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This article is to suggest or outline briefly the various phases of a somewhat specialized line of work in which accountants may have opportunities to take important parts in collaboration with engineers of reputation and responsibility.

The work referred is that involved in the appraisal or valuation of public utilities, including all transportation facilities, all gas, electric, steam heat, water, telephone and other corporations, subject to the authority of the national, state and municipal commissions which have been established or reorganized in the past ten years.

These engagements usually provide for all matters essential to

(1) A complete inventory, as of a point of time of all fixed or permanent physical property, as well as material and supplies, tools, shop equipment, furniture and fixtures, vehicles and other plant or current assets of a physical nature subject to deterioration from use or to subsequent exhaustion in operation.

(2) A determination, if possible, of the historical or original cost of the above property, this being usually definable as the outlay, whenever incurred, of the company for its then existing plant. Superseded investment and expenditures on any account are made the subject of special consideration.

(3) An estimate of the costs to reproduce new the stated tangible property, employing for this purpose prices of material and labor as of the date of the valuation or prices effective during a sufficient prior period in which the theoretical reproduction may be assumed to have taken place.

(4) Reduction of (3) to an estimated present value by deducting an estimated value proportion consumed by use, wear and tear or the action of the elements.

In some cases consideration has also been given to estimates for approaching obsolescence and inadequacy but these two elements may not be so well foreseen as to justify their application in part, prior to actual experience of retirement from service, in which latter case, such property, then definitely obsolete, is included as scrap material, of value only in respect of the material of which the items are composed.

(5) The depreciation is usually determined by a straight line method, under which an assumed total useful life is assigned the various elements and the value theoretically consumed up to the date of valuation deducted or charged off, the amount being proportionate to the expired portion of the total assumed life.

In some cases these lives are necessarily estimated without definite experience or knowledge, though for property having a life of less than 20 years fairly exact experience may be secured by research work.

In some cases there is no effort to determine or apply estimated lives but instead there is made a direct estimate of the condition per cent. or proportion of original value remaining for use subsequent to the date of the valuation.

The purposes to be served by these data are numerous and each separate purpose may necessitate variations in method and in form.

In rate cases, for instance, the courts have allowed a return to be calculated on certain values which represent large expenditures by the company for which the company gets no title to property devoted to its exclusive use.

In capitalization cases such items may be excluded by the commissions and the courts, while in tax cases the same items may be considered as franchise charges placed against the company through the taxing powers of the commonwealth.

Briefly the principal purposes may be listed as follows:

Uniform accounting practice.

Taxation of franchises or property, rate-making or adjustment.

Finances, concerning additional or total securities or adjustments.

Sales between corporations or to public authority at expiration of franchises.

General information of the corporation, its holding connections or the public.

While a considerable number of these valuation cases have been reviewed formally by the commissions and the courts, a great degree of uncertainty nevertheless prevails, not only as to the elements to be considered but also as to the method of presentation and the basis of the estimates.

Hard and fast rules have been fixed to a very limited extent only and the whole question of organization, development ex-

penditures, going value, goodwill, franchises, etc., remains to be settled, though engineering, superintendence, interest, taxes and insurance during construction and items definitely attaching to the physical divisions have been almost universally recognized and applied in varying amounts. The state commissions are not fully in accord with each other and in most cases the state commissions do not accord with the classifications, rulings, etc., of the interstate commerce commission.

Undoubtedly this latter is largely because the interstate commerce commission has been concerned with steam railroads while the state commissions have had street railways, water and gas companies, electric corporations, jitneys, etc.

One of the first steps in this work is to prepare a family tree or chart of the corporate organizations included in the operating unit which is to be valued. It is necessary to distinguish companies operated under agreement or lease, companies wholly or partly controlled through stock ownership and companies operated as part of the system but controlled by the same holding company or another holding company. There are also cases where private realty development concerns have made extensions and practically donated such property or subsidized the operating utility to obtain service.

The uniform classifications which have been provided in recent years are generally admirable in form and in detail but most valuation data prepared prior to classifications with reference to natural classes and divisions of property did not coincide with the later uniform classification. It appears that the classifications make unusual and unnecessary subdivisions of certain classes (as track structures) while neglecting other equally important classes (as transmission system or power plant equipment).

The application of these classifications to previously accumulated property and plant or franchise and property ledger accounts is a matter of exceeding difficulty in nearly every case and in most cases practically impossible without an inventory and valuation. While it has been unfortunate that the majority of public service corporations made little or no effort to subdivide their largest asset account, it is unreasonable to expect that they would preserve for decades all the data essential to an intelligent and detailed classification of their property accounts.

Corporate development has been varied and complicated; physical construction has frequently gradually or abruptly changed form. If public service corporations had from their beginning kept accounts as they did in 1916 our membership in the American Institute of Accountants would be much larger.

Further complications arise, and the potency of the records is lessened, by a very common situation for which accountants and accounting officials are principally responsible. This is the failure to have made, during the course of years, an accounting for property retired. It would seem that there was an assumption that all units were to be renewed in kind and that this led to an utter disregard even of property actually abandoned.

In too many cases the property accounts were "debt accounts" only and in some cases not even a list is available of important units damaged, superseded, scrapped or abandoned.

Judge McPherson of the United States circuit court, in the Des Moines water case said: "There can be no true test other than the physical valuation, and to such physical valuation there may be added certain other items."

