

stations and their central control of operating and financial conditions, cannot compete with privately owned plants; there must be certain extraordinary conditions involved which would suggest that these private plants should be permitted to operate for themselves. It is not fair to have other customers assume the losses incurred by serving these special customers from the central station.

The conditions revealed by real cost accounting will have to be fairly dealt with by the regulating bodies if the latter wish to encourage the utilities to analyze actual returns on the various classes of service rendered. Should assurance be given to the utilities that the conditions arising from a change in cost accounting methods would be settled in a manner that would not bring chaos into the public utility field before these conditions could be rectified, there is little doubt that many of the progressive utilities would co-operate with the commissions in an earnest effort to secure costs that would be of a real assistance in arriving at fair rates for every class of service rendered.

The foregoing paragraphs are not written with the thought that any general theory or practice of cost accounting will serve as a panacea for all rate problems. These will be with us as long as there is a customer buying from a central station.

In this period of the consolidation of individual utility companies into groups and these groups into large holding companies comprising power and light, gas, street railways, water, and bus companies, there is a lack of the old fashioned utility economy of operation that was formerly considered necessary to permit the operation of a utility without loss. This lack of operating economy is due to three outstanding conditions.

First, the higher executives cannot, under present methods of cost accounting, accurately check the economy of operation of each individual property. Knowledge of local conditions of each property is at the best rather meager. Long distance management cannot be expected to compare favorably with the type of supervision given on individual property by those who know every detail of local conditions. Granting that, through consolidation, the smaller properties secure the services of a higher class of engineering and financial talent and lower generating costs, both through the interchange of current and the use of larger power stations, the fact remains that rarely, if ever, have rates been reduced

to the public through any consolidation of properties. The reason for this condition can frankly be stated as a lack of accurate and comparative knowledge of costs.

Secondly, as long as the price of labor and material going into the capital accounts was increasing each year, and as long as utility commissions permitted the earnings allowed to be based on replacement value, the lack of operating and construction economy could be ignored. With the cost of construction work slowly but surely receding to a lower level, however, the utilities must eventually be placed in a position where they face a demand from the public for a new deal on service rates. With the utility commissions acting on the theory that adequate returns must be based upon replacement values, with construction costs on a level that will not permit former construction values to be appraised at a higher level, it is apparent that the utilities are in a serious situation as far as securing increased rates to cover lack of operation economy.

Thirdly, returns on investments are based on earnings as a whole, not on individual classes of service. This permits the pouring of all departmental costs through the proverbial funnel, thus eliminating all chance of lowering costs on the classes of service which may show upon proper analysis that they are unprofitable.

It is quite evident that many of the holding companies have already seen the handwriting on the wall. They realize that adequate returns can no longer be secured through increased valuation. This is proved by the pressure that is being put upon the local and district managers in an effort to decrease operating costs. With the maximum replacement value allowed, adequate returns for the future must be based upon operating economies.

With the changed conditions confronting the utility operators, it is apparent that the present wholesale hiding of cost of service must change and that future returns must to a great extent be based upon the earnings from each class of service rendered. This means that rates in the future must be set and defended on the basis of cost of service rendered, and that cost of operation must be broken up to permit comparison of the cost of service and the revenue derived from such service. From the foregoing it will be seen that this paper has at this time a special interest for investors in our electric utilities. Other things being equal, that

company which adopts cost finding that permits comparison of revenues from a given class of service with the expense of rendering such service will be in a stronger position than those companies depending on a comparison of total revenue with total expense—at present the general rule used in regulation.

The purpose of this paper, then, is to urge the necessity of securing actual cost data for both operating and rate purposes and, as a contribution to this end, to present the cost accounting methods used by one light and power company for the allocation of operating and maintenance costs to classes of customers. The fact that this utility prospered by following a policy of securing actual costs of service, and using this information as a guide in operating the property and in setting rates, would indicate that the methods used may be of interest and help to other utilities.

## II. The Cost System

Before going into the cost methods used, it may be well to consider the physical layout of this utility. By identifying the location of the various communities served and the power plants and transmission lines used for supplying the current, the subdivision of the classification of expense and revenue can be readily understood. Operating in four counties (see map, Figure 1, page 90), which for a better terminology were called districts, these counties were further divided into communities, called divisions. Each division was a subdivision of a district, and as such retained its identity in the classification.

Thus, each division represented a particular town or city in a district; the scattered customers, mainly made up of power customers who were not located in a town or city, were combined under a separate division in each district.

There was one general operating office in each of the four districts, supplemented by additional commercial offices in the various cities served, the number of these offices depending upon the size of the communities in the district. The property as a whole was directed by a general office which, through its various departments, supervised the work pertaining to the general activities of the utility. The current was generated by two active power plants and three standby plants. The active plants are indicated on the map as CPA and CPB,

and the standby plants as CPC, CPD and CPE. The standby plants were used only when trouble occurred in the active plants or on the transmission lines. A small amount of current was purchased from an independent water power company. This current and its cost are included with that of the standby plant CPE, both plants being located in the same community or district.

The cities and towns served had populations of from three hundred to eighty thousand. Several hundred miles of high tension transmission lines were required. Both overhead and underground distribution lines were required in the larger cities, and many of the larger customers required their own transmission lines and substations. From this description of the physical layout of this utility it will be seen that almost every conceivable operating condition confronting a power and light company existed on this property.

### Classification

The classification of accounts used by this utility was based primarily upon the classification adopted by the National Electric Light Association and quite generally prescribed by the regulating commissions. This standard classification was simplified to permit the allocation of joint costs and the segregation on individual city and customer costs. By adhering to the classification of the N. E. L. A., a direct comparison with "costs" of other utilities using this classification could be made.

In tying in the cost accounting with the general accounting, care had to be taken to be sure that everyone connected with the handling of costs would have the same general understanding of the division of the general ledger accounts. For the purpose of instructing the employes in selecting the proper general ledger account to be used for any cost incurred or any revenue received, a key<sup>1</sup>

<sup>1</sup>Mnemonic symbols were used throughout. These symbols were arranged so that this type of classification could be used in connection with standard tabulating machines. At the time the installation was made, it was felt that mnemonic symbols had a distinct advantage over numerical symbols because they were more easily interpreted and remembered.

With the more recent improvements made in modern tabulating machines, it is a question as to which type of symbol is the most advantageous. By using numerical symbols, both the symbol and the tabulated costs can now be printed automatically by the tabulating machine. However, the type of symbol used has no necessary bearing upon or relation to the methods used for allocating or accumulating costs.