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Sponsoring Party: Missouri-American Water Company
Case No.: WR-2003-0500
Date: November 10, 2003

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WR-2003-0500

Rebuttal Testimony of

JOHN J. SPANOS

on Behalf of

MISSOURI-AMERICAN WATER COMPANY

Jefferson City, Missouri

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

IN THE MATTER OF MISSOURI-AMERICAN WATER COMPANY FOR AUTHORITY TO FILE TARIFFS REFLECTING INCREASED RATES FOR WATER SERVICE	)))))	**CASE NO. WR-2003-0500**

AFFIDAVIT OF JOHN J. SPANOS

John J. Spanos, being first duly sworn, deposes and says that he is the witness who sponsors the accompanying rebuttal testimony entitled "Rebuttal Testimony of John J. Spanos"; that said rebuttal testimony and schedule(s) were prepared by him and/or under his direction and supervision; that if inquires were made as to the facts in said rebuttal testimony, he would respond as therein set forth; and that the aforesaid rebuttal testimony and schedule(s) are true and correct to the best of his knowledge.

John J. Spanos
JOHN J. SPANOS

Commonwealth of Pennsylvania
County of Cumberland
SUBSCRIBED and sworn to
before me this 4th day of November 2003.

Notary Public

My commission expires:

NOTARIAL SEAL
CHERYL ANN RUTTER, Notary Public
Camp Hill Boro, Cumberland County
My Commission Expires Feb. 20, 2007

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1. Q. Please state your name and address.

A. John J. Spanos. My business address is 207 Senate Avenue, Camp Hill, Pennsylvania.

2. Q. Have you previously submitted testimony in this proceeding?

A. Yes, I have. My direct testimony and Schedule JJS-1 were submitted with the rate filing of Missouri-American Water Company (referred to herein as "the Company") on May 19, 2003.

3. Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is to respond to the direct testimony of Gregory E. Macias and Edward F. Began of the Missouri Public Service Commission Staff.

4. Q. What are the subjects of your rebuttal testimony?

A. The subjects of my rebuttal testimony are net salvage, survivor curves and plant accounting data, and the treatment of the reserve variance.

NET SALVAGE

5. Q. In their direct testimony, what have Messrs. Macias and Began (collectively Staff) proposed as a ratemaking allowance for net salvage?

A. Messrs. Macias and Began have proposed that net salvage be removed from the calculation of depreciation and treated as an operating expense to be collected from customers on a current basis. That is, current net salvage costs related to retired plant that served customers in the past is to be collected from current customers in the same manner that the current

operation and maintenance expenses related to plant presently in service are collected from current customers.

6. Q. Do authoritative texts on depreciation support Staff's proposal related to net salvage?

A. I am not aware of any authoritative texts on the subject of depreciation that support Staff's proposal. In fact, the two most widely cited texts on the subject support the approach that I have proposed. Public Utility Depreciation Practices, published in 1996 by the National Association of Regulatory Utility Commissioners states:

> Closely associated with this reasoning are the accounting principle that revenues be matched with costs and the regulatory principle that utility customers who benefit from the consumption of plant pay for the cost of that plant, no more, no less. The application of the latter principle also requires that the estimated cost of removal of plant re recovered over its life.[1]

Depreciation Systems, the other recognized text, states the concept in this manner:

> The matching principle specifies that all costs incurred to produce a service should be matched against the revenues produced. Estimated future costs of retiring an asset currently in service must be accrued and allocated as part of the current expenses.[2]

7. Q. What treatment of net salvage have you proposed?

A. I propose a continuation of the traditional incorporation of net salvage in the determination of depreciation. The traditional approach has been used by

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[1] Public Utility Depreciation Practices. Page 157. National Association of Regulatory Utility Commissioners. 1996.

[2] Depreciation Systems, Wolf, Frank K. and W. Chester Fitch. Page 7. Iowa State University Press. 1994.

this Commission in establishing the Company's ratemaking allowances for depreciation for many years. The traditional approach collects net salvage cost ratably over the life of plant from the customers served by the plant. This approach is equitable and conforms to the definition of depreciation as the loss in service value, where service value is the original cost less net salvage.

8. Q. **Please refer to page 2, lines 17 through page 3 line 5, of Mr. Macias' testimony. Mr. Macias use the definition of depreciation from the Lindheimer v. Illinois Bell Telephone Company decision as support for his statement that "... depreciation expense is the full recovery of the original cost of utility plant assets distributed over the life of the assets." Do you agree?**

A. No, I do not. The Lindheimer decision does not indicate that the "loss" referred represents only the original cost. Lindheimer does not provide a definition of the loss that it refers to in its definition of depreciation. Subsequent definitions of depreciation and depreciation accounting in Uniform Systems of Accounts, including the system of accounts that governs accounting by the Company, and authoritative texts almost universally define depreciation as the "loss in service value" and define service value as "the difference between the original cost and net salvage value of utility plant." The following definitions of depreciation, depreciation accounting and service value confirm that it is the loss in the total capital costs of plant, i.e., the original cost less the net salvage value or cost, that is to be measured by depreciation.

"'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 providing service from causes which are known to be in current operation and against which the utility is not protected by insurance."[3]

"Depreciation accounting is a system of accounting that 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."[4]

"'Service value' means the difference between the original cost and net salvage value of utility plant."[5]

Mr. Macias' reliance on Lindheimer to attempt a definition of depreciation that references only the "original capital cost" is misleading and not in accord with the Uniform System of Accounts prescribed by this Commission. The Lindheimer decision does not define the loss to which it refers in the definition of depreciation. More recent authoritative publications are explicit in their use of the term "loss in service value" to define depreciation and then define such "loss" to be the original cost less net salvage value.

