Future estimates of expenditures for pollution control
 - 2.4 Future estimates of operating costs for pollution control
 - 2.5 Financing for pollution control
 - 2.6 Investment for pollution control
- 3 Pollutant discharge and abatement
 - 3.1 Air emission information
 - 3.2 Water discharge information
 - 3.3 Solid waste disposal information
 - 3.4 Control, installations, facilities or processes described
- 4 Environmental sustainability
 - 4.1 Energy reserves and/or consumption information
 - 4.2 Conservation of natural resources
 - 4.3 Recycling
 - 4.4 Tax advantage on economizing resources

5.2.3 Environmental disclosure index

An index, which is said to be a variable that correlates with what it claims to indicate, is the most commonly used analytical construct for content analysis (Krippendorff, 2004). In this study, a content analysis disclosure index was employed to examine the quality of environmental disclosures made by sample companies. An index should be sensitive enough to distinguish between different phenomena of interest, and it is constructed to help decide between two phenomena (Krippendorff, 2004), such as whether one year's environmental disclosure extent is higher than that of another.

The environmental disclosure index used in this study was adopted from Wiseman (1982), which has been used and slightly modified in many other studies (see, for example, Freedman and Wasley, 1990; Frost, 1999; Choi, 1999; Patten, 2002). Under this disclosure index method, rating of the disclosures was based on the presence or absence and the degree of specificity of each of the pre-defined 18 items by four categories. Based on the quantification, a score from zero to three was assigned to an individual item as an overall measure for the disclosure quality. More specific definitions of disclosure rating used for this index are provided as follows:

- Score = 3: an item was presented in the disclosure and was described in monetary or quantitative terms,
- Score = 2: an item was presented in the disclosure with company specific

information in non-quantitative terms,

- Score = 1: an item was mentioned only in general terms,
- Score = 0: an item was not present in the disclosure (Wiseman, 1982).

The scores of individual items in each category were added to yield the overall disclosure index score for each firm. A line count score was recorded for each firm to indicate the result for measuring the amount of the disclosure. In addition, average industry score for each item of disclosure was also compiled for inter-item comparisons.

5.2.4 Pre-testing for reliability and validity

Content analysts need to demonstrate the reliability of their coding instruments and the reliability of the data collected using those instruments so as to get valid research results (Milne and Adler, 1999). If research results are to be valid, the coded data or data set on which they are based, the individuals involved in their analysis, and the coding instruments themselves all must be reliable, which are separate but related issues of content analysis (Krippendorff, 2004).

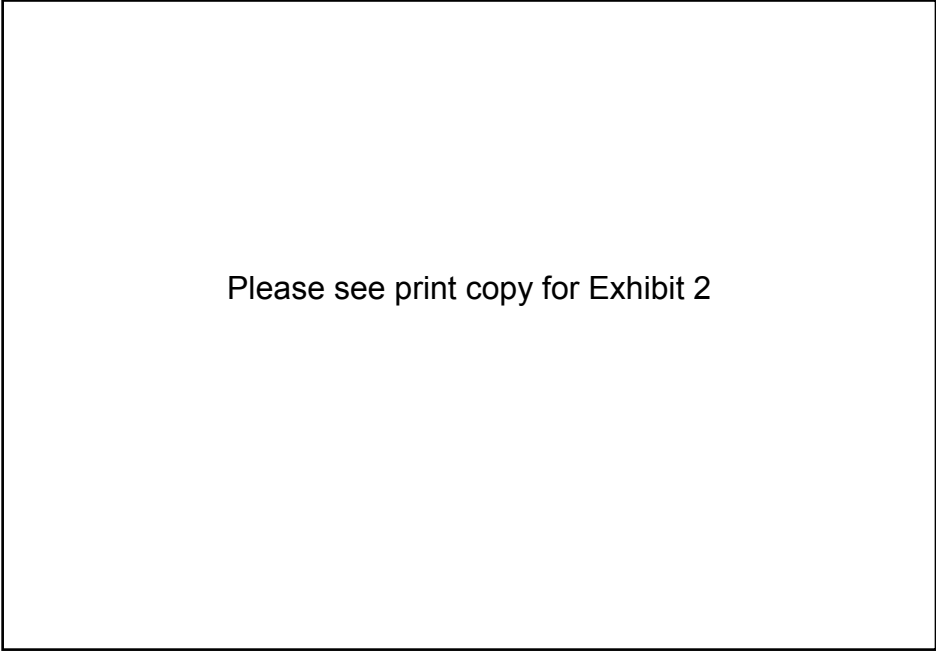
According to Krippendorff (2004), the reliability of content analysis covers three distinct types: stability, reproducibility and accuracy. Stability refers to the degree to which a coding process keeps the same way over time. It can be assessed through a test-retest procedure, such as the same coder is asked to code a set of annual reports twice at different time. The aim of reproducibility

is to measure the extent to which coding is the same when multiple coders are involved (Weber, 1990). Reproducibility is also termed “inter-coder reliability” (Krippendorff, 2004). The accuracy measure of reliability involves evaluating coding performance against a predefined standard set by a panel of experts, or known from previous studies (Milne and Adler, 1999). Whether reliability takes the form of stability, reproducibility or accuracy, it always boils down to measure the agreement achieved among coders regarding the assignment of units to given categories (Krippendorff, 2004). The measure of reliability for content analysis can be undertaken by several different forms of calculations, such as the coefficient of reliability, Scott’s (1955) pi, or Krippendorff’s (1980) α .

In this study, a pre-testing procedure was employed to test the reliability and validity of the coding instrument. The testing was undertaken on a set of sample companies’ annual reports for the previous reporting period. The author and two other coders (one with coding experience, one familiar with social and environmental disclosures research) were independently involved in the testing. As mentioned above, the reliability associated with the coding instruments themselves is as important as the coded data. Well specified decision categories, with well specified decision rules, may reduce discrepancies when used by relatively inexperienced coders (Milne and Adler, 1999). The coding process followed a set of basic rules which were obtained from prior work by Hackston

and Milne (1996) (see Exhibit 2).

Exhibit 2: Basic rules for coding



Please see print copy for Exhibit 2

Each coder was required to code the same sentences in the same way. They highlighted any sentence that was considered to be an environmental disclosure according to the definition and decision rules. After that, they classified the highlighted sentence according to which category of disclosure it belonged and its nature of disclosure (i.e. quantitative, non-quantitative, or generally declarative). Results were compared and any disagreements were thoroughly scrutinized and reconciled by reevaluation of the disclosure in question. In order to examine the stability of coders, the same work was asked to do again by all coders two weeks later. As a result, the discrepancies between two times by the same coder were quite negligible. From the discussions following each

coding work, some additions were made to the definitions of categories and decision rules of coding.

During the testing, the total number of judgments made by each coder and the coding outcome of each judgment were recorded for the purpose of calculating the reliability. The simplest measure of reliability is the coefficient of reliability, which is the ratio of the number of interjudge agreements to the total number of judgments. However, Holsti (1969) pointed out, this simple formula ignored the possibility that some agreements may occur by chance. Therefore, Krippendorff's α was used as a refinement of the coefficient of reliability. Krippendorff's α is well known and very flexible, which can be used with multiple coders, accounts for different sample sizes and missing data, and can be used for different kinds of variables.

Although no criteria or guidelines have been established for content analysis on social and environmental disclosures (Hackston and Milne, 1996), it is suggested that a value of 0.8 or above for reliability is acceptable (Guthrie and Mathews, 1985). Likewise, Milne and Adler (1999) suggested that a value of 0.75 or above for Krippendorff's α could be considered an acceptable reliability level for content analysis.²

² The final result of Krippendorff's α was 0.83, which meant that the categories selected for analysis were objective in the sense that independent coders could use them to achieve similar judgments.

This chapter has discussed the methodological framework of this research. As discussed, content analysis was adopted to examine the level of environmental disclosures made by sample companies. Sentences were used as context units for coding and lines were used as recording units for counting. A modified Wiseman (1982) disclosure index covering 18 items in four categories was employed to score corporate environmental disclosures.

CHAPTER SIX – Results and Discussion

Chapter five introduced the methodology of this study. In this chapter, the results of this research are presented and analyzed. The conclusion that a general increased tendency in corporate environmental disclosure occurred during the observational period is made.

6.1 General descriptive statistics of environmental disclosures made by the mineral extraction industry

From the number of firms disclosing environmental information in annual reports, there was an increase for the mineral extraction industry during the observational period, from 91.67 percent in 2005 to 96.77 percent in 2007 (see Table 4). As we can see, the percentage of companies with environmental disclosures for mineral extraction industry is relatively high, which is consistent with previous study (see, Xiao and Hu, 2005; Guo, 2005).

Table 4: Number and percentage of companies with environmental disclosures

	2005	2006	2007
Total companies	24	25	31
Disclosers	22	23	30
Percent (%)	91.67%	92.00%	96.77%

Note: discloser is a firm disclosing at least one item of environmental information in its annual report.

As mentioned above, line counting is used to evaluate the quantity of corporate environmental disclosures. A summary descriptive statistics of environmental disclosure line counts for sample companies is presented in Table 5. For the whole mineral extraction industry, there was a significant increase in the length of the environmental disclosures over the three year period, ranged from 0 to 109 lines. The mean value of environmental disclosure line counts for all sample companies has increased over 82 percent from 2005 to 2007.

Table 5: Descriptive Statistics of Environmental Disclosure Line Counts for Sample Companies

Year	Minimum	Maximum	Mean	Standard Deviation
2005	0	57	22.54	16.57
2006	0	58	27.96	16.25
2007	0	109	41.10	23.71

As to the quality of environmental disclosures made by the mineral extraction industry, Table 6 shows a descriptive statistics of environmental disclosure indexes for sample companies. There was also an obvious increase in the environmental disclosure indexes of sample companies from 2005 to 2007, ranging from 0 to 33. The mean value of environmental disclosure indexes for all sample companies increased by over 66 percent during the three year period, but the extent of increase in environmental disclosure index is lower than that of environmental disclosure line counts.

