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FINANCIAL ACCOUNTING AND REPORTING IN THE
EXTRACTIVE INDUSTRIES: A SURVEY OF LISTED
MINING COMPANIES IN NEW ZEALAND AND MALAYSIA

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CHAPTER ONE: PURPOSE AND SCOPE

INTRODUCTION

The extractive industries may be broadly defined as those industries involved in:

- "(a) prospecting and exploring for wasting (non-regenerative) natural resources,
- (b) acquiring them,
- (c) further exploring them,
- (d) developing them, and
- (e) producing (extracting) them from the earth"¹

These wasting (non-regenerative) natural resources "...include all the naturally occurring substances that are classified as minerals, are present in or on the earth's surface and are extracted therefrom by man but are not susceptible to man's attempts to replace them in their natural state or in a similar state (although they may in a sense be replaced by nature over the long term). Those resources include, but are not limited to:-

- (1) crude oil and natural gas;
- (2) metals such as copper, gold, iron, lead, nickel, platinum, silver, tin, titanium, tungsten, uranium, and zinc;
- (3) coal;
- (4) salt;
- (5) sulphur; and
- (6) gravel, sand and stone.

The natural resources excluded by that definition, because they are susceptible to man's attempts to replace them in their original state or in a similar state (being characteristically replaced by nature as

1. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", FASB Discussion Memorandum, FASB, Stamford, Connecticut, (23 December, 1976), p. 7.

well), are those that provide the basis for products normally associated with the industries of forestry, fishing, agriculture and animal husbandry".²

SIGNIFICANCE OF THE EXTRACTIVE INDUSTRIES

Implicit in the foregoing definition is the notion that the extractive industries include a broad range of wasting natural resources which provide the basis for much of the world's economic activity. In addition to their diverse properties and uses, the uneven global distribution of these wasting resources has also contributed to their general importance.

Furthermore, the powerful influence of these wasting assets as a source of international conflict has been documented in history. Examples include the Roman invasion of Britain to secure precious metals, and Spanish expeditions to South America in search of gold, whilst disputes over the sovereignty of some territories have also been known to involve minerals.³ Indeed, the strategic importance of some types of minerals has resulted in significant government involvement in many countries.⁴ The role of OPEC (Organization of Petroleum Exporting Countries) in the seventies, and the subsequent impact of oil prices on the world economy,⁵ provides a prime example of the potential political, economic, legal and social ramifications of the extractive industries.

In New Zealand, the extractive industries can be traced to the discovery of gold and coal around the 1850s.⁶ More recently, discoveries of natural

2. Ibid, p. 8.

3. Stocks, J. & Down, C., Mining and Mineral Processing, The Open University Press, England, 1980, p. 6. The authors cite the following territories and associated minerals as examples: Spanish Sahara (phosphates), the English Channel (oil), and the Aegean Sea (oil).

4. Peach, W.N. & Constantin, J.A., Zimmermann's World Resources and Industries, Harper & Row Publishers Inc., New York, 3rd edition, 1972, p.336.

5. Ibid, p.406.

6. New Zealand Official Yearbook 1982, 87th ed., Dept. of Statistics, Wellington 1982, p. 432.

gas at Kapuni and Maui, and oil at Mckee have also become important. Mineral exploration for 1980 was estimated at NZ\$2,433 million,⁷ this being perhaps indicative of the potential size and importance of the extractive industries to the New Zealand economy.

In Malaysia, the significance of the extractive industries is perhaps more obvious. The country has traditionally been the world's largest producer of tin.⁸ Crude petroleum and tin & tin-in concentrates are among the country's major exports, having accounted for about M\$4,713.2 million (or 51.6%) of its total exports for the period January-June 1981.⁹

Like other industries in the world today, the extractive industries have an important role to perform. More specifically, in New Zealand and Malaysia the extractive industries are an important source of employment and income. These two countries are mentioned as they will become the primary focus of this research study.

PURPOSE

The aim of this research report is to provide a critical examination and evaluation of annual reports produced by listed mining companies in New Zealand and Malaysia, with the goal of recommending improvements in accounting and reporting practices. For the purposes of this report

7. Ibid, p. 432. See also: New Zealand Energy Research and Development Committee, Oil: Australian and New Zealand Responses to Dwindling Resources, 49th ANZAAS Congress, Auckland, (February, 1979).

8. Money and Banking in Malaysia, Bank Negara Malaysia, Kuala Lumpur, 1979, p. 7.

9. "Economic Indicators", Malaysian Business, (March, 1982), p. 61.

the term "mining companies" will be used to describe all firms engaged in the extractive industries. With this in mind, the following objectives have been identified:-

- (1) (a) To describe the main characteristics and operational functions of the extractive industries which have at least been partially responsible for the accounting and reporting problems unique to these industries.
- (b) To establish the objectives of financial accounting and reporting within the context of the extractive industries.
- (2) To critically examine the following major issues associated with the extractive industries:
 - (a) The accounting treatment of pre-production costs.
 - (b) The selection of the cost centre.
 - (c) Accounting for depletion.
 - (d) The valuation of mineral reserves.
 - (e) The disclosure in financial statements of information unique to the extractive industries.
- (3) To critically examine and evaluate existing and proposed standards and requirements on accounting and reporting in the extractive industries, and their conformity with the established objectives.
- (4) To critically examine and evaluate several selected studies on accounting and reporting in the extractive industries.
- (5) To critically examine the annual reports for three consecutive years, produced by mining companies in New Zealand and Malaysia, and to analyse the survey results in relation to:-

- (a) the findings of similar overseas studies, and
 - (b) current and proposed accounting standards and requirements.
- (6) To advance recommendations for improving accounting and reporting practices in New Zealand and Malaysia on the basis provided by the achievement of the foregoing objectives. Potential avenues for further research will also be suggested.

LITERATURE REVIEW

The scope of the literature reviewed for the purposes of this research study extends from publications on issues relating specifically to the extractive industries, e.g. accounting standards, problems and studies in the extractive industries, to accounting topics of a more general nature such as the objectives of financial accounting and reporting, and the implications of the efficient market hypothesis on disclosure. Categorically, the American and Australian literature have been particularly useful with regard to the following accounting Standards and requirements:-

- (1) Australian Society of Accountants and The Institute of Chartered Accountants in Australia, AAS 7: Statement of Accounting Standards - Accounting For The Extractive Industries, (amended December, 1977)
- (2) Financial Accounting Standards Board:-
 - (a) FASB Discussion Memorandum: "Financial Accounting and Reporting in the Extractive Industries", (23 December, 1976).
 - (b) Statement of Financial Accounting Standards No. 19: "Financial Accounting and Reporting By Oil and Gas Producing Companies", (December, 1977).

- (c) Statement of Financial Accounting Standards No. 25: "Suspension of Certain Accounting Requirements For Oil and Gas Producing Companies", (February, 1979).
 - (d) Statement of Financial Accounting Standards No. 39: "Financial Reporting and Changing Prices: Specialised Assets - Mining and Oil and Gas", (October, 1980).
 - (e) Statement of Financial Accounting Standards No. 69: "Disclosures About Oil and Gas Producing Activities", (November, 1982).
- (3) Securities and Exchange Commission:-
- (a) Accounting Series Release No. 253: "Adoption of Requirements for Financial Accounting and Reporting Practices For Oil and Gas Producing Activities", (31 August, 1978).
 - (b) Accounting Series Release No. 269: "Oil and Gas Producers - Supplemental Disclosures on the Basis of Reserve Recognition Accounting", (24 September, 1979).
 - (c) Accounting Series Release No. 270: "Oil and Gas Producers - Postponement of Audit Requirement For Reserve Information"(24 September, 1979).
 - (d) Accounting Series Release No. 289: "Financial Reporting By Oil and Gas Producers", (26 February, 1981).

Furthermore, to determine accounting standards and requirements applicable to the extractive industries in New Zealand and Malaysia respectively, the following pronouncements have been reviewed :-

- (1) Statements on standard accounting practice in both countries;
- (2) New Zealand Companies Act 1955, and Malaysia Companies Act 1965.
- (3) Listing Manual of the New Zealand Stock Exchange, and Listing Manual of the Kuala Lumpur Stock Exchange.

The survey of annual reports was also preceded by an examination of similar empirical studies with subsequent emphasis being placed particularly on the following study:-

Ryan, J.B., Heazlewood, C.T., & Andrew, B.H., "Extractive Industries Financial Statements", Australian Company Financial Reporting 1980: Accounting Research Study No.9, Australian Accounting Research Foundation, 1980, pp. 150-175.

RESEARCH HYPOTHESIS

In view of the lack of specific accounting Standards on extractive industry accounting and reporting in New Zealand and Malaysia, the following primary research hypothesis was formulated:

A diversity of accounting and reporting practices exist among mining companies listed on the New Zealand Stock Exchange and those quoted on the Kuala Lumpur Stock Exchange; these two Exchanges being the main centres for trading securities of listed companies in New Zealand and Malaysia respectively.

This "diversity of accounting and reporting practices" was expected to be confirmed by the lack of adherence to any single method of accounting or disclosure expressed in the annual reports examined.

Furthermore, despite differences in economic and political structures,

the early British influence in both countries,¹⁰ coupled with recent attempts at international harmonisation of accounting Standards,¹¹ suggest that financial accounting and reporting practices in New Zealand and Malaysia are affected by Standards promulgated by overseas accounting bodies. Hence, as a subsidiary hypothesis,

Financial accounting and reporting practices of local mining companies listed on the New Zealand Stock Exchange, and those quoted on the Kuala Lumpur Stock Exchange are influenced by Standards and recommendations issued by overseas accounting bodies.

The subsidiary hypothesis is not inconsistent with the primary hypothesis because Standards and recommendations of overseas bodies are not expected to be exactly the same. Confirmation of this hypothesis is expected to be indicated either by direct reference made to foreign accounting Standards in the annual reports examined, or by substantial conformity with methods being proposed or enforced in other countries.

RESEARCH METHOD

The overall methodology employed in this research study comprises two distinct phases. The preliminary stage involved the critical examination of relevant literary writings and authoritative pronouncements. Hence,

-
10. The British influence in both countries can be traced to the early British Companies Acts, upon which the Malaysia Companies Act 1965 and the New Zealand Companies Act 1955 are based. For further discussion of the development of accounting standards in Malaysia, see Enthoven, A.J.H., "Chapter 29: Malaysia", Accountancy Systems in Third World Economies, North Holland Pub. Co., Amsterdam, 1977, pp. 317-328. Similarly, for New Zealand see Zeff, S.A., Forging Accounting Principles in New Zealand, Victoria University Press, Wellington, 1979.
 11. Cummings, J.P. & Chetkovich, M.N., "World Accounting Enters A New Era", Journal of Accountancy, Vol.145, No. 4, (April, 1978), p. 59.

it essentially involved a descriptive-normative approach aimed at achieving the first four objectives of the research report.

The second phase essentially consisted of the survey of mining companies listed on the New Zealand Stock Exchange, and those listed on the Kuala Lumpur Stock Exchange. It is consistent with the fifth and sixth objectives of this report. A discussion of the method employed in selecting the companies, and designing and applying the list of criteria used to facilitate a record of observations, is documented in Chapter Six.

CONCLUSION

The scope and purpose of this research report revolves around financial accounting and reporting practices of listed mining companies in New Zealand and Malaysia. With this in view, the form and content of the following chapters will be built upon the stated objectives of this study.

CHAPTER TWO: THE EXTRACTIVE INDUSTRIES

INTRODUCTION

The aim of this chapter is to familiarize the reader with some of the common facets of the extractive industries. This is achieved by describing the general characteristics and operational features of the industries. Appropriate objectives for financial accounting and reporting will also be established.

GENERAL CHARACTERISTICS

The extractive industries possess several unique features which collectively complicate the financial accounting and reporting process:-

- (1) Heavy Investment. The amount of investment typically involved is substantial. For instance, it was recently reported that the New Zealand government plans to invest NZ\$42 million into developing the McKee oil-field in North Taranaki.¹² The wellhead equipment alone was estimated at a cost of NZ\$30 million.¹³
- (2) High Risks. There are considerable risks involved. The most obvious risk is that the investment may not result in the discovery of a commercial deposit as the latter are difficult to locate, define, measure and value. However, the degree of risk will vary according to the type of extractive industry,¹⁴ and the prevailing economic, political, social and legal conditions prevailing at the time.
- (3) Long Gestation Period. The high degree of risk is compounded by the long gestation period between cost incurrence and the commencement of revenue receipt. During the time required to exploit a mineral discovery,

12. "McKee Oilfield Worth \$445m", The Dominion, (Tuesday, 9 November, 1982), p. 1.

13. Ibid, p. 1.

14. Field, R.E., "Financial Reporting in the Extractive Industries", Accounting Research Study No. 11, American Institute of Certified Public Accountants, New York, 1969, p. 6.

increased production costs may render further development uneconomic.

Similarly, changes in the demand for minerals, the imposition of government controls, and other factors may adversely affect the commercial viability of a discovery.¹⁵

- (4) No Direct Cost-Value Relationship. There is no direct relationship between the amount of costs incurred and the value of minerals discovered. Indeed, "... companies can incur considerable costs and find little, or incur relatively small costs and discover immense reserves".¹⁶
- (5) Uncertainty of Deposit Size and Value. Determining the size and value of a mineral deposit is a difficult task which depends not only on technological evaluations, but also on probable conservation policies and future economic conditions.¹⁷ As Davies states:

"Suffice to say ...that while geological assumptions may infer the existence of an ore body of a particular shape and grade based on drilling samples and other techniques, the final proof of the economically recoverable minerals only comes when the ore is finally extracted and treated".¹⁸

MAIN OPERATIONAL PHASES

The operations typically associated with the extractive industries may conveniently be categorized into five distinct phases. However, in practice these phases may overlap, and the terminology used to describe them may differ among countries. This is exemplified in Exhibit 2.1.

-
15. Henderson, S. & Peirson, G., "Accounting in the Extractive Industries" in Issues in Financial Accounting, Cheshire Pub. Pty. Ltd., Melbourne, 1975, p. 240.
16. Norton, J.C. & Rowe, D.A., Accounting and Auditing Guide for United Kingdom Oil and Gas Exploration and Production, ICAEW, London, 1978, p. 3.
17. Connor, J.E., "Discovery Value - the Oil Industry's Untried Method", Journal of Accountancy, Vol. 139, No. 5, (May, 1975), p. 57.
18. Davies, B.J., "Practical Problems Preclude Meaningful Disclosure", The Chartered Accountant in Australia, Vol. 50, No. 9, (April, 1980), p. 19.

Exhibit 2.1: Operational Phases in the Extractive Industries
(A Three Country Comparison)

	<u>Australia</u>	<u>United Kingdom</u>	<u>United States of America</u>	
1 *	2	3	4	5,6,7.
Exploration	Prospecting	Pre-exploration	—	Prospecting
Evaluation	Investigation	Exploration	Acquisition	Acquisition
Development	Development	Appraisal	Exploration	Exploration
Construction	Construction	Development	Development	Development
Production	Production	Production	Production	Production

- * 1. Australian Society of Accountants & Institute of Chartered Accountants in Australia, AAS 7: Statement of Accounting Standards- Accounting For The Extractive Industries, ASA & ICAA, (amended, December 1977), para. 5.
2. Australian Society of Accountants & Institute of Chartered Accountants in Australia, Exposure Draft: Accounting For The Extractive Industries, (February, 1973), para. 8.
3. Norton, J.C. & Rowe, D.A., Accounting and Auditing Guide for United Kingdom Oil and Gas Exploration and Production, London, ICAEW, 1978, p. 3.
4. Financial Accounting Standards Board, Statement of Financial Accounting Standards No. 19: Financial Accounting and Reporting By Oil and Gas Producing Companies, FASB, Stamford, Connecticut, (Dec., 1977), para. 15, 17, 21, 24.
5. Financial Accounting Standards Board, Discussion Memorandum: Financial Accounting and Reporting in the Extractive Industries, FASB, Stamford, Connecticut, (23 December, 1976), Appendix D-14.
6. Public Law 94-163: "The Energy Policy and Conservation Act", (42 U.S. Code, Sec 6383) , 1975, Title V, Section 503 (c) (1).
7. Field, R.E., Accounting Research Study No. 11: Financial Reporting in the Extractive Industries, AICPA, 1969, pp. 11-19.

SOURCE: Adapted & Modified - Heazlewood, C.T., Accounting For The Extractive Industries, (Book Draft), p. 3.

With this in mind, the classification and definitions provided by the United States Financial Accounting Standards Board (FASB) in its Discussion Memorandum on Financial Accounting and Reporting in the Extractive Industries, will be adopted for the purposes of this report:-

" Prospecting

The search for an area of probable mineralization; the search normally includes topographical, geological, and

geophysical studies of relatively large areas undertaken in an attempt to locate specific areas warranting detailed exploration. Prospecting usually occurs prior to the acquisition of mineral rights.

Acquisition

The procurement of the legal right to explore for and produce discovered minerals, if any, within a specific area; that legal right may be obtained by mineral lease, concession, or purchase of land and mineral rights, or of mineral rights alone.

Exploration

The detailed examination of specific areas of probable mineralization normally identified in the prospecting stage; the examination ordinarily consists of studies similar in nature to those applied during the prospecting process.

Development

The preparation of a specific mineral deposit for commercial production; this preparation includes construction of access to the deposit and of facilities to extract the minerals. The development process is sometimes further distinguished between a pre-production stage and a current stage, with the distinction being made on the basis of whether the development work is performed before or after production from the mineral deposit has commenced on a commercial scale.

Production

The extraction of minerals from a deposit, together with any related on-site processing of minerals that is necessary or economically desirable prior to transportation of the minerals from the deposit area, e.g., separation of bulk waste from raw mineral resources".¹⁹

The explicit definition of these major operational phases is necessary to put subsequent discussion into proper perspective.

19. Financial Accounting Standards Board, op. cit., Appendix D-14.

OBJECTIVES OF EXTRACTIVE INDUSTRY FINANCIAL ACCOUNTING AND REPORTING

Financial accounting and reporting encompasses a broad range of disclosure media, among which financial statements and annual reports are of immediate concern in this research report. In this regard, the fundamental issue of financial accounting and reporting objectives which has long been the subject of much debate,²⁰ needs to be established within the context of the extractive industries.

Probably the most recently promulgated financial accounting and reporting objectives are those developed as part of the FASB's Conceptual Framework Project.²¹ Exhibit 2.2 on the next page, provides a comparative summary of these objectives.

The FASB's objectives are so general that they should perhaps be more aptly termed "goals of financial accounting and reporting". However, they provide a useful starting point from which more specific objectives may be developed for specific classes of users' needs. Persons interested in extractive industry financial accounting and reporting represent a specific class of users whose more immediate information needs may be identified with the industries' unique operational characteristics. Although these information users may be classified as either internal or external, this research report focuses on the latter group *"... who lack the authority to prescribe the financial information they want from an enterprise and therefore must use the information*

20. Stanga, K.G. & Williams, J.R., "The FASB's Objectives of Financial Reporting" CPA Journal, Vol. 49, No. 5, (May, 1979), p. 31.

21. These include: Financial Accounting Standards Board, Statement of Financial Accounting Concepts No. 1: Objectives of Financial Reporting by Business Enterprises, Stamford, Connecticut, (November, 1978); FASB, Statement of Financial Accounting Concepts No. 4: Objectives of Financial Reporting by Nonbusiness Organizations, Stamford, Connecticut, (December, 1980). See Dopuch, N. & Sunder, S., "FASB's Statements on Objectives and Elements of Financial Accounting: A Review", The Accounting Review, Vol. 55, No. 1, (January, 1980), pp. 1-21.

that management communicates to them",²² typically in the form of the annual report.

EXHIBIT 2.2: A Comparative Summary of the Major Objectives of Financial Reporting For Business Enterprises (SFAC No. 1) and Nonbusiness Organizations (SFAC No. 4)²³

<u>Business Enterprises</u>	<u>Nonbusiness Organisations</u>
<p><u>General Major Objective:</u></p> <p>Financial reporting should provide information that is <u>useful</u> to present and potential <u>investors</u> and <u>creditors</u> and other users in making rational investment, credit, and similar decisions. (SFAC No.1, para. 34).</p> <p><u>Less General Major Objective:</u></p> <p>Financial reporting should provide information useful for assessing prospective <u>cash flows</u>,* and about how management has discharged its <u>stewardship responsibility</u> to owners.**</p> <p>* SFAC No.1, para. 37 ** SFAC No.2, para. 50</p> <p><u>Even Less General Major Objective :</u></p> <p>Financial reporting should provide information about enterprise <u>resources</u>, <u>claims to those resources</u>, as well as <u>changes to those resources and claims to them</u>. (SFAC No.1, para. 40).</p>	<p>Financial reporting should provide information that is <u>useful</u> to present and potential <u>resource providers</u> and other users in making rational decisions about the allocation of resources to those organisations. (SFAC No.4, para. 35).</p> <p>Financial reporting should provide information useful for assessing <u>services</u> and the organisation's <u>ability to continue to provide those services</u>.* Information should also be provided for assessing how managers have discharged their <u>stewardship responsibilities</u>**</p> <p>* SFAC, No.4, para. 38. ** SFAC, No.4, para. 40.</p> <p>Financial reporting should provide information about an organisation's <u>economic resources</u>, <u>obligations</u> and <u>net resources</u>, as well as <u>changes in resources and interests in them</u>. (SFAC No.4, para. 43).</p>

In recognition of the foregoing comments, the following objectives of financial accounting and reporting for the extractive industries are suggested:-

- (1) To facilitate the assessment of future cash flows by providing information on the company's:
 - (a) efforts in terms of periodic costs incurred in prospecting for,

22. Financial Accounting Standards Board, Statement of Financial Accounting Concepts No. 1, op. cit., para. 28.

23. Chye, M., "The FASB's Conceptual Framework For Financial Accounting and Reporting: An Evaluation", Discussion Paper Series No. 7, Dept. of Accounting and Finance, Massey University, (September, 1981), p. 4.

acquiring, exploring, developing and producing wasting non-regenerative natural resources; and

(b) accomplishments in terms of revenues received, and reserves discovered and developed.

(2) To provide additional information useful for assessing the high degree of uncertainty uniquely associated with current and proposed future operations.

Although it has been asserted that accounting objectives vary in appropriateness over different countries,²⁴ it is felt that the two stated objectives are sufficiently specific to the extractive industries; yet sufficiently general to be applicable within New Zealand and Malaysia. They are aimed at greater specificity, at least on an industrial classification basis.²⁵

Perhaps more important are the implications of the efficient market hypothesis which has gained much support in the accounting and finance literature, especially the semi-strong version which asserts that security prices reflect all publicly available information. Acceptance of the hypothesis may be argued to lessen the importance of the aforementioned objectives since the market apparently will have access of other information sources. However, these objectives at least ensure that extractive industry financial statements play a corroborative role by providing information which may be used to support market expectations. Hence, although the hypothesis contends that "*...publicly available information cannot improve one's performance beyond the market's assessment of a fair rate of return*"²⁶, the disclosure objectives will help to ensure that individuals are not much worse off than the rest of the market, either. Empirical studies on extractive industry accounting associated with the efficient market hypothesis will be examined in chapter five.

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24. Fantl, I.L., "The Case Against International Uniformity", Management Accounting (U.S.), Vol. 52, No. 11, (May, 1971), p. 15.
25. For accounting objectives developed for New Zealand conditions, see: Naran, V. "Accounting Objectives in New Zealand", Occasional Paper No. 43, Faculty of Business Studies, Massey University, (April, 1982).
26. Hagin, R.L., The Dow Jones-Irwin Guide To Modern Portfolio Theory, Dow Jones-Irwin, Homewood, Illinois, 1979, p. 12.

CHAPTER THREE: FIVE MAJOR FINANCIAL ACCOUNTING & REPORTING ISSUES

INTRODUCTION

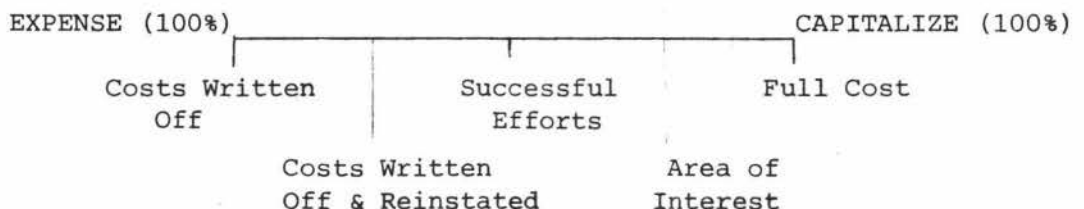
The aim of this chapter is to provide a critical examination of five major issues on extractive industry financial accounting and reporting. Collectively, they portray an area of primary concern faced by the accounting profession, which has reinforced the need for accounting Standards in the extractive industries.

ISSUE ONE: THE ACCOUNTING TREATMENT OF PRE-PRODUCTION COSTS

The importance of the accounting treatment of pre-production costs hinges primarily on the effect that alternative approaches have on reported income and financial position of mining companies. In the light of the unique operational characteristics of the extractive industries, it has been contended these reported results could affect the firm's access to capital sources and consequently, its ability to sustain operations.

The following alternative approaches are designed within the framework of historical cost accounting. Since variations of each method are possible, an overview of their inter-relationships is perhaps best described by a theoretical capitalize-expense continuum. With this in mind, the five methods identified in Exhibit 3.1 will become the subject of subsequent discussion.

EXHIBIT 3.1: ALTERNATIVE METHODS OF ACCOUNTING FOR PRE-PRODUCTION COSTS



SOURCE: Heazlewood, C.T., Accounting For the Extractive Industries, (Book Draft), p. 8.

METHODS OF ACCOUNTING FOR PRE-PRODUCTION COSTS

A. Costs Written Off Method

The costs written off method simply entails the write-off or expensing of all pre-production expenditures in the period incurred. It adopts a pessimistic outlook, and is supported by the following arguments.

- (1) It is consistent with the doctrine of conservatism which encourages immediate recognition of possible losses. This approach is particularly appropriate for prospecting and exploration costs, since prospects of successful discovery at these stages are relatively low.²⁷
- (2) Given that companies continually undertake exploration and development programmes, the amounts charged against revenues would be approximately the same in the long run, irregardless of whether costs were capitalized and amortized, or immediately expensed.²⁸
- (3) Immediate expensing facilitates reduction of reported profits, and possibly subsequent taxation relief.
- (4) Disclosure of periodic expenditures associated with various stages of pre-production operations, provide useful information to financial statement users.
- (5) The method is simple, practical and avoids overstating assets.²⁹

27. Henderson, S. & Peirson, G., op. cit., p. 243.

28. Alfredson, F.K., A Study of Some Accounting Problems in the Oil Industry, University of Queensland Press, 1964, p. 10.