9. Q. On page 7, line 11 through 14 of his testimony, Mr. Began states "Cost of removal and salvage, like other expenses (maintenance, payroll, postage, etc.), is an ongoing cost incurred by the utility. Therefore, like maintenance expense, the Staff has determined an annual, normal

[3]Uniform System of Accounts for Class A Water Utilities. National Association of Regulatory Utility Commissioners. 1996.

[4]Accounting Research and Terminology Bulletin #1. American Institute of Certified Public Accountants. 1961.

[5]National Association of Regulatory Utility Commissioners. Supra Note 1.

ongoing level for cost of removal and salvage." Do you agree with this approach?

A. No, I do not. The amount of net salvage that should be included in the annual cost of service and collected from current customers is a portion of the net salvage related to the current plant in service as a result of allocating these costs to each year of service rendered by such plant. The amount should not reflect only the current net salvage costs. Current net salvage costs are related to plant that previously rendered service.

Allocating net salvage costs during the life of the related plant is more appropriate and equitable and is in accord with the Uniform System of Accounts, authoritative publications and the pronouncements of the accounting profession. Delaying collection until such costs are incurred results in a charge to customers for plant from which they did not receive service and, as a result of the delay in recovery, also results in a higher present value of revenue requirements related to net salvage.

10. Q. Please explain your last statement related to the present value of revenue requirements related to net salvage.

A. The revenue requirements that result from the expensing option proposed by Mr. Began are greater than the revenue requirements that result from accruing for net salvage during the life of the related asset. Although a comparison of the current revenue requirements related to a net salvage accrual and the current revenue requirements related to expensing of net salvage may indicate that the accrual is higher, over time the revenue

requirements and the present value of those revenue requirements will be less if the net salvage cost is accrued over the life of the asset.

The reason for the lower revenue requirements with the accrual of net salvage is the impact of the accruals on rate base. That is, as net salvage accruals are recorded to the depreciation reserve, the balance in the reserve increases and reduces subsequent determinations of rate base in comparison to Mr. Began's expensing proposal.

11. Q. What is the basis for your conclusion related to the revenue requirement impacts of the alternative net salvage proposals?

A. The basis for my statement, in addition to my experience in ratemaking proceedings, is a paper that was presented to the American Gas Association's Plant Accounting Committee and the Edison Electric Institute's Property Accounting and Valuation Committee in 1992 by Mr. William M. Stout of my firm. This paper is attached as Schedule JJS-2.

The paper presents analyses of net salvage recognition for five methods: (1) straight line accrual method (the method that I have proposed in this proceeding), (2) expensing (the method that Mr. Began has proposed in this proceeding), (3) amortization of experienced net salvage, (4) a sinking fund which recognizes the price level in the year of retirement and (5) a sinking fund which recognizes the price level in the year of calculation. Mr. Stout's conclusion, which I endorse in this statement of testimony, was as follows:

"There is much to be said for the straight line accrual method. The provision for negative net salvage is accrued in accord with the loss in service value of the assets. For a single asset, the revenue requirements decrease over time, offsetting likely increases in operation and maintenance expense. The total revenue requirements and their present value are less for the straight line method than any of the four other methods evaluated."

12. Q. You also stated that it is more appropriate and equitable to recognize net salvage costs during the life of the related plant. Please explain.

A. The net salvage cost of an item of plant is a part of its service value and, therefore, it is a part of the item's cost of providing service. The cost of the item providing service should be collected from the customer's that receive the service. Thus, an allocable portion of the net salvage cost should be recovered each year from the customers receiving the value of the service rendered by the item of plant in the same way that an allocable portion of the item's original cost is recovered from such customers each year. This approach is equitable in that customers are responsible for the costs of plant that provide service to them. This is a sound ratemaking principle.

In contrast, expensing of net salvage recovers this entire element of an item's cost of service from customers that either did not receive service from the item or, if the customer has received service from the Company for a number of years, received only a portion of the item's service value. This is not equitable and violates the principle that customers should pay the costs of the plant that provides service to them.

13. Q. Please illustrate this principle as it applies to net salvage costs with a simple example.

A. Consider a single customer, Customer A, served by a section of distribution main that does not provide service to other customers. The original cost of the main is $5,000 and is installed when the customer is added to the system. The estimated life of the main is 50 years and the estimated net salvage is negative 20 percent. The annual depreciation expense to be recovered from this customer using the straight line accrual of net salvage is $120 per year ($5,000 x 1.20 / 50 years). The annual depreciation expense to be recovered from this customer using the expensing of net salvage approach is $100 per year ($5000 / 50 years).

In year 30, the customer moves out and another customer, Customer B, moves into the residence served by this main. During the 30 years, a total of $3,600 ($120 x 30 years) was collected from the Customer A under the straight line accrual of net salvage. Only $3,000 ($100 x 30 years) would be collected under the expensing approach.

At the end of year 50, the main is replaced at a total cost of $6,000, $1,000 to remove the old main and $5,000 to install the new main. (I have excluded inflation from the example to promote a better understanding of the principle.) Under the straight line accrual method, the depreciation expense in year 51 would continue at $120 ($5,000 x 1.20 / 50 years). Under the expensing method, the sum of the depreciation and net salvage expense would be $1,100 ($5,000 / 50 years + $1,000) in year 51 and then decline once again to $100 ($5,000 / 50 years) in years 52 and later.

