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# ACCOUNTING IN THE CHEMICAL INDUSTRY

By FREDA MEYERHOFFER, Baltimore

In presenting specific accounting procedures of the chemical industry, it is first necessary to define the various types of manufacturing activities which are to be regarded as "chemical". There is, of course, no sharply defined frontier between the chemical industry and other industries. Hence the chemical industry varies in its scope and size largely in proportion to the breadth of the definition employed. It is no real industry at all in a rigid economic sense. The various companies which comprise it have no bond of a common product as do the oil and auto industry. Instead, the only characteristics shared by all chemical companies is the common usage of a chemical process in some stage of their manufacturing operation. Furthermore, the industry consists of two parts: the chemical-product industry and the chemical-process industry.

The chemical-product industry—most difficult of the two to define—may be explained as a company which manufactures "chemicals" used in the manufacture of other products and which do not ordinarily take the form of familiar household products or articles of commerce. Thus, Phosphorus and soda ash are universally recognized as "chemicals", but paint and soap are not so regarded. The chemical-process industry consists of companies which manufacture allied products such as drugs, soap, paints, fertilizers, oils, etc. It was my good fortune to become familiar with both of these phases of the chemical field while associated with a company which originated in the "chemical-process" phase and through expansion proceeded into the "chemical-product" division.

The activities of this industry are generally divided into four major classifications: Production, Sales, Finance and Research.

Greater stress is placed upon research in the chemical business than in most other industries. Research has been appropriately described as the 'life-blood' of this industry, and the company which does not continue to engage in research will cease to progress. In view of the importance of research and the large amounts expended for this purpose by chemical manufacturing companies, let us briefly discuss the accounting for such expense. Research expense may be classified as follows: improvement of present

processes; new process for present products; related new products; unrelated new products; application research; pilot plant research; purchased processes and outside research. Before a research project is undertaken, it must first have been approved by management and if the project is to be financed by outside capital it must be approved by the investors before initiation. Upon approval, and armed with a rigid budget the project can proceed. Periodically, a report is prepared showing costs to date by project by expense classification with a comparison of the actual and budgeted expense.

## *Production Planning*

The basic aims of production (as in most industries) are to make products of high quality, in quantities to meet customers' demands, and at the lowest delivered cost. To achieve these aims, important production choices that can be implemented by advance long-term planning are plant-site location, raw materials and such factors as availability of labor. Also important are; physical features of the possible location, transportation for raw materials and saleable products, markets, utilities, quantity and quality and dependability of water supply, waste disposal, living conditions, general economic environment, climate, general facilities for construction and last but not least vulnerability—nearness to important wartime facilities.

## *Sales*

In the chemical business, as in most other enterprises, sales are made by calling on the customer at his place of business. Therefore, field selling organizations (brokers, for example) distributed geographically throughout the country are used. Sales management often requires cost information for sales use. The accountant will be asked to present this cost data as well as other cost information relating to commodity rates, carrier service rates, commission costs, freight equalizations per customer, per territory, etc.

## *Finance*

Finance is an important activity of any industry as far as the accountant is concerned. An enterprise is born and expanded

with finance. The chemical companies in general have been able to finance their expansion on favorable terms. Chemical management has been conservative in its financial practices, progressive in its labor policies and aggressive in its business methods. The chemical industry has experienced less loss of production because of strikes or other labor difficulties than industry as a whole. It has offered continuous year-round employment, higher-than-average wages, group insurance, retirement annuities and vacations without loss of pay. In its business methods, the chemical industry has sought to maintain or to increase its profits not so much by raising prices as by emphasizing cost reduction through technological improvements, sales expansion, aggressive merchandising, and the development of new products.

Financial personnel and some of the managerial staff of this industry should be highly trained accountants, preferably with college degrees in business administration. There should also be a few men and women with chemical and accounting training combined or engineering and accounting combined. Accountants in the chemical industry must have an understanding of the methods, equipment and terminology of the chemist. Likewise, chemists who would study the business aspects of their industry must understand the methods, equipment and terminology of the accountant.

