Public Utility

Depreciation Practices

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National Association of Regulatory Utility Commissioners
1101 Vermont Avenue, N.W., Suite 200
Washington, DC 20005
Telephone (202) 898-2200
Facsimile (202) 898-2213

CHAPTER II

CURRENT CONCEPTS OF DEPRECIATION

The preceding chapter outlined a number of different historical utility depreciation methods and concepts. This chapter presents two current depreciation concepts—value and cost allocation—and discusses several associated issues and considerations.

In everyday speech, depreciation generally means a decrease in the value or worth of an asset. The goal of depreciation is to allocate or assign a dollar amount to the reduction in worth or value occurring in each accounting period. This reduction starts when the asset is placed in service and usually continues throughout its life. The value of an asset is considered as being used up or consumed in the production of service. Consequently, a charge is made to the cost of production, over the asset's life, by some equitable method of allocation. Thus, depreciation accounting is fundamentally a process of allocating in a systematic and rational manner the value of a depreciable asset over its life.

Value Concept

The value concept assumes that all depreciable plant, due to forces such as obsolescence, wear and tear, and inadequacy, tends to diminish in value or worth with the passage of time. This value reduction may be dramatic—as when one purchases a new automobile. The new owner needs to do little more than drive it off the dealer's lot in order to put it in the classification of a "used car" with a value often substantially less than the purchase price. On the other hand, the reduction in value may occur much more slowly. For example, heavy duty manufacturing machinery will continue to perform the same operations in the same efficient manner for many years. Depreciation, in this sense, may not be consistent. If manufacturing machinery were producing a product that was in heavy demand for many years and suddenly lost its market, the machinery would rapidly lose value.

All other things being equal, on the day before this sharp demand decrease, the machinery would be nearly as valuable in the production of goods as the day it was first installed (assuming it had been kept in good repair). However, the day after the market disappeared the machine would be practically worthless or valueless.

Similarly, the installation of a new technology offering new or different services may cause existing plant to have little or no customer value. For example, a computerized supervisory control and data acquisition system (SCADA) may make the existing use of chart and pen recorders and the manual operation of gas city gate station valves unnecessary and uneconomical.

This situation suggests that depreciation can be determined through a series of periodic appraisals or estimates of plant value. The decrease in value between such estimates is regarded as a measure of the depreciation attributable to the period between estimates. The estimates could be based on the reproduction cost, market value, or earnings value of the property. Estimates may recognize the changing purchasing power of the dollar or they may be confined

strictly to original cost terms. In all cases, some measure of depreciation occurring between estimates can be determined. The customary method is for a competent appraiser to study the effect of factors such as obsolescence, inadequacy, and public requirements, as well as to conduct a physical inspection of the property, or a scientific sample of it, to determine its loss in value since it was first constructed. Regardless of the method employed, in order to achieve consistency, the successive estimates must be made in the same way.

It would, however, be a staggering undertaking to attempt such estimates on an annual basis for complex and extensive utility plant. Therefore, the practice of conducting annual estimates has found little application in the utility industry. It is particularly cumbersome and inadequate because utilities need to record depreciation on a monthly basis for earnings and expense reports. A further complication, of course, is that major technological improvements tend to make questionable any year-to-year measure of depreciation that is determined by this process.

Cost Allocation Concept

This concept recognizes the original cost of the asset as a prepaid expense. As such, it must be allocated to specific accounting periods and realized on income statements during the time the asset is providing service. The unallocated amount, often called net plant or net book (gross plant less accumulated depreciation), is recorded on the asset side of the balance sheet. The cost allocation concept satisfies the accounting principle of matching expense and revenues.

On the income statement, the inflow of resources is revenue. The outflow is expense. Using up the productive capacity of assets in an accounting period is recorded in accounting records as depreciation expense.

As used above, "cost" is based on the cost valuation principle of accounting, with cost being a surrogate for value. The amount of money used to purchase the asset is the basis for the entry in accounting records. This amount is regarded as being definite and immediately determinable. The accounting objectives of verifiability and neutrality are also satisfied.

Equally important to the proper estimation of current net income is the recovery of the investment over its useful life. Depreciation accounting cannot, automatically and of itself, result in the recovery of investment in property. However, if revenues are adequate to cover depreciation expense in addition to other current expense, the investment will be recovered. On the other hand, if revenues are not sufficient to cover the depreciation expense, the investment will not be fully recovered. Recognition of depreciation merely records the fact that costs are being incurred.