29. Ibid, p. 11.

Against these alleged advantages it has been argued that:

- (1) The method does not properly match costs with revenues, and therefore distorts periodic income.
- (2) The "tax relief" argument provides insufficient justification for the method, since accounting and tax objectives need not necessarily coincide.
- (3) Information on pre-production expenditure may be disclosed in the balance sheet or notes to the accounts, instead of in the income statement.
- (4) There is the inherent danger that operating results may be manipulated by varying pre-production expenditures to produce, within certain limits, desired net income figures.³⁰

B. "Costs Written Off and Reinstated" Method

Like the previous method, costs are expensed in the period incurred. However, the distinguishing feature of this method is that on determination of a successful discovery, the associated costs are capitalized and subsequently amortized. Clearly, the arguments for and against the "costs written off" method also apply to this approach with the additional advantage that the reinstatement process attempts to recognize as assets, costs associated with discoveries which are expected to provide future benefits. However, the reinstatement process also presents further possibilities for income manipulation.

C. Successful efforts Method

Under the successful efforts method, costs associated with a successful discovery are capitalized and amortized over future periods. Conversely, costs failing to result in commercial discoveries are expensed in the

30. Lourens, R., "The Development of Reporting Standards for the Extractive Industries", The Australian Accountant, Vol. 42, No. 8, (September, 1972), p. 331.

period ascertained. Expenditures on discoveries yet to be fully evaluated are carried forward until success or failure can be determined, and treated accordingly.

Proponents of the successful efforts method have offered the following arguments in support of it.

- (1) It recognizes the high risks involved in pre-production operations by adhering to the doctrine of conservatism i.e. provide for all possible losses and minimize the valuation of assets.³¹
- (2) It conforms with the matching principle to the extent that related costs are charged against revenues generated from successful operations in subsequent periods.
- (3) The method "...endorses the traditional concept of an asset, viz, that an asset is an economic resource expected to provide future benefits",³² Successful discoveries are expected to yield future benefits, and associated costs are therefore classified as assets.
- (4) An empirical study by Eskew³³, suggested that the successful efforts approach provides information that is more relevant to users' needs.

However, opposition to the successful efforts method has generally been expressed along the following lines.

- (1) By discriminating between the treatment of different types of costs, the method ignores the fact that all pre-production expenditures are necessary for discovering commercial deposits; "...to expense certain categories is a misrepresentation of the economic facts of the

31. Norton, J.C. & Rowe, D.A., op. cit., p.17.

32. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p. 74.

33. Eskew, R.K., "An Examination of the Association Between Accounting and Share Price Data in the Extractive Petroleum Industry", The Accounting Review, Vol. 50, No. 2, (April, 1975), pp. 316-324.

industry".³⁴

- (2) The method is an abuse of the conservatism convention, and by not capitalizing all pre-production costs, fails to match costs with revenues.³⁵
- (3) In the case of young companies and smaller producers newly engaged in exploration and development activities, successful efforts accounting could result in substantial reported losses which in turn could severely limit their ability to secure capital.³⁶

Against this, research on the efficiency of capital markets has indicated "...that the price of a given security in a national market reflect all information that is publicly available about that security".³⁷ Acceptance of this view suggests that a mining company's ability to attract capital is not affected by the accounting treatment of pre-production costs, provided that the securities market is efficient.

D. Area of Interest Method

The "area of interest" concept has been defined as "...an individual geological area which is considered to constitute a favourable environment for the presence of a mineral deposit or an oil or natural gas field, or has been proved to contain such a deposit or field".³⁸ The method itself essentially consists of capitalizing all pre-production

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34. Arthur Anderson & Co. , Accounting and Reporting Problems of the Accounting Profession, 5th edition, Arthur Anderson & Co., (August, 1976), p. 129.
 35. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p.70.
 36. Ibid, p. 72.
 37. Baker, C.R. "Discussion of the Drawbacks to Full-Cost in Petroleum Industry Accounting", as in Crumbley, D.L. & Grossman, S.D., Readings in Oil Industry Accounting, The Petroleum Pub. Co., Tulsa, Oklahoma, 1980, p.16.
 38. Australian Society of Accountants and the Institute of Chartered Accountants in Australia, AAS 7: Statement of Accounting Standards - Accounting for the Extractive Industries, Australian Society of Accountants and The Institute of Chartered Accountants In Australia, (amended December, 1977), para. 5(b). Hereafter referred to as AAS 7.

costs associated with each individual area of interest, provided that a reasonable probability of success can be expected in that area.³⁹

"...If the search is unsuccessful or evaluation produces a negative result, the costs associated with the area are written off".⁴⁰

Although the area of interest method is similar to the successful efforts approach, the former specifies the cost centre used by requiring cost analysis and evaluation to be confined within a defined area of interest. Thus it has been pointed out that the only distinguishing feature between the two methods is that the area of interest method retains capitalized costs assigned to an area of interest even if further exploration activities cause a contraction in the size of the area.⁴¹ Conversely, under the successful efforts approach, all costs associated with unproductive discoveries will progressively be expensed, and as such a contraction in area size can be expected to be accompanied by the write-off of at least some capitalized costs.⁴²

Nevertheless, other features remain essentially the same between the two methods among which capitalized costs associated with subsequently abandoned areas are expensed in the period in which the decision to abandon is made.⁴³ In view of their similarity, it is not surprising that the area of interest method shares the same alleged strengths and criticisms as the successful efforts method.

39. Ibid, para. 12-18.

40. Ibid, para. 12.

41. Heazlewood, C.T., "The Development of Extractive Industry Accounting Standards In Australia and the United States of America", in Holzmann, O.J. (editor), Proceedings of the Thirty-Second Annual Meeting of the South-East Region of the American Accounting Association, A.A.A., 1980, p. 135. See also AAS 7, op. cit., para. 23, 28.

42. AAS 7, op. cit., para. 18.

43. Ibid, para. 18.

E. Full Cost Method

The first use of the full cost method has been traced to the United States where in 1959, one company issued its annual financial statements on this basis.⁴⁴ Essentially, this method requires the capitalization of all pre-production costs irregardless of whether they result in commercial discoveries or not. However, a ceiling is usually imposed such that the total amount of costs capitalized does not exceed the net realizable value of the underlying economically recoverable reserves.⁴⁵ Amounts in excess of the value ceiling are expensed whilst capitalized amounts are amortized against future revenues.

Full cost accounting has been found to be popular among the smaller oil and gas producers in the United States,⁴⁶ primarily because it facilitates a higher reported net income figure than the successful efforts method. Major arguments advanced in favour of the full cost approach include the following.

- (1) Pre-production costs are a necessary and accepted part of discovering reserves which yield value. Therefore, they should be capitalized and amortized against revenues generated from commercial discoveries.
- (2) Full costing reflects pre-production costs as assets and subsequent amortization provides a smoothing effect on net income in future years. Also, from a reporting perspective, the method enables companies to spread the risks of pre-production operations over a number of investments or projects. Thus, it is argued that the method facilitates continued access to capital sources, which may be necessary for continued operations.

44. Bowles, J.T., Rooney, J.M. & Waller, R.E., "Full Costing For Petroleum Exploration", Canadian Chartered Accountant, Vol. 99, No. 6, (December, 1971), p. 421.

45. AAS 7, op. cit., para. 11.

46. Johnson, R.T., "Full Cost vs Conventional Accounting in the Petroleum Industry", The CPA Journal, Vol. 42, No. 6, (June, 1972), p. 479.

- (3) In a comparative study of successful efforts and full cost accounting methods, Johnson demonstrated "*...that full-cost accounting yields both a more reasonable balance sheet and income statement*".⁴⁷
- (4) Full cost accounting provides balance sheet figures which are usually closer to value accounting, than those produced under the successful efforts approach. Such information is likely to be more useful to investors.⁴⁸
- (5) Mineral reserves may be viewed as "*...a long term inventory item and should be accounted for on the basis used to account for such items, i.e. full absorption costing. The costs of unsuccessful ventures are essentially equivalent to normal, recurring spoilage in manufacturing which under generally accepted accounting principles becomes part of the cost of finished goods*".⁴⁹
- (6) From a practical viewpoint, the method avoids the problem of determining the appropriate costs to capitalize or expense. To the extent that all costs are capitalized, the method reduces the ability of management to influence annual reported earnings,⁵⁰ and enhances inter-company comparability of results.

In response to the foregoing points, the following arguments have been advanced against the full cost method.

- (1) The necessity of incurring pre-production costs does not by itself justify total capitalization. Only costs reasonably expected to result in future benefits should be capitalized and recognized as assets.⁵¹

47. Ibid, p. 482.

48. Baker, C.R., op. cit., p. 12.

49. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p. 70.

50. Ibid, p. 71.

51. Financial Accounting Standards Board, Statement of Financial Accounting Concepts No. 3: Elements of Financial Statements of Business Enterprises, FASB, Stamford, Connecticut, (December, 1980), para. 19.

- (2) There is no logically predictable relationship between exploration efforts in one geographical area and the discovery of reserves in another dissimilar area. Thus, to match costs of unsuccessful operations in one area with revenue generated from successful activities elsewhere is theoretically incorrect.⁵² Furthermore, aggregating diverse and distinct mining operations into one cost centre under full cost accounting, causes considerable loss of information.⁵³
- (3) By capitalizing costs associated with both successful and unsuccessful activities, full costing tends to obscure failure and risk.⁵⁴ Substantial pre-production expenditure may only be reflected at a later date by large write-offs of accumulated costs or higher amortization charges; by this time it may be too late for investors to recover their capital.⁵⁵
- (4) Given the efficiency of capital markets in which security prices fully reflect all publicly available information,⁵⁶ the accounting treatment of pre-production costs should not influence the firm's ability to secure capital. Hence, any alleged benefit from reporting a higher net income under full costing, is illusory.

F. Evaluation

Among the methods discussed, the successful efforts, area of interest and full cost approaches have been the primary alternatives which have received substantial support. In view of the foregoing discussion, it

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52. Flory, S.M. & Grossman, S.D., "New Oil and Gas Accounting Requirements", The CPA Journal, Vol. 48, No. 5, (May, 1978), p. 40.
53. Baker, C.R., op. cit., p. 10. See Lev, B., "Accounting and Information Theory", Studies in Accounting Research No. 2, American Accounting Association, George Banta Co. Inc., Menasha, Wisconsin, 1969.
54. Flory, S.M. & Grossman, S.D., op. cit., p. 42.
55. Nethercott, L.J., "Reporting in the Petroleum Industry Under "Full Cost Accounting", The Accountant's Magazine, Vol. 80, No. 838, (April, 1976), p. 13.
56. This corresponds to the "semi-strong form" of the efficient market hypothesis as described in Dyckman, T.R., Downes, D.H. & Magee, R.P., Efficient Markets and Accounting: A Critical Analysis, Prentice-Hall, Englewood Cliffs New Jersey, 1975, p. 5.

is not surprising that the accounting profession in general, has yet to completely resolve this issue.

ISSUE TWO: THE SELECTION OF THE COST CENTRE

Cost centres have been defined as "...persons or places to whom or to which costs can be allocated".⁵⁷ Being closely allied to problems concerning the treatment of pre-production costs, cost centres should be selected to:⁵⁸

- (1) aid in determining the proper accounting treatment of pre-production costs, and
- (2) facilitate proper matching of costs with related revenues via depletion.

Whilst the FASB has identified several factors commonly considered in the selection of cost centres, it has also demonstrated the complexity of the problem by indicating alternative choices. These include the following:

A. Acquisition Unit

An acquisition unit may be described as a piece of legally owned arrangement such as a mineral lease, a block containing several such leases, a concession or a tract.⁵⁹ Besides being clearly identifiable, the acquisition unit "...represents a separate venture entered into with the objective of earning a profit".⁶⁰ As such, it has been suggested that acquisition units are appropriate cost centres for financial accounting and reporting purposes.

57. Most, K., "The Cost Centre Problem In The Oil Industry", Management Accounting (U.S.), Vol. 54, No. 6, (December, 1972), p. 40.

58. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p.83.

59. A concession is "...[a]n agreement ...permitting a mineral producer to prospect for and produce minerals in an area subject to the agreement" (Ibid, Appendix D-9). A tract is "...[a] defined area of the earth's surface acquired for the purpose of exploring for minerals and recovering any minerals discovered". (Ibid, Appendix D-32).

60. Ibid, p. 60.

However, it has also been pointed out that this approach could lead to a situation where a single mineral deposit was divided into several acquisition units. Costs associated with the deposit might be capitalized and amortized at different amounts and rates thus producing inconsistent results for essentially similar conditions.⁶¹ Also, the need to allocate pre-acquisition costs to individual units, and variations in the size of such units would reduce the inter-company comparability of financial data so reported.⁶²

B. Organization Unit

The selection of organization units (e.g. territories, divisions or districts) as cost centres depends on the organizational structure of the company concerned.⁶³ It is suggested that since data are accumulated on the basis of organizational units for managerial control purposes, reported results should also be based on these as cost centres. Furthermore, since organization units are likely to encompass common elements such as shared facilities, and are easily identifiable, proper matching of costs and revenues can be facilitated.⁶⁴

Against this, it has been contended that the concept confuses control centres used for managerial control, and cost centres used for financial accounting and reporting.⁶⁵ Furthermore, since organization units differ among companies and can change frequently within a company, their use as cost centres would be impractical.⁶⁶

61. Field, R.E., op. cit., p. 60.

62. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p. 87.

63. Ibid, pp.84, 87.

64. Ibid, p. 88.

65. Field, R.E., op. cit., pp. 60-61.

66. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p. 88.

C. Company as a Whole

The concept of a company-wide cost centre is consistent with full cost accounting in a broad application.⁶⁷ Indeed, the basic rationale for the the concept is the same viz. since all costs incurred are a necessary and unavoidable part of the total discovered reserves, the company should be viewed as a whole unit for financial accounting and reporting purposes.

Although the company-wide cost centre concept shares most of the criticisms levied against full costing, possibly the most notable argument against the former is the averaging effect that results from combining the successful and unsuccessful outcomes of separate ventures whose operating environments may differ substantially.⁶⁸ The information content of financial results so presented is therefore diminished.

D. Geopolitical Unit

The fundamental argument for adopting geopolitical units, e.g. countries or continents, as cost centres is the need to recognize inherent political, legal and economic differences between such units.⁶⁹ The concept is also consistent with full cost accounting in its broadest application.

Against it, the geopolitical unit is accused of being too large for establishing "*... a meaningful cause and effect association between capitalized (or deferred) costs and commercially recoverable mineral reserves*".⁷⁰

67. Ibid, p. 88.

68. Ibid, p. 89.

69. Ibid, p. 89.

70. Ibid, p. 89.

E. Natural Geological Unit

Types of natural geological units vary from individual mineral deposits to larger units such as a field. Advocates of the natural geological unit as a cost centre emphasize the ability to establish cause-effect relationships between capitalized costs and discovered reserves within each discrete unit.⁷¹ Being consistent with the successful efforts approach, the concept has also gained support from the latter's proponents.

However, it has also been argued that although sound in concept, practical difficulties in identifying and delineating natural geological units make it prone to errors and manipulation.⁷²

F. Evaluation

The number of alternative cost centre concepts is multiplied by the possibility of combining different types of units. For example, different units may be employed for offshore and onshore operations or for different stages of operations.⁷³ Thus although the more restricted concepts have received some support,⁷⁴ there generally appears to be much scope for justifiably selecting alternative concepts in the absence of clear Standards.

ISSUE THREE: ACCOUNTING FOR DEPLETION

Depletion may be described as the process of systematically allocating the cost of mineral reserves over the periods in which associated benefits

71. Ibid, p. 90.

72. Ibid, pp. 91-92.

73. Ibid, pp. 92-93.

74. Notably Field, R.E. (op. cit., p. 58) recommended the individual mineral deposit as the appropriate cost centre. Coutts, W.B., (Accounting Problems in the Oil and Gas Industry, Canadian Institute of Chartered Accountants, 1963) recommended the individual area of interest.

are derived. Its significance is aptly reflected in the following quote:

"... because a mine will eventually be exhausted, each unit of the mineral sold carries with it part of the cost of the mining deposit and this cost should be matched against the revenue it produces in order to obtain a realistic periodic income figure".⁷⁵

With this in mind, it is pertinent to examine several problems involved in the selection of the appropriate depletion method. These have been identified by Heazlewood and summarized as follows:⁷⁶

- (1) Determining the cost of property to be depleted requires careful consideration of its acquisition cost as well as developmental expenditure incurred in preparing for related mining operations. Thus, the amount to be depleted is affected by the treatment of pre-production costs and its attendant problems.
- (2) The problems involved in estimating the quantity and quality of a mineral deposit is also tied to difficulties in estimating the commercial life of the mine. Technological advances in later years may facilitate more accurate estimates, and subsequently adjustments could materially alter depletion charges and reported profits.
- (3) Estimating the residual value of the property is complicated by the need to consider a variety of factors such as alternative uses of the

75. Heazlewood, C.T., "Accounting for Depletion", The Chartered Accountant in Australia, Vol. 43, No. 11, (May, 1973), p. 14.

76. Ibid, pp. 14-16.

land, future land prices etc.

- (4) Alternative methods of depletion each of which can materially affect reported results, include the following:-

- (a) Unit of Production Method: This approach attempts to match costs with each period's production by equating depletion cost per unit to

$$\frac{(\text{Property Cost less Residual Value})}{\text{Total Recoverable Units}}$$

Clearly, problems in estimating property costs, residual value and recoverable units have been foreshadowed in the preceding paragraphs. An overriding consideration includes the need to decide whether to include probable as well as proved reserves as part of the "Total Recoverable Units".

- (b) Percentage Depletion: This method essentially applies a percentage to profits or sales. It is seriously deficient because it fails to determine depletion "... *objectively as a cost centre without reference to effect upon net income*".⁷⁷
- (c) Arbitrary Write-Offs: As the term implies, under this method depletion is recorded on an arbitrary basis. The approach lacks a logical and consistent basis and is not theoretically justifiable.

- (d) Straight-Line Time Basis: Annual depletion is calculated as

$$\frac{(\text{Property Cost Less Residual Value})}{\text{Estimated Life of Reserves}}$$

In addition to the difficulties in estimating property cost, residual value and the life of the reserves, the method fails

77. Paton, W.A. & Littleton, A.C., "An Introduction to Corporate Accounting Standards", American Accounting Association Monograph 3, 1967, p. 91 as cited in Heazlewood, C.T., *ibid*, p. 15.

to reflect variances in productivity of the property and therefore does not match costs with revenues correctly.

- (e) Investment Recovery Basis: This method involves directing all all profits to depletion until the investment has been recovered, after which no depletion needs to be recorded. It makes no attempt at matching costs with revenues.
- (f) No depletion: The justification for this course of action is to avoid the problems of estimation and arbitrariness in calculating depletion. However, by setting depletion equal to zero the method ignores the continual reduction of ore reserves through mining operations and therefore fails to reflect economic reality.

Although there are problems involved in calculating depletion, it is a necessary procedure for achieving proper matching of costs with revenues. It has been suggested that in order to offset some of the shortcomings inherent in the allocation process, disclosure of the following items could enhance the meaningfulness of the information so provided:⁷⁸

- (1) Amounts subject to depletion.
- (2) Amount of depletion charged per period.
- (3) Depletion method adopted.
- (4) In the case of adjustments, the amount of adjustments, reasons for the change, and method adopted for recording the adjustments in the accounts.

78. Nethercott, L.J., "Depletion in the Mining Industry", The Australian Accountant, Vol. 43, No. 1, (February, 1973), p. 22.

ISSUE FOUR: THE VALUATION OF MINERAL RESERVES

It is generally acknowledged that mineral reserves are typically the most important asset of a mining company.⁷⁹ Most historical cost approaches attempt to recognize the importance of reserves by capitalizing some or all associated costs. However, these traditional methods fail to explicitly recognize the lack of a predictable relationship between costs incurred in the finding and development processes, and the value of the reserves ultimately discovered. Rather, it has been suggested that this relationship is only clearly recognized by some form of value-based accounting, which may provide more meaningful information for predicting and assessing future cash flows and operating results. With this in mind, several alternative methods have been proposed.

A. Discovery Value Accounting

The Discovery Value Method has been described as an approach unique to the extractive industries.⁸⁰ At the time of discovery, or alternatively when reserves are developed, the value of the reserves is recorded at "*... the amount that the resources can be bought or sold for - where is, as is*".⁸¹ This value is generally maintained in the financial statements until the resources are sold, although adjustments may be made for revisions of estimated reserve quantities.⁸²

Major arguments in favour of discovery value accounting include the

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79. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p. 145.
80. Connor, J.E., "Discovery Value - the Oil Industry's Untried Method", op. cit., p. 55.
81. Ibid, p. 55.
82. Financial Accounting Standards Board, Statement of Financial Accounting Standards No. 19: "Financial Accounting and Reporting By Oil and Gas Producing Companies, FASB, Stamford, Connecticut, (December, 1977), para. 120.

following:-

- (1) "...[P]rofit is earned at the moment of making the most critical decision or of performing the most difficult task in the cycle of a complete transaction".⁸³ This occurs at the point of discovery of mineral reserves rather than at the point of sale, and is recognized by the discovery value method.
- (2) It explicitly recognizes the lack of a predictable relationship between finding costs and discovered reserves.
- (3) By considering market values at the times of discovery, it appropriately recognizes the increase in wealth signalled by the event of discovery, by a corresponding increase in reported shareholders equity.
- (4) The value of discovered reserves will be included in the capital base for the purposes of rate of return calculations. This treatment recognizes the existence of capital contributed by successful discoveries.⁸⁴
- (5) The approach largely eliminates the "full cost versus successful efforts" controversy since exploration expenditure is generally written off on discovery.⁸⁵

In opposition to the method, several objections have been significant:-

- (1) Discovery value represents neither cost nor value. "... The mixture of values of minerals measured at different dates of discovery lacks

83. Myers, J. " The Critical Event and the Recognition of Net Profit", The Accounting Review, Vol. 34, No. 4, (October, 1959), p. 529.

84. Connor, J.E., "Discovery Value - the Oil Industry's Untried Method", op. cit., pp. 61-62.

85. Ibid, p. 62.

*both the verifiability of historical costs and the relevance of current values".*⁸⁶

- (2) It is inconsistent with the convention that profit realization should be at the point of sale when revenue collection is reasonably assured.⁸⁷
- (3) Unrealized income is reflected in the balance sheet, but not being available for distribution or reinvestment. Such information could be misleading if not properly communicated to users.⁸⁸
- (4) Besides deviating from traditional generally accepted accounting principles of income realization and historical cost, the degree of subjectivity associated with the method exposes financial statements to potential manipulation.⁸⁹
- (5) Most importantly, practical difficulties in estimating mineral reserve quantities prevent proper implementation.
- (6) It has also been suggested that it fails to resolve the area of interest question viz. *"... what exploration expenditure should be netted against the discovery value"?*⁹⁰

B. Current Value Accounting

In comparison to discovery value accounting, a current value approach requires periodic revaluations of a company's economic resources and obligations. This necessitates the recording of values and changes in values of mineral reserves at the end of each accounting period using the most

86. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p. 247.

87. Connor, J.E., op. cit., p. 62.

88. Ibid, p. 62.

89. Nethercott, L.J., "Oil - Is Discovery Value the Answer?", Accountancy, Vol. 87, No. 995, (July, 1976), p. 32.

90. Nethercott, L.J., "Discovery Value Accounting - A Viable Alternative?", The Australian Accountant, Vol. 47, No. 4, (May, 1977), p. 231.

currently available information.

The primary thrust of arguments in favour of current value is based on its ability to meet users' needs. Information on the current value of mineral reserves is more realistic and relevant than similar information based on historical cost or discovery value, since "... *an extractive company's true economic success is largely measured by the current values of the mineral reserves it owns*".⁹¹ It is argued that current values given a better indication of future cash flows than past costs incurred or values at times of discoveries.

However, opponents of current value accounting would maintain that the uncertainties surrounding estimates of mineral reserve values, preclude practical disclosure of meaningful information. Among the the variables to be considered in this regard are "... *reserve quantities, ultimates sales prices, timing of production, future development and operating costs, fluctuations in interest rates, changes in government regulations and restrictions, and technological and economic changes*".⁹² Costs of implementation and lack of a proper degree of verifiability and reliability of current values appear to be other major concerns. Furthermore, as in the case of discovery value, its deviation from traditional principles of accounting is another criticism of current value accounting.

91. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p. 251.

92. Ibid, p. 253.

C. Present Value Approaches

Several proposed methods are typified the estimation of the present value of future net cash flows expected to be derived from mineral reserves. Commonly shared advantages of these methods include the following:-

- (1) Given the difficulties of determining the current cost of non-regenerative natural resources, i.e. since a firm's mineral resources cannot be exactly replaced,⁹³ it has been suggested that a present value approach is the only reasonable substitute for current costs.⁹⁴
- (2) By its very nature, the present value approach facilitates an assessment of future cash flows and operating results. Information so provided is more relevant to users' needs than that provided under historical cost.
- (3) Although the future orientation of present value approaches necessitate standard assumptions to be made, such action will serve to enhance comparability of results.
- (4) Net present value is a well-known concept that is commonly used in management decision making.⁹⁵

However, critics of present value approaches have primarily objected to the subjectivity and reliability of the information produced. The validity of standard assumptions is questioned since "... *different*

93. Wallace, J.R., "Oil and Gas Accounting - Have We Found The Missing Assets?", The Accountant's Magazine, Vol. 86, No. 911, (May, 1982), p. 180.

94. FASB Oil and Gas Task Group, Interim Report on FASB Exposure Drafts: "Financial Reporting and Changing Prices" and "Constant Dollar Accounting", FASB, Stamford, Connecticut, (13 June, 1979), p. 14.

95. *Ibid*, p. 14.

*enterprises and different reserves have different risks attaching to their future production and sale, and the use of ... standard ... [assumptions] ... may understate the risks of some reserves or enterprises or may overstate the risks of others".*⁹⁶ On the other hand, permitting individual firms to state their own assumptions may be more realistic, but the subjectivity of the calculations would be significantly increased. Overall, the assumptions may be viewed as constraints designed to facilitate the calculation of discounted cash flows, and not the economic value of mineral reserves.⁹⁷

Three present value approaches have been significant insofar as they have been proposed in notable pronouncements issued by authoritative bodies. These are discussed as follows.

(1) Equivalent Purchase Cost Method

The equivalent purchase cost method was recommended in preference to six alternatives, in a major study sponsored by the American Petroleum Institute.⁹⁸ The method entails the estimation of the amount that "... an independent purchaser would be willing to pay for a portfolio of ... reserves identical to those held by the company"⁹⁹ i.e. the equivalent purchase cost. This is calculated as the net after-tax present value of the income stream expected from the reserves, based on the following standard assumptions.¹⁰⁰

96. Wallace, J.R., "Oil and Gas Accounting - The Missing Assets?", The Accountant's Magazine, Vol. 85, No. 906, (December, 1981), p. 418.

97. FASB Oil and Gas Task Group, op. cit., p. 15.

98. Welsch, G.A. & Deakin, E.B., Measuring and Reporting The 'Replacement' Cost of Oil and Gas Reserves, Sponsored by: The American Petroleum Institute, Washington, D.C., (July, 1977).

99. Ibid, p. 69.

100. Ibid, pp. 72-75.

- (a) Current prices and current costs should be used in the discounting calculations.
- (b) Discount rate of 8 percent should normally be used, although a revision may be required if there are major changes in risk.
- (c) Marginal tax rate of the company will apply.