Thus we have two primary divisions:

First: Physical value installed, which may be said to include
- Cost of designing, engineering, architects' fees.
- Cost of purchasing, purchasing department.
- Unit cost of article
  - Invoice cost
    - Transportation of material
      - From factory to city delivery
      - " city to storeroom
      - " storeroom to work
- Storeroom cost, including rent, light, heat, clerical handling.
- Inspection, assembling, fitting.
- Distribution at the job.
- Installation.
- Transportation of labor and tools.
- Lost time of men and equipment during travel and inclement weather.
- Loss of tools and material, breakage and waste.
- Insurance, payroll, fidelity, fire, liability.

Paymaster and watchmen.
Interest during construction.
Injuries and damages to property or persons.
Taxes during construction.
Superintendence.
Incidentals, whether damages, delays, temporary work, accidents, etc.

Second: Total physical value.

The "other items" which may be added (and cannot be allocated to the various classes and value of purely physical elements) may be stated as follows:

Preliminary corporate expenditures, including fees, certificates, permits, easements, financial reports, surveys, etc.
General legal expenditures including retainers, fees, salaries, etc., incident to the above and to all contracts, bids, etc., and other legal phases.
General administration expenditures, including
General officers other than legal departments.
General office clerks, office rents, etc.
Development of plant and operating organization.
Development of business, advertising, solicitation and education.
Going-concern value and goodwill.
Contractors' profits, if any.
Other items of general application to the particular case.
In this latter section would also fall promotion expenditures, discounts on securities, costs of financing and franchise values.

To dispose of these non-physical elements or intangible values first, it may be stated that these supercharges or overhead allowances relating to the property as a whole rather than to particular portions have been variously contended for and in many cases have been allowed in considerable sums.

Generally the findings and allowances have depended largely upon the nature of the evidence submitted and in nearly every case, where reasonable presentations have been made, due consideration has been given to expenditures for bringing the cor-

poration into existence and continuing it, under due legal, administrative and engineering management and supervision during the formative period.

In the more important instances only little weight has been attached by public authorities to the matter of promotion and financing expenditures, going-concern value and franchise values. It seems that the authorities hold the view that public service corporations operating under franchises given by the people can have no going-concern value or goodwill, that franchises, though sometimes taxable as such, can have no value as against the public and that the tendency of some corporations in earlier days to "overcapitalize" justifies a disregard of real promotion and development costs.

However this may be, the writer has no intention to criticise but merely wishes to point the suggestion that accountants may be able oftentimes to support these phases with real demonstrations from the accounts and with specific facts and figures which cannot be lightly brushed aside.

Reverting now to the physical or tangible costs as outlined on a preceding page, the writer is quite willing to admit that considerable difficulty is attached to the determination of these details with relation to a reservoir, a shop or other unit of an inventory, especially when the illustrative reservoir or shop was constructed during an operating period. Nevertheless, this matter resolves itself into one of apportionment, and accounting officers or auditors, when proceeding from the logical base and a knowledge of the physical conditions, will usually find their distribution methods and results approved by the management and accepted by representatives of commissions.

Looking into the past, however, and with reference to present day valuations and supporting data, accountants on valuation work are required to dig deep into ancient records, mostly prepared before the advent of our uniform classifications.

Where a job system (under which all or a large portion of charges relating to a physical unit or definite proposition are first assembled under a job number) has been employed the accounting work in determination of historical cost is very much reduced. Even in these cases, however, the accounting records often contain only direct labor charges and invoice cost of material. Some-

times, also, the accounting records under these job numbers will contain only new material, only a "betterment portion" or special items in which cases they do not represent the inventoried item at a point of time but have to be analyzed with reference to prior accounts and conditions. Naturally these job records largely refer to renewals in part of inventory units or are incomplete in other particulars necessary to valuation data comparable with an inventory of permanent or installed plant assets.

These circumstances then require a coordination of the records of the accounting department with those of the construction and maintenance departments, which, though not useful for ordinary accounting purposes, are important for valuation work.

Many operating companies are continually making extensions, adding to or improving the plant and to this work charges are seldom apportioned for purchasing department expense, engineering department expense or storeroom expense, though in a great many cases the highest salaried men in these departments are giving most attention to, and taking most interst in, the new rather than the routine situations.

If the company maintains shops of any considerable importance, an analysis of shop records will develop much valuable detail, particularly with reference to equipment which has been enlarged, improved, modified or converted. Also a large proportion of shop overhead in such cases will be chargeable against the special rather than the regular work.

In estimating the reproduction cost or making comparisons with recorded costs, much valuable information on prices is of course obtainable from the records of the purchasing agent and the storekeeper. It is necessary, however, to bear in mind that price fluctuations are so great that differences between records and engineering estimates are frequently more apparent than real.

The variations in bids (made by responsible and experienced contractors) for building construction are frequently astonishing in amount.

In pricing the inventory for reproduction cost, it seems best to consider a weighted average price over a period during which the assumed construction takes place. From the records may frequently be obtained costs per mile, per foot, per cubic yard or other unit, helpful in checking estimates, in disclosing unusual

and excessive costs or economies. Also from the records may often be obtained costs for typical standard construction or variations from standard, useful in the same way. The engineering and physical identity has to be carefully watched, however, and references made to blueprints, specifications, maps, drawings, etc.

In the preparation of forms for field notes, for office compilation and for summaries, the accountant is well qualified to consult with and advise the engineer.

In the supervision of the office engineering work, in the distribution of the employees, in the preparation of inventories of tools, supplies, furniture, fixtures, etc., the capable accountant can advantageously assist.

A careful study of the records will disclose the age and useful life of much property. Such information is of value in calculating and estimating depreciation or checking depreciation arrived at from a physical inspection of the property.

In conclusion, it may be hoped that this suggests an enlarging field of activity for accountants, where their professional training and their practical talents may be happily employed in cooperation with the engineering profession.