Definitions

Before proceeding into an investigation of some of the associated procedures and problems, let us examine some important definitions of depreciation.

According to the Supreme Court of the United States:

> Broadly speaking, depreciation is the loss; not restored by current maintenance, which is due to all the factors causing the ultimate retirement of the property. These factors embrace wear and tear, decay, inadequacy and obsolescence. Annual depreciation is the loss which takes place in a year.[1]

The Interstate Commerce Commission defines depreciation as:

> Depreciation is the loss in service value not restored by current maintenance and incurred in connection with the consumption or prospective retirement of property in the course of service from causes against which the carrier is not protected by insurance, which are known to be in current operation, and whose effect can be forecast with a reasonable approach to accuracy.[2]

The National Association of Railroad and Utilities Commissioners in 1958 sanctioned the following definition:

> 'Depreciation,' as applied to depreciable utility plant, means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of utility plant in the course of service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand, and requirements of public authorities.[3]

The Federal Communications Commission uses a definition in Part 32 of its rules that is almost identical to NARUC's, except that it applies to "telephone plant" instead of "utility plant," and it requires that the causes of depreciation "can be forecast with a reasonable approach to accuracy."

The definitions used by the Federal Energy Regulatory Commission for electric (Part 101 of the Code of Federal Regulations) and gas (Part 201 of the Code of Federal Regulations) companies are essentially the same as that used by NARUC. The only difference is that the definition for gas companies recognizes the exhaustion of natural resources as a cause of depreciation for natural gas companies.

Sec. 167 of the Internal Revenue Code states:

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[1] *Lindheimer v. Illinois Bell Telephone Company,* 292 U.S. 151, 167 (1934).

[2] 177 ICC 351, 422 (1931), 14700 Depreciation Charges of Telephone Companies, 15100 Depreciation Charges of Steam Railroad Companies.

[3] *Uniform System of Accounts for Class A and Class B Electric Utilities,* 1958, rev., 1962.

> There shall be allowed as a depreciation deduction a reasonable allowance for the exhaustion, wear and tear (including a reasonable allowance for obsolescence)—(1) of property used in the trade or business, or (2) the property held for the production of income.

Some of the definitions refer to depreciation as a loss in service value. "Service value" is used in a special sense, meaning the cost of plant less net salvage (net salvage is gross salvage less the cost of removal). The Uniform System of Accounts for electric utilities recommended by NARUC defines "service value" as follows:

> The difference between the original cost and the net salvage value of the utility plant.

"Loss in service value," therefore, must be understood and construed in light of its specially defined meaning.

The American Institute of Certified Public Accountants in Accounting Research and Terminology Bulletin #1 defines depreciation accounting as follows:

> Depreciation accounting is a system of accounting which aims to distribute cost or other basic value of tangible capital assets, less salvage (if any), over the estimated useful life of the unit (which may be a group of assets) in a systematic and rational manner. It is a process of allocation, not of valuation. Depreciation for the year is the portion of the total charge under such a system that is allocated to the year. Although the allocation may properly take into account occurrences during the year, it is not intended to be a measurement of the effect of all such occurrences.

This definition of depreciation accounting brings the "allocation of cost" concept into much clearer focus. It de-emphasizes the concept of depreciation expense as a "loss in service value" or an "allowance" and emphasizes the concept of depreciation expense as the cost of an asset which is allocable to a particular accounting period. This definition also clearly illustrates that the goal is recognizing cost, not providing funds for replacement of the asset.

Factors Which Affect the Retirement of Property

The sole reason for concern about depreciation is that all plant devoted to the pursuit of a business enterprise will ultimately reach the end of its useful life. Several factors cause property to be retired. They include:

1. Physical Factors
   a. Wear and tear
   b. Decay or deterioration
   c. Action of the elements and accidents

2. Functional Factors
   a. Inadequacy
   b. Obsolescence
   c. Changes in the art and technology
   d. Changes in demand
   e. Requirements of public authorities
   f. Management discretion

3. Contingent Factors
   a. Casualties or disasters
   b. Extraordinary obsolescence

Physical factors are the most readily observed causes of retirement. However, functional factors sometimes are the more frequent causes.