By reflecting the independent purchase price of the reserves, it is argued that the method provides an approximation of the present cost of the reserves held. However, among its shortcomings is the possible misstatement arising from using current prices and costs, to the extent that real future prices and costs are different.¹⁰¹

(2) Reserve Recognition Accounting

Reserve Recognition Accounting (RRA) is the method that was proposed by the United States Securities Commission (SEC), for use by oil and gas producing companies. In essence, the method reflects:

- "(1) Proved oil and gas reserves as assets in the balance sheet;*
- (2) Additions to proved reserves and changes in valuations of proved reserves in the income statement; and*
- (3) All costs associated with finding and developing additions to proved oil and gas reserves, together with all costs determined to be nonproductive during the current period, in the income statement".¹⁰²*

101. For a specific list of advantages and disadvantages associated with the equivalent purchase cost method, see Welsch, G.A. & Deakin, E.B., *ibid*, pp. 75-76.

102. Securities & Exchange Commission, "Adoption of Requirements for Financial Accounting and Reporting Practices for Oil and Gas Producing Activities", Accounting Series Release No. 253, (31 August, 1978), in Federal Register, Vol. 43, No. 177, (12, September, 1978), p. 40688.

The present value of the net revenue from estimated future production of proved reserves is calculated on the basis of current economic conditions, and using a ten percent discount rate.¹⁰³

Besides the shared advantages of the other present value approaches, RRA was found to be more consistent with several of the basic concepts under the FASB's Conceptual Framework, than historical cost based alternatives.¹⁰⁴ However, in February 1981 after a period of experimentation and evaluation, the SEC concluded that "... because of the inherent uncertainty of recoverable quantities of proved oil and gas reserves, RRA does not presently possess the requisite degree of certainty to be accepted as a primary method of accounting".¹⁰⁵ Nevertheless, the Commission suggested that RRA may still be a useful basis for supplemental disclosure.¹⁰⁶

(3) Standardized Measure of Discounted Future Net Cash Flows

Disclosure of a Standardized Measure of Discounted Future Net Cash Flows (SMDCF) is now required of publicly owned U.S. oil and gas companies for fiscal years beginning on or after 15 December 1982.¹⁰⁷ The SMDCF is the

103. Ibid, p. 40689.

104. Solomons, D., "Reserve Recognition Accounting: A Test Case For The Conceptual Framework", in Emanuel, D.M. & Stewart, I.C. (editors), Essays in Honour of Trevor R. Johnston, Dept. of Accountancy University of Auckland & The New Zealand Society of Accountants, (October, 1980), p. 77.

105. Securities & Exchange Commission, "Financial Reporting by Oil and Gas Producers", Accounting Series Release No. 289, (26 February, 1981), in Financial Accounting Standards Board, Invitation to Comment: Disclosures about Oil and Gas Producing Activities, FASB, Stamford, Connecticut, (13 May, 1981), p. 25.

106. Ibid, p. 26.; for a further discussion of RRA see Connor, J.E., "Reserve Recognition Accounting: Fact or Fiction?", Journal of Accountancy, Vol. 148, No. 3, (September, 1979), pp. 92-99.

107. Financial Accounting Standards Board, Statement of Financial Accounting Standards No. 69: "Disclosures About Oil and Gas Producing Activities", FASB, Stamford, Connecticut, (November, 1982), para. 39.

result of:¹⁰⁸

- (a) future cash inflows estimated by the year-end oil and gas prices of the company's proved reserves;
- (b) less future development and production costs estimated by year-end costs of developing and producing the proved reserves;
- (c) less future income tax expenses estimated "... by applying the appropriate year-end statutory tax rates, with consideration of future tax rates already legislated, to the future pretax net cash flows relating to the enterprises proved...reserves, less the tax basis of the properties involved".¹⁰⁹
- (d) less a 10 percent annual discount for estimating the timing of future net cash flows.

An integral part of the proposed method is the disclosure of the principal components of the SMDCF to enhance users' understanding and permit adjustments to meet individual user's needs.¹¹⁰ Indeed, although it adopts a present value approach, it is emphasized that SMDCF "... is neither fair market value nor the present value of future cash flows. It is primarily a tool to allow for a reasonable comparison of mineral reserves and changes through the use of a standardized method that recognizes qualitative, quantitative, geographic and temporal characteristics".¹¹¹ Because of the limitations of SMDCF, the FASB rejected the idea of providing an alternative measure of income on the basis of changes in the SMDCF.

108. Ibid, para. 30.

109. Ibid, para. 30.

110. Financial Accounting Standards Board, Exposure Draft: "Disclosures About Oil and Gas Producing Activities", FASB, Stamford, Connecticut, (15 April, 1982), para. 74.

111. Ibid, para. 75.

D. Evaluation

Although the proposals for some form of reserve valuation have focused mainly on the oil and gas industry, it is clear that their implications are equally important to other mining companies. The primary criticism levied against such a value-based approach has been directed mainly at its inherently subjective nature. Yet, there is reason to believe in the possible gradual acceptance of the approach, at least as a basis for supplemental disclosure, since estimates and approximations are but a normal aspect of much decision making in the extractive industries.

ISSUE FIVE: DISCLOSURE IN FINANCIAL STATEMENTS OF INFORMATION
UNIQUE TO THE EXTRACTIVE INDUSTRIES

The significance of this issue is well-exemplified in the United States oil and gas industry, where the uncoordinated actions of the FASB and the SEC have collectively resulted in the mandatory disclosure of a wide range of information causing a dramatic increase in the size of annual reports.¹¹² Similarly, a recent international survey of financial reporting in the mining industry revealed a growing trend towards disclosure of more detailed statistical information on ore reserves.¹¹³ These moves recognize the unique operational characteristics of the extractive industries.

Types of potentially useful information unique to the extractive industries, which could be disclosed in mining companies' financial statements, were considered by the FASB, and include the following.

112. Wallace, J.R., "Oil and Gas Accounting - The Missing Assets?", op. cit., p. 416.

113. International Survey on Financial Reporting In The Mining Industry", The Chartered Accountant in Australia, Vol. 50, No. 9, (April, 1980), p. 26.

(1) Disclosure of information regarding mineral reserves including¹¹⁴

- (a) estimated quantities of mineral reserves by categories and types;
- (b) other disclosures relating to estimated quantities of mineral reserves;
- (c) estimated value of mineral reserves;
- (d) descriptions of assumptions used and difficulties involved in the estimation of quantities and values of reserves;
- (e) changes in estimated quantities and values of reserves.

(2) Functional data including

- " (1) *Tabulation of expenditures for each of the extractive processes... including amounts capitalized (or deferred) and amounts expensed as incurred.*
- (2) *Disclosure of revenue for each of the extractive processes...*
- (3) *Disclosure of the above types of functional data further analyzed between domestic and foreign operations"*¹¹⁵

(3) Operating data including

- " (1) *Mineral reserve data:*
 - (a) *Average finding cost per unit discovered.*
 - (b) *Average depreciation, depletion, and amortization per unit produced.*
 - (c) *Average lifting cost per unit produced.*
 - (d) *Average sales or transfer price per unit transferred or sold.*

114. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., pp. 213-223.

115. Ibid, p. 223. See also pp. 225-227 for more detailed discussion of the items.

- (2) *Gross and net undeveloped acreage.*
- (3) *Gross and net productive acreage.*
- (4) *Net production and sales volume.*
- (5) *Units of by-products.*
- (6) *Gross and net producing wells.*
- (7) *Gross and net well completions by development and exploratory functions.*
- (8) *Amounts of overburden and waste removed.*
- (9) *Average grade of ore mined.*
- (10) *Description of work being done in improved recovery operations.*
- (11) *Information about the costs and results of major projects in process".*¹¹⁶

Arguments in favour of such additional disclosure include the following:

- (1) In view of the importance of mineral reserves in determining the future production capacity and success of the mining company, and the lack of such information being provided in historical cost financial statements, additional disclosure of mineral reserve data is warranted.

Furthermore, estimates of mineral reserve values provided by value-based accounting methods have been criticized for being possibly misleading because of their inherent subjectivity. For instance, mineral reserves differ in the degree of uncertainty with which their quantities can be estimated as well as the extent to which properties

116. Ibid, pp. 223-224. See also pp. 227 -228 for a further discussion of these items.

containing the reserves have been developed for production.¹¹⁷ Thus, developing estimates on the basis of different types of reserves would give different results having different implications. Providing more detailed information on the manner in which mineral reserve values have been obtained would therefore be useful for enhancing the meaningfulness of value disclosures.

- (2) Functional data can facilitate correlation of the results of each extractive process with reserve data and other operating statistics. When examined over a number of years, general trends in funds expended and reserves discovered can be observed.¹¹⁸
- (3) Operating data would permit a better basis for comparing mining companies whose costs-results relationship differs substantially, and facilitates a better evaluation of effort and result.¹¹⁹

In opposition, it is argued that more information does not necessarily mean better information. Indeed, the cost of providing additional information must be weighed carefully against the potential benefits. Also, information overload, i.e. too much information, presents the problem of reducing the ability of users to easily extract and understand the information. Other problems

117. The FASB in its Discussion Memorandum (ibid, pp.147-149) distinguishes proved reserves (reasonably certain of being recovered from known reservoirs and mineral deposits), from probable reserves (less well defined than proved reserves and would require significant additional development and exploration before production) and possible reserves (even less well defined than probable reserves and would also require further development and exploration before production).

118. Ibid, p. 226.

119. Ibid, p. 227.

have also been identified:

- (1) There are several practical difficulties in providing mineral reserve information such as the following.¹²⁰
 - (a) Uneven distribution of mineral content in discovered reserves and fluctuations in mineral prices and production costs, make it almost impossible to verify the quantity of economically recoverable reserves at any one time. This problem is aggravated in the case of multi-mineral reserve deposits.
 - (b) Financial information on economically recoverable reserves is of limited comparative value, in the absence of qualitative information such as distance from markets, types of mines being worked etc.
 - (c) Inclusion of subjectively derived value information in financial statements could attach a degree of precision to the information which might mislead users.
 - (d) Given that an auditor's expertise in this area must generally be dependent on his experience in the industry rather than his basic audit training, some reliance must be placed on the opinions and information provided by geologists and other experts. This relationship becomes questionable if the mining company's experts become involved, whilst seeking an independent expert's advice could prove costly.¹²¹
- (2) The provision of functional data to facilitate identification of the relationship between effort and results would be futile because of the lack of a predictable relationship between costs incurred and the value of reserves discovered.¹²²

120. Davies, B.J., op. cit., pp. 19, 29, 23, 25.

121. Nethercott, L.J., "Mineral Exploration Companies and the Auditor", The Chartered Accountant in Australia, Vol. 42, No. 5, (November, 1971), p. 6.

122. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p. 226.

- (3) The provision of detailed operating data could conceivably present difficulties of interpretation on one hand, and possibly provide a competitive advantage to other mining companies on the other.

CONCLUSION

The five issues discussed in this chapter are not intended to be an exhaustive representation of all the problems being faced by the accounting profession in the extractive industries. Instead, it is perhaps appropriate to state that some of the more difficult problems have been associated with the implementation of Standards designed to resolve these issues, rather than with the definition and justification of the issues themselves. In this regard, the following chapter looks at the development of financial accounting and reporting Standards for the extractive industries.

CHAPTER FOUR: FINANCIAL ACCOUNTING AND REPORTING STANDARDS

NEED FOR ACCOUNTING STANDARDS IN THE EXTRACTIVE INDUSTRIES

As illustrated in Chapter Three, the unique operational features and phases of the extractive industries, give rise to several major problems for which alternative accounting treatments are available. In the light of this situation, the traditional argument for accounting standards applies viz. *"... to narrow the choice of accounting treatment so as to make financial statements reasonably comparable with one another"*.¹²³

In the same vein, the Australasian view acknowledges the need *"... to improve the quality and uniformity of reporting and [to] introduce a definitive approach to the concept of what gives a true and fair view"*¹²⁴

The need for uniform accounting standards in the extractive industries has long been recognized, notably by Brock¹²⁵ and Alfredson¹²⁶ with respect to the oil industry. Davison took the case a step further by suggesting the need for separate accounting standards to enable small exploration type companies to meet the "different" information needs of its shareholders and potential investors.¹²⁷ Against this, it has been demonstrated that in Australia:-

*"Given the need to narrow ... the range of
available accounting standards for the*

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123. Accounting Standards Committee, "Setting Accounting Standards: A Consultative Document", Accountancy, Vol. 89, No. 1023, (November, 1978), p. 56.
124. AAS 1 "Conformity With Accounting Standards", The Institute of Chartered Accountants in Australia & Australian Society of Accountants, (December, 1979), para. 2.; "Explanatory Foreword to Statements of Standard Accounting Practice", New Zealand Society of Accountants, (April, 1979), para. 1.1 and 1.2. as cited in Heazlewood, C.T., "The Role of Accounting Standards Vis-A-Vis The Small Company", Discussion Paper Series No. 1, Dept. of Accounting and Finance, Massey University, (August, 1981), p. 2.
125. Brock, H.R., "A Look At Accounting Principles Used By Oil and Gas Producers", Accounting Review, Vol. 33, No. 1, (January, 1958), p. 67.
126. Alfredson, F.K., op. cit., p. 17.
127. Davison, A.G. "Mining Companies' Financial Statements - Of What Use?", The Chartered Accountant in Australia, Vol. 50, No. 2, (August, 1979), p. 26.

purposes of comparability, there is no need to create alternative accounting standards for small speculative mining companies when they can be adequately catered for by the existing industry standard".¹²⁸

Yet, even in the midst of this debate there is evident agreement on the need for clear and consistent accounting standards with which to regulate the form and content of extractive industries' financial statements. To date, accounting Standards specific to the extractive industries have been issued by private accounting policy-making bodies in only two countries - the United States and Australia.¹²⁹ The following sections will examine the development of these Standards, as well as the situation in the United Kingdom, New Zealand and Malaysia.

THE UNITED STATES EXPERIENCE

The first significant attempt at resolving extractive industry financial accounting and reporting issues in the United States, was in 1964 when the American Institute of Certified Public Accountants (AICPA) commissioned a study of "... the various accounting methods being used by companies in the extractive industries ... to make recommendations for consideration by the Accounting Principles Board (APB) in formulating an Opinion".¹³⁰ This resulted in Accounting Research Study No. 11 (ARS No. 11) being published in 1969.¹³¹ The conclusions of the study supported successful efforts accounting.

128. Heazlewood, C.T., "Mining Companies Financial Statements - Of What Use? An Alternative View", Accounting Forum, Vol. 4, No. 3, (September, 1981), p. 22.

129. Heazlewood, C.T., "The Development of Extractive Industry Accounting Standards in Australia and the United States of America", op. cit., p. 133.

130. Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries", op. cit., p. 33.

131. Field, R.E., op. cit.

The recommendations contained in ARS 11 were studied by the APB's Committee on Extractive Industries in their attempt to narrow the diversity of accounting practices. This eventually resulted in a paper being issued on accounting and reporting in the petroleum industry, in which the Committee expressed its conclusions. Although a public hearing was held on the matter, the APB was unable to act on the Committee's recommendations because the former was superseded by the Financial Accounting Standards Board in 1973.¹³²

Interestingly enough, in 1971 the Federal Power Commission issued a ruling which required natural gas producing companies under its jurisdiction to adopt full cost accounting for mineral leases, with a country-wide cost centre.¹³³ This was followed in 1974, by a comparative study of simulated results under full cost and successful efforts accounting, which concluded that the needs of financial statement users were better served by full cost accounting.¹³⁴

In the midst of the full cost versus successful efforts debate, extractive industry accounting was placed on the FASB's technical agenda in October, 1975.¹³⁵ This was followed by the issuance of the Energy Policy and Conservation Act in December, 1975 which required the SEC to establish accounting practices for all U.S. crude oil and natural gas producers by 22 December, 1977.

132. Ibid, pp. 37-38.

133. Flory, S.M. & Grossman, S.D., op. cit., p. 40.

134. Ibid, p. 40. This research study was undertaken by John H. Myers, and entitled: "Full Cost Vs Successful Efforts in Petroleum Accounting : An Empirical Approach".

135. Heazlewood, C.T., "The Development of Extractive Industry Accounting Standards in Australia and the United States of America", op. cit., p. 135.

In 1976, the SEC began requiring disclosure of reserve volumes in the 10K reports made available to the public either from the companies or the SEC. In the same year, the SEC released ASR 190 requiring supplemental disclosure of specified replacement cost information in financial statements filed with it,¹³⁶ but permitting "... a one-year delay for the reporting of replacement costs for mineral resource assets".¹³⁷ This preceded the issuance of the FASB's discussion memorandum on financial accounting and reporting in the extractive industries.¹³⁸ In June of the following year, the American Petroleum Institute published the results of a major study which "... concluded that replacement cost data are not applicable to oil and gas reserves".¹³⁹ By this time it was clear that the SEC's intention to require supplementary disclosure of replacement costs would be greeted with opposition in the oil and gas industry.

In attempting to meet the deadline imposed by the Energy Policy and Conservation Act, the SEC proposed to adopt the standards contained in the FASB's exposure draft on financial accounting and reporting by oil and gas producing companies. However, by now the smaller oil companies were already lobbying against the uniform adoption of the successful efforts method as they were concerned about the potential effects on their reported incomes, and their ability to borrow money. In late November 1977, the Justice Department acting under the powers of the 1975 Securities Amendments, requested the SEC to postpone the adoption of a uniform accounting method until the effect of the change on competition in the oil and gas industry had been established.

136. Securities and Exchange Commission, "Notice of Adoption of Amendments to Regulation S-X Requiring Disclosure of Certain Replacement Cost Data", Accounting Series Release No. 190, (23 March, 1976).

137. Flory, S.M. & Grossman, S.D., op. cit., p. 40.

138. FASB, "Financial Accounting and Reporting in the Extractive Industries", op. cit.

139. Flory, S.M & Grossman, S.D., op. cit., p. 40.

In response to these events, the FASB indicated that many small companies had used the successful efforts approach and had been successful in obtaining external finance. This view was supported by a study of twenty-seven companies, interviews with suppliers of capital to oil and gas producers, and a study of the effect of the proposals on stock prices of affected companies.¹⁴⁰ As a result, the FASB issued Statement No. 19 in December 1977 which did not substantially differ from the exposure draft that preceded it.

Statement No. 19.

Statement of Financial Accounting Standards No. 19 published in December 1977, "... *was the first authoritative pronouncement to establish explicit and comprehensive standards of financial accounting and reporting for oil and gas producing activities*".¹⁴¹ Financial accounting and reporting issues associated with the transporting, refining and marketing of oil and gas are outside the scope of the Standard.¹⁴²

Statement No. 19 explicitly recognizes the wide diversity in accounting practices and the varied nature and extent of information being disclosed.¹⁴³ Financial accounting and reporting standards for oil and gas producing activities are established within the framework of historical cost. It was decided that the assessment of alternatives based on value accounting be postponed until the broader issue of general applicability of value accounting is resolved in the FASB's Conceptual Framework Project.¹⁴⁴

140. Ibid, p. 43.

141. Financial Accounting Standards Board, Invitation to Comment: Disclosures About Oil and Gas Producing Activities, op. cit., p. 1.

142. Financial Accounting Standards Board, Statement of Financial Accounting Standards No. 19, op. cit., para. 6.

143. Ibid, para. 2.

144. Ibid, para. 4.

It has been suggested that the Statement's accounting treatment of pre-production costs was really a compromise solution which incorporated aspects of both full cost and successful efforts accounting.¹⁴⁵ Labelling the method as some form of successful efforts accounting was intended to enhance acceptance of it by major U.S. oil companies.¹⁴⁶ This assertion is basically founded on the premise that the accounting treatment specified in the Statement is based on the nature of expenditures incurred rather than on the success or failure of the efforts; the cost centre is not made a primary consideration in the capitalize-expense decision.¹⁴⁷

More specifically, the main provisions on the accounting treatment of pre-production costs are summarized as follows:¹⁴⁸

- (1) Costs incurred in the acquisition of a property (whether proved or unproved) shall be capitalized when incurred.
- (2) All exploration costs except the cost of drilling exploratory and exploratory-type stratigraphic test wells, are expensed as incurred; the latter costs are first capitalized and subsequently expensed if the well proves to be non-productive.
- (3) Development costs are capitalized as part of the cost of wells and related equipment and facilities.
- (4) Production costs are part of the cost of oil and gas produced. Previously capitalized costs are also part of the cost of oil and gas produced, and are amortized(depleted) by the unit of production

145. Brown, W.W. & Grove, H.D., "Another Compromise Solution: A Critical Analysis of SFAS No. 19", Oil and Gas Tax Quarterly, (March, 1978), pp. 332-345.

146. Ibid, p. 345.

147. Financial Accounting Standards Board, Statement of Financial Accounting Standards No. 19, op. cit., para. 209.

148. Ibid, para. 15-20, 22-26, 30.

method either on a property by property basis or on the basis of some reasonable aggregation of properties with a common geological structural feature or stratigraphic condition such as a reservoir or field. The amortization rates will be based on total estimated units of proved oil and gas reserves, and should be revised at least annually. On the abandonment of property, associated capitalized costs should be expensed in the period in which the decision to abandon is made.

- (5) Acquisition and construction costs of support equipment and facilities used in oil and gas production should be capitalized.

The Statement also provides detailed provisions regarding the accounting treatment of mineral property conveyances and related transactions, and accounting for income taxes.¹⁴⁹ Of more direct relevance to the purposes of this report are the disclosure requirements to be made either "*...within the body of the financial statements, in the notes thereto, or in a separate schedule that is an integral part of the financial statements*".¹⁵⁰ including:

- (1) Disclosure of reserve quantities specifying¹⁵¹
 - (a) net quantities of the company's interests in proved and proved developed reserves as at the beginning and end of the reporting period;
 - (b) changes in proved reserves of oil and gas distinguishing between those resulting from:
 - (i) revisions of previous estimates,
 - (ii) application of improved recovery techniques,
 - (iii) purchases of minerals-in-place,
 - (iv) extensions discovered, and other additions,

149. Ibid, para. 42-47, 60-62.

150. Ibid, para. 48.

151. Ibid, para. 50-55.

(v) production,

(vi) sales of minerals-in-place.

(c) location of proved reserves of oil and gas distinguishing between net quantities of revenues in the enterprise's home country, and each foreign geographic area in which significant reserves are located.

(d) amount of proved reserves at the end of the year and amounts recovered during the year in respect of oil and gas related to long-term supply agreements with foreign governments or authorities in which the company acts as producer, or otherwise participates in the operations of the properties in which the oil and gas is located.

(e) proportion of the company's interest in investee's reserves accounted for by the equity method of accounting, as at the end of the year.

(f) explanations of significant economic factors or uncertainties affecting particular components of the enterprise's proved reserves.

In disclosing reserve quantities and changes in them, oil reserves (including condensate and natural gas liquids) are to be stated in barrels, and gas reserves in cubic feet.

(2) Disclosure of the aggregate amounts of capitalized costs and related accumulated depreciation, depletion, amortization and valuation allowances as at the end of the reporting period.¹⁵²

(3) Disclosure of costs incurred in oil and gas producing activities distinguishing between

(a) property acquisition costs,

(b) exploration costs,

(c) development costs, and

(d) production (lifting) costs.¹⁵³

152. Ibid, para. 57.

153. Ibid, para. 58-59.

Critics of Statement No. 19 have attacked the historical cost-orientation of the recommendations particularly the method of accounting for pre-production costs. It has been suggested that the required disclosures of reserve quantities provide only a partial solution to the problem of providing relevant information since reserves have widely differing characteristics and values, and mere replacement of reserve quantities discovered and produced, will not necessarily ensure that the value of the asset base is maintained.¹⁵⁴ Statement No. 19 was subsequently affected by pronouncements issued by the SEC which recognized and attempted to overcome the deficiencies associated with historical-cost based reporting.

The SEC Releases

Even after the issuance of Statement No. 19, "the full cost versus successful efforts" debate continued in hearings held by the Department of Energy and the SEC in 1978. In August of that year, the SEC issued Accounting Series Release(ASR) No. 253,¹⁵⁵ in which the following actions were taken:

- (1) It adopted the form of successful efforts accounting prescribed in Statement No. 19,¹⁵⁶ but also proposed to adopt a prescribed form of full cost accounting.¹⁵⁷ In permitting the use of either method, the SEC maintained that while both are deficient in reporting financial position and operating results, it felt that

*"... proper application of the prescribed form of
SE or FC in preparing financial statements that
include supplemental disclosures of the information*

154. Wallace, J.R., "Oil and Gas Accounting - Have We Found The Missing Assets?", op. cit., p. 159.
155. Securities and Exchange Commission, ASR No. 253, op. cit.
156. Ibid, p. 40706.
157. This resulted in: Securities and Exchange Commission, "Oil and Gas Producers - Full Cost Accounting Practices", Accounting Series Release No. 258, in Federal Register, Vol. 43, No. 249, (Wednesday, 27 December, 1978), pp. 60413-60418.

required by the rules... will yield financial statements that, taken as a whole, result in a fair presentation of financial position, results of operations, and changes in financial position of oil and gas producing companies".¹⁵⁸

(2) Accordingly, the SEC proposed to develop a new method of accounting by initiating the development of reserve recognition accounting (RRA) as the basis for supplemental disclosures. These disclosures were required regardless of the accounting method adopted and include the following:

- "(a) Quantities and annual changes in quantities of proved oil and gas reserves;*
- (b) Costs incurred in exploration, development, and production activities;*
- (c) Capitalized costs relating to oil and gas producing activities;*
- (d) Historical information on cash flow and value of transfers from producing oil and gas;*
- (e) Cash flow and value of transfers ("net revenue") from estimated future production of proved oil and gas reserves, calculated on the basis of current economic conditions; and*
- (f) Present value of net revenue from estimated future production of proved oil and gas reserves using a ten percent discount rate".¹⁵⁹*

158. ASR 253, op. cit., p. 40706.

159. Ibid, p. 40689.

The SEC also proposed rules requiring the presentation of a supplemental earnings summary on oil and gas producing activities, prepared on an RRA basis.¹⁶⁰ It was intended that the information and the experience gained from presenting these disclosures would provide a basis upon which the Commission could assess the viability of RRA as the accounting method for preparing primary financial statements of oil and gas producing companies.

After receiving feedback on its proposed rules, the SEC issued Accounting Series Releases Nos. 269 and 270 in September, 1979. Rules contained in ASR 269 required the presentation in annual reports "... of a Summary of Oil and Gas Producing Activities and a Summary of Changes in Present Value of Estimated Future Net Revenues".¹⁶¹ ASR No. 270 postponed the audit requirement for oil and gas reserve information.¹⁶²

In February 1981, the SEC released ASR No. 289 which contained the following declaration:

"The Commission is announcing that it no longer considers Reserve Recognition Accounting to be a potential method of accounting in the primary financial statements of oil and gas producers. In addition, the Commission is announ-

160. Securities and Exchange Commission, "Release No. 33-5969: Oil and Gas Producing Activities - Proposed Supplemental Earnings Summary", in Federal Register, Vol. 43, No. 177, (Tuesday, 12 September, 1978), pp. 40726-40729.