Table 6: Descriptive Statistics of Environmental Disclosure Indexes for Sample Companies

Year	Minimum	Maximum	Mean	Standard Deviation
2005	0	21	10.00	5.97
2006	0	22	11.60	6.10
2007	0	33	16.65	8.62

In summary, from the above presentation of descriptive statistics of environmental disclosure line counts and indexes for sample companies, we can see that a general increased tendency in whether the quantity or the quality of environmental disclosures by sample companies occurred from 2005 to 2007. As discussed in chapter four, institutional theory would suggest that this is the result of an institutionalization process of corporate environmental disclosure. The institutionalization process pushed more and more companies within the industry to adopt the environmental disclosure policy and to disclose more and more environmental information over time.

6.2 Environmental disclosure index analysis for the mineral extraction industry

Results of the scoring of items of information disclosed by sample companies over the observation period under the disclosure index are presented in Table 7 group.

Table 7a: Environmental disclosure scoring for the mineral extraction industry – 2005

Categories and items of information	Average industry score	Number of firms with score=3	Number of firms with score=2	Number of firms with score=1	Number of firms with score=0
1 General information related to the environment					
1.1 Environmental policies or company concern for the environment	1.42	2	12	4	6
1.2 Compliance with regulations and requirements	2.63	21	0	0	3
1.3 Environmental impacts of products and services	0.42	0	3	4	17
1.4 Awards for environmental protection	0	0	0	0	24
2 Environmentally financial information					
2.1 Past and current expenditures for pollution control	1	8	0	0	16
2.2 Past and current operating costs for pollution control	0.13	1	0	0	23
2.3 Future estimates of expenditures for pollution control	0.17	1	0	1	22
2.4 Future estimates of operating costs for pollution control	0.13	1	0	0	23
2.5 Financing for pollution control	0.5	4	0	0	20
2.6 Investment for pollution control	0.63	5	0	0	19
3 Pollutant discharge and abatement					
3.1 Air emission information	0.04	0	0	1	23
3.2 Water discharge information	0.21	1	0	2	21
3.3 Solid waste disposal information	0.21	1	0	2	21
3.4 Control, installations, facilities or processes described	0.04	0	0	1	23
4 Environmental sustainability					
4.1 Energy reserves or consumption information	1.08	6	1	6	11
4.2 Conservation of natural resources	0.21	1	0	2	21
4.3 Recycling	0.83	4	0	8	12
4.4 Tax advantage on economizing resources	0.38	3	0	0	21

Table 7b: Environmental disclosure scoring for the mineral extraction industry – 2006

Categories and items of information	Average industry score	Number of firms with score=3	Number of firms with score=2	Number of firms with score=1	Number of firms with score=0
1 General information related to the environment					
1.1 Environmental policies or company concern for the environment	1.56	1	17	2	5
1.2 Compliance with regulations and requirements	2.64	22	0	0	3
1.3 Environmental impacts of products and services	0.24	0	2	2	21
1.4 Awards for environmental protection	0.04	0	0	1	24
2 Environmentally financial information					
2.1 Past and current expenditures for pollution control	1.52	12	1	0	12
2.2 Past and current operating costs for pollution control	0.12	1	0	0	24
2.3 Future estimates of expenditures for pollution control	0.16	1	0	1	23
2.4 Future estimates of operating costs for pollution control	0.12	1	0	0	24
2.5 Financing for pollution control	0.84	7	0	0	18
2.6 Investment for pollution control	0.84	7	0	0	18
3 Pollutant discharge and abatement					
3.1 Air emission information	0	0	0	0	25
3.2 Water discharge information	0.12	1	0	0	24
3.3 Solid waste disposal information	0.28	2	0	1	22
3.4 Control, installations, facilities or processes described	0	0	0	0	25
4 Environmental sustainability					
4.1 Energy reserves or consumption information	1.36	6	5	6	8
4.2 Conservation of natural resources	0.48	2	1	4	18
4.3 Recycling	0.92	3	2	10	10
4.4 Tax advantage on economizing resources	0.36	3	0	0	22

Table 7c: Environmental disclosure scoring for the mineral extraction industry – 2007

Categories and items of information	Average industry score	Number of firms with score=3	Number of firms with score=2	Number of firms with score=1	Number of firms with score=0
1 General information related to the environment					
1.1 Environmental policies or company concern for the environment	1.97	6	20	3	2
1.2 Compliance with regulations and requirements	2.71	28	0	0	3
1.3 Environmental impacts of products and services	0.58	0	5	8	18
1.4 Awards for environmental protection	0.13	0	0	4	27
2 Environmentally financial information					
2.1 Past and current expenditures for pollution control	1.65	16	0	3	12
2.2 Past and current operating costs for pollution control	0.29	2	1	1	27
2.3 Future estimates of expenditures for pollution control	0.39	4	0	0	27
2.4 Future estimates of operating costs for pollution control	0.19	2	0	0	29
2.5 Financing for pollution control	1.19	12	0	1	18
2.6 Investment for pollution control	1.29	13	0	1	17
3 Pollutant discharge and abatement					
3.1 Air emission information	0.52	4	0	4	23
3.2 Water discharge information	0.58	5	1	1	24
3.3 Solid waste disposal information	0.35	3	0	2	26
3.4 Control, installations, facilities or processes described	0.55	4	1	3	23
4 Environmental sustainability					
4.1 Energy reserves or consumption information	2.19	18	4	6	3
4.2 Conservation of natural resources	0.68	2	1	13	15
4.3 Recycling	0.94	4	4	9	14
4.4 Tax advantage on economizing resources	0.45	4	1	0	26

Environmental information was disclosed by sample companies mainly in the notes to the financial statements and the report of board of directors. Among all categories and items of information disclosed, the item *compliance with regulations and requirements* has the highest average industry score for each year. Moreover, all the firms with this item of information disclosure in each year get scores of three, which means that all the firms disclosed this item of information in monetary or quantitative form. This result shows that mandatory environmental disclosure has the largest proportion and the highest quality. In China, although there seems to be no definite regulations and standards to guide and effective ways to structure corporate environmental disclosures, extant laws and regulations related to environment and resources, especially the *Bulletin on Information Disclosure for Corporate Environmental Performance* (2003), have put much pressure on companies to disclose environmental information. According to institutional theory, governmental regulations and requirements have become coercive powers to push companies within the industry to disclose environmental information, and compliance with regulations and requirements has become the behaviour to be done by companies in order to attain the purpose of seeking legitimacy. Although the average industry score of this item is highest among all the items, it increased only by 3 percent (from 2.63 in 2005 to 2.71 in 2007) during the whole period. This slow growth can also be explained by institutional theory. The existence of a common legal environment leads to direct imposition of standard disclosure

pattern to companies in the industry (DiMaggio and Powell, 1983). When most companies in the industry adopted standard disclosure pattern, such as disclosing information related to *compliance with regulations and requirements* in monetary or quantitative form, the average industry score of disclosure keep stable and the growth is relatively slow. For the mineral extraction industry, the information disclosed by sample companies on this item mainly included resource tax, resource compensation fee and mineral rights.

Environmental policies or company concern for the environment is the second item with higher average industry score for each year. Sample companies usually disclosed this item of information in the report of board of directors within the annual report. Although most sample companies voluntarily reported this item of information, the limited scores of three in Table 7 group indicate that this reporting is short of monetary or quantitative measures. However the numerous two scores in Table 7 group show that most disclosing firms reported specific information on corporate environmental policies or concern for the environment in their annual reports and not only in general terms. According to institutional theory, uncertainty driven imitation in voluntary environmental disclosure makes a particular disclosure structure used by the influential companies in the industry more likely to be followed by imitators afterwards.

Except for the item *compliance with regulations and requirements*, items under the category *environmentally financial information* were also frequently reported in monetary terms, especially the item *past and current expenditures for pollution control*. For sample companies, the information disclosed under the item *past and current expenditures for pollution control* mainly included pollution discharge fee, pollutant clear up fee and environmental protection expenditure. Over the observational period, financing and investment for pollution control by sample companies have significantly increased and the information on these two items were also reported in specific monetary measures by sample companies. Most financing for pollution control came from the central or local governments. This result indicates that both governments at all levels and companies themselves have paid more and more attentions to pollution control and environmental protection.

As an energy industry, the mineral extraction industry also reported much information classified into the category *environmental sustainability*. For example, the information on the item *energy reserves and/or consumption information* was disclosed by sample companies on a remarkable increase. The disclosure form for this item was mixed. Some companies reported specific numerical measures for this item, some gave specific information but in non-quantitative terms, and some only mentioned this information in general terms. This result was also found in other items under this category except the

item *tax advantage on economizing resources* (almost all companies with this disclosure reported the information in monetary form).

As Table 7 group show, sample companies relatively reported less information on the category *pollutant discharge and abatement* over the observational period, but there was an obvious improvement in 2007. The majority of sample companies failed to report specific information about air emission, water discharge, solid waste disposal and facilities for pollution control whether in non-quantitative or quantitative terms. According to previous studies from developed countries (see, for example, Deegan and Gordon, 1996), companies will suppress 'negative' disclosures, like pollutant discharge. This result reported in Table 7 group provides strong support for the above argument.

From the results mentioned above, the particular disclosure structure adopted by sample companies, including the categories of information provided and the extent of disclosure, was obviously similar. For instance, most sample companies voluntarily disclosed corporate environmental policies or company concern for the environment, most sample companies disclosed environmentally financial information in monetary terms, and the majority of sample companies failed to report pollution discharge information. As discussed in institutional theory, this similarity can be regarded as the result of inter-firm mimetic behaviours in environmental disclosure. Specific

environmental disclosure patterns used by some influential companies were followed by other companies within the industry afterwards. On the other hand, most companies were likely to replicate their environmental disclosure patterns from a prior period. As a result, the particular disclosure structure adopted by sample companies was retained as a routine for each year during the observational period.

6.3 Inter-firm comparisons of environmental disclosures in the mineral extraction industry

Environmental disclosure index and line counts for each disclosing company in the mineral extraction industry from 2005 to 2007 are listed in Table 8 group.