At the end of year 60, after 30 years as a customer, Customer B moves out of the residence. The total depreciation expense collected from

this customer during years 31 through 60 under the straight line accrual method of net salvage is $3,600 ($120 x 30 years), the same as was collected from Customer A for a similar amount of service. However, the total amount of depreciation and net salvage expense collected from Customer B using the expense approach is $4,000 ($100 x 30 years + $1,000), significantly more than the $3,000 collected from Customer A.

This illustrates the inequity, i.e., customers paying different amounts for the same service, of the expensing approach. The example also confirms the equity, i.e., customers paying the same amount for the same service, and the sound ratemaking policy embodied in the straight line accrual method of net salvage that is used by nearly all regulatory bodies and was consistently used until recently by this Commission.

14. Q. Does this simple example really apply over time given the existence of inflation and service being provided to thousands of customers, not one customer?

A. Yes, it does. Although the addition of customers and the introduction of inflation into the simple model described above make it complex, the principle that is illustrated remains the same. The actual system in place is only the summation of many, many instances that are identical to the illustration.

15. Q. Does the net salvage accrual that you have proposed exceed the current net salvage cost?

A. Yes, it does.

16. Q. By what amount does the net salvage accrual exceed the net salvage cost currently?

A. The net salvage accrual proposed in this proceeding for the districts other than St. Louis County and Jefferson City is $626,988 and is the difference between the whole life annual accrual presented in Table 1 of Schedule JJS-3 of $5,950,267 and the whole life annual accrual calculated with zero net salvage of $5,323,279 as set forth in Table 2 of Schedule JJS-3 attached to this rebuttal statement. The net salvage accrual for the St. Louis County district in Case No. WR-2000-844 was $2,558,313. The net salvage expense proposed by Mr. Began is $179,775. Thus, the net salvage accrual is approximately $2.4 million greater than the net salvage cost.

17. Q. Why does your proposed net salvage accrual exceed the net salvage cost?

A. The net salvage accrual exceeds the net salvage cost because of system growth and maturity. The accrual for net salvage is related to the current plant in service. The current plant in service includes over 5,565 miles of mains and serves over 442,000 customers. The size of the system has doubled in the past 35 years.

As a result of this growth, as well as the growth in years prior to 1970, the system has not reached a steady state. Each year the amount of plant added exceeds the amount of plant retired. Because this has occurred over a long period of time and continues to do so, the amount of plant retired is not equal to the plant balance divided by the average life. It is only when

the plant reaches this steady state position that the net salvage accrual will or should equal the net salvage cost for the total plant in service.

Another way of looking at this model is to recognize that the plant being retired served fewer customers during its life than the plant that is currently in service. The current net salvage cost should have been recovered during the life of the plant to which it relates. The amount of net salvage accrued, and presumably collected from customers, for this retired plant was based on the plant that was in service during its life. This amount of plant was sufficient to serve, on average, 20,000, 50,000 or perhaps 100,000 customers. Neither the past net salvage accruals nor the current net salvage cost were based on the plant necessary to serve 442,000 customers. Thus, neither will compare to the current net salvage accrual computed for plant that is necessary to serve this larger customer base.

18. Q. Will the net salvage cost for plant presently in service ever exceed the net salvage accrual for plant presently in service?

A. Yes, it will. As the plant presently in service ages and retirements related to such plant increase, the net salvage costs related to these retirements will be greater than the net salvage accruals on the surviving balance. Ultimately, the net salvage accruals in total and the net salvage costs in total will equal one another.

I have illustrated the pattern of future net salvage accruals and net salvage costs related to Accounts 331, Mains – Transmission and Distribution, in Schedule JJS-4. This schedule is predicated on the current estimates of survivor curves and net salvage for this account. Periodic

studies of both during the remaining life of the plant, along with appropriate true-ups, will insure that the same pattern and balance occurs in actuality.

19. Q. Should the fact that current net salvage accruals exceed current net salvage costs raise concerns that the Company will over recover its expenditures?

A. No, it should not. First, as I have demonstrated, over the life of the assets the net salvage accruals and net salvage costs will balance. Second, the total cost of service for recovery of capital expenditures, both plant in service and negative net salvage, is significantly less than the total expenditures for additions and net salvage costs. That is, the sum of additions and net salvage costs is far greater than the accruals for plant and net salvage. The same growth that causes the net salvage accruals to exceed the net salvage costs also causes the plant additions to exceed the depreciation expense for the recovery of original cost. If Staff wants to insure that the Company recovers only the costs that it spends, it also should propose that we expense the plant additions. Third, net salvage accruals are recorded to the depreciation reserve that enables the monitoring of the total recovery so that such recovery does not exceed the total costs. Further, as described in greater detail in Schedule JJS-2, recovery in advance of cost incurrence reduces rate base and revenue requirements. Thus, the system is designed to be in balance and there are safeguards that insure this balance will occur.

20. Q. What were the statistical bases for your net salvage estimates?

A. The statistical bases for my estimates of net salvage are the historical net salvage costs as a percent of the original cost of the assets that have been retired.

21. Q. Does the use of such historical percents assume that history will repeat itself over the remaining life of the surviving assets?

A. No, it does not. Although the estimates of net salvage percent that I have used in calculating the net salvage accruals approximate the historical indications as represented by the net salvage costs divided by the original cost retired, I do not believe that this represents an assumption that history will exactly repeat itself over a period of decades in the future. Instead, use of these historical indications actually assumes that there will be substantial improvements in technology, comparable or lesser environmental regulations and a significant reduction in inflation.