161. Financial Accounting Standards Board, Invitation To Comment, op. cit. p. 24. ; See Securities and Exchange Commission, "Oil and Gas Producers - Supplemental Disclosures on the Basis of Reserve Recognition Accounting", Accounting Series Release No. 269, (24 September, 1979).

162. FASB, ibid, p. 24; See Securities and Exchange Commission, "Oil and Gas Producers - Postponement of Audit Requirement For Reserve Information", Accounting Series Release No. 270, (24 September, 1979).

*cing its support of an undertaking by the Financial Accounting Standards Board to develop a comprehensive package of disclosures for those engaged in oil and gas producing activities".*¹⁶³

However, the Commission emphasized the importance of value-based disclosures and indicated that RRA should be considered as the basis for supplementary disclosures.

The Work of The FASB During the Period Between ASR No.253 and ASR No.289.

About a year before ASR No.289 was released, the FASB issued an exposure draft which eventually resulted in Statement No.33 on "Financial Reporting and Changing Prices".¹⁶⁴ Recognizing the generality of the proposed provisions, the Board decided to form industry task groups with the aim of identifying special measurement and disclosure problems in six industries, and recommending solutions to these problems.¹⁶⁵ Among the industries selected, mining and oil and gas were two.

In February 1979, the FASB responded to SEC's views contained in ASR No. 253, by issuing Statement of Financial Accounting Standards No. 25. The Standard provided for the indefinite suspension of the form of successful efforts accounting required under Statement No. 19.¹⁶⁶ Other requirements of Statement No. 19 were retained with revision of the effective date,

163. Securities and Exchange Commission, "Financial Reporting By Oil and Gas Producers", Accounting Series Release No. 289, (26 February, 1981), as reproduced in FASB, Invitation To Comment, op. cit., p. 23.

164. Financial Accounting Standards Board, Statement of Financial Accounting Standards No. 33 "Financial Reporting and Changing Prices", FASB, Stamford, Connecticut, (September, 1979).

165. FASB Mining Task Group, Interim Report on FASB Exposure Drafts: "Financial Reporting and Changing Prices" and "Constant Dollar Accounting", (31 May, 1979), p. i.

166. Financial Accounting Standards Board, Statement of Financial Accounting Standards No. 25: Suspension of Certain Accounting Requirements For Oil and Gas Producing Companies, FASB, Stamford Connecticut, (February, 1979), para. 9.

except that categories of reserves defined in Statement No. 19 were replaced by those adopted by the SEC in ASR No. 253.¹⁶⁷ In addition, Statement No. 25 required disclosure of the accounting treatment of costs incurred in oil and gas producing activities and associated amortization methods.¹⁶⁸ Although information on reserve quantities was also required, disclosure was permitted to be made outside the financial statements and could therefore be unaudited.¹⁶⁹

It soon became obvious to the FASB that their disclosure requirements coupled with those of the SEC, had resulted in information being provided by oil and gas producing companies, that were "... unnecessarily voluminous and complex without a corresponding increase in the usefulness of the disclosures to users of financial statements".¹⁷⁰ In attempting to remedy the situation, and to ensure the provision of additional useful information, the FASB developed Statement No. 39.

Statement No. 39

Statement of Financial Accounting Standards No. 39 was published in October 1980 as a supplement to Statement No. 33, and applies to all companies meeting the size criteria established in the latter Standard.

Statement No. 39 specifically requires the "... measurement of mineral resource assets and related expenses at current cost or lower recoverable amount".¹⁷¹ Recognizing the difficulties in providing this type of infor-

167. Ibid, para. 7.

168. Ibid, para. 8.

169. Ibid, para. 6.

170. Financial Accounting Standards Board, Invitation To Comment, op. cit., p. 2.

171. Financial Accounting Standards Board, Statement of Financial Accounting Standards No.39: Financial Reporting and Changing Prices:Specialised Assets - Mining and Oil and Gas, Stamford, Connecticut, (October, 1980), para.1

mation, flexibility is permitted in choosing the basis for presenting the information provided that the basis is disclosed e.g. specific price indices etc.¹⁷² In addition, the Statement specifies required disclosure of quantity and price information relating to mineral reserves other than oil and gas, for the five most recent years.¹⁷³

Dissenting Board members of the FASB primarily objected to the requirement that enterprises attempt to estimate the current cost of finding oil and gas reserves. They felt that the approach was not feasible and "...unlikely to provide relevant and reliable information for users' assessments of future cash flows, maintenance of operating capability, or financial performance".¹⁷⁴ However, it should be recognized that the provisions contained in both Statement Nos. 33 and 39, are experimental and will be subject to a comprehensive review at the same time.

Statement No. 69

In November 1982, the FASB consolidated its position with respect to disclosures about oil and gas producing activities, by issuing Statement No. 69, which established a comprehensive set of disclosures and amended certain requirements of several earlier Statements. The current Standard retains the Statement No. 25 requirement applicable to all enterprises with oil and gas interests, that the method of accounting for oil and gas activities be disclosed together with the manner of disposing associated capitalized costs.¹⁷⁵

172. Ibid, para. 2, 7.

173. Ibid, para. 13-14.

174. Ibid, para. 9.

175. Financial Accounting Standards Board, Statement of Financial Accounting Standards No. 69, op. cit., para. 6.

However, Statement No.69 restricts the requirement to disclose supplementary information with annual financial statements, to publicly traded enterprises having significant oil and gas producing activities.¹⁷⁶ The significance of oil and gas producing activities is determined by satisfying one of three tests on the size of the enterprise's revenues, assets and results of operations.¹⁷⁷ The supplementary information to be disclosed include the following:

(1) Disclosure of Proved Oil and Gas Reserves

These requirements are substantially the same as those required under Statement No. 19. However, oil and gas subject to agreements with local governments or authorities are now treated in the same manner as those associated with foreign governments or authorities.¹⁷⁸ Furthermore, in the case of enterprises issuing consolidated financial statements, if a significant portion of reserve quantities at year-end "... is attributable to a consolidated subsidiary(ies) in which there is a significant minority interest, that fact and the approximate portion shall be disclosed".¹⁷⁹

An additional provision is also included to the effect that if a government restricts or otherwise affects the disclosure of reserves, the fact that the enterprise's disclosed reserve estimates exclude the figures for the named country, or include figures for reserves other than proved, shall be indicated.¹⁸⁰

176. Ibid, para. 7.

177. Ibid, para. 8.

178. Ibid, para. 13.

179. Ibid, para. 14(a).

180. Ibid, para. 17.

(2) Disclosure of Capitalized Costs Relating to Oil and Gas Producing Activities

These requirements are also adopted from Statement No. 19, with the added specification that the capitalized costs of improved properties, if significant, be separately disclosed. In this regard, the capitalized costs of support equipment and facilities is permitted to be disclosed either separately, or as part of the capitalized costs of proved and unproved properties.¹⁸¹

(3) Disclosure of Costs Incurred in Oil and Gas Property Acquisition, Exploration, and Development Activities

The requirement to disclose property acquisition costs, exploration costs and development costs, and separately, for each geographic area for which reserve quantities are disclosed when foreign operations are involved, is also retained from Statement No. 19.¹⁸² In addition, significant costs of acquiring mineral interests with proved reserves are required to be separately disclosed from the costs of acquiring unproved properties.¹⁸³

(4) Disclosure of the Results of Operations for Oil and Gas Producing Activities

Annual operating results for oil and gas producing activities are required to be disclosed in aggregate and for each geographic area for which reserve quantities are held, with presentation of:-¹⁸⁴

- (a) Reserves distinguishing between sales to unaffiliated enterprises and sales or transfers to the enterprise's other operations;

181. Ibid, para. 19.

182. Ibid, para. 21, 22.

183. Ibid, para. 22.

184. Ibid, para. 24-28.

- (b) Production (lifting) costs;
- (c) Exploration expenses;
- (d) Depreciation, depletion, and amortization, and valuation provisions;
- (e) Income tax expenses;
- (f) Results of operations for oil and gas producing activities calculated as item (a) less items (b) to (e), (excluding corporate overhead and interest costs).

(5) Disclosure of a Standardized Measure of Discounted Future Net Cash Flows (SMDCF) Relating to Proved Oil and Gas Reserve Quantities

Statement No. 69 requires disclosure of a SMDCF on the enterprise's interests in proved oil and gas reserves, and oil and gas subject to purchase under contracts in which it acts as producer of those reserves or participates in operating the properties on which the reserves are located.¹⁸⁵ Disclosure of the SMDCF is required in conjunction with the following information, in aggregate and for each geographic area for which reserve quantities are disclosed:

- (a) Future cash inflows.
- (b) Future development and production costs.
- (c) Future income taxes.
- (d) Future net cash flows. (Item (a) less items (b) and (c))
- (e) Discount amount using an annual discount rate of ten percent.

It is also provided that if a significant portion of the economic interest in the consolidated reported SMDCF belongs to a consolidated subsidiary(ies) in which there is significant minority interest, that fact and the approxi-

185. Ibid, para. 30.

mate portion is to be disclosed.¹⁸⁶ Also, annual changes in the SMDCF is to be disclosed in aggregate, with separate disclosure of significant sources of change. For the purposes of computing amounts relating to sources of change, the general rule is that the effects of price and cost changes be calculated before the effects of quantity changes. All changes except income taxes are to be reported before tax.¹⁸⁷ An overriding consideration is the need to provide additional information necessary for preventing the information on SMDCF from being misleading.¹⁸⁸

A noticeable feature about Statement No. 69 is the special attention that is directed towards enterprises whose financial statements include investments that are accounted for by the equity method. In these cases, the following information relating to oil and gas producing activities is required to be disclosed separately:-

- (a) the enterprise's share of the investee's year-end amount of net capitalized costs;¹⁸⁹
- (b) the enterprise's share of the investee's following reported items, in aggregate and for each geographic area for which reserve quantities are disclosed:-
 - (i) property acquisition, exploration and development costs;¹⁹⁰
 - (ii) results of operations;¹⁹¹
 - (iii) SMDCF.¹⁹²

186. Ibid, para. 31.

187. Ibid, para. 33.

188. Ibid, para. 34.

189. Ibid, para. 20.

190. Ibid, para. 23.

191. Ibid, para. 29.

192. Ibid, para. 32.

On the subject of presenting supplementary information on a current cost basis, Statement No. 69 allows the use of historical cost/ constant dollar measures of oil and gas mineral resource assets and related expenses, as well as current cost or lower recoverable amounts.¹⁹³ However, mining mineral resource assets and related expenses are required to be measured only at current cost or lower recoverable amounts. The Standard effectively restricts the need to present supplementary current cost information to enterprises with "... significant holdings of inventory and property, plant and equipment apart from oil and gas producing activities or certain other specialised assets".¹⁹⁴ The relevant amended sections of Statement No. 33 are superseded by provisions requiring the measurement of :-¹⁹⁵

- (a) property, plant and equipment at current cost or lower recoverable amount of the assets' remaining service potential at measurement date; and
- (b) depreciation, depletion, and amortization expenses of property, plant and equipment on the basis of average current cost or lower recoverable amount of the assets' service potential during the period of use.

Whilst the supplemental disclosures required in Statement No. 69, need not be complied with in producing interim financial reports, these reports are expected to "... include information about a major discovery or other favourable or adverse event that causes a significant change from the information presented in the most recent annual financial report concerning oil and gas reserve quantities".¹⁹⁶

193. Ibid, para. 35, 36.

194. Ibid, para. 35.

195. Ibid, para. 37, 38. These provisions are qualified by paragraph 53 of Statement No. 33 with respect to timberlands, and growing timber, income-producing real estate, motion picture films, and oil & gas mineral resource assets.

196. Ibid. para. 9.

Current Position in the United States

At the time of writing, Statement No. 69 is the prevailing authoritative accounting Standard on disclosures about oil and gas producing activities in the United States. It is encouraging to note that the SEC has announced its intention to adopt the requirements of Statement No. 69 in place of its own annual report requirements.¹⁹⁷ It is also interesting to note in retrospect, that although the FASB initially embarked on a discussion memorandum on extractive industry accounting, its subsequent Standards on extractive industry accounting have focused on the oil and gas industry. This is easily understandable in view of the importance of the oil industry to the U.S. economy especially in the light of the recent oil crisis, and more specifically the political pressures experienced by the FASB especially that attributed to the Energy Policy and Conservation Act.

However, these events and developments should not overshadow the importance of other similar extractive industries and the need to ensure the provision of similar information. This was clearly not overlooked in Statement No. 39 which established disclosure requirements on price and quantity information relating to mineral reserves other than oil and gas, and Statement No. 69 which requires mining mineral resources to be measured at current cost or lower recoverable amount.

Having come a long way in consolidating its views on oil and gas accounting disclosures, it seems logical to expect similar Standards on extractive industry accounting in the United States to follow suit. With the benefit

197. Financial Accounting Standards Board, "Disclosures Reduced For Oil and Gas Producing Companies", Status Report, FASB, Stamford, Connecticut, No. 137, (December, 1982), p. 1.

of hindsight, and the experience gained from facing the political aspects of the policy-making process,¹⁹⁸ the FASB may now be in a better position to accomplish the task of setting accounting Standards for the extractive industries.

AUSTRALIA

Mounting interest in information provided by published financial statements of mining companies in Australia, can be traced to the country's increased dependence on mineral exports since the 1960s.¹⁹⁹ Also during this period, a number of overseas studies on extractive industry accounting helped to create an academic environment for reviewing contemporary accounting practices in the Australian industry.²⁰⁰ In 1971, initial proposals for a uniform accounting approach in the extractive industries appeared in an exposure draft issued by the country's Institute of Chartered Accountants. The primary recommendation was that:-

"Expenditure on exploration and prospecting in a specific area or location should be carried forward until such time as a decision is taken to abandon that area or location. The balance sheet should state the lack of certainty of recovery of the exploration expenditure and that this is dependent upon the ultimate success of the operation".²⁰¹

Two years later, a more specific exposure draft on extractive industry accounting was issued jointly by the Institute and the Australian Society

198. See Most, K.S., "A New Method of Accounting for Oil and Gas Producers", Management Accounting (U.S.), Vol. 60, No. 11, (May, 1979), pp. 55-56.

199. Heazlewood, C.T., "The Development of Extractive...", op. cit., p. 133.

200. Selig, M., "The Making of An Accounting Standard For Extractive Industries", Accounting History Newsletter, Vol. 1, No. 2, (Spring, 1980), p. 11.

201. Institute of Chartered Accountants in Australia, Exposure Draft: Expenditure Carried Forward to Subsequent Accounting Periods, Sydney, (February 1971), para. 37.

of Accountants. In proposing an "area of interest" approach to accounting for pre-production costs, the exposure draft permitted deferral of prospecting and investigation costs provided that either of the following conditions were satisfied:-

- "(a) the presence of economically recoverable reserves is indicated for the particular area and there is reasonable probability that such costs will be recouped out of future revenue to be derived from the area concerned, or*
- (b) prospecting or investigation in the particular area has not yet proceeded to a stage which permits an assessment of the existence, or otherwise, of such reserves, provided prospecting or investigation is continuing currently in the area".*²⁰²

Similarly, deferral of development expenditure was permitted only if the costs can reasonably be expected to be recovered out of revenue to be generated from the area.²⁰³ Expenditures failing to meet the tests are expensed in the period that this is determined.²⁰⁴ It was also proposed that expenditures on abandoned areas be expensed in the period in which abandonment is decided.²⁰⁵ This exposure draft was finally replaced - about three and a half years later - by DS 12(10/76).

DS 12 (10/76)

DS 12 (10/76)²⁰⁶ issued in October 1976, was the first comprehensive statement of accounting standards on extractive industry accounting published by any

202. Australian Society of Accountants and the Institute of Chartered Accountants in Australia, Exposure Draft: Accounting For The Extractive Industries, Melbourne, (February, 1973), para. 22.

203. Ibid, para. 23.

204. Ibid, para. 24.

205. Ibid, para. 27.

206. Australian Society of Accountants and the Institute of Chartered Accountants in Australia, DS 12: Statement of Accounting Standards: "Accounting For The Extractive Industries", ASA & ICA, (October, 1976); hereafter DS 12 (10/76).

of the world's accounting bodies.²⁰⁷ A prominent feature of this Standard was that its main requirements were completely opposite to the proposals contained in the exposure draft. The primary thrust of DS 12 (10/76) was that pre-production costs be expensed immediately, except that they could be deferred up to a maximum period of two years provided that:

- "(a) such costs are expected to be recouped through successful development and exploitation of the area of interest, or alternatively, by its sale; or*
- (b) exploration and/or evaluation activities in the area of interest have not yet reached a stage which permits a reasonable assessment of the existence or otherwise of economically recoverable reserves; and*
- (c) in either case, active and significant operations are continuing currently in respect of that area of interest, or alternatively negotiations are actively being conducted for its sale".²⁰⁸*

The arbitrary two-year time limit was upheld on the grounds of prudence in the light of the risk and certainty inherent in the industry.²⁰⁹

The development of DS 12 (10/76) provoked criticism for the lack of opportunity for further discussion prior to its promulgation,²¹⁰ especially in view of its marked variations from the recommendations of the exposure draft. The arbitrary two-year limit imposed on pre-production costs was opposed because it failed to recognize the realities of the industry given the long time lag between exploration and commencement of development and production.

207. Selig, M., op. cit., p. 14.

208. DS 12 (10/76), op. cit., para. 14.

209. Ibid, p. 3.

210. Heazlewood, C.T., "DS 12 - October 1976, doomed to failure from the start", The Chartered Accountant in Australia, Vol. 49, No. 1, (July, 1978), p. 24.

Continued criticisms resulted in DS 12 (10/76) being revised particularly in the area of pre-production costs.

DS 12 (10/76) Revised = AAS 7

The revised DS 12 (10/76) since renumbered AAS 7²¹¹ was issued in December 1977. Unlike the American Standards which focus on the oil and gas industry, AAS 7 makes no differentiation between the types of product at which extractive operations are directed.²¹²

Whilst retaining the "area of interest" approach, the Standard requires exploration and evaluation costs associated with an area of interest to be expensed as incurred, but also permits deferral of pre-production costs "... provided that rights to tenure of the area of interest are current and provided that one of the following conditions is met:

- (a) *such costs are expected to be recouped through successful development and exploitation of the area of interest, or alternatively, by its sale; or*
- (b) *exploration and/or evaluation activities in the area of interest have not reached a stage which permits a reasonable assessment of the existence or otherwise of economically recoverable reserves, and active and significant operations in, or in relation to, the area are continuing".*²¹³

Development costs related to an area of interest in the pre-production stage, are allowed to be deferred to the extent that they are expected to be recovered through successful exploitation of the area or by its sale.²¹⁴

211. AAS 7, op. cit.

212. Ibid, para. 3.

213. Ibid, para. 14.

214. Ibid, para. 15.

Further development costs incurred during the production stage should be carried forward only if material; otherwise they are to be treated as production costs.²¹⁵ Capitalized costs associated with an area subsequently abandoned are to be expensed in the period in which that decision is made.²¹⁶

For the purposes of capitalize-expense decisions, all direct and indirect pre-production costs that are or can be directly related to an area of interest, should be allocated to that area.²¹⁷ Immaterial sales proceeds and reimbursements of previously incurred costs (including subsidies), received during the pre-production stages are to be offset against the related costs.²¹⁸ An overriding consideration is that costs be continually accumulated for areas of interest regardless of any future contraction in size of the area.²¹⁹

The Standard requires amortization charges to be determined on a production output basis, but also allows a time basis to be used in circumstances where the latter approach is judged to be more appropriate.²²⁰ However, the amortization basis adopted is to be consistently applied, and the amortization rate should not lag behind the depletion rate of economically recoverable reserves in the area of interest.²²¹ Estimates of economically recoverable reserves and future development costs (where applicable) are to be reassessed annually.²²² Fully amortised capitalised costs associated with facilities which are physically abandoned or of no further use, are to

215. Ibid, para. 17.

216. Ibid, para. 18.

217. Ibid, para. 24-25.

218. Ibid, para. 26-27.

219. Ibid, para. 28.

220. Ibid, para. 35.

221. Ibid, para. 35.

222. Ibid, para. 36.

be written out of the related accounts.²²³

In instances where material restoration costs are expected to be incurred, such costs necessitated by exploration, evaluation, development or production activities should be provided for at the time of such activities and be treated as part of the costs of the respective phases of operations.²²⁴ These provisions should also be periodically reassessed in the light of expected future costs.²²⁵

AAS 7 also provides guidelines on when and how inventories and sales revenue are to be brought into account.²²⁶ Perhaps more importantly are the disclosure requirements of the Standard, including the need to separately disclose in the financial statements or notes thereto:-²²⁷

- (1) periodic amounts of exploration, evaluation and development costs;
- (2) periodic amortization charges associated with exploration, evaluation and development costs carried forward;
- (3) government royalties on sales or production;
- (4) costs carried forward in respect of areas of interest in

"(a)... the exploration and/or evaluation phases; with an explanation that ultimate recoupment is dependent on successful development and commercial exploitation, or alternatively, sale of the respective areas;

(b)... the development phase in which production has not yet commenced, with an explanation that amortization is not being charged pending the commencement of production; and

223. Ibid, para. 37.

224. Ibid, para. 39.

225. Ibid, para. 40.

226. Ibid, para. 42-43, 45-47.

227. Ibid, para. 49-51.

(c) ... which production has commenced, with accumulated amortisation charges being shown separately as a deduction";²²⁸

(5) government subsidies accounted for in the period, with details of circumstances in which any such subsidies may become repayable.

On the subject of current cost information, one must look to the Australian Omnibus Exposure Draft which proposes the need to determine current costs as accurately as is practical, for non-monetary assets in the extractive industries.²²⁹ As in the United States, the major argument against this proposal is the irrelevance of the concept of current replacement cost or net realisable value for mining companies "... due to the characteristic of extractive operations where, especially in the early stage of exploration and development, most of the assets are of an intangible nature and have no realisable value, or alternatively are not going to be replaced".²³⁰ However, while recognizing the measurement problems involved, the exposure draft proposals appear to support the need for more relevant information even in the face of practical problems of implementation.²³¹

Although AAS 7 overcame some of the dissatisfaction with its predecessor, DS 12 (10/76), by removing the arbitrary two-year limit on preproduction costs, the former Standard may still be criticized for failing to require the disclosure of sales.²³² It has also been suggested that its definition of "area of interest" needs clarification.²³³ Furthermore, more definite recommendations on methods of overcoming the problems associated with implementing

228. Ibid, para. 50.

229. Australian Accounting Research Foundation, "Current Cost Accounting - Omnibus Exposure Draft", (March, 1980), para. 23.

230. Nethercott, L.J., "DPS 1.1 and Capital Erosion in Extractive Industries", The Chartered Accountant in Australia, Vol. 47, No. 8, (March, 1977), p. 59.

231. Australian Accounting Research Foundation, op. cit., para. 23.

232. Davison, A.G., & Lourens, R.M., "Compliance With DS 12", The Chartered Accountant in Australia, Vol. 48, No. 10, (May, 1978), p. 35.

233. Heazlewood, C.T., "DS 12 - October 1976, doomed to failure from the start", op. cit., p. 24.

current cost accounting in the extractive industries is required. Above all, it cannot be overemphasized that some form of mineral reserve disclosure needs to be dictated.²³⁴ For these reasons, AAS 7 should be revised.

UNITED KINGDOM

At the time of writing, no specific accounting Standard or exposure draft on extractive industry accounting has yet been published in the United Kingdom. Hence, the more general provisions of prevailing Standards in the country, must carefully be applied.

In this regard, it appears that the U.K. Standard on accounting policy disclosure would require the accounting treatment of pre-production costs to be reported by way of note to the accounts, since the related items involved in the extractive industries, would typically be "*...material or critical in determining profit or loss for the year and in stating the financial position*".²³⁵ Similarly, the Standard on the accounting treatment and disclosure of government grants could be relevant to mining companies receiving such grants,²³⁶ just as the Australian Standard (AAS 7) provides guidance on the treatment of government subsidies.

Furthermore, the need to recognize the unique features of wasting assets is recognized in SSAP 12 which makes the point that depreciation not only includes the amortization of fixed assets but also the "*... depletion of wasting assets (e.g. mines)*".²³⁷ With this in view, the provisions of the Standard on the accounting treatment and disclosure of depreciation, is made equally applicable to the extractive industries. In contrast, the

234. See especially: Heazlewood, C.T., "Mineral Reserves - should disclosure be Mandatory? A Case for following the U.S. example", The Chartered Accountant in Australia, Vol. 50, No. 9, (April, 1980), pp. 14-15, 17-18.

235. Institute of Chartered Accountants in England and Wales, Statements of Standard Accounting Practice 2: Disclosure of Accounting Policies, ICAEW, London (November, 1971) para. 18.

236. Institute of Chartered Accountants in England and Wales, Statements of Standard Accounting Practice 4: The Accounting Treatment of Government Grants, ICAEW, London, (April, 1974).

237. Institute of Chartered Accountants in England and Wales, Statements of Standard Accounting Practice 12: Accounting For Depreciation, ICAEW, London, (December, 1977), para. 1.

Standard on accounting for research and development explicitly excludes expenditures incurred in locating and exploiting mineral deposits in the extractive industries, from its definition of "research and development expenditure"; thus the provisions of the Standard are not intended to encompass the extractive industries.²³⁸

It is also significant that the U.K. Institute's guidance notes on Current Cost Accounting, contains the following guidelines on wasting assets:

- (a) *"Where acquisition costs have been capitalized, current replacement costs should, where possible, be based on the best evidence available as for other fixed assets",*²³⁹ and
- (b) *"Exploration and development costs carried forward under the historical cost convention should be recalculated by reference to current costs".*²⁴⁰

These guidelines appear to ignore the related developments in the United States where the American Petroleum Institute had appeared to reject the application of replacement costs to the petroleum industry, and Statement No. 69 had also recognized the difficulties in providing current cost information on such activities.

Perhaps more importantly, the absence of any standards relating to the key issue of mineral reserves, spells an urgent need for more comprehensive

238. Institute of Chartered Accountants in England and Wales, Statements of Standard Accounting Practice 13: Accounting For Research and Development, ICAEW, London, (December, 1977), para. 15.

239. Institute of Chartered Accountants in England and Wales, Guidance Notes on SSAP 16: Current Cost Accounting, ICAEW, para. 43, in Accounting Standards, ICAEW, London, p. 263.