Inadequacy is a lack of capacity to supply what is required or demanded. For example, a telephone company's central office switch may not have sufficient capacity to process the traffic generated, or it may be unable to provide certain information services desired by customers. Thus, it may be more prudent to replace the entire switch in lieu of making additions.

Obsolescence may bring about retirements by rendering plant uneconomical, inefficient, or otherwise unfit for service because of improvements in technology or because of changes in function. Equipment manufacturers may contribute to obsolescence by discontinuing production of replacement parts or de-emphasizing maintenance, software, or other kinds of support for older equipment.

Technological advances have increased the frequency in which obsolescence causes the retirement of utility plant. Computers, the electronic chip, remote controlled operation and supervision of power distribution stations and natural gas regulating equipment, remote meter reading, fiber optic cable, as well as interest in nonutility power production and demand-side management are technological developments that have impacted utility operations.

Changes in demand reflect changing customer preferences requiring the replacement of plant which no longer permits the utility to fulfill its obligation to provide service. An example is the replacement of electric kilowatt hour meters with meters that also record usage by time of day.

Public authorities may require utility plant to be relocated because of its interference with public uses, such as highway relocations. They also may require utility plant to be replaced or refurbished because its design fails to meet current service, environmental, or safety standards. An example is the imminent expiration of operating licenses for hydraulic production plants. This has often resulted in an extensive review of the safety, environmental, recreational, as well as power generation aspects of these projects. Substantial requirements for additional maintenance and capital expenditures may be required to satisfy the concerns of regulatory agencies and their constituencies.

Although not included in the previous definitions, management discretion clearly is also a factor in the retirement of plant. This can occur when management decides to:

1. Retire production plant, rather than extend its life;

2. Sell and lease back plant to affect cash flow;

3. Replace aging plant with new plant to enhance the corporate image;

4. Contract out functions which were formerly done by utility personnel and equipment in an effort to reduce costs;

5. Place surplus plant in storage in anticipation of future growth in demand; and

6. Retain removed plant that would normally be scrapped in anticipation of repairing it for reuse.

The advent of competition in markets that were historically monopolistic adds a new dimension to property retirements, particularly for incumbent public utilities. Competition may influence some or all of the functional factors. For example, a competitor may deploy modern technology, which may render the incumbent's equipment inadequate or obsolete because it cannot duplicate the competitor's new services or match a lower price enabled by the new, low-cost technology. Competition provides incentives to look for new technologies to provide enhanced or less costly services. Competition can also affect the demand for services if the competitor succeeds in obtaining a significant share of existing markets or creates new markets. And finally, because of competition, public authorities may require companies to do things that otherwise would not be done. For example, the FCC required local telephone companies to offer equal access interconnection to all long distance companies so that the companies could compete on equal terms.

Contingent causes are associated with such things as casualties and extraordinary obsolescence. Remote contingencies are not properly considered in establishing depreciation rates. For example, it would not be proper to include, as a cost of operation, a charge for depreciation because an earthquake might destroy property in a location where such a phenomenon is a rare occurrence. On the other hand, property retirements from ordinary storm damages, recurring more or less continually, are properly considered in estimating service lives.

Usually, any given retirement is a result of the inseparable action of a number of underlying causes. Public authorities, for example, may require that a fish ladder be installed at an existing dam, making retirement of some plant necessary. Physical deterioration of certain parts may take place such that high maintenance charges justify replacement of the whole with a more modern and more durable material or design. Reduction of the carrying capacity of water mains resulting from interior deposit buildup may cause them to become inadequate for the required loads. Shifting load centers may result in under-utilization of the facilities. This, in turn, may result in economic justification for substituting smaller, more efficient, or more economical facilities. The possibility of price increases, labor shortages, or functional changes may cause prudent management to replace large blocks of plant before physical deterioration or other factors materialize. What appears to be the cause may be only the final straw.

Methods of Allocating Depreciation Expense to the Accounting Period

Having developed the "allocation of cost" concept as being the most appropriate for day-to-day utility operation; having compared this concept to standard definitions of depreciation and found it to be compatible with them; and having discussed many of the factors that cause plant retirements, we can now consider the determination of the actual amount of depreciation expense to be recorded for a utility.