Accountants, engineers, and chemists deal with many different types of figures—be it termed chemical reactions, material stresses, or cost of manufacture—in industry they have one word in common: Profit. This is a relative word, but to those in business questions immediately arise as to what is profitable, why and to what extent. This brings to mind costs and cost systems. The actual cost system is the basic system usually used by companies in the chemical industry. As the name implies, the objective of an actual cost system is to determine the actual cost of each major activity of the company and how much each product contributed to the actual cost of each major activity. Today there are so many factors affecting a business, particularly a chemical manufacturing business, that for management to know the relative profit position of each product produced, the accountant must constantly scrutinize the definitions, classifications, methods of recording, and methods of analyzing the expenditures and income to keep them current and improve them. This often necessitates changing them. Changes in accounting con-

cepts, accounting methods and equipment must be explained to the chemist as he encounters them. If the company is relatively small, these improvements may be the responsibility of the comptroller or the office manager. If large, these improvements may be the responsibility of a group established for that purpose alone. In any successful company, new and improved accounting methods and procedures are being developed constantly.

Here we must mention the permanent investment factor. Investment is an important factor determining business performance in the chemical industry. This is true because of the low turnover (sales related to investment) characteristic of the chemical field. In addition, sizeable chemical-processing plants that manufacture a number of products present complex problems in utilization and allocation of permanent investment by products. Chemical equipment is frequently removed to a new location for another process step or retired because of physical deterioration. Accordingly, some items of equipment used in a process step may be changed monthly. Items of equipment must have detailed descriptions available for rough estimates for similar equipment in a new process, studies of costs of equipment by types and sizes and determinations of the scope of facilities used in a process step. Investment should be forecast and analyzed in the same manner as forecasts of costs, earnings, etc. Investment forecasts can readily be prepared from adequate investment records and properly detailed construction forecasts. Such forecasts provide information to determine future investment and return-on-investment trends.

Financial management in the chemical industry must also consider the factor of depreciation. In the chemical industry, the factor of obsolescence of properties is often of greater importance than physical condition in influencing the lessened useful value of property. The causes for obsolescence that must be considered along with physical deterioration in determining sound depreciation rates include the following:

*Process obsolescence*—Improved chemical processes may afford economies which hasten the retirement of the older, more costly and inefficient process.

*Sales obsolescence*—Competitors or competitive products may capture the market or the market may shrink or disappear because of changing customer demands.

*Mechanical obsolescence*—Major engineer-

ing improvements may result in making the older equipment too costly to operate.

*Capacity obsolescence*—A major growth in market demand for a product, over and above expectations, may result in abandoning existing facilities and substituting larger, improved and more economical facilities.

*Product obsolescence*—A substantial reduction in market demand, caused by the development of new and cheaper substitute materials may force the abandonment of an entire project or projects.

*Location obsolescence*—An expanding community and the outward growth of residential properties may surround an established industrial site. This would result in reducing the expected life of existing facilities at the site and the abandonment of all future plans for expansion at the location. Location obsolescence may be hastened by other factors such as:

1. Changes in raw material prices resulting in higher prices at one location compared with prices of similar or substitute materials available at other locations.
2. Excessive increases in competition for local labor due to greater industrial expansion.
3. Legislation pertaining to air or water pollution or the correction of severe waste disposal problems.

### **Commercial Intelligence Service**

One of the responsibilities of any industrial company is to keep closely in touch with commercial activities in the business which it serves; especially activities which bear in any way on the present or potential business of that firm. Many of the operations of such a company are influenced by such factors as; what is happening in the case of competitive firms, related industries, consumer trends and raw material suppliers. The need for keeping in touch with industry happenings—particularly those of growth-type companies—has become even more urgent with the tremendous post-Second World War industrial expansion programs. The chemical industry alone has engaged in recent capital spending at an annual rate of \$1 billion per year. Reports are frequently noted to the effect that a considerable portion of some company's business is based on products which were non-existent on the commercial market 10 or 15 years ago. Such collecting, organizing and disseminating of information is the responsibility of the commercial intelligence

service organization. Intelligence items of the types mentioned may be obtained from both public and private sources. As much as 80 to 90% of the material will come from news services available to the general public. Unpublished information and rumors outside of a given company are frequently learned by conversations between individuals in a related field, during attendance at scientific meetings and as a result of interviews with company representatives engaged in market surveys. This is a valuable source of commercial intelligence items which seems to have been neglected to a greater extent than it should be. It should not, of course, be obtained in the sense of "spying" but by a legitimate and ethical exchange of information.