240. Ibid, para. 44, p. 263.

guidance on extractive industry accounting in the United Kingdom. In this connection, it is significant that in 1978 the Institute of Chartered Accountants in England and Wales published an "Accounting and Auditing Guide for United Kingdom Oil and Gas Exploration and Production" by Norton and Rowe.²⁴¹ The authors suggest that the lack of a Standard in this area in the U.K. may be attributed to the country's Accounting Standards Committee's preoccupation with the resolution of accounting problems with wider applicability, and the relatively young nature of the North Sea exploration industry itself.²⁴² Although the book represents a commendable attempt at providing a comprehensive discussion of major accounting and reporting issues of the industry, the authors' conclusions and recommendations lack the authoritative weight of a Standard. Nevertheless, the need to develop a U.K. exposure draft and subsequently a Standard on the matter, is perhaps best supported by the authors' own views:

"The annual accounts of oil companies require significantly more disclosure of accounting policies, operating conditions, and other matters than is necessary for most companies, in order to provide meaningful and comparable information to shareholders and other interested parties. In some cases failure to provide full disclosure in notes to the accounts can be positively misleading, even though the accounts themselves have been drawn up in accordance with accepted accounting practices for the industry".²⁴³

The writer believes that this view can be applied to the extractive industries in general.

241. Norton, J.C. & Rowe, D.A., op. cit.

242. Ibid, p. 5.

243. Ibid, p. 115.

NEW ZEALAND

No New Zealand accounting Standard or exposure draft currently exists on extractive industry accounting. However, as in the case of the United Kingdom, several of the prevailing Standards do refer to the extractive industries.

The New Zealand Standard on fixed asset depreciation (SSAP-3) includes an introductory declaration that it "... does not deal with expenditures carried forward in accounting for the exploration for, and extraction of, minerals, oil and natural gas".²⁴⁴ Nevertheless, in dealing with depletion of mines, oil wells, quarries and similar assets, it states that:

*"The cost of the land containing natural resources, including capitalised exploration and development costs, but allowing for the estimated residual value of the land when extraction is complete, should be charged periodically against revenue during the economic life of the asset. Provision for depletion should be based on the rate of exhaustion of the asset concerned".*²⁴⁵

In conjunction with its overriding provisions, the straight-line method is generally recommended, either on a production-output or time basis.²⁴⁶ The method adopted is required to be consistently applied, and disclosed in all accounting reports.²⁴⁷

Although SSAP-3 appears to imply that exploration expenditure could be accounted for by some form of capitalization, it does not provide any guidance

244. New Zealand Society of Accountants, Statement of Standard Accounting Practice No. 3: Depreciation of Fixed Assets, NZSA, Wellington, (April, 1977), p. 6.

245. Ibid, para. 2.2 (c).

246. Ibid, para. 2.1 (c).

247. Ibid, para. 2.1 (f), 2.1 (h).

on what, if any, exploration expenditure should be capitalized.²⁴⁸ In this regard, a research bulletin on expenditures to be carried forward, published by the New Zealand Society of Accountants, contained the following recommendations:-

"(32) Any capitalisation of prospecting, investigation and development expenses in the extractive industries should be clearly shown in the accounts, together with a note concerning the uncertainty of recovery or the basis of amortization against revenue arising from production.

*(33) The costs of exploring and testing an area which is later abandoned should be written off immediately. However, where the value of the deposit can be determined, a basis of apportionment of the cost of development may be arrived at. There is an inherent uncertainty between these two extremes and full disclosure of the method of accounting adopted is essential..."*²⁴⁹

However, SSAP-11 which was subsequently issued on expenditures to be carried forward, failed to include similar requirements.²⁵⁰ Instead, the Statement acknowledges that it "...cannot deal adequately with specialised expenditures in such activities as... the extractive industries".²⁵¹ Similarly, SSAP-13 on accounting for research and development activities explicitly excludes specialised activities including exploration for oil, gas and mineral deposits.²⁵²

248. Heazlewood, C.T., "Wrestling With The Cost of Exploration", Accountants' Journal, Vol. 60, No. 2, (March, 1981), pp. 44-45.

249. Challinor, R.L., "Expenditure Carried Forward To Subsequent Accounting Periods", A Research Bulletin, NZSA, Wellington, (December, 1973), p. 15.

250. New Zealand Society of Accountants, Statement of Standard Accounting Practice No. 11: Expenditures Carried Forward To Future Accounting Periods, NZSA, Wellington, (December, 1979).

251. Ibid, p. 3.

252. New Zealand Society of Accountants, Statement of Standard Accounting Practice No. 13: Accounting For Research and Development Activities, NZSA, Wellington (August, 1981), para. 1.2 (b).

More recently, the exposure draft ED 23, which is intended to be a revision of the existing New Zealand Standard on accounting policy disclosure, lists wasting assets among items requiring a particular policy statement.²⁵³ It is also significant that recently issued guidance notes on current cost accounting include provisions very similar to the corresponding U.K. document, which effectively requires capitalized acquisition costs to be stated at current replacement costs where possible, based on the best evidence available.²⁵⁴ Exploration and development costs carried forward are also required to be recalculated on a current cost basis.²⁵⁵

Apart from the Standards and recommendations of the New Zealand Society of Accountants, the New Zealand Stock Exchange Listing Manual contains special provisions for mining companies.²⁵⁶ However, it fails to make any specific requirement on financial accounting and reporting practices of listed companies, besides endorsing compliance with SSAPs issued by the accounting society, and reserving the right to require additional information.²⁵⁷ Similarly, the New Zealand 1955 Companies Act whilst devoting a section to mining companies,²⁵⁸ fails to specify accounting and reporting requirements in addition to the general provisions of the Eighth Schedule of the Act.

In the light of developments in the United States and Australia, and New Zealand's "...transitional programme for the 1980s aimed at significant self sufficiency in transport fuels and export of energy resources to help the balance of payments",²⁵⁹ the New Zealand accounting profession should seek to

253. New Zealand Society of Accountants, Exposure Draft No. 23 of a Proposed Statement of Standard Accounting Practice: Determination and Disclosure of Accounting Policies, NZSA, (December, 1980), p. 12.

254. New Zealand Society of Accountants, GU4: Guidance Notes on CCA 1, NZSA, Wellington, (March, 1982), pp. 15-16.

255. Ibid, p. 16.

256. Stock Exchange Association of New Zealand, Listing Manual, (Aug. 1981), para. 25.

257. Ibid, para. 503.

258. _____, New Zealand Companies Act 1955, Brooker & Friend, Wellington, 1982, para. 424-445.

259. Speech by Falconer, W.J., as reported in "Energy Choice For The 1990s", Accountants' Journal, Vol. 61, No. 4, (May, 1982), p. 131.

establish a comprehensive Standard on extractive industry accounting. Indeed, the warning has been sounded that

"... if the profession does not accept this challenge then we may well find the New Zealand Securities Commission taking the same set of actions as its counterpart in the USA in developing a standard which may prove unacceptable both to the accounting profession and the business community".²⁶⁰

MALAYSIA

There is currently no accounting Standard or exposure draft on extractive industry accounting in Malaysia. This is not surprising in view of the fact that in 1978, the AAA Committee on International Accounting Operations and Education reported that:

"Accounting research and development in Malaysia is virtually non-existent"²⁶¹

Guidance on accounting practices is provided in the form of Statements issued by the Malaysian Association of Certified Public Accountants, and prepared on the basis of material supplied by the Institute of Chartered Accountants in Australia and the Institute of Chartered Accountants in England and Wales.²⁶² However, specific reference to extractive industry accounting appears to be limited to the following recommendation:

"Certain expenditure such as preproduction expenditure, research and development costs or share issue expenses may be carried forward at the balance sheet date rather

260. Heazlewood, C.T., "Wrestling With The Cost of Exploration", op. cit, p.46.

261. Committee on International Accounting Operations and Education, Accounting Education and the Third World, American Accounting Association, Sarasota, Florida, 1978, p. 43.

262. This is acknowledged in all MACPA Statements.

*than being written off to the profit and loss account".*²⁶³

Hence, some form of capitalization is permitted, but further guidance on the issue is clearly warranted.

It is understood that the recommendations of the Institute of Chartered Accountants in England and Wales are adhered to by most accountants in Malaysia, as many are members of the Institute.²⁶⁴ However, it has already been shown that these are of little help in the area of extractive industry accounting. In recent years, increasing importance has been attached to the Standards issued by the International Accounting Standards Committee (IASC). Although conformance to these international Standards has also been the norm in the other countries discussed, it is perhaps more significant to the Malaysian accounting community in view of the lack of adequate locally produced Standards. In this regard however, specific reference to the extractive industries is confined to IAS Nos. 4, 9 and 16, all of which exclude related expenditure from the scope of their provisions.²⁶⁵

An important source of accounting principles in Malaysia is also the country's 1965 Companies Act which has the force of law. However, it too fails to provide specific recommendations on extractive industry accounting practices. Similarly, the Kuala Lumpur Stock Exchange Listing Manual is of little additional help to listed companies in this regard, even though separate additional requirements for mining companies, in relation to granting of official quotation on the Exchange, is provided.²⁶⁶

263. Malaysian Association of Certified Public Accountants, Statement No. 1: Recommendations on the Presentation of Accounts, MACPA, (June, 1972), para. 48, p. 7.

264. Enthoven, A.J.H., Accountancy Systems in Third World Economies, North Holland Pub. Co., Amsterdam, 1977, p. 317.

265. International Accounting Standards Committee, IAS 4: Depreciation Accounting, IASC, London, (October, 1976), para. 1; IAS 9: Accounting For Research and Development Activities, IASC, London, (July, 1978), para. 2; IAS 16: Accounting For Property, Plant and Equipment, IASC, London, (March, 1982), para. 3.

266. Kuala Lumpur Stock Exchange, Listing Manual, KLSE, (August, 1980), p. 11.

CONCLUSION

Among the five countries discussed in this chapter, only the United States and Australia have succeeded in developing accounting Standards for the extractive industries. The professional accounting bodies in these countries have paved the path for others to follow. In order to better understand the practical implications of these Standards, several empirical studies have been undertaken. These will be examined in the following chapter.

CHAPTER FIVE: EMPIRICAL STUDIES ON EXTRACTIVE INDUSTRY ACCOUNTING

INTRODUCTION

Most of the prominent studies on extractive industry accounting have been descriptive-normative in nature, and may conveniently be classified either as empirical or non-empirical. Studies in the non-empirical category may be described as those in which views and conclusions are expressed primarily on the basis of theoretical justification, although references to the findings of previous empirical studies may frequently be made. Many of these views have already been exemplified in the course of this report, and it is to the empirical studies that the focus of this chapter will be directed at.

Among the empirical studies, a number have concentrated on the market-related effects of accounting information especially in the United States, where changes in the requirements of the FASB and the SEC, have caused consternation over the effects of alternative accounting methods on security prices. In this respect, the findings of Patz & Boatsman, Eskew, Collins & Dent among others have been chosen for discussion. Another distinct group of empirical studies constitute surveys of contemporary accounting practices, and in this regard, the conclusions of selected American and Australian studies will be examined.²⁶⁷

STUDIES OF THE MARKET-RELATED EFFECTS OF ACCOUNTING INFORMATION IN THE EXTRACTIVE INDUSTRIES

Major empirical studies in this area have been conducted mainly in the United States, within the context of the efficient market hypothesis. Market efficiency is supported in the accounting and finance literature in that security prices are believed to fully reflect all publicly available information by

267. Two major Canadian studies include: Coutts, W.B., Accounting Problems in the Oil and Gas Industry, The Canadian Institute of Chartered Accountants, 1963; and Mulholland, J.M., Financial Reporting For Non-Producing Mining Companies, The Canadian Institute of Chartered Accountants, 1967.

reacting instantaneously and faithfully to new information.²⁶⁸ The primary implication is therefore that on average, an investor acting solely on publicly available information would be unable to earn abnormally high returns.

Given acceptance of the efficient market hypothesis, differences in reported incomes due purely to the use of alternative accounting practices would not cause changes in security prices. It may be argued that issues concerning the choice of accounting alternatives such as the "full cost versus successful efforts" debate, have been overemphasized since the market is not deceived by the use of either methods. Hence, there would be little point for policy-makers to seek "...*correct reporting methods for items which the market can assess the impact of the mode of reporting them*".²⁶⁹ The following studies are therefore important in assessing the applicability of these views to the extractive industries.

Patz & Boatsman (1972)

The Patz & Boatsman study was undertaken in an attempt to determine the effect on security price behaviour, of the 1971 APB memorandum on extractive industry accounting.²⁷⁰ The memorandum designated the field as the appropriate cost centre, and essentially supported successful efforts accounting. Using a sample of forty-nine companies involved in oil and gas related activities, the researchers compared the weekly returns of full cost and successful efforts firms, two weeks before and five weeks after the issuance of the document.

On the basis of the efficient market hypothesis, the researchers concluded

268. See Keane, S.M., The Efficient Market Hypothesis and the Implications For Financial Reporting, Gee & Co. Ltd., London, 1980.

269. Eijgenhuijsen, A.G. & Klaassen, J., "Stock Market Efficiency and The Information Content of Financial Reports", in van Dam, Cees (editor), Trends in Managerial and Financial Accounting, Leiden, Boston, 1978, p. 193.

270. Patz, D.H. & Boatsman, J.R., "Accounting Principle Formulation in an Efficient Markets Environment", Journal of Accounting Research, (Autumn, 1972), pp. 392-403.

that companies employing full cost accounting were not adversely affected by the recommendations in the memorandum probably because "... the market perceived the changes which might ensue from the Board's recommendations as simply bookkeeping changes having no real economic substance".²⁷¹ The major implication was that policy-makers seeking to reduce accounting alternatives could ignore arguments that proposed methods which cause reduced reported earnings, would subsequently affect the company's security prices and its ability to secure external capital.²⁷²

Eskew (1975)

Using a total sample size of forty-three firms involved in the extractive petroleum industry, Eskew provided additional empirical evidence that security returns are not affected merely by the accounting alternative adopted by a firm.²⁷³ However, the researcher also concluded that successful efforts accounting as opposed to full costing appeared to produce accounting results which were more highly consistent with the market risk measure developed from share prices.²⁷⁴

O'Connor & Collins (1977) and Subsequent Studies

In attempting to rectify some of the alleged methodological deficiencies of the Patz & Boatsman study, O'Connor & Collins²⁷⁵ undertook a study of stock price activity involving a sample of seventy-eight oil and gas producing companies over a twenty-one week period surrounding the announcement date of the APB proposal. The results instead suggested that the APB's proposed

271. Ibid, p. 403.

272. Ibid, p. 403.

273. Eskew, R.K., op. cit., pp. 322-323.

274. Ibid, p. 323.

275. O'Connor, M. & Collins, D., Full Cost vs. Successful Efforts Accounting in the Oil and Gas Industries: A Closer Look at the Potential Market Consequences, Graduate School of Business, Michigan State University, (May, 1977), as reported in Collins, D.W., Dent, W.T., & O'Connor, M., "Market Effects of the Elimination of Full Cost Accounting in the Oil and Gas Industry", in Crumbley, D.L. & Grossman, S.D., op. cit., pp. 108-109.

elimination of full cost accounting adversely affected the security returns of full cost firms relative to successful efforts companies.²⁷⁶

Similar studies on the proposed elimination of full cost accounting by the FASB in a subsequent exposure draft on accounting and reporting for oil and gas companies, were published by the FASB and the SEC.²⁷⁷ Both came out in favour of the Patz & Boatsman findings.

However, the research methodologies employed in the FASB & SEC studies were criticized by Collins & Dent²⁷⁸ who proceeded to implement improved procedures in comparing "... the market performance of 45 U.S. full cost firms with that of 18 successful efforts firms over three, six and eight-month periods following the issuance of the FASB exposure draft".²⁷⁹ The results contradicted those of the FASB and the SEC.

Another similar study was undertaken by Lev²⁸⁰ who used daily stock return data in examining the security price behaviour of oil and gas companies during a period of seven trading days surrounding the release of the FASB's exposure draft. The study concluded that security prices of companies employing full cost or successful efforts accounting were adversely affected by the exposure draft recommendations. Full costing firms were found to be more adversely affected than their successful efforts counterparts.²⁸¹

276. Collins, D.W., Dent, W.T., & O'Connor, M., "Market Effects of the Elimination of Full Cost Accounting in the Oil and Gas Industry", in Crumbley, D.L. & Grossman, S.D., op. cit., p. 109.

277. Ibid, pp. 109-110.

278. Collins, D. & Dent, W., "An Empirical Assessment of the Stock Market Effects of the Proposed Elimination of Full Cost Accounting in the Extractive Petroleum Industry", Journal of Accounting and Economics, (March, 1979), pp.3-44.

279. Collins, D.W., Dent, W.T. & O'Connor, M.C., op. cit., p. 110.

280. Lev, B., "The Impact of Accounting Regulation on the Stock Market: The Case of Oil and Gas Companies", The Accounting Review, Vol.54, No.3 (July, 1979) pp. 485-503.

281. Ibid, p. 487.

More recently, Collins, Rozeff & Salatka²⁸² attempted to examine the effect of the SEC's rejection of the FASB's proposed elimination of full costing, on the share prices of affected firms. Based on a sample of forty-three full cost and thirty successful efforts firms, the researchers concluded "... that the FASB's proposal and the SEC's subsequent reversal of the FASB's position were both associated with substantive stock revaluations",²⁸³ this being consistent with the previous findings of Lev and Collins & Dent.

Conclusion

The foregoing discussion is indicative of the existence of both empirical support and opposition to the proposition that since markets are efficient, the use of alternative accounting methods will not influence the security prices of affected firms. With this in view, it is pertinent to realize that while there is substantial support for market efficiency, there have also been serious questions raised about the degree of efficiency.²⁸⁴ For instance, while the semi-strong form of the hypothesis has been generally supported with respect to the United States capital markets, it has been suggested that the weak form of the hypothesis may be applicable in New Zealand and Malaysia.²⁸⁵

The main difference between these two versions of the hypothesis is that while the semi-strong form asserts that the market reflects all publicly available information, the weak form proposes that only historical information is fully reflected.²⁸⁶ Hence, while the use of alternative accounting methods may be quickly detected and reflected in the more efficient U.S. capital markets, the same may not be true in the less efficient markets of other countries.

282. Collins, D.W., Rozeff, M.S. & Salatka, W.K., "The SEC's Rejection of SFAS No. 19: Tests of Market Price Reversal", The Accounting Review, Vol. 57, No. 1, (January, 1982), pp. 1-17.

283. Ibid, p. 15.

284. Bierman, H.Jr. et. al., op. cit., p. 64.

285. Emanuel, D.M., "A Note on Filter Rules and Stock-Market Trading in New Zealand", Economic Record, Vol. 56, (1980), p. 378; Lim, T.L., "The Efficient Market Hypothesis And Share Price Behaviour On The K.L.S.E.", The Malaysian Accountant, Vol.3, No.1, (January, 1982), pp. 24-31.

286. Dyckman, T.R., Downes, D.H. & Magee, R.P., op. cit., p. 5.

Empirical research on the efficient market hypothesis in the United Kingdom, Australia, New Zealand and Malaysia has been very limited in comparison to the United States. The degree of efficiency of the capital markets in these countries still needs to be established with some degree of confidence. Until such time, it is perhaps fair to state that the findings of related studies conducted in the United States should be cautiously be applied to other countries. As far as the standard-setting efforts in the extractive industries are concerned, it should be recognized that "... the efficient market refers to the aggregate market and not to the impact of reporting on individuals".²⁸⁷ For financial accounting and reporting purposes, the author believes that Standards are required to ensure that an adequate degree of uniformity and disclosure is maintained so that the information needs of individuals interested in extractive industry financial statement information, can be met.

SURVEYS OF CONTEMPORARY ACCOUNTING PRACTICES IN THE EXTRACTIVE INDUSTRIES

As the development of extractive industry accounting Standards in the United States and Australia have been discussed, this section will examine the conclusions of surveys which have attempted to determine contemporary accounting practices, including responses to these Standards as exhibited in the practices found in the two countries.

United States of America

One of the earliest surveys on extractive industry accounting practices in the United States was conducted by Brock who reviewed the accounting policies and practices used by sixty-one United States oil companies, in accounting for the costs of acquiring and developing oil and gas properties.²⁸⁸ The study

287. Bierman, H., Jr., et. al., op. cit., p.64.

288. Brock, H., "A Look At Accounting Principles Used By Oil and Gas Producers", The Accounting Review, Vol. 33, No. 1, (January, 1958), p. 66.

concluded that there was a wide diversity in accounting practices, and that smaller companies tended to capitalize more items of cost while larger firms were more conservative in expensing these items.²⁸⁹

A later study by Klingstedt suggested that while the full cost method was not widely accepted, it was increasingly being used in the petroleum industry mainly by non-major and non-integrated companies.²⁹⁰

The study by Robert Field published in 1969, was conducted with the aim of evaluating financial reporting practices in the United States extractive industries, and recommending appropriate accounting and reporting practices. Although comparisons were made to the results of earlier surveys, the Field study also involved a survey of the 1964 annual reports of 265 companies, supplemented by a review of the Form 10-K reports required by the SEC, for 69 of the companies.²⁹¹ The scope of the survey included an examination of the capitalize-expense decision, disposition of capitalized costs, accounting for revenue, special conveyances & joint operations, accounting for federal income taxes and presentation of financial statements & disclosure of supplementary information in financial reports.²⁹² On the basis of his results, Field made nineteen recommendations.

Field supported the application of the traditional accounting concepts of realization, matching and conservatism in the extractive industries. He also proposed the following accounting treatments in supporting some form of successful efforts accounting :- ²⁹³

289. Ibid, pp. 69-70.

290. Klingstedt, J.P., "Effects of Full Costing In the Petroleum Industry", Financial Analysts Journal, (September-October, 1970), p. 79.

291. Field, R.E., op. cit., p.131.

292. Ibid, pp. 37-148.

293. Ibid, p. 150.

- (1) The appropriate cost centre is the individual mineral deposit.
- (2) Prospecting costs, indirect acquisition costs and most carrying costs should be expensed as incurred.
- (3) Direct acquisition costs of unproven properties be capitalized, but unsuccessful exploration and development expenditures should be expensed.

On the depletion issue, Field recognized the need to amortize capitalized acquisition costs which are unlikely to be directly associated with minerals-in-place. It was recommended that capitalized costs be amortized at the rate of extraction but that depletion on a time-basis be permitted where appropriate.²⁹⁴

Field concluded that existing disclosure practices were inadequate and that the conventional financial statements needed to be supplemented by:-²⁹⁵

- (1) a description of major accounting policies adopted;
- (2) sufficient disclosure of mineral reserves and operating activities, to permit evaluation of effort and result.
- (3) functional classification of financial data to facilitate correlation with mineral reserve and operating statistics;
- (4) complete tabulation of exploration, acquisition, and development program expenditures.

The Field study may be viewed as a milestone in the development of extractive industry accounting Standards. Many authors have referred to the Field study and it is not surprising that many of the views expressed in the FASB's

294. Ibid, p. 151.

295. Ibid, p. 154.

discussion memorandum on financial accounting and reporting in the extractive industries, are documented in the study. The study has also been regarded as one of the influencing factors leading to and beyond the promulgation of the Australian Standard, AAS 7.²⁹⁶ It is perhaps a pity that Field's study was not replicated perhaps in a modified manner, in subsequent years as a means of monitoring extractive industry accounting practices in the United States, especially in the light of subsequent developments in standard-setting related to the industry.

Australia

Lourens & Henderson (1972)

In comparison, one of the earlier studies in Australia was undertaken by Lourens & Henderson and published in 1972. The authors adopted a questionnaire approach in attempting to survey a sample of 292 selected organizations in the Australian extractive industry, out of which 138 usable replies were obtained. Their findings indicated a considerable diversity of accounting practices.²⁹⁷

The overall conclusion on the capitalize-expense decision was that most forms of preproduction expenditure tended to be capitalize especially among explorers and the smaller mining companies, although general and administrative costs were typically expensed.²⁹⁸ Amortization of capitalized costs was allocated over the shortest determinable useful life, and the depletion method most used was the unit-of-production method.²⁹⁹ When properties were found to be unproductive, the accumulated costs were typically expensed as a lump-sum write-off at the time of abandonment.³⁰⁰ A mixed bag of cost-centre types was found

296. Selig, M., op. cit., pp. 16-17.

297. Lourens, R. & Henderson, S., Financial Reporting in the Extractive Industries, Australian Society of Accountants, Melbourne, 1972, p. 71.

298. Ibid, p. 72.

299. Ibid, p. 69.

300. Ibid, p. 52.

among explorers, developers and producers.³⁰¹ Among other results it was significant that disclosure of major accounting policies adopted was rarely made; it was suggested that there was considerable room for improving disclosure practices.³⁰²

In a succeeding article by Lourens, it was implied that since the Australian extractive industry structure and practices differed in some respects from the U.S position, the recommendations of Field's study may require modification before they can be applied in Australia.³⁰³ The writer proceeded to advance twenty-five tentative conclusions among which he suggested:-³⁰⁴

- (1) Capitalization of pre-production costs until the outcome is determined with unsuccessful expenditure being written off on determination.
- (2) Capitalized costs of successful operations should be matched systematically against actual and anticipated revenue flows either on an output or time basis.
- (3) The basic cost centre should be the particular areas of interest involved with the treatment adopted being disclosed.
- (4) Separate and detailed disclosure of pre-production costs, mining properties, claims and reserves.
- (5) Presentation of a detailed operating statement, funds statement, and description of significant accounting policies.

The Lourens and Henderson survey may be viewed as the Australian version of the U.S. Field study. The former might perhaps have been more effective if the authors had advanced a comprehensive set of recommendations in the text of the survey report, as was done in the latter study. Nevertheless, the authors

301. Ibid, pp. 58-59.

302. Ibid, p. 70.

303. Lourens, R., "The Development of Reporting Standards for the Extractive Industries", op. cit., p. 333.

304. Ibid, pp. 333-334.

made a valuable contribution by suggesting the potential impracticalities of blindly adhering to the findings of overseas studies, and for making what may be considered to be a pioneering attempt at describing contemporary Australian accounting practices in the extractive industries.

Heazlewood (1971, 1977, 1982)

Three separate surveys on Australian extractive industry accounting practices were reported by Heazlewood. The first which was conducted by the author himself, involved a sample of sixty annual reports for the period 1968-69.³⁰⁵ The findings indicated a multiplicity of accounting treatments for exploration and development expenditure,³⁰⁶ with an overall preference for some form of capitalization as opposed to immediate expensing.³⁰⁷ This was consistent with the Lourens & Henderson survey findings. Interestingly enough, most of the companies which adopted the capitalization approach were apparently unsure of the balance sheet treatment, while none indicated the basis for writing off capitalized expenditure nor was any justification provided by companies consistently capitalizing expenditures on areas since abandoned.³⁰⁸

Among the author's recommendations was the need for further specification and disclosure of the balance sheet treatment of pre-production costs.³⁰⁹ It was also suggested that some support be given to the idea of permitting deferral of pre-production costs until the outcome of activities can be ascertained, at which time more appropriate treatment can be undertaken.³¹⁰

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305. Heazlewood, C.T., "A Critical Survey of Reported Accounting Practices Used in the Extractive Industry 1971", Unpublished Thesis for a Master of Economics Degree, Monash University, (January, 1971).
306. Heazlewood, C.T., "Accounting For The Extractive Industry", op. cit., p. 8.
307. Heazlewood, C.T., "Accounting For Exploration and Related Expenditures", op. cit., p. 137.
308. Heazlewood, C.T., "Accounting For The Extractive Industry", op. cit., pp.8-9.
309. Heazlewood, C.T., "Accounting For Exploration and Related Expenditures", op. cit., p. 138.
310. Ibid, p. 138.