Table 8a: Environmental disclosure index and line counts for each disclosing company – 2005

No.	Company name	Line counts	Environmental disclosure index
1	SINOPEC Shengli Oilfield Dynamic Group Co. Ltd	3	3
2	Offshore Oil Engineering Co. Ltd	3	4
3	Tianjin Good Hand Railway Holding Co. Ltd	7	4
4	SINOPEC Zhongyuan Petroleum Co. Ltd	8	4
5	Tibet Mineral Development Co. Ltd	10	3
6	Shanxi Lanhua Sci-tech Venture Co. Ltd	10	11
7	Shandong Gold Mining Co. Ltd	12	5
8	Henan Shenhua Coal Industry and Electricity Power Co. Ltd	15	8
9	Kailuan Clean Coal Co. Ltd	18	9
10	Gansu Jingyuan Coal Industry & Electricity Power Co. Ltd	20	10
11	Shanghai Datun Energy Resources Co. Ltd	22	11
12	Guizhou Panjiang Refined Coal Co. Ltd	24	14
13	Shanxi Xishan Coal and Electricity Power Co. Ltd	27	12
14	Taiyuan Coal Gasification Co. Ltd	29	15
15	Hebei Jinniu Energy Resources Co. Ltd	33	14
16	Shanxi Guoyang New Energy Co. Ltd	35	18
17	Anhui Hengyuan Coal Industry & Electricity Power Co. Ltd	36	15
18	Yunnan Chihong Zinc & Germanium Co. Ltd	37	17
19	Yanzhou Coal Mining Co. Ltd	39	12
20	Inner Mongolia Yitai Coal Co. Ltd	41	13
21	Zhongjin Gold Co. Ltd	55	17
22	China Petroleum & Chemical Corporation	57	21

Table 8b: Environmental disclosure index and line counts for each disclosing company – 2006

No.	Company name	Line counts	Environmental disclosure index
1	Offshore Oil Engineering Co. Ltd	5	6
2	Tianjin Good Hand Railway Holding Co. Ltd	6	5
3	Tibet Mineral Development Co. Ltd	10	3
4	Shanxi Lanhua Sci-tech Venture Co. Ltd	16	14
5	Gansu Jingyuan Coal Industry & Electricity Power Co. Ltd	18	11
6	Shandong Gold Mining Co. Ltd	19	7
7	Henan Shenhua Coal Industry and Electricity Power Co. Ltd	22	8
8	Shanghai Datun Energy Resources Co. Ltd	23	13
9	Kailuan Clean Coal Co. Ltd	25	11
10	Shanxi Guoyang New Energy Co. Ltd	27	12
11	Yunnan Chihong Zinc & Germanium Co. Ltd	27	18
12	Datong Coal Industry Co. Ltd	30	8
13	Anhui Hengyuan Coal Industry & Electricity Power Co. Ltd	32	10
14	Inner Mongolia Yitai Coal Co. Ltd	34	12
15	Taiyuan Coal Gasification Co. Ltd	35	19
16	Hebei Jinniu Energy Resources Co. Ltd	41	16
17	Shanxi Xishan Coal and Electricity Power Co. Ltd	41	17
18	Pingdingshan Tian'an Coal Mining Co. Ltd	42	10
19	Shanxi Lu'an Environmental Energy Development Co. Ltd	43	16
20	Guizhou Panjiang Refined Coal Co. Ltd	44	19
21	Zhongjin Gold Co. Ltd	49	22
22	Yanzhou Coal Mining Co. Ltd	52	12
23	China Petroleum & Chemical Corporation	58	21

Table 8c: Environmental disclosure index and line counts for each disclosing company – 2007

No.	Company name	Line counts	Environmental disclosure index
1	Tianjin Good Hand Railway Holding Co. Ltd	3	3
2	Offshore Oil Engineering Co. Ltd	12	4
3	Tibet Mineral Development Co. Ltd	16	4
4	Gansu Jingyuan Coal Industry & Electricity Power Co. Ltd	16	10
5	Shandong Gold Mining Co. Ltd	23	11
6	China Oilfield Services Limited	25	8
7	Henan Shenhua Coal Industry and Electricity Power Co. Ltd	25	15
8	Inner Mongolia Pingzhuang Energy Resources Co. Ltd	26	9
9	Huolinhe Opencut Coal Industry Corporation Limited of Inner Mongolia	27	15
10	Shanxi Lanhua Sci-tech Venture Co. Ltd	28	17
11	Guizhou Panjiang Refined Coal Co. Ltd	30	17
12	Shanghai Datun Energy Resources Co. Ltd	31	20
13	Anhui Hengyuan Coal Industry & Electricity Power Co. Ltd	32	15
14	Kailuan Clean Coal Co. Ltd	38	27
15	Inner Mongolia Yitai Coal Co. Ltd	40	13
16	Datong Coal Industry Co. Ltd	41	20
17	Pingdingshan Tian'an Coal Mining Co. Ltd	44	14
18	Shanxi Xishan Coal and Electricity Power Co. Ltd	45	20
19	Western Mining Co. Ltd	47	7
20	Chenzhou Mining Group Co. Ltd	48	24
21	Zhongjin Gold Co. Ltd	50	25
22	Taiyuan Coal Gasification Co. Ltd	52	28
23	Petro China Company Limited	55	13
24	Yunnan Chihong Zinc & Germanium Co. Ltd	60	20
25	Hebei Jinniu Energy Resources Co. Ltd	61	25
26	Shanxi Guoyang New Energy Co. Ltd	68	28
27	Yanzhou Coal Mining Co. Ltd	71	17
28	China Petroleum & Chemical Corporation	73	24
29	Shanxi Lu'an Environmental Energy Development Co. Ltd	78	30
30	China Shenhua Energy Company Limited	109	33

From these tables, we can see that there is a big gap on environmental disclosure index and line counts across sample companies. Take the year 2007 for example, the longest disclosure was 109 lines and its index score was more than sixty percent of the possible score of 54. At the same time, there was still one company without any environmental disclosure in that year.

The length of corporate environmental disclosures fails to represent the quality of information disclosed. This can be seen by comparing the values of line counts and environmental disclosure index across sample companies. Some companies with longer disclosures failed to get the same higher index scores. One reason is that these companies provided only specific explanation of compliance with environmental regulations and requirements in often lengthy disclosures.

Among the listed companies in the mineral extraction industry, there are six companies from Shan Xi province, which is the largest energy base of China, and accounting for an important weight of the total. Since 2007, Shan Xi province has been regarded as the pilot province of sustainable development by central government, which may have a remarkable effect on mineral extraction companies. This can be seen by observing environmental disclosures made by six sample companies from the Shan Xi province in the year 2007. As Table 9 shows, all of six companies have an increase in whether the quantity or the

quality of environmental disclosures from the year 2006 to 2007. It can be argued that this makes a significant contribution to the remarkable increase of environmental disclosures made by the whole industry in the year 2007.

Table 9: Comparisons of environmental disclosures by sample companies from the Shan Xi province between 2006 and 2007

Company name	Line counts		EDI	
	2006	2007	2006	2007
Shanxi Lanhua Sci-tech Venture Co. Ltd	16	28	14	17
Shanxi Guoyang New Energy Co. Ltd	27	68	12	28
Shanxi Xishan Coal and Electricity Power Co. Ltd	41	45	17	20
Taiyuan Coal Gasification Co. Ltd	35	52	19	28
Datong Coal Industry Co. Ltd	30	41	8	20
Shanxi Lu'an Environmental Energy Development Co. Ltd	43	78	16	30

In addition, two large state owned companies (Shenhua Energy and Petro China) returned to the domestic stock market from overseas in 2007. These two enterprises have important influences and are dominant within the industry. They were listed on other more developed stock markets before returning to the domestic stock market, so they had higher environmental disclosure levels because of facing stronger environmental regulations and reporting requirements from developed stock markets. As the Table 8c indicates, these two companies have higher values of line counts and environmental disclosure index, especially Shenhua Energy. Therefore, it can be argued that their return may have some impacts on the level of environmental disclosures by the whole

industry.

In conclusion, a general increase in environmental disclosures by the mineral extraction industry occurred during the period 2005 to 2007 in terms of both the quantity and the quality of disclosure. This finding provided support for the applicability of institutional theory as an explanation for increased corporate environmental disclosure. However, there was a big gap on the level of environmental disclosures across sample companies. The length of corporate environmental disclosures failed to represent the quality of information disclosed. Sample companies disclosed environmental information mainly in the notes to the financial statements and the report of board of directors. Environmental information reported by sample companies in their annual reports included both mandatory and voluntary disclosures. Mandatory environmental disclosures were monetary or quantitative, and the disclosure form of voluntary environmental disclosures was mixed. The majority of sample companies suppressed 'negative' environmental disclosures.

CHAPTER SEVEN – Conclusions

In chapter six, the results of this research were discussed. In this chapter, conclusions about the research question are made. This is followed by a discussion of the research limitations, contributions and opportunities for future research.

Through analyzing sample companies' annual reports, this thesis has studied the environmental disclosure practices of Chinese stock-listed companies in the mineral extraction industry from 2005 to 2007. The findings indicated that there was an increased tendency in environmental disclosures made by the mineral extraction companies during the period 2005 to 2007 in terms of both the quantity and the quality of disclosure. This result can be explained by institutional theory as an institutionalization process of corporate environmental disclosure. However, there was a big gap on corporate environmental disclosure among different companies in the industry, and the length of environmental disclosures failed to represent the quality of information disclosed. Environmental disclosures made by mineral extraction corporations were both mandatory and voluntary. Mandatory environmental disclosures were monetary or quantitative, and the elaborate extent of voluntary environmental disclosures was mixed. The majority of mineral extraction corporations suppressed 'negative' environmental disclosures.

The findings of this study provided effective support for the applicability of

institutional theory in interpreting corporate environmental disclosure. Institutional theory is relatively unused in extant Chinese environmental disclosure studies. Therefore, this research fills a theoretical void in Chinese environmental disclosure studies.

In this study, a content analysis disclosure index was used to examine the quality of corporate environmental disclosure. Studies of environmental disclosure that use disclosure index are not present in extant Chinese literature. Therefore, the approach adopted in this research provides a methodological contribution to Chinese environmental disclosure studies.

It is to be cautioned that some limitations of this study are inevitable. An element of subjectivity was involved in determining what constituted a particular type of disclosure when using content analysis (Zegal and Ahmed, 1990). Given the potential problem caused by subjectivity, a pre-testing procedure was completed independently by the author and two other coders. Any disagreements were thoroughly examined and reconciled by careful reassessment of the disclosure in question. It is also important to note that the data source of this study was confined to corporate annual reports in examining the level of environmental disclosures, whereas companies may disclose environmental information in other media, such as websites or stand-alone environmental reports. Nevertheless, it is expected that these information

sources may not be significant in Chinese settings.