### **Patent Application**

The accountant should be familiar with the patent application. The formal parts of a patent application are the petition, the specification with the claims, the oath and the official filing fee. In the case of a re-issue application, an abstract of title should also be included where there has been an assignment from the inventor. If the invention can be illustrated, a drawing should also be filed. The Patent Office recommends that a competent attorney trained in the specialized procedure of patent prosecution, be employed by the applicant. Hence a power of attorney to such a person forms a usual part of a patent application.

Patents, processes and goodwill are frequently referred to as intangible assets as distinct from tangible assets. These are among the most difficult of all assets to appraise. Many chemical companies either assign to them a nominal value of \$1.00 or else eliminate them completely from their balance sheets.

### **Government Agencies**

No chemical can be developed without in some way coming into contact with one or more activities of government. The development of any product can be materially aided by recourse to the informational and technical facilities of the proper governmental agency. Each branch of the government reaches deeply into every corner of the industrial economy of the United States. Of major interest in the chemical industry are the statistics provided by the government agencies. It is one thing to obtain the necessary statistics. It is something else again to interpret them correctly. The accountant may have to determine whether

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# TAX NEWS

By LOUISE A. SALLMANN, CPA, Oakland, California

At this time of the year we don't expect anything new in the way of tax legislation. However, it is about the time when news of Presidential action on tax laws, which have been volleyed around Congress, is finally disseminated to the taxpayers.

Much publicized have been the changes in the Social Security Act, particularly the lower retirement age for women (dropped from 65 to 62). Other amendments not generally discussed by news commentators are of more immediate concern to accountants and taxpayers. The more important ones are as follows:

1. As of April 15, 1957, all professional persons, heretofore excluded from self-employment coverage, with the exception of medical doctors and Christian Science practitioners, will pay the 3% self-employment tax with their 1956 income tax returns.
2. Effective January 1, 1957, social security tax rates on both employers and employees will be increased from 2% to 2¼% and on self-employed from 3% to 3¾%.
3. Members of the Armed Forces will have social security taxes deducted from their basic pay and will receive benefits under the social security system.

Several other laws which were recently signed by the president are P. L. 1010 which raises the tax exemption on general admission prices to 90 cents from the present 50 cents, effective on and after September 1, 1956; P. L. 1015 which raises the maximum transportation fare exempt from the 10 percent travel tax from 35 cents to 60 cents; and the bill which retains the 10 percent tax on the transportation of persons, but makes that part of a trip outside the United States tax-free by redefining taxable transportation to mean (1) travel which begins and ends in the United States or in Canada or Mexico within 225 miles from the nearest point in the continental United States, or (2) that portion of a trip which is directly or indirectly from one United States port or station to another.

Although we are always most interested in tax legislation which has been finalized, proposed legislation quite often colors the taxpayers' future business decisions. A recent report to the President by his Cab-

inet Committee on Small Business included five tax-relief measures in its recommendations to improve the position of small business concerns. In view of the many speeches made during the political conventions in which aid to the small business man was constantly championed the proposed law changes certainly have some significance.

These changes would (1) reduce the tax rate on business corporations from 30 per cent to 20 per cent on incomes up to \$25,000; (2) give businesses the right to utilize accelerated depreciation formulas, now available to purchasers of new property under 1954 Code Sec. 167, for purchases of property not exceeding \$50,000 in one year; (3) permit corporations with ten or fewer stockholders to have the option of being taxed as if they were partnerships; (4) provide the option of paying the estate tax over a period of up to ten years in cases where the estate consists largely of investments in closely held business concerns; (5) simplify wage reporting by employers for purposes of social security records and income tax withholding.