A following survey of forty-seven companies for the period 1973-1975 reported by the author, indicated a shift from some form of full costing to a form of successful efforts accounting.³¹¹ A third survey of seventy-seven annual company reports covering the years 1976-1978 was also conducted by the author, in which increasing acceptance of the then recently issued DS 12 (especially since its revision), was indicated. However, the survey findings also suggested that the range of methods being employed in accounting for pre-production expenditures is still quite extensive.³¹² In this regard, although a move was detected away from successful efforts towards the area of interest method, the author proposed tightening the definition of "area of interest" as a means of distinguishing the latter method more clearly from the former; thereby possibly enhancing the successful implementation of AAS 7.

Perhaps the most valuable contribution of the Heazlewood surveys was that they were conducted at critical periods surrounding the release of authoritative pronouncements on extractive industry accounting. The first was undertaken just before the release of the exposure draft on the matter, while the later two were conducted after the issuance of the exposure draft and Standards respectively. The latter surveys were therefore especially helpful in monitoring the response of accounting practices to the recommendations contained in the pronouncements.

Davison & Lourens (1978)

The authors attempted to examine the extent to which published financial

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311. Ewin, G.A., "An Examination of the Treatment of Exploration and Development Costs in Published Accounting Reports of Companies Involved in the Extractive Industries", Unpublished Research Essay For A Bachelor of Commerce (Hons) Degree, Wollongong University, (December, 1976), as reported in Heazlewood, C.T., "Accounting For Exploration and Related (Development) Expenditure", op. cit., p. 13.
312. Heazlewood, C.T., "Compliance With AAS 7 (DS 12) - "Accounting For The Extractive Industries", The Chartered Accountant in Australia, Vol.52, No.10 (May, 1982), p. 39.

statements in Australia complied with the country's original Standard on extractive industry accounting. Using a sample of sixty-one published financial statements of mining and oil & gas companies, the authors concluded that the Standard had little effect insofar as "...[m]ost of the larger producers still expensed preproduction expenditure, and most smaller explorers still capitalised such costs".³¹³ However, although their overall conclusion was that the Standard failed to make a significant impact, the authors admitted that it did influence a move away from excessive capitalization of pre-production expenditure.³¹⁴ This suggested move away from full costing towards some form of successful efforts accounting (including the area of interest method) appears consistent with the Heazlewood observations.

Ryan, Heazlewood & Andrew (1975, 1980)

The Ryan et. al. surveys were undertaken as part of two separate Australian research studies. The first survey involved the 1975 financial statements of forty-three Australian companies, all of which had the opportunity of applying the proposals of the 1973 exposure draft on extractive industry accounting.³¹⁵

The survey indicated that:-³¹⁶

- (1) most of the companies attempted to distinguish prospecting and investigation costs but few adequately distinguished their operating phases;
- (2) a majority failed to disclose the nature and location of the area of interest adopted;

313. Davison, A.G. & Lourens, R.M., op. cit., p. 33.

314. Ibid, p. 36.

315. Ryan, J.B., Heazlewood, C.T. & Andrew, B.H., "Extractive Industries Financial Statements", in "Australian Company Financial Reporting: 1975", Accounting Research Study No. 7, Australian Accounting Research Foundation, 1977, p. 67.

316. Ibid, pp. 69-80.

- (3) a majority failed to disclose the nature and extent of mineral reserves required by the exposure draft, and the accounting treatment of other costs including general overheads and sundry revenue;
 - (4) while successful efforts appeared to be the most popular method being used, strong support for other methods was also observed;
 - (5) a majority disclosed the amortization method adopted, with production and time-based methods prevailing.
 - (6) a majority did not indicate the accounting treatment of restoration costs;
 - (7) a majority disclosed the balance sheet treatment of prospecting and/or investigation expenditure, and development expenditure.
- Disclosure in the profit and loss account was judged to be generally inadequate except for the expensing of prospecting and investigation expenditure. The overall impression was that the disclosure proposals of the exposure draft were "... not as widely accepted and/or adopted within the industry as could be expected".³¹⁷

The second survey was conducted over 101 annual reports for the period 1976 to 1978 with the revised Australian Standard AAS 7 being operative for the last two and a half years of the survey period.³¹⁸ With this in view the findings of the survey included the following:-³¹⁹

- (1) Very few companies made formal disclosures of areas of interest although many provided detailed information on prospective exploration sites.

317. Ibid, p. 80.

318. Ryan, J.B., Heazlewood, C.T. & Andrew, B.H., "Extractive Industries Financial Statements", in Australian Company Financial Reporting 1980 (Accounting Research Study No. 9), Australian Accounting Research Foundation, 1980.

319. Ibid, pp. 154-175.

- (2) There was substantial voluntary disclosures of mineral reserve quantities but in a multitude of categories or descriptions, making comparisons difficult.
- (3) A switch from a successful efforts type approach to an area of interest approach was detected in 1977 following the introduction of AAS 7, with increasing reference to the "area of interest" method in the accounting policy statement on pre-production costs.
- (4) A majority of the companies in their annual report for the 1978-79 financial year disclosed information on pre-production costs carried forward relating to the balance sheet classification and amortization of these costs.

Conclusion

Viewed in totality, the surveys discussed have been an important contribution to the accounting profession in two main respects. The Field, Lourens & Henderson and Heazlewood(1971) studies provided a descriptive view of contemporary accounting practices which facilitated subsequent assessment and recommendations. The follow up surveys of Heazlewood, Davison & Lourens and Ryan et. al. over critical periods during the development of extractive industry accounting Standards in Australia also served a monitoring function in attempting to determine the degree of compliance with Standards. Published surveys of the latter function should perhaps be applied regularly in the U.S.

Interestingly enough, the trend away from full costing towards successful efforts and more recently the area of interest approach, is

perhaps sufficiently indicative of the impact that accounting Standards can have on accounting practices in the extractive industries provided they are properly developed and implemented. The difficulties of setting Standards in this area experienced in the United States, may be cited in support of this view. In this regard, surveys of contemporary accounting practices may be used to provide useful feedback on the responses of practices to Standards, so that early problems may be detected and corrected.

CHAPTER SIX: THE SURVEY

INTRODUCTION

In this chapter, the author will report on the survey which was conducted with the primary aim of determining the financial accounting and reporting practices of mining companies listed on the New Zealand and Kuala Lumpur Stock Exchanges, respectively. As indicated in the previous chapter, the main purpose is to provide a basis for assessing and improving extractive industry accounting practices in New Zealand and Malaysia, in view of the lack of adequate relevant accounting Standards in the two countries.

SELECTION OF COMPANIES SURVEYED

For the purposes of the survey, two major groups of companies were selected:-

New Zealand

Companies selected to form the New Zealand group were divided into three subgroups (See Appendix A):-

- (1) All mining companies listed on the New Zealand Stock Exchange at December 1981.³²⁰ This subgroup consisted of nine companies, three of which had commenced operations in 1981, and one in 1980.
- (2) Companies listed on the New Zealand Stock Exchange at December 1981 which had substantial interests in mining operations.³²¹ These included companies which were found to possess subsidiary or associate companies involved in mining activities. This was determined from information contained in the 1981 annual reports of all New Zealand non-mining companies listed at December of that year. Five companies

320. "The Official Record of the New Zealand Stock Exchange", Vol. 2, No. 11, as in The New Zealand Financial Times, Vol. 52, No. 3, (December, 1981).

321. Ibid.

were eventually included in this group.

- (3) Australian mining companies listed among the leading stocks on the New Zealand Stock Exchange in 1981.³²² This subgroup of five companies was intended to provide a basis for comparing the accounting practices of the local companies, since the Australian companies, being a select group of the largest Australian mining companies, were expected to adhere to the accounting standards set forth in AAS 7.

Malaysia

Companies selected to form the Malaysian group consisted of two sub-groups (See Appendix B):-

- (1) All mining companies listed on the Kuala Lumpur Stock Exchange at 29th January 1982.³²³ This subgroup originally consisted of thirty companies, among which three had effectively ceased mining operations prior to 1979.
- (2) Companies listed on the Kuala Lumpur Stock Exchange at 29th January 1982, with substantial interests in mining operations.³²⁴ These included companies with subsidiary or associate companies involved in mining activities. This was determined from information contained in the 1981 Annual Companies Handbook published by the Kuala Lumpur Stock Exchange.³²⁵ Four companies were included in this group.

DATA COLLECTION

Information for the survey was obtained from the annual reports of the selected companies for the financial years ending in 1979, 1980 and 1981. In the case of companies which had commenced operations during this period,

322. _____ "Equity Investment 1981", Berl Publications, inset with The New Zealand Economist, Vol. 43, No. 9, (December, 1981).

323. The Kuala Lumpur Stock Exchange, Gazette, Vol. 10, No. 2, (February, 1982), pp. 42-43.

324. Ibid, pp. 34-37.

325. The Kuala Lumpur Stock Exchange, Annual Companies Handbook, Vol. 7, KLSE, 1981, pp. 1-631.

the most recently available annual report was examined. This procedure is consistent with the aim of the survey which is to determine extractive industry accounting and reporting practices.

Among companies included in the New Zealand group, Fletcher Challenge Corporation was the result of a merger between Challenge Corporation Limited, Fletcher Holdings Limited, and Tasman Pulp and Paper Company Limited which became operative in January 1981. It was felt that the activities of the new company did not differ significantly from that of Fletcher Holdings, and for this reason, the latter company's annual report for financial years ending in 1979 and 1980 were examined together with the 1981 annual report of Fletcher Challenge Corporation.

Among the companies in the Malaysian group, three had ceased operations prior to 1979 whilst the annual reports for another three could not be obtained. The final number of Malaysian mining companies surveyed was therefore brought down to twenty-four. Also, the annual reports of three of the companies "with substantial interests" could not be obtained, leaving only one company in this group.

The Survey Instrument - Design and Form

For the purposes of the survey, an instrument was designed to facilitate a record of observations relating to specific aspects of extractive industry accounting and reporting displayed in the annual reports (see Appendix C). The set of criteria comprising the survey instrument was designed with the following considerations in mind.

- (1) Documentation of similar overseas empirical studies with particular attention being directed towards the following:-

Ryan, J.B., Heazlewood, C.T., & Andrew, B.H., "Extractive Industries Financial Statements", Australian Company Financial Reporting 1980 (Accounting Research Study No. 9), Australian Accounting Research Foundation, 1980, pp. 150-175.

- (2) Authoritative pronouncements on extractive industry accounting and reporting especially those developed in the United States and Australia, in view of the lack of adequate corresponding Standards in New Zealand and Malaysia.
- (3) Emphasis on the five major financial accounting and reporting issues discussed in Chapter Three.

In this manner, the survey instrument provided a useful means of assessing the accounting and reporting practices of the selected companies against recommended practices.

The survey instrument which is reproduced in Appendix C, consists of two main sections which will be described and justified as follows:-

Company Profile

This section consists of a series of subsections aimed at presenting a picture of the company's activities and size.

- I. Involvement in Extractive Industries: There are two defined categories of involvement. Companies engaged in mining are those which have been listed on the New Zealand or Kuala Lumpur Stock Exchange as mining companies. Companies possessing substantial interests in mining operations include other listed companies which have subsidiaries or associate companies involved in mining activities.

This subsection facilitates a record of any major changes in the principal activities of the selected companies which may account for changes in accounting and reporting practices, over the period covered by the survey.

II. Nature of Operations: This subsection facilitates a record of the nature of the company's mining activities or interests in mining activities, in terms of the principal wasting non-regenerative natural resources, towards which the company's efforts are directed.

III. Nature of Involvement: This subsection facilitates a record of the nature of the company's involvement in the extractive industries in terms of three defined categories. It is determined from the information contained in the annual reports whether the company is engaged in:-

- (1) both exploration and production activities in which case it is classified as "explorer and producer";
- (2) exploration activities with minimal or no production, in which case it is classified as "explorer only";
- (3) production activities with minimal or no exploration programme in which case it is classified as "producer only".

IV. Size: The size criterion chosen for the purposes of the survey is the dollar amount of the company's total assets. The aim is to attempt to determine a meaningful relationship between the size of the company and its accounting practices particularly the treatment of pre-production costs.

Accounting and Reporting Practices

This section facilitates a record of accounting and reporting practices as exemplified in the annual reports of the companies surveyed, with particular attention being directed at the following items of information:-

I. Identification of operational stages and terminology employed:

This subsection facilitates a record of operational stages identified in the annual reports. In addition to the five stages of exploration, evaluation, development, construction and production identified in the Australian Standard AAS 7, the additional terms "prospecting" and "acquisition" favoured in corresponding U.S. pronouncements, were included to provide a wider range with which to detect the terminology employed in the annual reports.

II. Accounting For Pre-production Costs

The aim of this subsection is to aid in determining the extent of disclosures relating to pre-production expenditures with respect to the following items:-

- A. the method adopted for accounting for pre-production costs, including the place of disclosure;
- B. the basis for capitalizing pre-production costs e.g. a statement to the effect that some future benefit is expected to be derived from the costs incurred;
- C. the balance sheet classification of pre-production costs carried forward e.g. as a fixed asset, non-current asset etc.;
- D. the degree with which capitalized costs written off have been disclosed in the financial statements i.e. whether amounts have

been disclosed in aggregate, by operational phase, by area of interest, or not disclosed;

E. the degree with which costs carried forward have been disclosed distinguishing between areas of interests in the exploration and/or evaluation stage, in the development stage in which production has not commenced, and those in the production stage.

III. Selection of Cost Centre: This subsection facilitates a record of the type of cost centre adopted and the place of disclosure in the annual report. Although the broader concepts of the acquisition unit, organization unit, company unit, geopolitical unit and natural geological unit, have been identified, the annual reports are expected to include a more specific policy statement on the cost centre adopted e.g. mineral lease, individual mines etc.

IV. Accounting For Depletion: This subsection facilitates a record of the depletion method adopted and the degree with which amounts of amortization charges are disclosed, as well as the place for such disclosures in the annual report. A primary criterion for adequate disclosure is that depreciation and depletion charges be distinguished from depletion and related expenses.

V. Valuation of Mineral Reserves: This subsection facilitates a record of the methods adopted for valuing mineral reserves, including the place of disclosure. Although developments in standard-setting relating to mineral reserve valuation have mainly been in the U.S.,

the issue is of such importance that an attempt should be made to ascertain whether current values, discovery values or some form of present value have been used in valuing mineral reserves.

VI. Disclosure of Information Unique to the Extractive Industries:

This subsection facilitates a record of disclosure information unique to the extractive industries particularly:-

A. the extent and place of disclosing estimates of mineral reserve quantities including whether

- (1) different types or categories of mineral reserves are distinguished e.g. proved, probable and possible reserves;
- (2) a description is provided of assumptions used and difficulties involved in making estimates;
- (3) changes in estimates are disclosed;
- (4) reasons for changes in estimates are disclosed.

B. other mineral reserve data such as

- (1) the location of proved reserves;
- (2) reserve price data such as current prices or likely future prices of existing reserves; and
- (3) other relevant information.

C. functional data including

- (1) the extent and place of disclosing revenue from mining activities;
- (2) the extent and place of disclosing expenditures incurred in mining activities.

In both cases, it is necessary to ascertain whether revenues and expenditures are disclosed in aggregate, by operational phase, by area of interest or not disclosed at all.

D. other information including

- (1) the treatment of restoration costs by means of a policy statement;
- (2) the treatment of general and administrative costs by means of a policy statement;
- (3) sundry revenues as distinct from mining revenues;
- (4) subsidies received;
- (5) government royalties in respect of sales or production;
- (6) long-term sales; and
- (7) other significant information.

VII. Current Cost Information

This subsection facilitates a record of whether current cost information is disclosed, and if so, the basis adopted for determining current cost amounts e.g. indices, valuer's estimates etc.

VIII. Reference to Accounting Standards

This subsection facilitates a record of specific references to extractive industry accounting Standards, as a basis for assessing the influence of such authoritative pronouncements promulgated in the United States and Australia, on the accounting and reporting practices of the selected companies.

The Survey Instrument - Application

The survey of annual company reports was undertaken in two distinct phases. The first phase may be described as a pilot survey of ten companies randomly selected from each of the following groups:-

- (1) Among the companies listed on the New Zealand Stock Exchange, the following number of companies were selected:
 - (a) two mining companies;
 - (b) two companies with substantial interests in mining operations;
 - (c) two Australian companies.
- (2) Among the companies listed on the Kuala Lumpur Stock Exchange, the following number of companies were selected:
 - (a) three mining companies; and
 - (b) one company with substantial interests in mining operations.

The primary criterion for determining the number of companies to be taken for the pilot survey, was that at least twenty percent of the number in each group be selected. The 1981 annual report for each of these ten companies were examined by using the originally designed survey instrument. It was felt that the number of randomly selected companies was sufficient for testing the adequacy of the initial form of the survey instrument. The preliminary survey also provided the researcher with experience in applying the survey instrument, and highlighted several problem areas which were subsequently overcome. Hence, the survey instrument reproduced in Appendix C represents a revised version of an earlier form.

It should be recognized that the major limitation of the survey instrument is the accuracy of the observations recorded, since this is dependent upon:

- (1) the observer's understanding of the types of observations to be made; and
- (2) the observer's competence in recording observations.

Nevertheless, although the survey instrument does not eliminate the need for sound judgement by the observer, it represents a useful tool which may be used to reduce the degree of subjectivity associated with the type of data collected.

The second phase consisted of the actual survey of the annual reports of all selected companies for each of the designated years. It was necessary to examine the whole annual report, and relevant observations were recorded in the survey instrument. The results of the survey are tabulated and analysed in the following section.

DATA ANALYSIS - COMPANIES LISTED ON THE N.Z. STOCK EXCHANGE

Company Profile

As Table 6.1 on the next page indicates, the operating activities of the companies surveyed are collectively associated with a wide range of wasting non-regenerative natural resources. Although all the Australian companies are involved in both exploration and production activities, at least half of the New Zealand companies were mainly involved with only one of either activities in each year. Not surprisingly, in terms of the dollar amount of total assets, the Australian companies

Table 6.1: COMPANY PROFILE OF SELECTED COMPANIES LISTED ON THE
NEW ZEALAND STOCK EXCHANGE

	New Zealand companies				Australian companies		
	1979	1980	1981	1982	1979	1980	1981
<u>Type of Involvement</u>							
Engaged in mining(M)*	5	5	6	3	5	5	5
Possessing substantial interests in mining(S)**	4	4	4				
	M S	M S	M S				
<u>Nature of Operations</u>							
Oil	2	2	4 1	2	4	4	4
Natural gas			2 1	1	3	3	4
Coal		1	3 2	1	3	4	4
Tin	1	1	1		2	2	2
Other***	4	4	4		5	5	5
*** Overall, these included a variety of minerals :-	lime, gold, tungsten, limestone, silver, vanadium, zinc, lead, iron ore, bentonite, copper, molybdenum, ilmenite, magnetite dolomite.				uranium, manganese, bauxite, copper, gold, nickel, lead, zinc, silver, iron ore.		
<u>Nature of Involvement of mining companies</u>							
Explorer & Producer	2	2	4		5	5	5
Explorer only	3	3	2	2			
Producer only				1			
<u>Size in terms of dollar amount of total assets</u>	NZ\$0.03 million to NZ\$27.8 million				A\$443 million to A\$6,070 million		

are extremely large compared to the New Zealand ones, since the former represent some of the largest Australian mining companies.

Accounting and Reporting Practices

I. Identification of Operational Stages and Terminology Used

From the results displayed in Table 6.2, the companies appear to identify various operational stages. The Australian companies exhibited some degree

Table 6.2: IDENTIFICATION OF OPERATIONAL STAGES, AND TERMINOLOGY

USED - N.Z. GROUP

	New Zealand Companies							Australian Companies		
	1979		1980		1981		1982	1979	1980	1981
	M	S	M	S	M	S				
(1) Exploration	5	1	5	2	6	2	2	4	4	5
(2) Evaluation	1		1		1			3	3	3
(3) Development	2		2	2	4	2	2	5	5	4
(4) Construction							1	1	1	1
(5) Production	1	1	1	1	3	2	1	5	5	5
(6) Prospecting	3		4		3	2	2	1	1	
(7) Acquisition				1			1	1		

*M: mining companies; S: companies with substantial interests in mining.

of consistency in employing the terminology defined in AAS 7 in relation to the stages of exploration, development, construction and production. The range of terms used to describe the various phases of operations appears to be quite diverse in the case of the New Zealand companies, with the terms "prospecting" and "acquisition" being used in addition to the rest.

II. Accounting for Pre-production Costs

Table 6.3: METHODS ADOPTED FOR ACCOUNTING FOR PRE-PRODUCTION COSTS -

N.Z. GROUP

	New Zealand Companies							Australian Companies		
	1979		1980		1981		1982	1979	1980	1981
	M	S	M	S	M	S				
(1) Costs Written Off		1		1	1		1			
(2) Successful Efforts	1		1		2		1	2	2	1
(3) Area of Interest	1		1		1			2	2	2
(4) Full Cost	3		3		2		1	1	1	2
(5) Not disclosed	1	3	1	3	1	4				
Total number:	6	4	6	4	6	4	3	5	5	5

*M: mining companies; S: companies with substantial interests in mining.

As Table 6.3 indicates, the five Australian companies surveyed exhibited a variety of methods of accounting for pre-production costs. There appears to be a greater preference for some form of successful efforts accounting as opposed to full costing among these companies. This observation is not inconsistent with the findings of Heazlewood (1982)³²⁶ and Davison & Lourens³²⁷ who suggested a move away from full costing towards some form of successful efforts accounting among Australian mining companies in recent years.

Interestingly, in only one annual report was the method adopted explicitly stated, with disclosure taking the following form in the Statement of Accounting Policies:-

*"The company follows the full cost method of accounting whereby all costs of exploration for and development of oil, gas and related reserves are capitalised. Such costs include acquisition costs, geological and geophysical expenses, carrying charges of non-producing properties, costs of drilling both productive and unproductive wells, production and gas facilities and all technical and administrative overheads directly associated with these functions"*³²⁸

Other annual reports typically included a description of the method adopted as a policy statement by stating the treatment of different types of costs such as exploration or development costs. In most cases such disclosure was judged to be sufficiently informative.

326. Heazlewood, C.T., "Compliance With AAS 7 (DS 12) - "Accounting For The Extractive Industries", op. cit., p. 39.

327. Davison, A.G. & Lourens, R.M., op. cit., p. 33.

328. Ampol Petroleum Limited, Annual Report 1979, p. 27.

In comparison, the New Zealand companies exhibited a wider diversity of methods employed to account for pre-production costs. Table 6.3 also indicates an overall preference for capitalisation as opposed to immediate expensing. This observation is consistent with the findings of earlier Australian studies by Lourens & Henderson³²⁹ and Heazlewood.³³⁰ Although a description of the method adopted was typically provided as a statement of accounting policy, other places of disclosure have also been found. For instance, the following policy statement was included in the Director's Report of the 1981 L & M Oil New Zealand Limited Annual Report:

*"The financial statements presented in this report follow one of the accepted mining accounting practices of charging all expenditure to the profit and loss account, except payments to third parties for plant".*³³¹

However, most of the policy statements on the accounting treatment of pre-production costs were found to be sufficiently informative as well.

In an effort to establish a meaningful relationship between company size and the accounting treatment of pre-production costs, individual company sizes in terms of dollar amounts were tabulated together with the corresponding accounting method adopted. In comparison to the findings of the American survey by Brock who found that smaller oil and gas companies tended to capitalize more items of cost while the larger ones were more conservative in expensing the items,³³² the results displayed in Table 6.4

suggest that no such relationship can be justifiably inferred in the case

329. Lourens, R. & Henderson, S., op. cit., p. 71.

330. Heazlewood, C.T., "Accounting For The Extractive Industry", op. cit., p.8.
Heazlewood, C.T., "Accounting For Exploration and Related Expenditures", op. cit., p. 137.

331. L & M Oil, New Zealand Limited, Annual Report 1981, p. 2.

332. Brock, H., "A Look At Accounting Principles Used by Oil and Gas Producers", op. cit., pp. 69-70.

Table 6.4: COMPANY SIZE AND THE TREATMENT OF PRE-PRODUCTION COSTS - N.Z. GROUP

Australian Companies		Total Assets (A\$ million)					
		1979		1980		1981	
Ampol Petroleum Ltd.		443	FC	553	FC	565	FC
Broken Hill Pty. Co. Ltd.		4042	AOI	4989	AOI	6070	AOI
Comalco Ltd.		768	SE	1178	SE	1263	SE
CSR Ltd.		1260	AOI	2061	AOI	2298	AOI
MIM Holdings Ltd.		753	SE	1136	SE	1158	FC
New Zealand Companies		Total Assets (NZ\$ million)					
		1979		1980		1981	
Bridgevale Mining Ltd.		NA		NA		3.1 SE	NA
Coal and Energy N.Z.		NA		NA		NA	4.2 SE
Consolidated Silver		0.03	SE	0.04	SE		NA
Consolidated Minerals						0.8 SE	
Cue Energy Resources		NA		NA		NA	5.6 CWO
L & M Oil N.Z. Ltd.		0.8	FC	0.8	FC	1.4 CWO	NA
Mineral Resources (NZ)		0.6	FC	0.7	FC	2.3 FC	NA
N.Z. Oil and Gas Ltd.		NA		NA		NA	27.8 FC
N.Z. Petroleum Co. Ltd.		0.2	AOI	0.3	AOI	2.2 AOI	NA
Southern Cross Min. Expl.		0.8	FC	0.9	FC	1.2 FC	NA

* SE: Successful Efforts Accounting; AOI: Area of Interest Method;
FC: Full Cost Method; CWO: Costs Written Off Method;
NA: Not Applicable.

of the selected companies in this study. For instance, in the case of the New Zealand mining companies, the costs-written-off method was found in only two instances and in both cases the companies involved may be classified as medium rather than large in relation to the other companies.

Table 6.5 shows that most of the Australian companies indicated the basis or otherwise justified the capitalization of pre-production costs. The

Table 6.5: DISCLOSURE OF BASIS FOR CAPITALIZING PRE-
PRODUCTION COSTS - N.Z. GROUP

	New Zealand Companies							Australian Companies		
	1979		1980		1981		1982	1979	1980	1981
	M	S	M	S	M	S				
Disclosed	1	1	1	1	2	1	1	4	4	3
Not Disclosed	5	3	5	3	5	3	2	1	1	2

*M: mining companies; S: companies with substantial interests in mining.

following are two illustrative examples:-

"Expenditure on prospecting, exploration and evaluation on purchased prospects and other prospects of a major nature which is expected to be recouped through successful development is capitalised".³³³

"Development costs incurred in establishing operations are charged against earnings as incurred, except when they result in significant future benefits. In the latter case they are capitalised and amortised over the period of benefit".³³⁴

In contrast, most of the New Zealand companies failed to provide similar explanations. Instead, the types of costs capitalized were commonly identified. However, companies which did present such explanations appeared to provide adequate disclosure e.g.