Despite these limitations, this study could provide some preliminary evidence on corporate environmental disclosures made by the Chinese mineral extraction industry. Further research on environmental disclosure is suggested to consider the following areas: (i) a widely continuing study aimed at analyzing whether firms disclose or not and what is disclosed; (ii) a study attempting to discover the determinants of managerial decisions to disclose environmental information; (iii) a study attempting to explore the value relevance and reliability of environmental disclosure and (iv) cooperation with other groups of professionals to develop regulations, standards and techniques for environmental disclosure practices.

REFERENCES

A Guidebook for Declaring Central Special Fund for Environmental Protection Projects (2006 - 2010), available at http://fgk.mof.gov.cn/do_moflaw/do_file_summary.nsf/vwFile/1EB27C2E760012824825737300333A4C?OpenDocument, Accessed: 2008, March 5.

Aerts, W., D. Cormier, et al. (2003). "Intra-industry imitation in corporate environmental disclosure: A neo-institutional perspective", Working paper, University of Antwerp.

Aerts, W., D. Cormier, et al. (2006). "Intra-industry imitation in corporate environmental reporting: An international perspective." *Journal of Accounting and Public Policy* 25, pp. 299-331.

Alnajjar, F. K. (2000). "Determinants of Social Responsibility Disclosures of US Fortune 500 Firms: An Application of Content Analysis." *Advances in Environmental Accounting & Management* 1, pp. 163-200.

Al-Tuwaijri, S. A., T. E. Christensen, et al. (2004). "The relations among environmental disclosure, environmental performance and economic performance: a simultaneous equations approach." *Accounting, Organizations and Society* 29(5-6), pp. 447-471.

Anderson, R. H. (1977). "Social Responsibility Accounting: Time to Get Started." *CPA Magazine* February, February, pp. 28-31.

Andrew, B. H., F. A. Gul, et al. (1989). "Note on corporate social disclosure practices in developing countries: the case of Malaysia and Singapore." *British Accounting Review* 21(4), pp. 371-376.

Arnold, P. J. (1990). "The state and political theory in corporate social disclosure research: a response to Guthrie and Parker." *Advances in Public Interest Accounting* 4, pp. 177-181.

Barnett, A. H. and C. C. James (1974). "Accounting for Corporate Social Performance: A Survey." *Management Accounting*, November, pp. 23-26.

Batley, H. and L. E. Tozer (1993). "Sustainable development: an accounting perspective." *Accounting Forum* 17(2), pp. 38-61.

Belal, A. R. (2000). "Environmental reporting in developing countries: empirical evidence from Bangladesh." *Eco-Management and Auditing* 7(3), pp. 114-121.

Belkaoui, A. (1976). "The Impact of Disclosure of the Environmental Effects of Organizational Behavior on the Market " *Financial Management*, Winter, pp. 26-31.

Belkaoui, A. (1980). "The Impact of Socio-Economic Accounting Statements on the Investment Decision: An Empirical Study." *Accounting, Organizations and Society* 5(3), pp. 263-283.

Belkaoui, A. and P. G. Karpik (1989). "Determinants of the corporate decision to disclose social information." *Accounting, Auditing & Accountability Journal* 2(1), pp. 36-51.

Berthelot, S., D. Cormier, et al. (2003). "Environmental Disclosure Research: Review and Synthesis." *Journal of Accounting Literature* 22, pp. 1-44.

Bewley, K. and Y. Li (2000). "Disclosure of Environmental Information by Canadian Manufacturing Companies: A Voluntary Disclosure Perspective " *Advances in Environmental Accounting & Management* 1, pp. 201-226.

Blacconiere, W. G. and D. M. Patten (1994). "Environmental Disclosures, Regulatory Costs and Changes in Firm Value." *Journal of Accounting and Economics* 18(3), pp. 357-377.

Bowman, E. H. and M. Haire (1975). "A Strategic Posture Toward Corporate Social Responsibility." *California Management Review* 18(2), pp. 49-58.

Brown, N. and C. Deegan (1998). "The Public Disclosure of Environmental Performance Information - A Dual Test of Media Agenda Setting Theory and Legitimacy Theory" *Accounting and Business Research* 29(1), pp. 21-41.

Burns, J. and R. Scapens (2000). "Conceptualizing management accounting change: an institutional framework." *Management Accounting Research* 11, pp. 3-25.

Campbell, D. (2004). "A longitudinal and cross-sectional analysis of environmental disclosure in UK companies—a research note." *The British Accounting Review* 36, pp. 107-117.

Campbell, D., G. Moore, et al. (2006). "Cross-sectional effects in community disclosure." *Accounting, Auditing & Accountability Journal* 19(1), pp. 96-114.

Carney, T. F. (1972). *Content Analysis: A Technique for Systematic Inference from Communications*. University of Manitoba Press, Winnipeg.

China Water (2008). "Water pollution in China", available at <http://www.chinawater.net/chinaWaterToday/viewpaper.asp?id=5811>, Accessed: 2008, March 12.

Choi, J. S. (1999). "An investigation of the initial voluntary environmental disclosures made in Korean semi-annual financial reports." *Pacific Accounting Review* 11(1), pp.73-102

Clarkson, P., Y. Li, et al. (2004). "The market valuation of environmental capital expenditures by pulp and paper companies." *The Accounting Review* 79(2), pp. 329-354.

Clarkson, P. M., Y. Li, et al. (2008). "Revisiting the relation between environmental performance and environmental disclosure: an empirical analysis." *Accounting, Organizations and Society* 33(4/5), pp. 303-327.

Collier, P. (2001). "The power of accounting: a field study of local financial management in a police force." *Management Accounting Research* 12, pp. 465-486.

Cooper, C., P. Taylor, et al. (2005). "A discussion of the political potential of social accounting." *Critical Perspectives on Accounting* 16(7), pp. 951-974.

Cormier, D. and I. M. Gordon (2001). "An examination of social and environmental reporting strategies." *Accounting, Auditing & Accountability Journal* 14(5), pp. 587-616.

Cormier, D. and M. Magnan (1999). "Corporate Environmental Disclosure Strategies: Determinants, Costs and Benefits." *Journal of Accounting, Auditing and Finance* 14(4), pp. 429- 451.

Cormier, D. and M. Magnan (2001). "Corporate Environmental Reporting: An International Comparison." Working Paper (UQAM).

Cormier, D. and M. Magnan (2003). "Environmental Reporting Management: A Continental European Perspective." *Journal of Accounting and Public Policy* 22, pp. 43-62.

Cormier, D., M. Magnan, et al. (2005). "Environmental Disclosure Quality in Large German Companies: Economic Incentives, Public Pressures or Institutional Conditions?" *European Accounting Review* 14(1), pp. 3-39.

Council on Economic Priorities (1975). *The CEP Report*, CEP, New York.

Dasgupta, S., J. H. Hong, et al. (2006). "Disclosure of environmental violations and stock market in the Republic of Korea." *Ecological Economics* 58, pp. 759-777.

Deegan, C. (2002). "The Legitimising Effect of Social and Environmental Disclosures - A Theoretical Foundation." *Accounting, Auditing & Accountability Journal* 15(3), pp. 282-311.

Deegan, C., S. Geddes, et al. (1995). "A survey of Australian accountants' attitudes on environmental reporting." *Accounting Forum* 19(2/3), pp. 143-163.

Deegan, C. and B. Gordon (1996). "A study of the environmental disclosure practices of Australian corporations." *Accounting and Business Research* 26(3), pp. 187-199.

Deegan, C. and M. Rankin (1996). "Do Australian companies report environmental news objectively? An analysis of environmental disclosures by firms prosecuted successfully by the Environmental Protection Authority." *Accounting, Auditing & Accountability Journal* 9(2), pp. 50-67.

Deegan, C., M. Rankin, et al. (2002). "An examination of the corporate social and environmental disclosures of BHP from 1983-1997: a test of legitimacy theory." *Accounting, Auditing & Accountability Journal* 15(3), pp. 312-343.

Dierkes, M. and L. E. Preston (1977). "Corporate Reporting for the Physical Environment: A Critical Review and Implementation Proposal." *Accounting, Organizations and Society* 2(1), pp. 3-22.

Dillard, J. F., J. T. Rigsby, et al. (2004). "The making and remaking of organization context: Duality and the institutionalization process." *Accounting, Auditing & Accountability Journal* 17(4), pp. 506-542.

Dilley, S. C. and J. J. Weygandt (1973). "Measuring Social Responsibility: An Empirical Test." *The Journal of Accountancy* September, pp. 62-70.

DiMaggio, P. J. and W. W. Powell (1983). "The iron cage revisited: institutional isomorphism and collective rationality in organizational fields." *American Sociological Review* 48(April), pp. 147-160.

Disu, A. and R. H. Gray (1998). "An exploration of social reporting and MNCs in Nigeria." *Social and Environmental Accounting* 18(2), pp. 13-15.

Dye, R. A. (1985). "Disclosure of Nonproprietary Information." *Journal of Accounting Research* 23(1), pp. 123-145.

EIA Report, available at <http://www.beijing.gov.cn>, Accessed: 2008, March 08.

Environmental Information, available at <http://www.sepa.gov.cn>, Accessed: 2008, February 11.

Ernst and Ernst (1972-1978). *Social Responsibility Disclosure Surveys*, Ernst and Ernst, Cleveland, OH.

Estes, P. (1976). "Standards for Corporate Social Reporting" *Management Accounting*, November, pp. 19-22.

Fekrat, M. A., C. Inclan, et al. (1996). "Corporate Environmental Disclosures: Competitive Disclosure Hypothesis Using 1991 Annual Report Data." *The International Journal of Accounting* 31(2), pp. 175-195.

Financial System for Industrial Enterprises (Cai Gong Zi, 1992, No.574), http://fgk.mof.gov.cn/do_moflaw/do_file_summary.nsf/vwFile/F4E928C416FF0DD948256E06001D79F2?OpenDocument, Accessed: 2008, March 5.

Fogarty, T. J. (1996). "The imagery and reality of peer review in the US: insights from institutional theory." *Accounting, Organizations and Society* 18, pp. 243-267.

Freedman, M. and C. Wasley (1990). "The Association Between Environmental Performance and Environmental Disclosure in Annual Reports and 10Ks." *Advances in Public Interest Accounting* 3, pp. 183-193.