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production and use figures are reported on a gross or net basis or are included in some aggregate statistics. The method of obtaining these statistics should be determined. The reporting of products may not be complete and there may be substantial variations from actual production. In making comparisons between historical series and price indexes, it is important that the base year for each series is the same. Despite the profusion of government agencies, however, they all stand ready to direct the accountant or any interested person to the proper source for statistics and published material.

## The Future

The eminent position which the United States has attained in the manufacture of chemicals and chemical products will undoubtedly continue for decades to come. Chemical production has had an average growth rate since 1930 eleven times greater than that of our national population and over three times that of the composite United States industry average. This growth of the chemical industry demands skilled technical personnel. For the ac-

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and labor to produce maximum profit to the owners, service to the community and satisfaction to the workers.

Adequate stock control results in that amount and kind of merchandise being used which will make the greatest possible contribution to the net profit of the business. It is the basis of sound purchasing and merchandising practice. An efficient system of inventory control permits a firm to keep its stock on hand as small as possible and, at the same time, avoid shortages of materials which cause interruptions in the productive process or which dangerously limit the sales opportunities. As a result of these two advantages, stock control permits a firm to operate with less capital. Storage charges, price declines due to falling market, and loss due to obsolescence are additional economies effected by adequate stock control.

Skillful scheduling of raw materials, work-in-process, and finished goods is based on the formula for inventory turn-over, the schedule that may be expected for deliveries of raw materials, the anticipated requisitions during production and the orders expected for finished goods. It is not necessary for the alert manager to know all of these facts and schedules, but he must have information and must know how to use the facts reported to him by the various departments.

Inventory may be handled through periodic or through perpetual methods. The method is determined primarily by the type of articles involved and convenience in record-keeping. Management will determine the system which is most efficient in adequately recording this asset.

Finally, it seems logical that competent control of inventory is not only reflected in increased capital, but also observed in labor, the third element which is essential to complete operation. Reduced confusion in the purchasing department, adequate service on requisitions and prompt deliveries in the shipping room are some of the results which reduce friction among the personnel. This guidance affecting the workers is assuming increasing importance in the success of an organization. This is that intangible something which makes the workers feel that "the show must go on." Pride in the job automatically follows such a spirit.

It seems axiomatic that a proud and happy personnel working with adequate inventory to create added capital which in turn will benefit the personnel is a circle that approaches perfection. This is the type of "show" that investors might call "The

Blue Chips." The college student in the audience watches in amazement the perfection of the acting, the plot, the coordination, the props, the scenery, and the director. If this student will accept intelligent changes and criticisms, he may have talent and acquire sufficient training to be one of the great actors in industry some day. Furthermore, America can furnish the stage and props for this same lowly student to become the conductor of a great opera, "Industrial Excellencia," because the possibilities are infinite in the fields of tomorrow.

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countant this industry offers some of the greatest opportunities for success and leadership in production, sales, research and finance.

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sidered:

1. Internal check and control should be most detailed where most needed. This determination is based on the probability of loss and the cost of control in relation to the accuracy to be gained. This requires careful evaluation of both procedures and personnel. There is a danger of a false sense of security where the control set up does not meet the specific situations, or is not adapted to the abilities of those who are expected to operate it.
2. Any system of control is only effective insofar as it is understood and followed.

Constant attention is needed to see that these two essentials are being met.

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report on a five-year comparative basis. One company had its Funds Statement on a ten-year comparative basis.

The Funds Statement was not born in the 1950's as its present growth might indicate. Around 1930-35, the statement was often referred to as the "Where Got" and "Where Gone" Statement wherein was presented a summary of balance sheet changes. The statements took various forms but one of the often used forms followed a balance sheet arrangement where the balance sheets for two consecutive years were compared and the net change for each balance sheet