22. Q. How does use of net salvage percents that are comparable to the historical indications assume these events?

A. The net salvage percents, that is the net salvage costs divided by the original costs retired and expressed as percents, are related to the retirement of plant that on average is significantly younger than the average service life of the plant on an original cost dollar weighted basis. For example, the average age of retirements of transmission and distribution mains during the period 1987 through 2002 was 24.1 years. This amount is less than 27 percent of the average life estimated for this account.

The average net salvage percent related to these retirements, made on average at age 24.1, was negative 30 percent. That is, after 24.1 years in

service, the plant was retired and the cost to remove the plant, as a result of inflation, technological changes and other factors, was 30 percent of the cost to install the same plant.

Future retirements of the current mains in service will have an average age that actually exceeds the average life. Thus, future retirements will be of plant that has been in service about 4 times as long as the plant retired during the period 1987-2002. For retirements at such ages to experience net salvage that is 30 percent of the cost to install, there will have to be a reduction in the rate of inflation adjusted for technological improvements. If the rate of inflation adjusted for technological improvements that occurred between the installation and retirement of plant retired during the period 1987-2002 occurred over a period that is twice as long, the net salvage cost would be much greater as a percent of the original cost of the plant retired.

23. Q. What is the implication of the assumption that the future rate of inflation adjusted for technological improvements will be less than the historical rate?

A. The implication of this assumption as reflected in my estimates of net salvage percents is that the resultant net salvage accruals are most likely inadequate to recover the total net salvage costs over the entire life cycle of the plant currently in service.

24. Q. What is your understanding of the Commission's prior decisions regarding the treatment of net salvage?

A. My understanding of the Commission's last decision is based on the following statement from page 18 of the Report and Order in Case No. WR-2000-844,

a case involving another district of the very same Company currently before the Commission:

> Under the circumstances faced by the Company, including its need for cash flow to address its infrastructure issues, the Commission concludes that using the whole life method and including estimated net salvage is in the public interest. The whole life method collects net salvage cost ratably over the life of plant by customers served by the plant. This approach is equitable based on the circumstances of this case.
>
> The Commission's holding that the Company's use of the whole life method of determining depreciation rates is based on the record in this case, and on circumstances in which the Company finds itself. The whole life method is not appropriate for all types of property, for all utilities, and in all situations. In a situation in which a utility has a type of asset that is at or very near the end of its service life, that is not likely to be replaced, and for which the cost of removal is high and likely to move higher, another approach may be appropriate. (Emphasis added.)

25. Q. Do the Company's assets include any significant asset that is "at or very near the end of its service life, that is not likely to be replaced"?

A. No, they do not.

26. Q. Does the Company have a "need for cash flow to address its infrastructure issues"?

A. Yes, it does.

27. Q. Does the Company have the same infrastructure issues that it did in Case No. WR-2000-844 when the Commission allowed it to collect net salvage cost ratably over the life of plant?

A. Yes it does. This issue is addressed by Company witness Jenkins in his rebuttal testimony.

28. Q. Please summarize your rebuttal related to net salvage.

A. The portion of the annual depreciation accrual rates and amounts proposed by the Company in this proceeding that is related to net salvage is reasonable and in accord with sound ratemaking principles. Depreciation is the loss in service value and service value is the difference between original cost and net salvage value. Thus, net salvage should be a part of the straight line depreciation accrual.

Net salvage costs should be recovered from customers served by the plant that results in the expenditure of net salvage costs. The use of a straight line accrual over the life of the asset accomplishes this equity. Expensing net salvage does not. Expensing actually results in higher revenue requirements over the life of the plant. The straight line accrual of such costs during the life of plant minimizes revenue requirements.

The net salvage accrual proposed in this proceeding is $3.2 million and exceeds the proposed expense allowance of Mr. Began by $3 million. It is appropriate for the net salvage accrual to exceed the current net salvage cost during a period of growth and prior to reaching a steady state for the plant. As retirements continue to be made of the plant presently in service, the net salvage costs for this plant will exceed the net salvage accruals for this plant.

The estimates of net salvage percents used in developing the net salvage accrual are very reasonable and likely understate the future net salvage costs that will occur

Finally, the policy of this Commission as described in its order in Case No. WR-20000-844 supports the use of ratable recovery of net salvage for the Company.

SURVIVOR CURVES

29. Q. Has Mr. Macias recommended survivor curves that are different from the survivor curves that you have proposed?

A. Yes. Mr. Macias has estimated survivor curves for most accounts that are different from my proposals. For several accounts, Mr. Macias has not estimated a survivor curve and instead used either a composite rate from another group of accounts or "Staff's standardized depreciation rates." The survivor curves and depreciation rates recommended by Mr. Macias are presented in his testimony in Schedules 1 through 3.

30. Q. Have you reviewed the testimony, schedules and workpapers of Mr. Macias?

A. Yes, I have.

31. Q. Please describe the approach that Mr. Macias used to estimating survivor curves.

A. Mr. Macias conducted retirement rate analyses of the Company's St. Louis County district and then estimated survivor curves for (1) the St. Louis County district, (2) the Jefferson City district, and (3) the combination of the remaining districts based on the results of these analyses. As I previously noted, in several instances, the survivor curve estimate was based on Staff's standardized depreciation rates.