Frost, G. R. (1999). "Environmental Reporting: An Analysis of Company Annual Reports of the Australian Extractive Industries 1985-1994." Unpublished PhD, The University of New England.

Frost, G. R. (2007). "The Introduction of Mandatory Environmental Reporting Guidelines: Australian Evidence." *ABACUS* 43(2), pp. 190-216.

Geng, J. X. and R. J. Jiao (2002). "Exploring the Disclosures of Information of Environmental Accounting in Listed Companies." *Accounting Research* (1), pp. 43-47.

Gibson, R. and J. E. Guthrie (1995). "Recent environmental disclosures in annual reports of Australian public and private sector organisations." *Accounting Forum* 19(2/3), pp. 111-127.

Gray, R., R. Kouhy, et al. (1995a). "Corporate social and environmental reporting: a review of the literature and a longitudinal study of UK disclosure."

Accounting, Auditing & Accountability Journal 8(2), pp. 47-77.

Gray, R., R. Kouhy, et al. (1995b). "Methodological themes: constructing a research database of social and environmental reporting by UK companies." Accounting, Auditing & Accountability Journal 8(2), pp. 78-101.

Gray, R., D. Owen, et al. (1987). *Corporate Social Reporting: Accounting and Accountability*. Prentice-Hall, London.

Gray, R. H. (1993). "Current practice in environmental reporting." Social and Environmental Accounting 13(1), pp. 6-9.

Gray, R. H. (1994). "Social and Environmental Accounting, Accountability and Reporting: New Wine in Old Skins or Silk Purses from Sow's Ears?" Accounting Forum 17(4), pp. 4-30.

Grojer, J. E. and A. Stark (1977). "Social accounting: a Swedish attempt." Accounting, Organizations and Society 2(4), pp. 349-386.

Guo, P. Y. (2005). "Corporate Environmental Reporting and Disclosure in China." CSR Asia 2005.

Gupta, P. P. and N. Nayar (2007). "Information content of control deficiency disclosures under the Sarbanes-Oxley Act: An empirical investigation." International Journal of Disclosure and Governance 4(1), pp. 3-24.

Guthrie, J. and L. Parker (1989). "Corporate Social Reporting: A Rebuttal of Legitimacy Theory." Accounting and Business Research 9(76), pp. 343-352.

Guthrie, J. and L. Parker (1990). "Corporate Social Disclosure Practice: A Comparative International Analysis." Advances in Public Interest Accounting 3, pp. 159-176.

Guthrie, J., R. Petty, et al. (2004). "Using content analysis as a research method to inquire into intellectual capital reporting" Journal of Intellectual Capital 5(2), pp. 282-293.

Guthrie, J. E. and M. R. Mathews (1985). "Corporate social accounting in Australia." Corporate Social Performance and Policy 7, pp. 251-277.

Hackston, D. and M. J. Milne (1996). "Some determinants of social and environmental disclosures in New Zealand companies." Accounting, Auditing & Accountability Journal 9(1), pp. 77-108.

Harte, G. and D. L. Owen (1991). "Environmental disclosure in the annual reports of British companies: a research note." *Accounting, Auditing & Accountability Journal* 4(3), pp. 51-61.

He, W. H. and T. Q. Li (2007). "Realistic Reflections on the Disclosure of Environmental Accounting." *Journal of Jinling Institute of Technology (Social Science)* (1), pp. 54-57.

Hegde, P., R. Bloom, et al. (1997). "Social financial reporting in India: a case." *The International Journal of Accounting* 32(2), pp. 155-172.

Hines, T., K. McBride, et al. (2001). "We're off to see the wizard." *Accounting, Auditing & Accountability Journal* 14(1), pp. 53-84.

Hogner, R. H. (1982). "Corporate Social Reporting: Eight Decades of Development at US Steel." *Research in Corporate Social Performance and Policy* 4, pp. 243-250.

Holsti, O. R. (1969). *Content Analysis for the Social Sciences and Humanities*. Addison-Wesley, London.

Hughes, S. B., A. Anderson, et al. (2001). "Corporate Environmental Disclosures: Are They Useful in Determining Environmental Performance?" *Journal of Accounting and Public Policy* 20, pp. 217-240.

Hughes, S. B., J. F. Sander, et al. (2000). "Do Environmental Disclosures in US Annual Reports Differ by Environmental Performance?" *Advances in Environmental Accounting & Management* 1, pp. 141-161.

Hunt, H. G. and R. L. Hogler (1993). "An institutional analysis of accounting growth and regulation in the United States." *Accounting, Organizations and Society* 18, pp. 341-360.

Ilinitch, A. Y., N. S. Soderstrom, et al. (1998). "Measuring Corporate Environmental Performance." *Journal of Accounting and Public Policy* 17, pp. 383-408.

Information Office of the State Council (1996). "Environmental Protection in China", available at http://news.xinhuanet.com/zhengfu/2002-11/18/content_633191.htm, Accessed: 2008, February 10.

Information Office of the State Council (2006). "Environmental Protection in China (1996-2005)", available at

<http://www.lawinfochina.com/Wbk/display.asp?id=52&keyword=>, Accessed: 2008, March 5.

Information Office of the State Council (2007). "China's Energy Conditions and Policies", available at <http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File229.pdf>, Accessed: 2008, March 4.

Ingram, R. W. (1978). "An Investigation of the Information Content of (Certain) Social Responsibility Disclosures." *Journal of Accounting Research* 16(2), pp. 270-285.

Ingram, R. W. and K. B. Frazier (1980). "Environmental Performance and Corporate Disclosure." *Journal of Accounting Research* 18(2), pp. 614-621.

Interim Measures on the Collection of Pollution Discharge Fee (1982), available at http://english.sepa.gov.cn/Policies_Regulations/regulations/Pollution_Discharge_Fee/200711/t20071122_113275.htm, Accessed: 2008, February 28.

Irvine, H. J. (2000). "Powerful friends: the institutionalization of corporate accounting practices in an Australian religious/charitable organization." *Third Sector Review* 6(1/2), pp. 5-26.

Jaggi, B. and M. Freedman (1982). "An Analysis of the Information Content of Pollution Disclosures." *The Financial Review* 19(5), pp. 142-152.

Kaya, U. and H. E. Yayla (2007). "Remembering Thirty-five Years of Social Accounting: A Review of the Literature and the Practice", Working paper.

Kisenyi, V. and R. H. Gray (1998). "Social disclosure in Uganda." *Social and Environmental Accounting* 18(2), pp. 16-18.

Klare, M. T. (2001). *Resource Wars: The New Landscape of Global Conflict*. Henry Holt and Co, New York.

KPMG (1999). *KPMG International Survey of Environmental Reporting 1999*. De Meern, KPMG.

KPMG (2006). *Global Mining Reporting Survey 2006*. Toronto, KPMG.

Kreuze, J. G., G. E. Newell, et al. (1996). "Environmental disclosures: what companies are reporting." *Management Accounting* 78(1), pp. 37-42.

Krippendorff, K. (1980). *Content Analysis: An Introduction to Its Methodology*. Sage Publications, Beverly Hills.

Krippendorff, K. (2004). *Content Analysis: An Introduction to Its Methodology (2nd ed.)*. Sage Publications, London.

Li, D. (2007). "Environmental expenses and the disclosure of information related to the value of a special industry company research." *Journal of Modern Accounting and Auditing* 3(3), pp. 58-63.

Li, J. F. and H. Xiao (2002). "The Status quo, Demand and Future of Environmental Reporting in Chinese Enterprises " *Accounting Research*(4), pp. 42-51.

Li, X. (2004). "Theory and Practice of Environmental Management Accounting: Experience of Implementation in China." *The International Journal of Technology Management & Sustainable Development* 3(1), pp. 47-57.

Li, Y., G. D. Richardson, et al. (1997). "Corporate Disclosure of Environmental Liability Information: Theory and Evidence." *Contemporary Accounting Research* 14(3), pp. 435-474.

Linowes, D. F. (1972). "Social-economic accounting." *Journal of Accountancy* 142, pp. 37-42.

Logsdon, J. M., (1985). "Organizational responses to environmental issues: oil refining companies and air pollution": 26, in Preston, L. E. (eds.), *Research in Corporate Social Performance and Policy*, vol. 7, New York, JAI Press.

Magness, V. (2002). "The Value Relevance of Environmental Disclosures - an Event Study in the Canadian Mining Industry." Working Paper, Ryerson University.

Magness, V. (2006). "Strategic posture, financial performance and environmental disclosure: an empirical test of legitimacy theory." *Accounting, Auditing & Accountability Journal* 19(4), pp. 540-563.

Martinez, R. J. (1999). "Efficiency motives and normative forces: combining transaction costs and institutional logic." *Journal of Management* 26, pp. 27-43.

Mathews, M. R. (1984). "A suggested classification for social accounting research." *Journal of Accounting and Public Policy* 3, pp. 199-221.

Mathews, M. R. (1997). "Twenty-five Years of Social and Environmental Accounting Research." *Accounting, Auditing & Accountability Journal* 10(4),

pp. 481-531.

Measures on the Administration of Pollution Sources Monitoring (1999), available at http://english.sepa.gov.cn/Policies_Regulations/regulations/Environmental_Standards_Monitoring/200711/t20071122_113261.htm, Accessed: 2008, February 29.

Meyer, J. W. and B. Rowan (1977). "Institutionalized organizations: formal structure as myth and ceremony." *American Journal of Sociology* 83, pp. 340-363.

Milne, M. J. and R. W. Adler (1999). "Exploring the reliability of social and environmental disclosures content analysis." *Accounting, Auditing & Accountability Journal* 12(2), pp. 237-256.

Mobley, S. C. (1970). "The Challenges of Socio-Economic Accounting." *The Accounting Review*, October, pp. 762-768.

Murray, A., D. Sinclair, et al. (2006). "Do financial markets care about social and environmental disclosure?: Further evidence and exploration from the UK." *Accounting, Auditing & Accountability Journal* 19(2), pp. 228-255.

National Energy Administration (2007). *News Conference*, available at http://www.gov.cn/jrzq/2008-08/20/content_1075206.htm, Accessed: 2008, August 21.

Neu, D., H. Warsame, et al. (1998). "Managing public impressions: environmental disclosures in annual reports." *Accounting, Organizations and Society* 23(3), pp. 265-282.