There are many ways, of course, to allocate the cost of property to the various accounting periods. One method is to charge to expense the total cost at the time of installation. This is known as "expense" accounting, which is used in lieu of depreciation, and is generally applicable to inexpensive and short-lived items. At the other extreme is "retirement" accounting which charges the cost of the property to expense in a lump sum at the time of its retirement from service.

The expense and retirement accounting methods fail to achieve the goal of distributing costs to the accounting periods during the property's life. Therefore, they would not properly match revenues and costs, and the accounting representation of net income would be distorted. Furthermore, the appropriate customer would not pay a fair share of the cost, assuming depreciation expense is included in the cost of service. Generally accepted accounting principles require expenses, such as depreciation, to be allocated by systematic and rational procedures to the periods during which the related assets are expected to provide benefits.[4] The simplest and most logical way to accomplish this is to use a method that distributes the cost of property in a reasonable and consistent manner to all the accounting periods in which the property is providing utility service.

Several methods for distributing these costs are explained in detail in other chapters. Generally these methods may be grouped as follows:

1. The **deferred** method assigns more depreciation expense to the later years of the life of the plant by applying compound interest formulas. Among the several variations of this approach are the "annuity," "sinking fund," and "compound interest" procedures.

2. The **accelerated** method assigns more depreciation expense to the earlier years of the plant's life. These methods have been allowed by the Internal Revenue Code for income tax purposes. "Sum-of-the-years-digits" and "declining balance" are two methods in this category. (see Chapter V).

3. The **straight line** method distributes the cost of property in equal annual amounts, as nearly as is practicable, over its life. This includes the "average service life" and "remaining life" procedures.

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[4] *Statement of Financial Accounting Concepts No. 5,* Financial Accounting Standards Board, December 1984.

Costs may also be distributed over production rather than over service life. This method, the unit of production method, distributes the costs as units are produced using a rate per unit developed from the total estimated units to be produced. It is similar to the straight-line method but is a function of production rather than a function of time.

Salvage Considerations

Under presently accepted concepts, the amount of depreciation to be accrued over the life of an asset is its original cost less net salvage. Net salvage is the difference between the gross salvage that will be realized when the asset is disposed of and the cost of retiring it. Positive net salvage occurs when gross salvage exceeds cost of retirement, and negative net salvage occurs when cost of retirement exceeds gross salvage. Net salvage is expressed as a percentage of plant retired by dividing the dollars of net salvage by the dollars of original cost of plant retired. The goal of accounting for net salvage is to allocate the net cost of an asset to accounting periods, making due allowance for the net salvage, positive or negative, that will be obtained when the asset is retired. This concept carries with it the premise that property ownership includes the responsibility for the property's ultimate abandonment or removal. Hence, if current users benefit from its use, they should pay their pro rata share of the costs involved in the abandonment or removal of the property and also receive their pro rata share of the benefits of the proceeds realized.

This treatment of net salvage is in harmony with generally accepted accounting principles and tends to remove from the income statement any fluctuations caused by erratic, although necessary, abandonment and removal operations. It also has the advantage that current consumers pay or receive a fair share of costs associated with the property devoted to their service, even though the costs may be estimated.

The practical difficulties of estimating, reporting, and accounting for salvage and cost of retirement have raised questions as to whether more satisfactory results might be obtained if net salvage were credited or charged, as appropriate, to current operations at the time of retirement instead of being provided for over the life of the asset. The advocates of such a procedure contend that salvage is not only more difficult to estimate than service life but, for capital intensive public utilities, it is typically a minor factor in the entire depreciation picture. The obvious exception, of course, is the huge retirement cost of decommissioning nuclear power plants. The advocates of recording salvage at the time of retirement further contend that salvage could properly be accounted for on the basis of known happenings at the date of retirement rather than on speculative estimates of factors, such as junk material prices, future labor costs, and environmental remediation costs in effect at the time of retirement.

One of the practical difficulties of estimating net salvage is that reported salvage is a mixture of salvage on items retired and reused internally, salvage on items sold externally as functional equipment, and salvage on items junked and sold as scrap. Because the likelihood of reuse is greater for items that are retired at early ages, the historical salvage is usually higher than the future salvage to be realized when the account begins to decline and there is little opportunity for reuse. Therefore, under these circumstances, book salvage may overstate the average salvage realized over the entire life of the account. This has led to the proposal to