32. Q. Is this approach reasonable?

A. No, it is not. First, estimated survivor curves, net salvage percents and annual depreciation rates were established for the St. Louis County district by the Commission in its order in Case No. WR-2000-844. There is no need, nor is it appropriate, to revise these estimates and rates at this time. It has been only three years since the previous study. Generally speaking, the practice of the Company is to update its depreciation rates every five years. This Commission does not have regulations regarding the frequency at which water utilities must conduct depreciation studies. The Company undertook a comprehensive depreciation study of the St. Louis district three years ago, the results of which are a part of the record in Case No. WR-2000-844 and are incorporated herein by reference. The Commission accepted the estimated survivor curves, net salvage percents and annual depreciation rates that resulted from that study and the Company has appropriately continued to use those rates in developing its pro forma depreciation expense for the St. Louis district in this proceeding. In addition, the study conducted by Mr. Macias was inadequate as further discussed below. Mr. Macias' proposals for the St. Louis County district should be ignored.

Second, in the previous proceeding involving the St. Joseph, St. Charles, Warrensburg, Joplin, Mexico, Brunswick and Parkville districts, the Commission order required the Company to conduct a depreciation study of these districts. I have conducted such a study. The survivor curves for these districts should be based on service life analyses of their retirement

experience, not the retirement experience of the St. Louis County district. Mr. Macias' recommendations for these seven districts are based primarily on his inadequate study for the St. Louis County district and should be rejected. Third, although it would be difficult to obtain meaningful analyses of the Jefferson City district by itself, application of the St. Louis County estimates would not be appropriate. Eventually, the Jefferson City district information will be incorporated into analyses of multiple districts. The present rates for the Jefferson City district should be retained and Mr. Macias' recommendations for Jefferson City should be ignored.

33. Q. Why do you consider Mr. Macias' study of the St. Louis County district to be inadequate?

A. My review of the testimony, schedules and workpapers of Mr. Macias indicate that his estimates of survivor curves were based almost entirely on statistical fitting of the Iowa curves to the entire original survivor curve. Little, if any, consideration was given to either the significance of the data being analyzed or other appropriate factors such as the nature of the equipment, management plans and outlook, and the estimates of other water utilities.

34. Q. Do authoritative texts on the subject of depreciation support you view that statistically fitting survivor curves to all data is an inadequate approach to estimating survivor curves?

A. Yes, they do. For example, Public Utility Depreciation Practices states that the estimation of service lives should be based on informed judgment that incorporates consideration of:

"...general experience, knowledge of the properties and a

physical inspection, information gathered throughout the industry, and other factors which the analyst in making a knowledgeable estimate…In summary, several factors should be considered in estimating property life. Some of these factors are:

1. Observable trends reflected in historical data,
2. Potential changes in the type of property installed
3. Changes in the physical environment,
4. Changes in management requirements,
5. Changes in government requirements, and
6. Obsolescence due to introduction of new technologies."[6]

35. Q. Please give an example that demonstrates the inadequacy of the St. Louis County district depreciation study of Mr. Macias.

A. I will use Account 304.2, Structures and Improvements – Power and Pumping (321.2 in Mr. Macias' study) as an example. In Mr. Macias' direct testimony, Schedule 1-1 sets forth the service life estimate for this account of 178-R2.5. The schedule sets forth the original cost, life, curve and depreciation rate. This account includes relatively small buildings that house booster pump stations. The survivor curve and average service life should reflect the expected life characteristics of small booster station structures. With the 178-R2.5 estimate, Mr. Macias is suggesting that the average life of these assets will be 178 years and the maximum life will be approximately 331 years. These are unreasonably long time periods for a water utility to operate and maintain such structures. Such estimates demonstrate that Mr. Macias did not consider factors other than the results of the statistical analyses and placed reliance on the statistical analyses whether there were sufficient data or not.

36. Q. In his workpapers, Mr. Macias indicates, for booster station structures,

"If all plant in the account was retired next year, the ASL would be greater than 81 years." Do you agree?

A. No, Mr. Macias' interpretation of the original survivor curve is incorrect. The fact that the original survivor curve attains 92% surviving at age 88 does not indicate that if all plant were retired next year that the average service life (ASL) would be greater than 81 (92% x 88) years. This would only be true if all of the plant in the account were 88 years old. It is not. In fact, as shown in those same workpapers, the average age of the account is only 15 years. The average age of the retirements to date, also in the workpapers, is 12.7 years. If all the plant were retired next year, the average life of the account would be somewhere between 12.7 and 15 years, not 81 years. It is clear from his analysis that Mr. Macias not only did not consider all appropriate factors, but he also is not able to properly interpret the analyses performed by the computer.

37. Q. **Are there other aspects of Mr. Macias' survivor curve estimation for the St. Louis County district that warrant comment?**

A. Yes. I have two further issues: (1) his use of something other than the life span procedure for certain structures and equipment accounts and (2) his use of something other than amortization accounting for certain general plant accounts. The currently approved depreciation rates for the St. Louis County district's structures and improvements, as well as several equipment accounts, reflect the use of the life span procedure. In the life span procedure, an interim survivor curve is used to describe the rates of

[6]Supra Note 1.

retirement between installation and the final concurrent retirement of all facilities at a location. This approach recognizes that all elements of a structure will be retired concurrently, regardless of whether they were part of the original installation or represent a subsequent addition or replacement of a component of the structure such as a roof. Mr. Macias recognizes that these accounts have these characteristics in the notes in his workpapers. However, he used his analysis of interim retirements in an attempt to describe both the interim and final retirements of these structures. This is inappropriate as (1) it results in the use of the same survivor curve for each vintage of a structure, which is an impossibility, and (2) it does not consider the impact of final retirements since they are not reflected in the historical analyses. Further, Mr. Macias offered no explanation for changing the approach to estimating the survivor characteristics of these accounts.

The currently approved rates for Accounts 391, 393, 394, 395, 397, 398, and 399 are based on the concept of amortization accounting. Amortization accounting is appropriate for these accounts as they represent numerous units of property, but a very small portion of depreciable water plant in service. Mr. Macias offered no basis for changing either the previously established amortization periods or the concept of using amortization accounting.