O'Connor, L. (2006). "Empirical Research in Social and Environmental Accounting: A Meta-review", Working paper. La Trobe University.

Owen, D. (2008). "Chronicles of wasted time?: a personal reflection on the current state of, and future prospects for, social and environmental accounting research." *Accounting, Auditing & Accountability Journal* 21(2), pp. 240-267.

Parker, L. D. (2005). "Social and environmental accountability research: a view from the commentary box." *Accounting, Auditing & Accountability Journal* 18(6), pp. 842-860.

Patten, D. M. (1991). "Exposure, Legitimacy and Social Disclosure." *Journal of Accounting and Public Policy* 10, pp. 297-308.

Patten, D. M. (1992). "Intra-industry environmental disclosures in response to the Alaskan oil spill: A note on legitimacy theory " *Accounting, Organizations and Society* 17(5), pp. 471-475.

Patten, D. M. (2000). "Changing superfund disclosure and its relation to the provision of other environmental information." *Advances in Environmental Accounting & Management* 1, pp. 101-121.

Patten, D. M. (2002). "The relation between environmental performance and environmental disclosure: a research note." *Accounting, Organizations and Society* 27, pp. 763-773.

Peck, P. and K. Sinding (2003). "Environmental and Social Disclosure and Data-Richness in the Mining Industry." *Business Strategy and the Environment* 12(3), pp. 131-146.

Power, M. (1991). "Auditing and environmental expertise: between protest and professionalisation." *Accounting, Auditing & Accountability Journal* 4(3), pp. 30-42.

Provisions on the Administration of Report and Registration of Pollutants Discharge (1992), available at http://english.sepa.gov.cn/Policies_Regulations/regulations/Pollution_Discharge_Fee/200711/t20071122_113271.htm, Accessed: 2008, February 27.

Puxty, A. (1986). "Social accounting as immanent legitimation: a critique of a technicist ideology." *Advances in Public Interest Accounting* 1, pp. 95-111.

Regulations of Environmental Inspection on Companies Accessing to or Refinancing from the Stock Market (2003), available at http://www.zhb.gov.cn/info/gw/huangfa/200306/t20030616_85622.htm, Accessed: 2008, March 2.

Regulations on Environmental Management of Construction Project (1998), available at http://english.mep.gov.cn/Policies_Regulations/policies/EIA1/200711/t20071120_113154.htm, Accessed: 2008, February 28.

Regulations on the Administration of Environmental Protection in the Exploration and Development of Offshore Petroleum (1983), available at http://english.sepa.gov.cn/Policies_Regulations/regulations/Marine_Environment/200710/t20071022_111648.htm, Accessed: 2008, March 1.

Regulations on the Prevention of Pollution Damage to the Marine Environment by Land-based Pollutants (1990), available at http://english.sepa.gov.cn/Policies_Regulations/regulations/Marine_Environment/200710/t20071022_111647.htm, Accessed: 2008, March 1.

Richardson, A. J. (1985). "Symbolic and substantive legitimation in professional practice." *Canadian Journal of Sociology* 10(2), pp.139-152.

Richardson, A. J. (1987). "Accounting as a legitimating institution." *Accounting, Organizations and Society* 12(4), pp. 341-355.

Richardson, A. J. and M. Welker (2001). "Social Disclosure, Financial Disclosure and the Cost of Equity Capital." *Accounting, Organizations and Society* 26(7/8), pp. 597-616.

Roberts, C. B. (1991). "Environmental disclosures: a note on reporting practices in mainland Europe." *Accounting, Auditing & Accountability Journal* 4(3), pp. 62-71.

Roberts, R. W. (1992). "Determinants of corporate social responsibility disclosure: an application of stakeholder theory." *Accounting, Organizations and Society* 17, pp. 595-612.

Rockness, J. W. (1985). "An Assessment of the Relationship Between US Corporate Environmental Performance and Disclosure." *Journal of Business Finance & Accounting* 12(3), pp. 339-354.

Ross, G. H. B. (1971). "Social Accounting: Measuring the Unmeasurables." *Canadian Chartered Accountant*, July, pp. 46-54.

Ryan, B., R. W. Scapens, et al. (1992). *Research Method and Methodology in Finance and Accounting*. Academic Press Ltd, London.

Savage, A. A. (1994). "Corporate social disclosure practices in South Africa: a research note." *Social and Environmental Accounting* 14(1), pp. 2-4.

Scott, W. A. (1955). "Reliability of content analysis: the case of nominal scale coding." *Public Opinion Quarterly* 19, pp. 321-325.

Scott, W. R. (1995). *Institutions and Organizations*. Sage, Thousand Oaks, CA.

SEPA (2003). *Bulletin on Information Disclosure for Corporate Environmental Performance*, China Youth Newspaper.

Shane, P. B. and B. H. Spicer (1983). "Market response to environmental information produces outside the firm." *The Accounting Review* 58, pp. 521-538.

Singh, D. R. and J. M. Ahuja (1983). "Corporate social reporting in India." *The International Journal of Accounting* 18(2), pp. 151-169.

Smith, M., K. Yahya, et al. (2007). "Environmental disclosure and performance reporting in Malaysia." *Asian Review of Accounting* 15(2), pp. 185-199.

Standards for the Content and Form of Information Disclosure by Companies Issuing Securities to the Public (Guideline No.1) – Prospectus (1997, revised in 2006), available at <http://www.csrc.gov.cn/n575458/n6807967/n6808062/n6809508/6810839.html>, Accessed: 2008, March 3.

Standards for the Content and Form of Information Disclosure by Companies Issuing Securities to the Public (Guideline No.6) – Legal Statements for IPO (1999), available at <http://www.ndcnc.gov.cn/datalib/2003/PolicyLaw/DL/DL-11936>, Accessed: 2008, March 3.

Standards for the Content and Form of Information Disclosure by Companies Issuing Securities to the Public (Guideline No.9) – Application Files for IPO (2001, revised in 2006), available at <http://www.csrc.gov.cn/n575458/n6807967/n6808062/n6809508/6810968.html>, Accessed: 2008, March 3.

State Development Planning Commission (1995). "Environmental Protection", available at <http://wwwold.sdpc.gov.cn/c/cc/ccb/cbb036e.htm>, Accessed: 2008, March 2.

Steenkamp, N. and D. Northcott (2007). "Content analysis in accounting research: the practical challenges." *Australian Accounting Review* 17(3), pp.12-25.

Summary of Chinese Legal System for Environmental Protection (2006), available at http://www.zjtt.gov.cn/introduce/newsdetail.jsp?doc_id=20060620172833_45, Accessed: 2008, February 17.

Teoh, H. Y. and G. Thong (1984). "Another look at corporate social responsibility and reporting: an empirical study in a developing country." *Accounting, Organizations and Society* 9(2), pp. 189-206.

The Cleaner Production Promotion Law of the PRC (2002), available at http://english.sepa.gov.cn/Policies_Regulations/laws/envir_elatedlaws/200710/t20071009_109966.htm, Accessed: 2008, February 27.

The Coal Industry Law of the PRC (1996), available at http://english.sepa.gov.cn/Policies_Regulations/laws/envir_elatedlaws/200710/t20071009_109947.htm Accessed: 2008, February 25.

The Energy Conservation Law of the PRC (1997), available at http://english.sepa.gov.cn/Policies_Regulations/laws/envir_elatedlaws/200710/t20071009_109953.htm Accessed: 2008, February 23.

The Environmental Impact Assessment Law of the PRC (2002), available at <http://english.mofcom.gov.cn/aarticle/policyrelease/internationalpolicy/200703/20070304470743.html>, Accessed: 2008, February 25.

The Environmental Protection Law of the PRC (1989), available at http://english.sepa.gov.cn/Policies_Regulations/laws/environmental_laws/200710/t20071009_109928.htm, Accessed: 2008, February 5.

The Marine Environmental Protection Law of the PRC (1982, revised in 1999), available at <http://www.chinamining.org/Policies/2006-07-18/1153190362d5.html>, Accessed: 2008, March 4.

The Mineral Resources Law of the PRC (1986, revised in 1996), available at http://english.sepa.gov.cn/Policies_Regulations/laws/envir_elatedlaws/200710/t20071009_109919.htm, Accessed: 2008, February 19.

The Prevention and Control of Air Pollution Law of the PRC (1987, revised in 1995, 2000), available at http://english.sepa.gov.cn/Policies_Regulations/laws/environmental_laws/200710/t20071009_109943.htm, Accessed: 2008, February 19.

The Prevention and Control of Noise Law of the PRC (1996), available at http://english.sepa.gov.cn/Policies_Regulations/laws/environmental_laws/200710/t20071009_109950.htm, Accessed: 2008, February 21.

The Prevention and Control of Solid Wastes Law of the PRC (1995), available at http://english.sepa.gov.cn/Policies_Regulations/laws/environmental_laws/200710/t20071009_109944.htm, Accessed: 2008, February 19.

The Prevention and Control of Water Pollution Law of the PRC (1984, revised in 1996), available at http://english.sepa.gov.cn/Policies_Regulations/laws/environmental_laws/200710/t20071009_109915.htm, Accessed: 2008, February 18.

Tilt, C. A. (1994). "The Influence of External Pressure Groups on Corporate Social Disclosure: Some Empirical Evidence." *Accounting, Auditing & Accountability Journal* 7(4), pp. 47-72.

Tilt, C. A. (1997). "Environmental Policies of Major Australian Companies: Australian Evidence." *British Accounting Review* 29(4), pp. 367-394.

Tilt, C. A. and C. F. Symes (1999). "Environmental Disclosure by Australian Mining Companies: Environmental Conscience or Commercial Reality?" *Accounting Forum* 23(2), pp. 137-154.

Tinker, A. M. (1985). *Paper Prophets: A Social Critique of Accounting*. Holt, Reinhart and Winston, Eastbourne.

Tinker, T. and R. Gray (2003). "Beyond a critique of pure reason: from policy to politics to praxis in environmental and social research." *Accounting, Auditing & Accountability Journal* 16(5), pp. 727-761.

Tozer, L. E. and M. R. Mathews (1994). "Environmental auditing: current practice in New Zealand." *Accounting Forum* 18(3), pp. 47-69.

Trotman, K. T. (1979). "Social Responsibility Disclosures by Australian Companies." *Chartered Accountant in Australia*, March, pp. 24-28.