"Expenditure on developing mineral leases has been capitalised where in the opinion of the Directors it is reasonably certain that it will produce sufficient revenue to recoup such development costs".³³⁵

333. MIM Holdings Limited, Annual Report 1979, p. 28.

334. Comalco Limited, Annual Report 1981, p. 28.

335. Coal and Energy New Zealand Limited, Annual Report 1981, p. 7.

Table 6.6: BALANCE SHEET CLASSIFICATION OF PRE-PRODUCTION COSTS

CARRIED FORWARD - N.Z. GROUP

	New Zealand Companies							Australian Companies		
	1979		1980		1981		1982	1979	1980	1981
	M	S	M	S	M	S				
*										
Fixed Asset							1	3	3	3
Non-current Asset & own heading							1			
Separately classified as an asset under own heading	2	1	2	1	1	1	1			
Intangible Asset								2	2	2
Fixed and own heading	1				1					
Deferred Asset	2		2		2					

*M: mining companies; S: companies with substantial interests in mining

Table 6.6 shows that the Australian companies appear to be more consistent in their classification of pre-production costs carried forward insofar as these costs are either categorized as fixed or intangible assets.

In contrast, the New Zealand companies appear unsure about the balance sheet classification to the extent that a wider variety of categories was found among the companies examined. Interestingly enough, this is consistent with the findings of a survey of Australian companies undertaken before the promulgation of a formal accounting Standard on the issue in that country.³³⁶

Furthermore, as Table 6.7 indicates, the Australian companies appear to provide more detailed information on capitalized costs written off and costs carried forward in areas of interests. Exhibits 6.1 and 6.2 provide illustrative examples of these disclosures.

336. Heazlewood, C.T., "Accounting For The Extractive Industry", op. cit., pp. 8-9.

**Table 6.7: DISCLOSURE OF COSTS WRITTEN OFF & COSTS CARRIED FORWARD
IN AREAS OF INTERESTS - N.Z. GROUP**

	New Zealand Companies						Australian Companies		
	1979		1980		1981		1979	1980	1981
	* M	S	M	S	M	S			
Capitalized costs written off disclosed:-									
(1) in aggregate	4		4		4	1	2	2	2
(2) by operational phase	1		1		1		3	3	3
Costs carried forward in areas of interests which are:-									
(1) in the exploration or evaluation stage							2	2	2
(2) in the development phase in which production has not commenced							1	1	1
(3) in the production stage							2	2	2

* M: mining companies; S: companies with substantial interests in mining.

**Exhibit 6.1: Illustrative example of capitalized costs written off
disclosed by operational phase**

10. Intangible Assets

1,871	2,136	Share, Issue and Borrowing Expenses— at cost	2,136	1,871
1,005	1,132	Less: Amounts written off	1,132	1,005
<u>866</u>	<u>1,004</u>	Balance Sheet Value	<u>1,004</u>	<u>866</u>
		Mineral Exploration Expenditure		
		At Cost	1,802	1,153
		Less: Expenditure on surrendered areas (Refer Note 1)	1,166	1,139
		Balance Sheet Value	<u>636</u>	<u>14</u>
		Deferred Expenditure— Refinery Expansion		
		(This represents abnormal operating expenditure incurred as a direct result of expansion work carried out to increase refinery capacity)		
		— At Cost	5,495	5,495
		Less: Amounts written off	5,495	3,995
		Balance Sheet Value	<u>—</u>	<u>1,500</u>

Source: Ampol Petroleum Limited, "Notes forming part of the accounts",
Annual Report 1981, p. 34.

Exhibit 6.2: Illustrative example of detailed disclosure of costs
carried forward in areas of interests

Included in fixed assets is exploration, evaluation and development expenditure carried forward in areas of interest relating to extractive industries which		
— are now in production		
— gross expenditure.....	43 134	42 763
— deduct accumulated amortisation.....	14 623	13 065
— net expenditure carried forward.....	28 511	29 698
— are in the development stage, but not yet producing.....	7 994	3 190
— are in the exploration and/or evaluation stage only.....	3 410	9 070
Total expenditure carried forward.....	39 915	41 958

Source: The Broken Hill Proprietary Company Limited, "Notes on financial statements", Annual Report 1981, p. 27.

III. Selection of Cost Centre

None of the company annual reports examined included a policy statement on the type of cost centre adopted for financial accounting and reporting purposes. In many cases, information on mining activities was provided for the various areas of interests usually in terms of geographical location. However, even in these cases, a useful summary of financial information relating to these areas, was uncommon.

IV. Accounting For Depletion

Overall, most of the companies failed to make a clear policy statement on the depletion method adopted, as shown in Table 6.8. In almost all cases, a depreciation policy was included but such a general statement fails to distinguish wasting assets from other fixed assets. Examples of disclosures which recognize this distinction include the following:

*"Depreciation of non-current assets
(including amortisation and depletion)*

Assets at cost or valuation are depreciated at rates based

upon their expected useful economic lives, using the straight-line method".³³⁷

"Existing mining developments are being amortized over the expected economic life of each mine based on the estimated recoverable reserves of coal and current annual production".³³⁸

Table 6.8: ACCOUNTING FOR DEPLETION - N.Z. GROUP

		New Zealand Companies						Australian Companies			
		1979		1980		1981		1982	1979	1980	1981
		M	S	M	S	M	S				
* Method Adopted:-											
(1) Unit of production								1			
(2) Straight-line time						1		2	2	2	2
(3) Prime cost method									1		
(4) Not disclosed		6	4	6	4	5	4		2	3	3
Depletion charges											
(1)separately disclosed in aggregate								2	3	3	3
(2)not separately disclosed		6	4	6	4	6	4	1	2	2	2

*M: Mining companies; S: Companies with substantial interests in mining.

Among the depletion methods disclosed, the straight line time basis appears to be the most popular.

Although all the companies disclosed depreciation charges, few made separate disclosure of depletion and other amortization charges especially in the case of the New Zealand companies. Again, this type of presentation fails to distinguish depletion of wasting assets from depreciation of other fixed assets.

337. CSR Limited, Annual Report 1981, p. 44.

338. Coal and Energy New Zealand Limited, Annual Report 1981, p. 7.

V. Valuation of Mineral Reserves

Not a single company provided estimates of the value of mineral reserves. In fact, one Australian annual report contained a declaration to the effect that:-

*"No value has been ascribed to the mineral reserves shown in this report except when those reserves have been acquired for a consideration".*³³⁹

Consideration paid for the acquisition of mineral reserves constitutes the cost as opposed to the value of those reserves. In this sense, value needs to be determined in terms of current values, discovery values or some form of present value. Disclosures on these bases were not found.

VI. Disclosure of Information Unique to the Extractive Industries

Table 6.9: MINERAL RESERVE INFORMATION - N.Z. GROUP

	New Zealand Companies							Australian Companies			
	1979		1980		1981		1982	1979	1980	1981	
	M	S	M	S	M	S					
* Estimates of Mineral Reserve Quantities by categories/types							1	1	2	2	3
Location of proved reserves								1	2	2	2

*M: mining companies; S: companies with substantial interests in mining.

Overall, few companies were found to provide estimates of mineral reserve quantities by categories or types. Among those that did, there was a wide variation in presentation. For instance, an excellent tabulation of reserve quantities and other information, by categories and types was provided by MIM Holdings Limited in its 1981 Annual Report. This is reproduced on the following page.

339. MIM Holdings Limited, Annual Report 1981, p. 36.

Exhibit 6.3 : Illustrative example of disclosure of Mineral Reserve

MINERAL RESERVES

as at 30 June 1981

Proven reserves, possible ore, and mineralisation reported in the following tables have been prepared in accordance with the terminology recommended by the International Institute of Mining and Metallurgy and the Australian Mining Industry. Coal reserves accord with the relevant State Government codes.

Proven reserves are those which are expected to be mined. In situ reserves make allowance for material not recoverable by established mining practices.

Based on reasonable expectations of future prices, costs, and more recent geological work, we have changed the basis of calculation, some of the figures contained in the tables, differ from those published previously in respect to tonnage and grade, and they are classified as proven or probable, recoverable or in situ.

Abbreviations:

Cu	Copper
Ag	Silver
Pb	Lead
Zn	Zinc
Ni	Nickel
Fe	Iron
Au	Gold
U ₃ O ₈	Uranium Oxide
Co	Cobalt
Cr ₂ O ₃	Chromite
t	Tonnes
Mt	Million of tonnes
Mm ³	Millions of cubic metres
g/t	Grams per tonne
Mg/m ³	Milligrams per cubic metre
%	Percentage metal content

MINERAL RESERVES - IN SITU ISA and HILTON (100% MIM)

	RECOVERABLE ORE RESERVES		Possible Ore
	Proven	Probable	
	75Mt 3.0% Cu 46Mt 150 g/t Ag 6.4% Pb 6.5% Zn	70Mt 3.2% Cu 9Mt 148 g/t Ag 5.9% Pb 7.0% Zn	
	35Mt 2.9% Cu	—	
	IN SITU ORE RESERVES		Possible Ore
	Proven	Probable	
	—	45Mt 150 g/t Ag 6.6% Pb 9.6% Zn	
	—	—	
See report, page 12			

	IN SITU COAL RESERVES (Millions of Tonnes)							M.I.M. Beneficial Interest %
	Type	Open Cut			Underground			
		Measured	Indicated	Inferred	Measured	Indicated	Inferred	
nsville, Qld	Coking	35	1	—	80	—	—	100
	Steaming	15	15	Small	100	10	Very small	100
y Creek, Qld	Coking	85	—	—	320	205	Large	79
	Steaming	—	5	—	—	—	—	79
lands, Qld	Steaming	70	—	—	80	—	—	100
chilla, Qld	Steaming	100	30	—	—	—	—	40
man, NSW	Steaming	—	—	—	190	30	—	100
	Coking	—	—	—	230	20	—	100
ern Creek, Qld	Steaming	—	10	—	—	10	—	100
ilah, Qld	Steaming	—	20	—	—	—	—	100
gildie, Qld	Steaming	20	—	—	—	—	Small	50
eston, Qld	Steaming	230	—	—	—	190	—	50
th Yarrabee, Qld	Steaming	15	15	—	—	—	—	50
idoan, Qld	Steaming	320	380	Large	—	—	Large	50
	Steaming	150	230	Large	—	—	—	40
t Moura, Qld	Coking	—	—	—	—	365	Small	50

MINERALS

	RECOVERABLE ORE RESERVES		POSSIBLE ORE	MINERALISATION	M.I.M. Beneficial Interest %
	Proven	Probable			
Agnew, W.A. No. 1 Mine	0.4Mt 3.1% Ni	2.3Mt 2.2% Ni	—	—	40
East Kalkaroo, S.A.	—	—	1150t U ₃ O ₈	—	6.7
Goldsworthy, W.A. Area A	1.5Mt 63% Fe	—	—	—	20
Area B	0.3Mt 62% Fe	—	—	—	20
Area D	23 Mt 62% Fe	—	—	—	20
Honeymoon, S.A.	—	3400t U ₃ O ₈	—	—	49
Lady Loretta, Qld	—	9Mt 95 g/t Ag 6.5% Pb 14.8% Zn	—	—	50
Teutonic Bore, W.A. Open Cut	0.8Mt 161 g/t Ag 4.5% Cu 11.5% Zn	—	—	—	40
Underground	0.6Mt 160 g/t Ag 3.6% Cu 10.9% Zn	—	0.1Mt 210g/t Ag 3.0% Cu 13.6% Zn	—	40
	IN SITU ORE RESERVES		POSSIBLE ORE	MINERALISATION	M.I.M. Beneficial Interest %
	Proven	Probable			
Agnew, W.A. No. 2 Mine	—	35Mt 1.9% Ni	—	—	40
Balcooma, Qld	—	—	—	3.5Mt 3.0% Cu	100
Frieda, P.N.G.	—	—	—	500Mt 0.5% Cu 0.28 g/t Au	37.5
Horse-Ivaal	—	—	—	260Mt 0.4% Cu 0.23 g/t Au	37.5
Koki	—	—	—	—	—
Goldsworthy, W.A. Area B	24Mt 60.9% Fe	—	—	—	20
Area C	880Mt 61.6% Fe	655Mt 60.7% Fe	990Mt 60% Fe	—	20
Area D	29Mt 63.1% Fe	—	—	—	20
McArthur River, N.T.	—	—	—	227Mt 41 g/t Ag 4.1% Pb 9.2% Zn	100
Mikonui, N.Z.	—	—	—	35Mm ³ 202 mg/m ³ Au	95
Porgera, P.N.G. Waruwari	—	—	—	100Mt 2.3 g/t Au	33.3
Ramu, P.N.G.	—	—	—	67Mt 0.16% Co 1.1 % Ni	30.5
Sorby Hills, W.A.	—	—	—	100Mt 6.5% Cr ₂ O ₃ 10Mt 84 g/t Ag 6.5% Pb	30.5
					50

Source: MIM Holdings Limited, Annual Report 1981, pp. 30-31.

It is indeed commendable that the illustrative example in Exhibit 6.3 disclosed the basis for the terminology employed, as well as an explanation of the terms "recoverable reserves" and "in situ reserves". Furthermore, the reader is informed that differences from previous estimates may have been due to amended expectations of future prices, costs and more recent geological work.

In comparison, reserve information provided by Cue Energy Resources Limited took the form exemplified by the following extracts.

*"Recoverable reserves from the main field are approximately 5.3 trillion cubic feet of gas and 75 million barrels of condensate. There are also small as yet untested oil reserves in the field"*³⁴⁰

*"In-place reserves in this zone were estimated by the previous operator at 33 million barrels. A 213 metre zone of residual oil beneath the production zone was also estimated to have contained a further 100 million barrels which subsequently remigrated out of the interval as a result of spillage caused by Late Tertiary tilting".*³⁴¹

Judging from these two examples, it appears that a greater degree of standardization in the presentation of information on mineral reserve quantities is warranted.

Overall, few companies provided information on the location of proved reserves, with this being more uncommon among the New Zealand companies.

340. Cue Energy Resources Limited, Annual Report 1982, p. 4.

341. Ibid, p. 4.

Disclosure of past mineral prices were included in many of the annual reports, but information on likely future prices relating to proved reserves were not found. The types and extent of other mineral reserve information disclosed varied among the companies.

Table 6.10: DISCLOSURES OF REVENUES AND EXPENDITURES - N.Z. GROUP

		New Zealand Companies						Australian Companies			
		1979		1980		1981		1982	1979	1980	1981
		M	S	M	S	M	S				
Disclosure of:-											
1. Revenues from mining operations		2	1	2	1	4	1	1	5	5	5
2. Expenditures in mining operations		6		6		6		3	5	5	5

*M: mining companies; S: companies with substantial interests in mining.

As Table 6.10 indicates, all the Australian companies were found to disclose revenues received or expenditures incurred in mining operations. The information was typically found presented in the income statement.

The New Zealand companies were found to similarly disclose expenditure information but some were unable to disclose mining revenue since related sales had not been made. Of the four companies with substantial interests in mining activities, only one was found to provide revenue information and this was in the managing director's review.

Although more detailed information on revenues and expenditures by operational phase or areas of interest were not found, a few companies provided additional information outside the financial statements. Exhibits 6.4 and 6.5 provide illustrative examples.

Exhibit 6.4: Illustrative example of additional revenue information provided outside the financial statements

REVENUE			
	1981	1980	Variance
	\$million	\$million	per cent
Sales from Australian production —			
export	494.2	581.4	- 15.0
domestic	193.1	219.7	- 12.1
Other sales	34.1	45.6	- 25.2
Total Sales	721.4	846.7	- 14.8
Other income	38.6	32.2	+ 20.1
Total Revenue	760.0	878.9	- 13.5
Sales			
Total sales revenue of \$721.4 million was 14.8 per cent lower than the previous financial year mainly due to lower metal prices received.			
Prices received			
Per tonne/kilogram	1981	1980	Variance
	\$	\$	per cent
Copper	1 679	1 953	- 14.0
Lead	673	1 022	- 34.1
Zinc	701	711	- 1.4
Silver	409	520	- 21.3
Nickel	6 379	5 393	+ 18.3
Coal	27.68	19.85	+ 39.4
Iron Ore	15.53	13.47	+ 15.3
Sales Volumes			
tonnes/kilograms	1981	1980	Variance
			per cent
Copper	172 992	160 482	+ 7.8
Lead	147 255	148 013	- 0.5
Zinc	84 978	85 964	- 1.1
Silver	438 039	440 624	- 0.6
Nickel	4 258	2 169	+ 96.3
Iron Ore	1 118 000	1 164 200	- 4.0
Coal	1 016 834	625 315	+ 62.6
(The above figures represent MIM's interest in products sold and in the case of metals are the payable metal content of products sold)			

Source: MIM Holdings Limited, Annual Report, p. 10.

Exhibit 6.5: Illustrative example of additional expenditure information provided outside the financial statements

EXPENDITURE		
	1981 \$ million	1980 \$ million
Total costs (including income tax).....	653.6	675.3
Major cost items —		
Wages and salaries	149.6	123.5
Income tax.....	94.5	177.5
Rail freight	38.5	31.5
Mineral royalty.....	22.4	30.4
Payroll tax	7.0	5.7
Purchased materials and services and other operating charges.....	341.6	306.7
including —		
Depreciation.....	42.0	48.3
Exploration	15.7	19.2
Earnings		
Net profit.....	106.4	203.6
Shareholders' dividends	67.0	123.3
Profit available for re-investment in MIM	39.4	80.3

Source: MIM Holdings Limited, Annual Report 1981, p. 11.

Table 6.11: DISCLOSURE OF OTHER INFORMATION - N.Z. GROUP

	New Zealand Companies				Australian Companies		
	1979	1980	1981	1982	1979	1980	1981
	M S	M S	M S				
* Disclosure of:-							
1. Treatment of restoration costs							
2. Treatment of general & administrative exps.	3	2	1	1			
3. Sundry revenues	5	6	5	2	3	3	3
4. Subsidies received					1	1	1
5. Government royalties					3	4	4

* M: Mining companies; S: Companies with substantial interests in mining

In attempting to determine other types of information disclosed by the

companies surveyed, none were found to disclose the accounting treatment of restoration costs. In a few cases, these costs were found to be expensed but a clear policy statement to this effect was missing.

The treatment of general and administrative expenses was disclosed in some of the New Zealand reports while none was found in any of the Australian ones (see Table 6.11). In most cases these costs were expensed with companies disclosing the treatment to this effect e.g.

"ADMINISTRATION COSTS AND EXPENDITURE ON CLAIMS

All costs incurred by the company to balance date have been written off with the exception of costs on projects with promises at that date".³⁴²

Most companies made separate disclosure of sundry revenues. Information on subsidies and government royalties were found in some of the Australian reports. It is difficult to draw any firm conclusions on these observations since the researcher was unable to ascertain the existence of these items other than from the information contained in the reports.

With regard to other information being provided, the general impression gained was that most companies attempted to present an overview of operations in the chairman's report or managing director's review. Some even included a separate exploration report.³⁴³ Much of the information was qualitative and historical in nature. However, the form and degree of disclosures within the annual reports clearly varied among different companies.

342.Consolidated Minerals Limited, Annual Report 1981, p. 9.

343.See New Zealand Oil and Gas Limited, Annual Report 1982, pp. 7-16; and Mineral Resources (N.Z.) Limited, Annual Report 1981, pp. 9-13.

VII. Current Cost Information

Only one Australian company was found to present current cost financial statements in addition to the historical cost accounts, and in each of the three years covered by the survey. As exploration and development costs were classified as fixed assets in the annual reports, the following explanatory note was relevant in describing the basis for the related current cost amounts:-

"Fixed assets are progressively revalued for current cost accounting purposes by internal indices and by expert revaluations. These values indicate the current value of investment in fixed assets, taking into consideration technological changes and service potential".³⁴⁴

VIII. Reference to Accounting Standards

Reference to the Australian accounting Standard AAS 7 was found in only two instances. In both cases, these were Australian annual company reports. Hence, no evidence was found to indicate that the New Zealand listed companies were influenced by overseas Standards on extractive industry accounting, as far as direct reference to these Standards in the annual reports of the companies, was concerned.

IX. Companies with substantial interests in mining operations

These companies were generally found to provide very little information on mining operations, as indicated by the results in Tables 6.3 and 6.5 to 6.11.

344. MIM Holdings Limited, Annual Report 1981, p. 48.

DATA ANALYSIS - COMPANIES LISTED ON THE K.L. STOCK EXCHANGE

Company Profile

As Table 6.12 indicates, all the mining companies surveyed were involved in tin mining operations, the majority being either primarily producers or explorers & producers. Company sizes in terms of dollar amount of total assets, vary within a very broad range.

Table 6.12: COMPANY PROFILE OF SELECTED COMPANIES ON THE KUALA LUMPUR STOCK EXCHANGE

	1979	1980	1981
<u>Type of Involvement:</u>			
Engaged in mining (M)	24	24	24
Possessing substantial interests in mining (S)	1	1	1
	M S	M S	M S
<u>Nature of Operations</u>			
Tin	24 1	24 1	24 1
Gold	2	2	2
<u>Nature of Involvement of mining companies</u>			
Explorer and Producer	12	12	12
Explorer only	1	1	1
Producer only	11	11	11
Size in terms of dollar amount of total assets*	M\$4.3 million to M\$237.4 million.		

* Three companies which expressed total assets in terms of pound sterling had the following range: £0.2 million to £ 1.4 million over the three years.

Accounting and Reporting Practices

The annual reports of The Straits Trading Company Limited, which was the only company "with substantial interests" surveyed, contained very little information on mining operations. This mainly consisted of a descriptive overview of mining operations in the chairman's report and a review of the tin market.³⁴⁵

The accounting and reporting practices of mining companies, revealed through the examination of their annual reports, are discussed in the following sections.

I Identification of Operational Stages, and Terminology Used

Overall, various stages of operations were identified in the annual reports examined with the terms "production", "development" and "prospecting" being most commonly found. (See Table 6.13)

Table 6.13: IDENTIFICATION OF OPERATIONAL STAGES AND TERMINOLOGY USED - MALAYSIAN GROUP

	1979	1980	1981
(1) Exploration	3	3	4
(2) Evaluation			2
(3) Development	11	12	11
(4) Construction	1	1	2
(5) Production	23	23	23
(6) Prospecting	14	13	14
(7) Acquisition	1	1	1

345. The Straits Trading Company Limited:
Annual Report 1979, pp. 22-24;
Annual Report 1980, pp. 22-24;
Annual Report 1981, pp. 22-24.

II. Accounting for Pre-production Costs

None of the companies were found to state the method adopted for accounting for pre-production costs. The task of determining the methods adopted was made difficult because many of the companies failed to include a description of the treatment accorded to such costs. However, among those which included a policy statement to this effect, the full cost method was found to prevail. (see Table 6.14)

Table 6.14: METHODS ADOPTED FOR ACCOUNTING FOR PRE-PRODUCTION COSTS - MALAYSIAN GROUP

	1979	1980	1981
(1) Costs Written Off	3	3	2
(2) Area of Interest			1
(3) Full Cost	11	11	11
(4) Not Disclosed	10	10	10

Typically, the method of accounting for pre-production costs was described in the following manner.

"Prospecting expenditure

*Prospecting expenditure is capitalised after acquisition of mining rights and amortised over the estimated life of the mine. When it is considered not economically viable to mine the area under prospect such expenses are written off as abortive"*³⁴⁶

In this particular example, mining leases and mine development expenditure were also found to be capitalised under fixed assets in the notes

346. Killinghall Tin (Malaysia) Berhad, Annual Report 1981, p. 15.

to the accounts, with no pre-production expenses appearing in the income statement. On the basis of these observations, the author concluded that the full cost method had been adopted, and that policy disclosure was inadequate since the treatment of mining leases and mine development expenditure was not stated.

An example of more adequate policy disclosure in this area is perhaps the following:-

"Prospecting expenditure

Expenditure incurred by the group on prospecting, exploration and evaluation of areas of interest is capitalised under the heading of prospecting expenditure. Ultimate recoupment of such expenditure is dependent on successful development and commercial exploitation or sale of the prospect concerned.

Should a prospect be abandoned or be considered to be of no value, the accumulated expenditure applicable to such an area of interest is written off as an extraordinary item in the year in which such a decision is made".³⁴⁷

This was the only instance of the area of interest method found. Much of the wording of the policy statement is consistent with the recommendations contained in the Australian Standard, and is perhaps indicative of the influence that the Standard may have had on the financial accounting and reporting practices of this company.

Among the companies found not to disclose the accounting treatment of

347. Malaysia Mining Corporation Berhad, Annual Report 1981, p.16.

pre-production costs, some were found to show items of mining expenditure in both the balance sheet and income statement. As the nature of the mining expenditures were difficult to determine, it was not possible to draw firm conclusions about the method adopted.

Hence, there was generally a wide diversity of accounting methods employed for accounting for pre-production costs, with the majority of those disclosing their policy, preferring to capitalize these items. In attempting to establish a meaningful relationship between company size and the method of accounting for pre-production costs, dollars of total assets and the method adopted were tabulated as shown in Table 6.15.

Table 6.15: COMPANY SIZE AND THE TREATMENT OF PRE-PRODUCTION COSTS -

MALAYSIAN GROUP

Companies disclosing treatment of pre-production costs	Total Assets (M\$ million, or £ million where indicated by *)		
	1979	1980	1981
Aokam Tin Bhd.	56.0 FC	42.2 FC	44.7 FC
Austral Amalgamated Tin Bhd.	39.6 FC	42.5 FC	40.0 FC
Ayer Hitam Tin Dredging (M) Bhd.	40.9 CWO	43.9 CWO	33.3 ND
Gopeng Consolidated Ltd.	10.0*FC	11.7*FC	11.9*FC
Hongkong Tin Ltd.	5.5 FC	5.7 FC	4.3 FC
Idris Hydraulic Tin Ltd.	1.1*FC	0.9*FC	0.2*FC
Kampong Lanjut Tin Dredging Tin Bhd.	11.0 FC	10.9 FC	11.9 FC
Kamunting Tin Dredging (M) Bhd.	13.9 FC	15.8 FC	13.0 FC
Killinghall Tin (M) Bhd.	11.4 FC	20.0 FC	34.0 FC
Malaysia Mining Corporation Bhd	93.4 ND	101.0 ND	237.4 AOI
Pahang Consolidated Co. Ltd.	55.9 CWO	74.1 CWO	73.3 CWO
Sungei Besi Mines Malaysia Bhd.	40.7 CWO	53.2 CWO	44.0 CWO
Timah Langat Bhd.	43.6 FC	42.7 FC	42.7 FC
Tongkah Harbour Tin Dredging Bhd.	14.5 FC	11.5 FC	18.9 FC
Tronoh Mines Malaysia Bhd.	82.8 FC	60.6 FC	64.9 FC

** FC: Full Cost Method; CWO: Costs Written Off Method; AOI: Area of Interest Method; ND: Not Determinable.

From Table 6.15, it generally appears that companies with total assets amounting to less than \$40 million typically capitalize pre-production

costs. This is consistent with the Brock study finding that smaller U.S. oil and gas producers tended to capitalize more items of cost than their larger counterparts.³⁴⁸ In view of the results in Table 6.15, it is suggested that the smaller tin mining companies in Malaysia tend to capitalize pre-production expenditure rather than expense these items because the former treatment provides higher reported asset and income figures.