38. Q. Why did Mr. Macias base his estimates for the seven combined districts and the Jefferson City district on his analyses of the St. Louis County district data?

A. Mr. Macias states that "The Company has not maintained complete or

accurate data for the other eight districts, and therefore it is not possible to complete a life analysis with any degree of accuracy."

39. Q. Do you agree?

A. Absolutely not. I prepared a combined data base for these seven districts incorporating information that was maintained at the individual district level through 1999 and data that was maintained on a combined basis beginning in the year 2000. I reviewed this combined data base for accuracy and completeness. I found the data to be accurate. The data were incomplete only in the sense that the retirement history for several districts was not available prior to the implementation date of various accounting systems. Retirement history was available for some districts as far back as 1956 and for all districts since 1983. However, the absence of earlier retirements does not mean that the data base cannot be used for analyses of service life. In fact, the lack of retirement history never was an impediment to the Commission in developing depreciation rates for these properties in past rate cases.

40. Q. How is it possible to conduct analyses of service life without a complete history of retirements?

A. In the retirement rate method, the construction of an original life table requires two sets of data: (1) the plant exposed to retirement and (2) the plant retired. The determination of the plant exposed to retirement can be constructed by bringing forward the amount added or by working backwards from the amount surviving at the end of the study period. The Gannett Fleming programs develop the plant exposed to retirement, or exposures, by

working backwards from the surviving balance. This approach enables the use of a database that consists of retirements for a recent period, say 1984 through 2002, rather than requiring a complete history of retirements. That is, by using this approach, both the plant exposed to retirement and the plant retired by age interval can be constructed for the period during which retirements are available.

41. Q. Was the data file for the combined districts sent to Mr. Macias?

A. Yes, in response to his initial data request, I forwarded the combined file that I used to conduct my service life study of the seven districts. The combined file included aged additions, retirements, transfers, acquisitions and ending balances through 2002.

42. Q. Was this file utilized in Mr. Macias' study?

A. No, it was not. Apparently, Mr. Macias wanted to perform service life analysis on an individual district basis and not rely on a combined analysis of all the districts.

43. Q. Why did you not study the data by individual district for life analysis purposes?

A. A valid life analysis is dependent not only on accurate accounting transactions, but also on a sufficiently large sample in order to produce statistically valid results. A study of each district's life characteristics would produce very inconclusive statistical results as many of the districts are small and have limited data. Further, the same management team operates these districts. As a result consistent practices and policies have been in place for a number of years and will continue. Finally, the need for a sufficiently large

base of data is particularly imperative when the analyst places great weight on the results of the statistical analyses. For these reasons, I chose to combine the data for the several districts for analysis and insured that the combined database was accurate.

44. Q. When Mr. Macias requested files for each district were they available?

A. No, the files by district were not available initially. As I indicated earlier, the database has been maintained on a combined basis since 1999. The past studies were conducted on a combined basis, so there was no need to change the methodology by studying separately by district.

45. Q. What was required in order to provide Mr. Macias with files for each district?

A. The steps required in order to provide files for each district to Mr. Macias were similar to those that I took when I initiated my study of the combined districts. A depreciation study requires two to four months to complete and a large portion of that time is spent assembling the data; checking it for logic, consistency, and control; and then formatting it to run using the Gannett Fleming software. In the case of Missouri-American, there also was an account number conversion and a change in accounting systems during this period. Historical information came from several sources and required conversion to a common account numbering system. Performing this exercise for the combined districts file took considerable time during the course of my study. Therefore, completing the requirements of Mr. Macias for each district within the discovery time frame was very difficult. I requested the detailed information from the Company for the period 2000

through 2002, converted the account numbers as appropriate and then added it to each district's file through 1999. This was done as quickly as possible in order to comply with the discovery timetable.

46. Q. Were there errors in some of the files that you provided to Mr. Macias?

A. Yes, in Gannett Fleming's desire to supply staff with the needed information over the very short time frame there were errors in some of the files relating to some of the districts.

47. Q. Did these errors warrant Mr. Macias decision to use the analyses of the St. Louis County data as the bases for his survivor curve estimates for the combined districts?

A. No, not at all. First, this approach of individual district files is questionable given the statistical validity of the data for an individual district, particularly the smaller districts. Second, the appropriate alternative to an analysis of each district's file would be the accurate combined file of these same districts that was provided early in the process to Mr. Macias. Instead, Mr. Macias chose to rely on the database for St. Louis County that contains none of the history of the districts in question. This is not appropriate given the alternative of using the combined file for these districts.

48. Q. Please summarize your rebuttal testimony related to Mr. Macias' survivor curve estimates.

A. Mr. Macias' estimates of survivor curves should be rejected. His estimates for St. Louis County are premature and strictly based on fits of historical statistical points instead of reasonably considering all of the factors that lead to realistic estimates of service life. The use of his results for the St. Louis

County district are even less appropriate when applied to the remaining districts in the state. He has used a life analysis of one set of assets and applied them to an entirely different set of assets. Sole reliance on the St. Louis County results is not appropriate and should be rejected. Mr. Macias claim of flawed data, although partially true, should not have caused him to disregard the combined data file for the districts. Mr. Macias' unwillingness to use the combined district file caused unnecessary issues and data analysis. The combined data file is accurate and sufficient to conduct retirement rate analyses of the historical retirements of these districts.

49. Q. Is it appropriate in this case to conduct a life analysis by district?

A. No, it is not. When there is very limited service life data or no retirements, such as the case with many of these districts, then studying each district separately does not allow for reliable results.

TREATMENT OF RESERVE VARIANCES

50. Q. Mr. Macias recommends elimination of the currently approved amortizations of the reserve deficiency for the St. Louis County district. Do you agree?

A. No, I do not. Mr. Macias' recommendation is based on the recovery of only original cost rather than service value (original cost less net salvage) and his unreasonable survivor curve estimates. The St. Louis County depreciation study did not require updating. The exclusion of net salvage from depreciation is inappropriate for all the reasons previously discussed in this testimony. The survivor curves estimated by Mr. Macias are unreasonable as they do not incorporate consideration of all factors as previously

discussed. The amortization of the deficiency determined as of December 31, 1999, in Case No. WR-2000-844 was approved by this Commission and should continue until a timely and reasonable depreciation study is conducted of this district.

51. Q. How have you amortized any variance related to St. Joseph, St. Charles, Joplin, Warrensburg, Parkville, Mexico and Brunswick districts in your depreciation study?

A. I have amortized the variance between the book and theoretical reserves for these districts over remaining lives on an account by account basis. I have done this through the use of the remaining life technique.

52. Q. Please summarize your rebuttal testimony related to the treatment of reserve variances.

A. The amortizations of the reserve variance for the St. Louis County district should continue. The reserve variance for the other districts should be amortized on an account by account basis using the remaining life technique.

53. Q. Does this conclude your rebuttal testimony?

A. Yes, it does.

AN EVALUATION OF ALTERNATIVE METHODS FOR DETERMINING ACCRUALS RELATED TO NEGATIVE NET SALVAGE FOR MASS PROPERTY

Presented by

William M. Stout, P.E.
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ANNOTATION

A comparison of the annual accruals and a review of the magnitude, timing and present value of revenue requirements under five alternative methods of accruing for negative net salvage.

DISCLAIMER

This paper represents the consensus of the author. It does not have the specific endorsement of the EEI Property Accounting and Valuation Committee or the AGA Plant Accounting Committee Meeting. The thoughts, viewpoints and positions expressed herein are not necessarily those of the A.G.A., EEI or any of their member companies.

AN EVALUATION OF ALTERNATIVE METHODS FOR DETERMINING ACCRUALS RELATED TO NEGATIVE NET SALVAGE FOR MASS PROPERTY

INTRODUCTION

Prior to the double-digit inflation and increasing environmental regulation of the 1970's, the subject of negative net salvage was of interest to individuals in the depreciation profession, but probably was viewed as almost a non-issue to senior utility management who were coping with the need to finance and build capacity to meet customer demand. In recent years, the subject of negative net salvage for mass property has received increased attention, although not nearly the level received by decommissioning costs for nuclear plants.

The problem of negative net salvage for mass property is masked by growth in the account. However, because it does not appear to be a problem on the surface, does not mean it has gone away. There is no better time than now for a serious evaluation of the analytical techniques and accrual methods required for negative net salvage. This paper will not attempt to deal with both the necessary improvements in analysis of and accruing for negative net salvage. Rather, the purpose of this paper is to provide a comparison of several methods of accruing for negative net salvage including their impact on the magnitude, timing and present value of revenue requirements.

The alternative methods which are evaluated are those that are used in the industry today and those that have been proposed for use. The five methods are the straight line accrual method, expensing, amortization of experienced net salvage, a sinking fund which recognizes the price level in the year of retirement and a sinking fund which recognizes the price level in the year of calculation.

The five methods will be evaluated in two scenarios: (1) a single vintage with no dispersion of retirement and (2) multiple vintages with no dispersion of retirement. In the first scenario, the effect of taxes on revenue requirements are considered in

four different ways: (1) no tax effect, (2) normalization-deferred taxes only, (3) normalization with all tax effects and (4) flow-through. The purpose of including the first scenario is to promote an understanding of the manner in which the methods operate and their impact on the several factors to be considered. The purpose of the second scenario is to better illustrate the nature of the impacts on a case study more akin to an actual account.

There are a number of critical parameters to be selected in the evaluation of the several methods of accruing for negative net salvage. The rate of inflation, the rate of return on rate base, the income tax rate, the interest rate for determining the sinking fund annuities, and the interest rate for calculating the present value of the revenue requirements. In the scenarios developed in this paper, a 5 percent rate of inflation and a 10 percent return on rate base are used. The return on rate base is developed from a 50/50 capital structure with the cost of both equity and debt equal to 10 percent. The combined federal and state income tax rate is assumed to be 40 percent. In the sinking fund and present values calculations, an 8 percent interest rate is used.

A greater concern in the evaluation is the selection of the criteria for judging the merits of the methods. The total amount and timing of the accruals is of concern. That is, does the method fully recover the cost and in what manner is it charged to customers? The absolute amount of revenues required also is a factor to be considered. But how important is the timing of the revenues? Should the pattern of revenue requirements be increasing, decreasing or uniform? Should we seek the method that minimizes the present value of the revenue requirements?

The following discussions of the five methods as applied to the two scenarios will present observations related to the accruals and to the magnitude, timing and present value of the revenue requirements in each case. Comparisons of the methods using these criteria will be made. Although opinions are offered regarding the benefits of certain methods, *the relative appropriateness of a method for a utility will depend on its specific circumstances and policies.*

SINGLE VINTAGE

The single vintage example is based on a unit with a 10-year service life that would cost $100 to remove today. Based on the 5 percent inflation assumption, the cost to remove the unit at the end of its life will be $162.90. In the single vintage example, the "A" tables are those in which tax effects have not been considered, the "B" tables are those in which the deferred tax impact on rate base due to normalization is considered, the "C" tables are those in which both the tax deduction and the deferred tax impact are considered and the "D" tables are based on flow-through.