Trotman, K. T. and G. W. Bradley (1981). "Associations between social responsibility disclosure and characteristics of companies." *Accounting, Organizations and Society* 6(4), pp. 355-362.

Tsang, E. W. K. (1998). "A longitudinal study of corporate social reporting in Singapore: the case of the banking, food and beverages and hotel industries." *Accounting, Auditing & Accountability Journal* 11(3), pp. 624-635.

Ullmann, A. E. (1976). "The Corporate Environmental Accounting System: a Management Tool for Fighting Environmental Degradation." *Accounting, Organizations and Society* 1(1), pp. 71-79.

Ullmann, A. E. (1985). "Data in search of a theory: a critical examination of the relationships among social performance, social disclosure and economic performance of US firms " *Academy of Management Review* 10(3), pp.

540-557.

United Nations Economic and Social Commission for Asia and the Pacific (2000). "State of Environment in Asia and the Pacific 2000", available at <http://www.unescap.org/esd/environment/soe/2000/documents/CH08.PDF>, Accessed: 2008, March 8.

Verrecchia, R. E. (1983). "Discretionary Disclosure." *Journal of Accounting and Economics* 5, pp. 179-194.

Voon, P. K. (2007). "China's Energy Needs and Economic Relations with reference to Southeast Asia." Conference paper.

Walden, W. D. and B. N. Schwartz (1997). "Environmental disclosures and public policy pressure." *Journal of Accounting and Public Policy* 16(2), pp. 125-154.

Wang, L. Y., C. Y. Yin, et al. (1998). "An Investigation and analysis on Environmental Accounting Practices of Chinese Enterprises." *Accounting Research* (8), pp. 17-23.

Weber, R. P. (1990). *Basic Content Analysis* (2nd ed.). Sage Publications, Newbury Park, CA.

Wei, Z. H. (2004). "Economic Development and Energy Issues in China" Working paper: 25.

Westphal, J. D., M. D. Seidel, et al. (2001). "Second-order imitation: uncovering latent effects of board network ties." *Administrative Science Quarterly* 46, pp. 717-747.

Wilmshurst, T. D. and G. R. Frost (2000). "Corporate Environmental Reporting: A Test of Legitimacy Theory." *Accounting, Auditing & Accountability Journal* 13(1), pp. 10-26.

Wiseman, J. (1982). "An Evaluation of Environmental Disclosures Made in Corporate Annual Reports." *Accounting, Organizations and Society* 7(1), pp. 53-63.

Xiao, S. F. and W. Hu (2005). "A Study on the Environmental Information Disclosure System of Chinese Enterprises." *Accounting Research* (3), pp. 47-52.

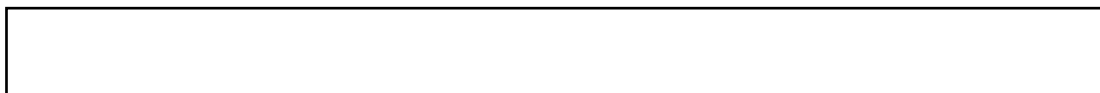
Xiao, S. F. and H. Y. Mi (2004). "Analysis on the Survey of Enterprises' Environmental Protection and Accounting - Views on the Necessity and

Feasibility of Establishing Environmental Accounting in China." Green China (22).

Xinhua News Agency (2008). "Pollution poisons Guangxi villagers", available at <http://www.chinadialogue.net/blog/show/single/en/2460-Pollution-poisons-Guangxi-villagers>, accessed: 2008, October 20.

Zeghal, D. and S. A. Ahmed (1990). "Comparison of social responsibility information disclosure media used by Canadian firms." Accounting, Auditing & Accountability Journal 3(1), pp. 38-53.

Zhu, J. F. and H. F. Xue (2007). "Research on Environmental Accounting in China: History, Status Quo and Future." Journal of Modern Accounting and Auditing 3(1), pp. 41-46.



Disclosure in Environmental Laws

- 1 The Marine Environmental Protection Law of the People's Republic of China (1982, revised in 1999) (National Congress, 1999)

This law is a basic law for the country to protect the marine environment and prevent damage to the marine environment resulting from coastal construction projects, offshore oil exploration and exploitation, operations of vessels and dumping of wastes. Article 43 requires enterprises running coastal construction projects to submit Environmental Impact Assessment (EIA) reports to the state competent authorities when undertaking the project feasibility study. Article 60 states that enterprises with the permission to dump wastes into the sea should record the details of wastes and report to the competent authorities afterward.

- 2 The Prevention and Control of Water Pollution Law of the People's Republic of China (1984, revised in 1996) (National Congress, 1984)

This law aims at preventing water pollution and protecting water resources. Within this law, Article 14 requires enterprises discharging pollutants into water to report the details of pollutants discharged and treatment facilities to their local environmental protection department. If any substantial change occurs in the details of pollutants discharged, enterprises mentioned above should report to the same department in time. Article 15 states that enterprises with exceeding discharges must set down a program to deal with such discharges and report to their local environmental protection department.

- 3 The Mineral Resources Law of the People's Republic of China (1986,

revised in 1996) (National Congress, 1986)

This law is enacted for the purpose of regulating the mining industry, protecting mineral resources and ensuring the long-term needs of sustainable development. According to Article 3, enterprises wishing to explore or mine mineral resources need to make applications to the government and cannot start their activities until their applications are approved. Article 5 states that enterprises must pay resource tax and resource compensation fee for mining mineral resources in accordance with relevant regulations.

4 The Prevention and Control of Air Pollution Law of the People's Republic of China (1987, revised in 1995, 2000) (National Congress, 1987)

This law is the major statute that deals with air pollution and protects the atmospheric environment. According to Article 12, enterprises discharging atmospheric pollutants must report the details of pollutants discharged and treatment facilities for pollutants to the local environmental protection department. They need to report again in case of any substantial change in the details of pollutants discharged. Article 20 stipulates that any enterprise must promptly report to the local environmental protection department in case of any air pollution emergency resulting from discharging toxic or harmful gases or leaking radioactive substances, at the same time take emergency measures to prevent and control the air pollution hazard.

5 The Environmental Protection Law of the People's Republic of China (1989) (National Congress, 1989)

According to this law, enterprises that refuse the inspection by governments at all levels, or fail to report the details of pollutants discharged to the relevant authorities, will be warned or fined.

6 The Prevention and Control of Solid Wastes Law of the People's Republic of China (1995) (National Congress, 1995)

This law is enacted with the intention of preventing environmental pollution caused by solid wastes and ensuring public health. Article 31 states that enterprises producing industrial solid wastes need to present the details of wastes to the local environmental protection department. Article 45 also requires enterprises which produce dangerous wastes must report to and register with the government in accordance with relevant regulations.

7 The Prevention and Control of Noise Law of the People's Republic of China (1996) (National Congress, 1996)

This law is applied to prevent and control environmental noise pollution. Within this law, Article 15 states that enterprises making environmental noises should use facilities to prevent and control noise pollution and need to report to the competent authorities in advance if they want to remove or disuse such facilities. According to Article 24, any industrial enterprise making environmental noises due to the use of equipment in the course of production should report to the competent authorities the details of its equipment and the level of noises produced. Article 29 also requires enterprises running construction project to submit a report to the local environmental protection

department before the commencement of construction if the construction is supposed to make noises. In addition, Article 42 states that commercial enterprises located in noise sensitive areas which produce noises due to the use of equipment in the course of business operation, should report to the competent authorities the information about equipment and solutions to prevent noise pollution in details.

8 The Coal Industry Law of the People's Republic of China (1996) (National Congress, 1996)

This law is enacted in order to utilize and protect coal resources efficiently, standardize the production of coal products, and promote the development of the coal industry. In accordance with Article 19, an application must be submitted to the competent authorities for approval in order to establish a coal mining enterprise. Article 22 also requires coal mining enterprises to submit applications to the relevant government department for coal production licenses before starting production.

9 The Energy Conservation Law of the People's Republic of China (1997) (National Congress, 1997)

This law is the major law enacted to promote energy conservation by all sectors of the country and ensure sustainable development of national economy. According to Article 26 enterprises manufacturing energy consumption products need to indicate the information about energy consumption on the labels or specifications of their products. Article 28 stipulates that vital energy

consumption enterprises should periodically submit their energy utilization reports including energy efficiency, energy conservation measures and benefits from energy conservation to the government in accordance with relevant regulations.

10 The Environmental Impact Assessment(EIA) Law of the People's Republic of China (2002) (National Congress, 2002)

This law is enacted to evaluate the possibly environmental effects caused by the construction of any project, so as to take precautions against that. According to this law, a developer should complete an EIA prior to project construction and submit an EIA report to the government. The project cannot be launched until the environmental protection bureau approves the report. (An example of EIA report is presented in Appendix Two.)

11 The Cleaner Production Promotion Law of the People's Republic of China (2002) (National Congress, 2002)

This law is the major statute enacted to promote cleaner production, reduce environmental pollution and ensure the sustainable development of the economy and society. Within this law, Article 17 states that the relevant government departments may publish a list of the names of heavy pollution companies in local mass media. According to Article 31, enterprises appearing on the list required in Article 17 must periodically publish the details of their pollutant discharge.

APPENDIX TWO - An Example of EIA Report

The information required and format of an EIA report provided by the Beijing Environmental Protection Bureau are as follows:

1. Basic introduction of the project
 - Title, builder, location, budget, contact etc.
2. Overview of the situation where the project is located
 - Natural environment
 - Social environment
3. Overview of environmental quality status
 - Key environmental problems in the location
 - Key environmental objects that should be protected
4. Standards to be applied
 - Standards of environmental quality
 - Discharge standards
 - Indicators
5. Technical analysis
 - Details of technical analysis
 - Working procedures that produce pollutants
6. Principle pollutants and emissions
 - Air pollutants
 - Waste water
 - Solid wastes
 - Noise
 - Others
7. Environmental impact analysis
 - Environmental impact when the project is being constructed
 - Environmental impact when the project is being run
8. Measures to deal with the problems
 - Air pollutants
 - Waste water
 - Solid wastes
 - Noise
 - Others
9. Conclusions and suggestions

Source by: <http://www.beijing.gov.cn>

**Environmental Disclosure by the State Environmental
Protection Administration (SEPA)**

1. Interim Measures on the Collection of Pollution Discharge Fee (1982)
(SEPA, 1982)

These measures are promulgated pursuant to Article 18 of the Environmental Protection Law of the People's Republic of China (1989), which states that "in cases where discharged pollutants exceed the specified national standards, a fee shall be charged according to the quantity and concentration of the pollutants discharged as specified in the relevant regulations." Within these measures, Article 4 requires pollutant discharging enterprises to report and register the details of pollutants including categories, quantities and densities to the local environmental protection department. These details of pollutants discharged will be used as the basis for charging pollution discharge fee after inspected by the local environmental protection department.

