

Public Utility Depreciation Practices

August 1996



Compiled and Edited by
Staff Subcommittee on Depreciation of
The Finance and Technology Committee
of the
National Association of Regulatory Utility Commissioners

Published by

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CHAPTER XIII

THEORETICAL RESERVE STUDIES

Introduction

As discussed in Chapter IV, the sole purpose of depreciation accounting is to rateably allocate the capital costs of the property over its average service life through current charges to utility expenses. In depreciation accounting, depreciation expense is calculated either monthly or annually, charged (debited) to the current expense, and credited to the depreciation reserve (accumulated provision for depreciation account). Most commissions require that the depreciation reserve be charged (debited) at retirement with the book cost of plant and credited with any actual net salvage received. Some commissions, however, require that salvage and cost of removal be recovered through current income and expense accounts, respectively, allowing only the book (original or gross) cost of the plant to be accounted for through depreciation charges.

It is intended that the depreciation reserve at the end of an accounting period be that part of the book cost of the plant in service which has been charged to depreciation expense. If depreciation rates have been accurately estimated, the depreciation reserve will reflect the investment in service capacity, utility, or service life of the surviving plant which has been used up in operations. Therefore, the unconsumed usefulness of the plant is its book cost less the depreciation reserve.

In many regulatory customer rate-setting procedures, the depreciation reserve is a deduction from rate base. Therefore, it is desirable that the depreciation reserve be as accurate as possible. Financial reporting standards also demand accuracy.

The depreciation reserve is a balance sheet account, shown as a reduction to the property, plant, and equipment balance and is not a cash reserve. Depreciation accounting is not intended for the purpose of funding plant replacement. The cash flows resulting from the recovery of the capital invested in plant are not required to be retained in the utility accounts or assets. Utility directors have the responsibility and freedom to use these funds in accordance with their best judgement.

Theoretical Reserve In General

It is important that utility management and regulators monitor the consumed service capacity of plant and its complement—unconsumed service value. Because the dollars representing the unconsumed service value, calculated by subtracting the theoretical reserve from the book cost, must be recovered from operations over the property's average remaining life, the utility and the regulators should strive to ensure that the unrecovered dollars are reasonable in relationship to the property's remaining life.

One way to estimate this theoretical consumed service capacity of plant or the adequacy of the depreciation reserve is to perform theoretical reserve studies, often called reserve

requirement studies. The results of analyses from theoretical reserve studies answer many questions about the consumption pattern of plant. However, theoretical reserve studies should not be used to modify the life and net salvage parameters for calculating future depreciation rates. If a theoretical reserve study reflects an inadequate reserve, and the service lives are reduced solely on this basis, a new theoretical reserve study based on the new service lives would indicate not a "corrected" reserve but instead a greater deficiency, calling for even higher depreciation rates. This would not be a correct application of the results of a theoretical reserve study.

Theoretical reserve studies also have been conducted for the purpose of allocating an existing reserve among operating units or accounts. Such allocation is done when either the reserve has not been accumulated in sufficient detail or cannot be determined from utility records.

In recent years, theoretical reserve studies have been used to estimate the theoretically correct book depreciation reserve based upon past and/or future service life and net salvage considerations. Changes in technology and challenges from competition place a greater emphasis on theoretical reserve studies. Periodic comparisons of the theoretical reserves to the actual book reserves and the booking, as depreciation expense, of any reserve imbalance decrease the risk that the original cost of plant will not be recovered during its service life.

The booked consumed service capacity of plant is also expressed by the reserve ratio, which is the book depreciation reserve divided by the book plant balance. A higher ratio indicates a higher consumption of service capacity or life.

For example, the reserve and the reserve ratio, for a single unit, continually increase with each accounting period until the unit is retired. The reserve ratio for a single vintage with a large number of units, however, does not steadily increase. The ratio increases, with some fluctuations caused by the retirement dispersion, until the vintage's age equals its average service life, after which the ratio decreases with the later period retirements until the vintage's units are all retired.

The reserve ratio for an account containing several vintages also does not steadily increase. It may be affected by vintages with differing survivor curve characteristics caused by improvements which lengthen the property's service life. Other factors affecting reserve ratios are inflation and the pattern of growth in vintage installations.

Treatment of Reserve Imbalances

A reserve imbalance exists when the theoretical reserve is either greater or less than the actual reserve. If changes are made to the estimated service life and net salvage, creating a reserve imbalance, a decision must be made as to whether and how to correct the reserve imbalance. Should the imbalance be amortized (debited or credited) to the current depreciation expense over a short period of time; or should a remaining life depreciation rate be used to spread the imbalance over the future remaining life of the plant; or should future depreciation rates be adjusted to reflect the current estimated service life of the plant leaving the decision to adjust the reserve for the future? Further analysis will provide additional information to assist in making these decisions.

When a depreciation reserve imbalance exists, one should investigate why past depreciation rates, average service lives, salvage, or cost of removal amounts differ from current estimates. Care should be taken to analyze these effects before correcting for the reserve imbalances. Instances will occur where subsequent experience shows the original estimates no longer to be appropriate. It should be noted that only after plant has lived its entire useful life will the true depreciation parameters become known. Recognizing the nature of depreciation and its requirement for future estimations, no adjustment in annual depreciation accruals to reflect a reserve requirement, based on current rates, should be made unless there is a clear indication that the theoretical reserve is materially different from the book reserve.

Whereas the judgement of materiality is subjective, if further analysis confirms a material imbalance, one should make immediate depreciation accrual adjustments. The use of an annual amortization over a short period of time or the setting of depreciation rates using the remaining life technique are two of the most common options for eliminating the imbalance. The size of the plant account, the reserve ratio, the account remaining life, the technology of the plant in the account, and the account reserve imbalance in relationship to the account annual accrual all have a bearing on the chosen course of action.

Calculating a Theoretical Depreciation Reserve

There are two accepted methods for calculating a theoretical depreciation reserve, the prospective method and the retrospective method.

For any given class of depreciable plant, the theoretical reserve plus the estimated future depreciation accruals equals the service value of the plant (i.e., book cost less estimated net salvage). Under the prospective method, the future depreciation accruals are first estimated. Under the retrospective method, the aggregate of past net accruals (annual depreciation accruals less salvage and cost of removal) is determined.

Future depreciation accruals represent the estimated aggregate of annual depreciation charges during the average remaining life of the plant. Future depreciation accruals are based on the best available data as to past and future conditions affecting the average service lives and net salvage percentages of plant. Past accruals are calculated based upon depreciation rates deemed reasonable for the future but applied to the annual average historical plant balances.

Reasonable estimates of plant service lives, net salvage percentages, and resulting depreciation rates incorporating future conditions are used to estimate the theoretical depreciation reserve.

Prospective Method

As previously expressed, the theoretical reserve, as of the study date, is equal to the plant balance minus future accruals (the depreciation rate times the average annual plant balance times the expected remaining life in years) and minus estimated net salvage value expected at the end of the plant's average life. Expressed as a percent of book cost of plant, the theoretical reserve ratio using the prospective method is: