

Concluding Comments

The intent of this book as stated in the Preface was to present a fundamental, practical approach to financial and economic analysis used in industry. The text is primarily directed to undergraduate chemical engineering students in a process economics or design course. This text may also be used for a continuing education course in process economics for experienced engineers who feel the need to refresh their use of the principles of economic and financial analysis. The book may also serve as a self-study text.

A chemical engineering graduate upon entering industry is confronted with financial terminology unfamiliar to this person. Further, each company has jargon used by the company to add to the confusion. These terms and associated concepts are new to the engineer who has been engrossed in scientific and technological terminology. When the young engineer comes in contact with middle- or upper-level management, they often use financial terminology in discussions or meetings.

The focus of this chapter is to show how the topics presented in this book, in [Chapters 4](#) through [13](#), ultimately appear in financial reports. The reader is lead through information in these chapters in an orderly, logical manner.

The backbone of any economic analysis is the capital cost estimate. Methods for preparing an estimate were presented based upon the quality of information and data available to the engineer. Although most corporations use sophisticated computer programs for obtaining a capital cost estimate, the young engineer must understand the principles used in preparing an estimate and especially know the limitations. This is particularly true today since many companies outsource the capital cost estimate. It is often the responsibility of

the young engineer to review such estimates however generated, using handheld calculators or desktop computers to check the reasonableness of the estimate. Just because an estimate was computer generated does not mean that it is correct. If the project is approved, the capital cost ultimately appears in balance sheet as fixed assets and in the income statement since certain operating expenses are capital dependent.

Although there are numerous methods for obtaining a capital cost estimate extant in the literature, the same cannot be said for estimating operating expenses. There is a dearth of operating expense estimation, because such information is often of a proprietary nature. The information on the preparation of an operating expense is based upon the author's experience and information available in the literature. The operating expenses will appear along with operating expenses from other segments of a company under the cost of goods sold in the income statement.

Time value of money, that is, interest, is a business fact of life. Interest is charged no matter the source of funding, be it from external sources such as loans, bonds, or stock, or from internal sources such as retained earnings, or a combination of both. Interest is an item in the income statement and the balance sheet of a firm.

Depreciation and taxes are irrevocably tied together, as noted in [Chapter 7](#). Depreciation appears on the balance sheet and both depreciation and taxes are found in the income statement as operating expenses. One important item in financial reporting is cash flow. By definition it is the net income after taxes plus depreciation. It is the amount of money available for the day-to-day operating expenses. In financial reports, there is a table showing the changes in cash flow generated by the company from year to year. The net income after taxes is found in the firm's income statement and depreciation, the other component of cash flow ultimately appears in the balance sheets.

After these foregoing items are estimated, the next step is to determine the profitability of a venture. Current methods for quantitatively determining this information were presented in [Chapter 9](#). In today's economy, qualitative factors affect the decision to invest in a venture even though the quantitative numbers appear attractive.

No economic study would be complete without sensitivity and/or uncertainty analyses being performed, wherein various scenarios are examined to determine the affect on profitability of changes in sales price, sales volume, capital requirements, and operating expenses. These studies permit management to consider what might happen should such changes occur.

A discussion of the requirements for the preparation of a feasibility analysis is appropriate since it includes items from estimating the capital requirements ([Chap. 4](#)) through sensitivity and uncertainty analyses ([Chap. 10](#)). A sample feasibility study is presented to illustrate how one is prepared.

The last two topics, choice between alternatives and economic balance, are directed toward plant-scale problems and their methods for solution. The results of these studies ultimately affect the income statement through operating expenses and the attendant capital investment requirements in both the balance sheet and the income statement.

This chapter then is a recapitulation of the material presented in the text with indications of how the contents of each chapter affect the financial reporting of an enterprise.

An engineer seeking upward mobility as a technical manager in a firm must not only be technically capable but also have a clear understanding of process economics and know financial terminology. The contents of this text should assist the reader in understanding process economics and its relationship with financial terminology.