2. Regulations on the Administration of Environmental Protection in the
Exploration and Development of Offshore Petroleum (1983) (SEPA, 1983)

These regulations are formulated pursuant to the Marine Environmental Protection Law of the People's Republic of China and employed to prevent and control pollution to the marine environment caused by offshore petroleum exploration and development. According to Article 16, when significant pollution accidents like oil overflow, oil leakage and well blowout occur, operating enterprises should immediately take effective measures to control and

eliminate the pollution, and at the same time make a report to the local competent authorities.

3. Regulations on the Prevention of Pollution Damage to the Marine Environment by Land-based Pollutants (1990) (SEPA, 1990)

These regulations are promulgated with a view to strengthen the supervision of land pollution sources and prevent the pollution by land-based pollutants to the marine environment. Within these regulations, Article 6 states that enterprises discharging land-sourced pollutants into the sea must report to and register with the local environmental protection department regarding the categories, quantities and densities of pollutants discharged and the conditions of treating facilities. Enterprises mentioned above also need to be approved by the local environmental protection department in case of any change in the details reported.

4. Provisions on the Administration of Report and Registration of Pollution Discharge (1992) (SEPA, 1992)

These provisions are formulated with a view to strengthen the supervision and management of pollutants discharge. In accordance with these provisions, pollutants discharging enterprises should submit the Pollutants Discharge Report and Registration Form to the competent departments within a specified period of time, and provide the details of pollutants including categories, quantities, densities, locations and prevention measures. If any substantial changes occur in the details of pollutants, enterprises mentioned above need to

report these changes to the government. For enterprises refusing to report or providing mendacious information, the competent authorities may impose a fine.

5. Regulations on Environmental Management of Construction Project (1998)
(SEPA, 1998)

These regulations are formulated in order to prevent and control environmental pollutions arising from construction projects. According to these regulations, enterprises that run construction projects making significant effects on the environment must submit EIA reports to the government; enterprises that run construction projects making light effects on the environment should submit environmental impact forms to the government; and enterprises that run construction projects making little effects on the environment may only fill in registration forms. After completion, construction projects should be inspected by the government.

6. Measures on the Administration of Pollution Sources Monitoring (1999)
(SEPA, 1999)

These measures are formulated with a view to strengthen the monitoring of pollution sources. According to these measures, environmental protection bureaus at all levels should establish local pollution sources monitoring networks. Pollutant discharging enterprises that have installed uninterrupted automatic monitoring devices should connect the monitoring devices with the local monitoring network, and report the monitoring results directly to the

environmental protection bureau.

7. Regulations of Environmental Inspection on Companies Accessing to or Refinancing from the Stock Market (2003) (SEPA, 2003)

These regulations are released for the purpose of avoiding environmental risks associated with heavy pollution companies which plan to access to or refinance from the stock market. In accordance with these regulations, companies from heavy pollution industries which want to access to or refinance from the stock market should report to the local environmental protection departments and submit required documents. Environmental protection departments at provincial level should take an on site inspection in 30 days and release the results to the public after 10 days.

8. Bulletin on Information Disclosure for Corporate Environmental Performance (2003) (SEPA, 2003)

This bulletin is issued in accordance with the Cleaner Production Promotion Law of the People's Republic of China, with a view to restrict corporate environmental information disclosures. According to this bulletin, local environmental protection bureaus should periodically release lists of non-compliant enterprises to the public via the mass media. Listed enterprises must disclose their environmental performance information of the previous year prior to March 31 of each year. Environmental information required to be disclosed by non-compliant enterprises includes: corporate environmental policy, situation of environmental compliance, pollutant discharge level,

condition of pollution elimination and payment for discharge fee. As to non-listed enterprises, environmental disclosure is encouraged but on a voluntary basis. (See Appendix Four for full text of the Bulletin)

Corporate Environmental Performance

The State Environmental Protection Administration issued the “Bulletin on Information Disclosure of Corporate Environmental Performance” on November 5, 2003.

The Bulletin stipulates that non-compliant enterprises should disclose their corporate environmental performances to the public. According to the Bulletin, local environmental protection bureaus (EPBs) should release non-compliance corporate lists periodically to the public via local media (newspaper, television, etc.). Enterprises which have been put onto the list recently should disclose their performance for the first half of this year. Starting from 2004, listed enterprises should disclose their environmental performances of the previous year by March 31 every year. Non-listed enterprises can report their environmental performances on a voluntary basis.

Whenever the following situations occur, local EPBs should publicize relevant information on their websites or report to SEPA for information disclosure:

- During routine inspective monitoring, the occurrence that emissions/discharges of major pollutants beyond the limit of national or local emission/discharge standards is successively more than twice;
- During routine inspective monitoring, the occurrence that emissions/discharges exceed the allowable level prescribed in emission/discharge permit is successively more than twice;
- During on-site inspection, the occurrence of non-compliance is

successively more than twice;

- Serious pollution damage occurred; and collective complaints received.

Environmental information required to be disclosed include: corporate environmental policy, emission/discharge level, situation of pollution abatement, state of environmental compliance, payment for pollution levy, etc.

Information provided should be accurate and relevant data should be available at least for 3 years successively. The provision of other information, such as resource consumption and environmental targets for the next year, is encouraged but on a voluntary basis.

Source: China Youth Newspaper, 11/5/2003

Disclosure by the China Securities Regulatory Commission

(CSRC)

1. Standards for the Content and Form of Information Disclosure by Companies Issuing Securities to the Public (Guideline No.1) – Prospectus (1997, revised in 2006) (CSRC, 1997)

This guideline aims at supervising information disclosures by enterprises applying for Initial Public Offerings (IPO), and protecting investors' legal rights and interests. According to this guideline, the prospectus for IPO should disclose environmental risks (including other risks caused by environmental issues) associated with the projects for which enterprises raise money from the stock market. Enterprises involved in high risk or heavy pollution business should disclose information including measures to safe production or pollution prevention, environmental expenditures for the last three years, future environmental expenditures and fines caused by deregulations related to safe production or environmental protection.

2. Standards for the Content and Form of Information Disclosure by Companies Issuing Securities to the Public (Guideline No.6) – Legal Statements for IPO (1999) (CSRC, 1999)

In accordance with this guideline, a legal statement should clarify whether the issuer has debts arising from environmental problems, whether his production activities meet the environmental protection requirements, and whether the issuer has been punished owing to deregulations related to environmental

protection in the last three years.

3. Standards for the Content and Form of Information Disclosure by
Companies Issuing Securities to the Public (Guideline No.9) – Application
Files for IPO (2001, revised in 2006) (CSRC, 2001)

Within this guideline, Article 9-4 requires enterprises applying for IPO to provide documents which can demonstrate that their proposed projects for which enterprises raise money from the stock market, meet environmental protection requirements. Enterprises from heavy pollution industries need to submit proof documents issued by environmental protection departments at provincial level.

Environmental Disclosure by Local Governments

Please see print copy for Appendix Six

Environmental Credit

Environmental Performance	Rating Level
Four successive Credit As	Environmental Friendly Enterprise of Shandong Province
Three successive Credit As	Credit AAA
Two successive Credit As	Credit AA
Best	Credit A
Good	Credit B
Normal	Credit C
Poor	Credit D

Source by: SEPA, Environmental Information, Vol.209

APPENDIX EIGHT - Sample Companies List

No.	Name of Companies
1	INNER MONGOLIA YITAI COAL COMPANY LIMITED
2	SHANXI LANHUA SCI-TECH VENTURE CO. LTD
3	SHANGHAI DATUN ENERGY RESOURCES CO. LTD
4	OFFSHORE OIL ENGINEERING CO. LTD
5	CHINA PETROLEUM & CHEMICAL CORPORATION
6	GUIZHOU PANJIANG REFINED COAL CO. LTD
7	ZHONGJIN GOLD CORPORATION LIMITED
8	SHANXI GUOYANG NEW ENERGY CO. LTD
9	SHANDONG GOLD MINING CO. LTD
10	YUNNAN CHIHONG ZINC&GERMANIUM CO. LTD
11	ANHUI HENGYUAN COAL INDUSTRY & ELECTRICITY POWER CO. LTD
12	KAILUAN CLEAN COAL CORPORATION LIMITED
13	YANZHOU COAL MINING COMPANY LIMITED
14	DATONG COAL INDUSTRY CO. LTD
15	SHANXI LU'AN ENVIRONMENTAL ENERGY DEVELOPMENT CO. LTD
16	PINGDINGSHAN TIANAN COAL MINING CO. LTD
17	WESTERN MINING CO. LTD
18	CHINA OILFIELD SERVICES LIMITED
19	CHINA SHENHUA ENERGY COMPANY LIMITED
20	PETRO CHINA COMPANY LIMITED
21	SHENZHEN CHIWAN PETROLEUM SUPPLY BASE CO. LTD
22	GANSU JINGYUAN COAL INDUSTRY & ELECTRICITY POWER CO. LTD
23	TIANJIN GOOD HAND RAILWAY HOLDING CO. LTD
24	TIBET MINERAL DEVELOPMENT CO. LTD
25	INNER MONGOLIA PINGZHUANG ENERGY RESOURCES CO. LTD
26	HENAN SHENHUO COAL INDUSTRY AND ELECTRICITY POWER CO. LTD
27	HEBEI JINNIU ENERGY RESOURCES CO. LTD
28	TAIYUAN COAL GASIFICATION COMPANY LIMITED
29	SHANXI XISHAN COAL AND ELECTRICITY POWER CO. LTD
30	HUOLINHE OPENCUT COAL INDUSTRY CORPORATION LIMITED OF INNER MONGOLIA
31	CHENZHOU MINING GROUP CO. LTD
32	SINOPEC SHENGLI OILFIELD DYNAMIC GROUP CO. LTD
33	SINOPEC ZHONGYUAN PETROLEUM CO. LTD