None of the companies disclosed the basis for capitalizing pre-production costs where this treatment was adopted. Among those which had capitalized costs, a variety of balance sheet headings were used to describe the asset as shown in Table 6.16. None of the companies were found to disclose the amounts of capitalized costs written off, or a breakdown of deferred costs by areas of interests.

Table 6.16: BALANCE SHEET CLASSIFICATION OF PRE-PRODUCTION COSTS CARRIED FORWARD - MALAYSIAN GROUP

Titles	1979	1980	1981
(1) Fixed Asset	2	2	2
(2) Separately Classified as an asset under own heading	6	6	6
(3) Fixed and own Heading	3	3	4

III. Selection of Cost Centre

None of the companies were found to disclose the cost centre adopted for financial accounting and reporting purposes.

348. Brock, H. , "A Look At Accounting Principles Used by Oil and Gas Producers", op. cit., pp. 69-70.

IV. Accounting for Depletion

A majority of the companies were found to disclose the method of depletion adopted, as a policy statement with an overall preference for depletion on a time basis (see Table 6.17). However, fewer companies were found to separately disclose depletion charges, and those that did typically did so in the notes to the accounts. Most of the companies probably lumped depletion amounts together with depreciation charges, thereby failing to distinguish between the two.

Table 6.17: ACCOUNTING FOR DEPLETION - MALAYSIAN GROUP

	1979	1980	1981
<u>Method Adopted</u>			
Unit of production basis	7	7	7
Time basis	12	12	12
Not disclosed	5	5	5
<u>Depletion charges</u>			
(1) separately disclosed in aggregate	4	4	4
(2) not separately disclosed	20	20	20

V. Valuation of Mineral Reserves

No attempt to estimate the value of mineral reserves was found in any of the annual reports examined.

VI. Disclosure of Information Unique to the Extractive Industries

Estimates of reserve quantities were found to be provided by one company. Even in this case, the reserves were not categorized to give an indication of the degree of certainty with which these reserves were expected to be recovered. The disclosure found is reproduced in Exhibit 6.6.

Exhibit 6.6: Illustrative Example -
Mineral Reserve Disclosure

ORE RESERVES

Estimated ore reserves at 31st July 1981, are 345,497 tonnes at an average grade of 1.38% containing 4,766.57 tonnes of cassiterite. This compares with 373,173 tonnes at an average grade of 1.35% containing 5,050.03 tonnes of cassiterite as at 31st July, 1980.

The ore extracted during the financial year was 177,546 tonnes and there was a decrease of ore reserves of 27,676 tonnes. Thus, 149,870 tonnes of ore were both exposed and extracted from old areas during the year compared with 170,997 tonnes in the preceding year.

In development, 1,029 tonnes of ore were produced compared with 1,344 tonnes last year. In stope development, 9,046 tonnes of ore were broken compared with 8,567 tonnes last year.

This year's development added 4,574 tonnes of new ore to reserves compared with 24,440 tonnes of ore last year. This new ore was mainly exposed at Gakak III Extension Lode below the No. 10 Level. Stope Development added 5,427 tonnes compared with 4,126 tonnes last year. The new ore from stope development was mainly exposed in Willinks Mine.

Source: The Pahang Consolidated Public Co.
Ltd., Annual Report 1981, p. 24.

Overall, very little information appeared to be provided on mineral reserves. Among those that did, disclosure was typically made outside the financial statements.

Amounts of revenues and expenditures associated with mining operations were typically disclosed in the financial statements but detailed disclosure e.g. by areas of interests, was not found. The treatment of restoration costs, and general & administrative expenses were not found to be disclosed. Whilst the majority of companies distinguished sundry revenues from mining revenues, only isolated instances of government royalties

were found. Nevertheless, a number of companies attempted to provide additional information on mining statistics (see Exhibit 6.7), while the director's report typically provided a descriptive overview of the year's operations.

Exhibit 6.7: Illustrative example of disclosure of mining statistics

MINING STATISTICS		1981	1980	1979
DREDGE OPERATIONS				
Area dredged	(Hectares)	11.51	5.65	7.79
Average depth dredged	(Metres)	17	33	26
Volume of ground mined*	(000's m ³)	2,054	2,057	2,023
Dredge running time	(Hours)	6,829	7,238	7,383
Percentum dredge possible running time		79	83	89
Tin concentrate recovered	(Tonnes)	371	414	454
	(Piculs)	6,148	6,852	7,504
Recovered grade per cubic metre	(Kg/m ³)	0.18	0.21	0.23
Cost per cubic metre	(\$)	2.45	2.17	1.58
Cost per kilogramme	(\$)	13.55	10.80	7.05
OPENCAST OPERATIONS				
Volume dry-stripped	(000's m ³)	2,966	1,511	—
Volume treated	(000's m ³)	2,611	1,330	—
Maximum depth reached	(Metres)	58	45	—
Total running time	(Palong Hours)	31,946	14,772	—
Percentum possible running time		95	92	—
Tin concentrate recovered	(Tonnes)	1,614	765	—
	(Piculs)	26,692	12,654	—
Recovered grade of ground treated	(Kg/m ³)	0.62	0.58	—
Cost per cubic metre	(\$)	3.06	2.77	—
Cost per kilogramme	(\$)	10.57	10.29	—

Source: Killinghall Tin (M) Bhd., Annual Report 1981, p. 20.

CONCLUSION

In retrospect, the mining operations of companies included in the survey encompassed a wide range of minerals in the case of the New Zealand group, with a concentration on tin mining in the Malaysian group. The latter observation is not surprising since Malaysia has traditionally been the world's largest producer of tin. While the Australian companies included in the New Zealand group were relatively large "explorers and producers", the involvement of the New Zealand companies was more varied, and most of the Malaysian companies were found to be either producers or explorers & producers.

Overall, a wide diversity of accounting practices was found among the New Zealand and Malaysian listed companies. This conclusion is consistent with the situations in the United States and Australia before the promulgation of extractive industry accounting Standards in those countries, as reported by Field, Lourens & Henderson and Heazlewood (1971).³⁴⁹ More specifically, variations in accounting practices were discovered in the:-

- (1) accounting treatment of pre-production costs (Tables 6.3 and 6.14);
- (2) balance sheet classification of pre-production costs (Tables 6.6 and 6.16);
- (3) accounting for depletion (Tables 6.8 and 6.17); and
- (4) disclosure of mineral reserve information (Table 6.9).

None of the companies were found to disclose the cost centre adopted, or estimates of mineral reserve values, even though these have been major issues discussed in the United States. Only one Australian company was

349. Field, R.E., op. cit. ; Lourens, R. & Henderson, S., op. cit., p. 71; Heazlewood, C.T., "Accounting For the Extractive Industry", op. cit., p. 8.

found to provide current cost information, and none of the New Zealand or Malaysian companies made reference to overseas accounting Standards. In comparison to the Australian companies included in the survey, the degree of accounting disclosure by the other companies was felt to be inadequate particularly in the areas of capitalized pre-production costs, depletion charges and mineral reserve information.

CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS

REVIEW

In retrospect, it has been established that the unique operational characteristics of the extractive industries has given rise to the need for mining companies' financial statements to provide information useful for assessing future cash flows , and uncertainty associated with current and future operations. It was suggested that the provision of information on periodic costs incurred in the various stages of mining operations, revenues received and mineral reserves discovered and developed, would be consistent with the aim of meeting this need.

Difficulties involved in effectively communicating this information was highlighted by the discussion of five major issues, in Chapter Three. A prominent feature of the problem areas discussed was the availability of acceptable alternatives especially in the key areas of pre-production costs, cost centre selection, accounting for depletion, and mineral reserve valuation. This was the primary basis on which the need for accounting Standards for the extractive industries, was argued. However, it was also made clear that the policy-making aspect is in itself a difficult process, and this point was illustrated in the historical account of the development of extractive industry accounting Standards (Chapter Four).

Empirical studies in the area of extractive industry accounting were reviewed and discussed (Chapter Five). Conflicting evidence on the implications of the efficient market hypothesis on disclosure in the extractive industries was presented. With these in view, the author maintained that in any case, financial accounting and reporting Standards are required to ensure an

adequate degree of uniformity and disclosure consistent with the aim of meeting the information needs of interested individuals.

Previous surveys of contemporary extractive industry accounting practices in the United States and Australia were reviewed and discussed. They provided the background against which the survey of accounting and reporting practices of selected companies listed on the New Zealand or Kuala Lumpur Stock Exchanges, was undertaken. The overall conclusion was that a wide diversity of accounting practices was exhibited by the companies.

CONCLUSION

The findings of the survey exhibited a lack of adherence to a single method of accounting for, or disclosure of, pre-production expenditures, and depletion charges. In this respect, the findings support the primary research hypothesis that:

A diversity of accounting practices exist among mining companies listed on the New Zealand Stock Exchange and those quoted on the Kuala Lumpur Stock Exchange; these two Exchanges being the main centres for trading securities of listed companies in New Zealand and Malaysia respectively.

However, there was generally a preference for capitalizing pre-production costs among the New Zealand and Malaysian mining companies, with this

being more obvious among the smaller Malaysian companies. The Australian mining companies generally displayed a greater preference towards some form of successful efforts accounting, this observation being consistent with the findings of recent Australian studies.

Although there were variations in the depletion methods adopted, the time basis generally seemed to be the most popular approach among all the companies.

In addition, it was also found that the mining companies failed to provide a policy statement on the cost centre adopted, or estimates of mineral reserve values, with none of the New Zealand or Malaysian ones providing current cost information or referring to overseas accounting Standards. The companies classified as having "substantial interests in mining operations" were generally found to provide very little information on mining operations.

However, the fact that one New Zealand mining company and Malaysian company were found to employ an area of interest approach in accounting for pre-production costs, suggests that mining companies in these two countries may be influenced by Australian Standards on extractive industry accounting. Nevertheless, these two instances cannot be said to provide conclusive evidence on this point. As such, in view of the foregoing conclusions, it is felt that very little evidence was found to support the subsidiary hypothesis that:

Financial accounting and reporting practices of local mining companies listed on the New Zealand Stock Exchange, and those quoted on the Kuala Lumpur Stock Exchange are influenced by Standards and recommendations issued by overseas accounting bodies.

RECOMMENDATIONS

For the Accounting Profession in New Zealand and Malaysia

In the light of the survey results, the author believes that extractive industry accounting Standards should be developed in New Zealand and Malaysia. This recommendation is advanced with the realisation that:

- (1) accounting Standards in New Zealand are well-established, and a Statement of Standard Accounting Practice on extractive industry accounting would be a useful addition, especially in view of the country's growing concern for future energy resources and the increasing importance of the extractive industries;
- (2) accounting Standards in Malaysia do not appear to be well established, but a Statement of recommended accounting and reporting practices focusing on the tin industry would help reduce the diversity of accounting practices. This would clearly be an appropriate step forward by the Malaysian Association of Certified Public Accountants especially in view of the significance of the tin industry in this country.

Based on the Standards which have been promulgated for extractive industry accounting in the United States and Australia, the following recommended

provisions are provided for consideration.

I. Definition of Terms

It is felt that the broad definition of "extractive industries" presented in this report³⁵⁰ is sufficiently comprehensive to provide a useful perspective of the typical operations, and wasting natural resources within its ambit. It is also suggested that the main operational phases described and defined in this report,³⁵¹ be adopted since these terms have also been found to be used in the annual reports produced by mining companies in New Zealand and Malaysia.

II. Accounting for Pre-production Costs

The author believes that despite the limitations of the historical cost accounting system, there is a need to specify a single method of accounting for pre-production costs in order to secure an acceptable degree of consistency in the methods adopted by mining companies. This is particularly important in New Zealand and Malaysia, insofar as mining companies in these countries were found to adhere to the traditional system of accounting, with none having presented current cost information.

Admittedly, the selection of a generally acceptable method of accounting for pre-production costs is a difficult task. This point has been well emphasized by Stevenson who recently summarized the position in the United States on this issue, in the following words.

350. See pp. 1-2 of this report.

351. See pp. 12-13 of this report.

"An exposure draft released as recently as April of this year in the US, tacitly admitted that the US has failed to determine a method of accounting for costs and is not, nearly six years after the release of AAS 7, able to recommend one for adoption".³⁵²

However, the author believes that the area of interest approach as set forth in the Australian Standard AAS 7,³⁵³ should be the recommended accounting treatment for pre-production costs in New Zealand and Malaysia because of the following reasons:-

- (1) The method's theoretical basis for capitalizing pre-production costs is sound insofar as it endorses the traditional concept of an asset i.e. as an item associated with the expectation of future benefits.
- (2) From a practical viewpoint, the method has been found to have gained increasing acceptance among mining companies in Australia.³⁵⁴
- (3) The method emphasizes the need to accumulate revenues and expenditures by areas of interest, and detailed disclosure along these lines can therefore be facilitated to provide an evaluation of efforts and results.

In recommending the area of interest method, it is also important that mining companies be required to:-

352. Stevenson, K., "Accounting for the extractive industries - recent development in the US", The Chartered Accountant in Australia, Vol. 53, No. 3, (September, 1982), p. 9.

353. See pp. 71-72 of this report for a description of the AAS 7 provisions relating to the treatment of pre-production costs under the area of interest method.

354. Stevenson, K., op. cit., p. 11; Heazlewood, C.T., "Compliance With AAS 7" -- 27 20

- (1) state and describe the accounting treatment of pre-production costs in the statement of accounting policies;
- (2) describe the major areas of interests, and provide a breakdown of pre-production costs carried forward and written off for each of these areas of interest, in the notes to the accounts.

These disclosures will facilitate an evaluation of pre-production operations carried out in each area of interest.

III. Selection of the Cost Centre

Recognizing that each alternative cost centre concept has its strengths and weaknesses, the author believes that the natural geological unit should be recommended as the appropriate cost centre. The defined areas of interests should be consistent with this cost centre concept. These propositions are supported on the following basis.

- (1) The concept of the natural geological unit as the cost centre to be adopted is sufficiently restrictive to ensure that the defined areas of interest are confined smaller units such as individual mineral deposits, or fields of deposits. As such, the concept rules out the use of larger cost centres on a company-wide or country-wide basis, therefore avoiding information loss resulting from the averaging effect of reporting results at a more general level.
- (2) The cost centre concept will necessarily be consistent with the area of interest approach to accounting for pre-production costs.

IV. Accounting for Depletion

The recommended method of accounting for depletion should be the unit of production basis because it forces an estimation of the economically recoverable reserves owned by the company. The method also facilitates an assessment of the company's production in relation to its estimated reserves since the periodic amount of depletion will be computed on this basis.³⁵⁵

However, in view of the arbitrariness of the allocation process, it is felt that depletion calculated on a time basis should also be permitted. Since two methods are to be permitted, the following disclosures are important:-

- (1) The depletion method adopted should be clearly stated and described in the statement of accounting policy.
- (2) Amounts of depletion should be separately disclosed from depreciation charges, in the financial statements or notes to the accounts.

These disclosures will facilitate assessments of the amounts of wasting assets, as distinguished from others assets of the company.

V. Valuation of Mineral Reserves

In view of the difficulties in establishing an acceptable method of estimating mineral reserve values experienced in the U.S., and the relative lack of development in this area by the Australian professional accounting bodies, the author believes that no method should be

355. See p. 35 of this report for a description of the unit of production method.

recommended for providing estimates of mineral reserve values, at this time. Although the SMDCF concept has recently been introduced in the United States, it is perhaps too early at this stage to judge the degree of acceptance with which it will be greeted by the accounting profession.

Instead, the author suggests that the following mineral reserve information should be required to be provided by mining companies:-

- (1) estimated quantities of mineral reserves for each defined area of interest, and for at least the past three years. In doing so, a distinction should clearly be made between proved, probable and possible reserves.³⁵⁶

The basis for these estimates should also be disclosed e.g. geologist's report etc., and any changes from previous years' estimates should also be disclosed together with reasons for these changes.

- (2) average prices of the minerals for at least each of the past three years, and current prices at the balance date.

These disclosures should provide a sufficient basis for informed individuals to make inferences about the values of the mining company's mineral reserves.

VI. Other Information

The following types of information should be required to be disclosed

356. See p. 45 of this report (footnote 117) for definitions of proved, probable and possible reserves.

in the notes to the accounts:-

- (1) Revenue from mining operations should be disclosed for each defined area of interest, and be distinguished from other revenue items.
- (2) Expenditures incurred in mining operations should be disclosed for each defined area of interest.

The above information will facilitate assessment of efforts expended in various areas of interests (in terms of expenditures incurred) in relation to results achieved (in terms of revenue received).

In view of the recent formal introduction of current cost accounting in New Zealand, mining companies disclosing current cost information should be required to separately disclose the restated amounts of pre-production costs carried forward. The basis for restating these amounts should also be clearly stated in the statement of accounting policies to the current cost financial statements.

In considering the foregoing proposed Standard provisions, it should always be recognized that the effectiveness of these provisions can only be achieved if compliance with them can be secured. Therefore, in promulgating the proposed Standard, the professional accounting bodies in New Zealand and Malaysia should proceed by issuing exposure drafts with which to solicit relevant views and opinions, to provide a basis for assessing the likely degree of acceptance with which the proposals will be received. A "compromise Standard" need

not necessarily result from this process, provided that conflicting views are carefully examined and evaluated. By providing affected parties and interested individuals the opportunity to participate in the Standard-setting process in this manner, eventual general acceptance of and greater compliance with the final Standard may be fostered.

After the promulgation of the Standard, there will be a need to monitor compliance. In this regard, it is suggested that a regular review of annual company reports perhaps in the form similar to the survey undertaken in this research study or other overseas studies, should be undertaken. This monitoring procedure should be supplemented by open criticism and censure of sub-standard practices e.g. through the professional accounting bodies' publications.

Further Research

This research study may be viewed as a first attempt at examining the accounting practices of mining companies in New Zealand and Malaysia. Indeed, there is much scope for applying the methodology of this study towards determining the extractive industry accounting practices of other countries. Such surveys could become the basis upon which an international accounting Standard could be established on extractive industry accounting.

In view of the findings of this study, the author looks forward to seeing extractive industry accounting Standards being developed in New Zealand and Malaysia. The introduction of these Standards would signal the possibility of conducting empirical studies on the effect of requiring a specific method of accounting for pre-production expenditures, on the security prices of mining companies. The research methodologies of studies conducted in the United States in this area, as discussed in Chapter Six may therefore be applied perhaps even with the aim of testing the efficiency of the capital markets in New Zealand and Malaysia.

Following the promulgation of extractive industry accounting Standards in New Zealand and Malaysia, there will clearly be scope for conducting regular surveys of mining companies' financial statements, to monitor compliance with the provisions of the Standards.

APPENDIX A: List of companies forming the New Zealand group included
in the Survey

Mining Companies¹

Bridgevale Mining Ltd.^{2*}
Coal and Energy New Zealand Ltd.^{2**}
Consolidated Minerals Limited (known as the Consolidated Silver Mining
Co. Ltd. in 1979, 1980).
Cue Energy Resources Ltd.^{2**}
L & M Oil New Zealand Ltd.
Mineral Resources (N.Z.) Ltd.
New Zealand Oil and Gas Ltd.^{2**}
New Zealand Petroleum Co. Ltd.
Southern Cross Minerals Exploration Ltd.

Companies with substantial interests in mining operations³

Alex Harvey Industries Ltd.
Fletcher Challenge Ltd.⁴
Southland Frozen Meat Co. Ltd.
TNL Group Ltd.
Westbridge Holdings Ltd. (known as Bridgevale Consolidated Ltd. in 1979,
1980).

Australian mining companies among the leading stocks quoted on The
New Zealand Stock Exchange in 1981⁵

Ampol Petroleum Ltd.
Broken Hill Pty. Co. Ltd.
Comalco Ltd.
CSR Ltd.
MIM Holdings Ltd.

-
1. These companies were listed on the New Zealand Stock Exchange at December 1981 as reported in "The Official Record of the New Zealand Stock Exchange", Vol. 2, No. 11, The New Zealand Financial Times, Vol. 52, No. 3, (December, 1981).
 2. These companies officially commenced operations in: 1980(*), 1981 (**).
 3. See note 1 above.
 4. This company was formed as the result of a merger which became operative in 1981. The annual reports of Fletcher Holdings Ltd. for 1979 and 1980 were also examined since it was felt that the activities of both companies did not differ significantly.
 5. _____, Equity Investment 1981, Berl Publications Ltd., inset with The New Zealand Economist, Vol. 43, No. 9, (December, 1981).

APPENDIX B: List of companies forming the Malaysian group included
in the Survey

Mining Companies

Aokam Tin Berhad
Austral Amalgamated Tin Berhad
Ayer Hitam Tin Dredging Malaysia Berhad
Berjuntai Tin Dredging Berhad
Gopeng Consolidated Ltd.
Hongkong Tin Ltd.
Idris Hydraulic Tin Ltd.
Johan Holdings Berhad²
Kampong Lanjut Tin Dredging Berhad
Kamunting Tin Dredging Berhad
Kesang Tin (Malaya) Berhad³
Killinghall Tin Malaysia Berhad
Kinta Kelas Tin Dredging Co. Ltd.
Kramat Tin Dredging Berhad
Kuala Kampar Tin Fields Berhad
Kuchai Development Berhad³
Larut Tin Fields Berhad²
Malaysia Mining Corporation Berhad (known as Malayan Tin(M) Bhd. in 1979,1980)
The Pahang Consolidated Co. Ltd.
Pengkalen Ltd.
Petaling Tin Berhad
Rahman Hydraulic Tin Berhad.
The Renong Tin Dredging Co. Ltd.²
Selangor Dredging Berhad
The Sungei Besi Mines Malaysia Berhad
Talam Mines Berhad³
Tanjong Tin Dredging Ltd.
Timah Langat Berhad
Tongkah Harbour Tin Dredging Berhad
Tronoh Mines Malaysia Berhad

-
1. These companies were listed on the Kuala Lumpur Stock Exchange at 29th January 1982 as reported in The Kuala Lumpur Stock Exchange, Gazette, Vol. 10, No. 2, (February, 1982), pp. 34-37.
 2. These companies had ceased mining operations prior to 1979.
 3. The annual reports for the three years(1979, 1980 and 1981) of these companies could not be obtained.

APPENDIX B (... continued)

Companies with substantial interests in mining operations⁴

Magnum Corporation Berhad⁵

Malaysia Mosaics Berhad⁵

Perlis Plantations Berhad⁵

The Straits Trading Co. Ltd.

4. These companies were listed on the Kuala Lumpur Stock Exchange at 29th January 1982 as reported in The Kuala Lumpur Stock Exchange, Gazette, Vol. 10, No. 2, (February, 1982), pp. 42-43.

5. The annual reports of these companies for the three years (1979, 1980 and 1981) could not be obtained.

APPENDIX C: THE SURVEY INSTRUMENT

SECTION ONE: COMPANY PROFILE

I. Involvement in Extractive Industries:-

- (1) Engaged in mining
- (2) Possessing substantial interests in mining operations

II. Nature of Operations:-

- (1) Oil
- (2) Natural gas
- (3) Coal
- (4) Tin
- (5) Other (specify)

III. Nature of Involvement:-

- (1) Explorer and Producer
- (2) Explorer only (minimal or no production)
- (3) Producer only (minimal or no exploration programme)

IV. Size:-

Dollar amount of Total Assets:

SECTION TWO: ACCOUNTING AND REPORTING PRACTICES

I. Identification of operational stages, and terminology used:-

- (1) Exploration
- (2) Evaluation
- (3) Development
- (4) Construction
- (5) Production
- (6) Prospecting
- (7) Acquisition
- (8) Not disclosed

II. Accounting For Pre-Production Costs

A. Method Adopted:- (specify place of disclosure)

- (1) Costs Written Off
- (2) Costs Written Off & Reinstated
- (3) Successful efforts
- (4) Area of Interest
- (5) Full Cost
- (6) Other
- (7) Not Disclosed

B. Basis for capitalizing pre-production costs:-

- (1) Disclosed (specify)
- (2) Not Disclosed

C. Balance sheet classification of pre-production costs carried forward:-

- (1) Fixed Asset
- (2) Noncurrent Asset
- (3) Separately classified as an asset under own heading
- (4) Fixed and Intangible Asset
- (5) Fixed and own heading
- (6) Intangible Asset
- (7) Other

D. Disclosure of capitalized costs written off:-

- (1) in aggregate
- (2) by operational phase
- (3) by area of interest
- (4) not disclosed

E. Disclosure of costs carried forward in areas of interest which are:-

- (1) in the exploration and/or evaluation stage
- (2) in the development phase in which production has not commenced
- (3) in the production stage

III. Selection of Cost Centre (specify place of disclosure)

Cost centre adopted

- (1) Acquisition unit (specify e.g. mineral lease)
- (2) Organization Unit (specify e.g. territory)
- (3) Company as a Whole
- (4) Geopolitical Unit (specify e.g. country)
- (5) Natural geological unit (specify e.g. mine)
- (6) Not Disclosed

IV. Accounting for Depletion

A. Method Adopted:- (specify place of disclosure)

- (1) Unit Of Production
- (2) Straight-line Time Basis
- (3) Other
- (4) Not Disclosed

B. Amortization charges disclosed (specify place of disclosure)

- (1) in aggregate
- (2) by area of interest
- (3) by operational stage
- (4) other

V. Valuation of Mineral Reserves (specify place of disclosure)

Method Adopted:-

- (1) Discovery Value
- (2) Current Value
- (3) Present Value (specify)
- (4) Not Disclosed

VI. Disclosure of Information Unique to the Extractive Industries

A. Estimates of Mineral Reserve Quantities (specify place of disclosure)

(1) by categories and types (specify e.g. proved)

--

(2) description of assumptions used and difficulties involved in making estimates

(3) changes in estimated quantities

(4) reasons for changes in estimates (specify)

B. Other Mineral Reserve Data: (specify place of disclosure)

(1) Location of proved reserves

(2) Reserve price data

(3) Other (specify)

C. Functional Data:- (specify place of disclosure)

(1) Disclosure of Revenue

(a) in aggregate

(b) by operational phase (specify)

(c) by area of interest (specify)

(d) not disclosed

(2) Disclosure of Expenditures Incurred

(a) in aggregate

(b) by operational phase (specify)

(c) by area of interest (specify)

(d) not disclosed

D. Other Information: (specify place of disclosure)

(1) Disclosure of the treatment of restoration costs

(a) disclosed (specify treatment)

(b) not disclosed

(2) Disclosure of the treatment of general and administrative costs

(a) disclosed (specify treatment)

(b) not disclosed

(3) Disclosure of :-

(a) sundry revenues

(b) subsidies received

(c) government royalties in respect of sales or production

(d) long-term sales

(e) other significant information (specify)

E. Current Cost Information:-

(1) Disclosed (specify basis adopted)

(2) Not disclosed

F. Reference to Accounting Standards

(1) Disclosed (specify Standard)

(2) Not disclosed

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