No Tax Effect. In the straight line accrual method, as presented in Table A1, the annual provision for removal is $16.29 in each year 1 through 10. The amount accrued is recorded to the depreciation reserve and reduces rate base. The reduction in rate base lowers the required return and partially offsets the annual provision. As a result, the total revenue requirement is $89.59. The present value of the revenue requirement is $66.98 when discounted using 8 percent interest. Although the revenue requirements are received while the unit is in service, they decline throughout its life from $16.29 in year 1 to $1.63 in year 10.

The expensing method is presented in Table A2 and results in an accrual and revenue requirement of $162.90 in the year in which the unit is retired. There is no impact on rate base. The present value of the $162.90 accrual which occurs at the end of year 10 is $75.45. The revenue requirement is recouped entirely in the final year of service.

The amortization method, which is used in Pennsylvania, provides for net salvage after it is experienced. In Pennsylvania and in the example as set forth in Table A3, one-fifth of the experienced net salvage is recorded as an accrual in each of the five years following the unit's retirement. The total accruals equal the experienced negative net salvage of $162.90. The negative net salvage decreases the reserve account when it occurs and, therefore, increases rate base. The return on rate base adds $48.87 to the total accrual for a total revenue requirement of

$211.77. The present value of the revenue requirements is $79.25. This method produces a decreasing revenue requirement in the five years following the unit's retirement.

The sinking fund method as illustrated in Table A4 provides for the negative net salvage of $162.90 through an annual annuity of $11.24 and earnings on the fund to which these annuities are deposited. Inasmuch as the earnings are used to provide for the negative net salvage, the annuities are not deducted from rate base and there is no rate base impact. This version of the sinking fund method fully recognizes inflation by accruing for the negative net salvage based on the estimated price level in the year of retirement. The total revenue requirement is the sum of the annuities, $112.47, and has a present value of $75.45. The revenue requirement is the same in each year during the life of the unit. Note that the present value of the revenue requirement is the same as the present value of the revenue requirements in the expensing method because the sinking fund earnings rate and the present value discount rate are both 8 percent.

Another approach to the sinking fund method is to develop an annuity based on the expected negative net salvage at the calculation year's price level. This sinking fund method which partially recognizes inflation is presented in Table A5. The annuity is determined by applying the sinking fund factor based on the remaining life of the unit and the remaining amount to be provided. The remaining amount to be provided is the estimate of negative net salvage in the calculation year less the cumulative amount accrued. The annuities which also are the revenue requirements increase from $6.90 in year 1 to $16.94 in year 10. The resultant total annuities of $122.53 are somewhat greater than the annuities in the sinking fund method with full recognition of inflation because the timing of the annuities is later and therefore, the interest earned is less. The present value of the revenue requirements is $77.00.

Figure A presents a graphical comparison of the revenue requirements in each year with no tax effects for four of the five methods of accruing for net salvage. The expensing method is not plotted, as it represents a single point at age 10. For years

1 through 10, the figure shows decreasing revenue requirements for the straight line method, uniform revenue requirements for the sinking fund method which recognizes inflation to the year of retirement and increasing revenue requirements for the sinking fund method which recognizes inflation to the year of calculation. The amortization method is characterized by decreasing revenue requirements in years 11 through 15.

Normalization. Tables B1 through B5 present the same methods for accruing net salvage as presented in Tables A1 through A5 and add the impact on revenue requirements of accumulated deferred income taxes. That is, the net salvage accrual is used as a deduction in determining the ratemaking allowance for income taxes, but is not a deduction on the actual return. In the case of negative net salvage, normalization of this difference in timing results in an addition to rate base. The "B" tables incorporate the return and taxes related to this rate base addition.

A further difference in the "B" tables is the introduction of the income taxes related to return. A tax effected rate of return of 13.33 percent is used [10% rate of return + 40% tax x (5% equity/(100% - 40%))].

In the straight line accrual method, as presented in Table B1, the annual provision for removal is $16.29 in each year 1 through 10. The reduction in rate base resulting from the accrual is partially offset by the deferred tax addition. The reduction in return and taxes related to the net rate base impact results in a total revenue requirement of $104.30. The annual revenue requirements decrease from $16.29 in year 1 to $4.57 in year 10. The present value of the revenue requirements is $75.48.

The expensing method is presented in Table B2 and, inasmuch as there is no impact on deferred taxes or rate base; the accrual, revenue requirements and present value of revenue requirements are the same as the amounts in Table A2.

The amortization method with normalization is set forth in Table B3. The accrual for net salvage is $32.58 in each of the five years, 11 through 15, subsequent to the experienced negative net salvage in year 10. In this case, the deferred taxes continue to offset the rate base impacts as compared to Table A3, but this time

represent a reduction in rate base. The return and taxes add $39.09 to the total accrual for a total revenue requirement of $201.99. The present value of the revenue requirements is $75.45, the same as the present value of the straight line and expensing methods with normalization. This equality results from the use of a discount rate equal to the after-tax rate of return.

The "full inflation" sinking fund method with normalization as presented in Table B4 provides for negative net salvage of $162.90 through an annuity of $11.24 plus fund earnings as was the case in Table A4. The only impact on rate base is the accumulated deferred tax addition which results in total return and taxes of $33.62. The total revenue requirements are the sum of the annuities, $112.47, and the return and taxes, $33.62, or $146.09. The present value of the revenue requirements is $94.56.

The "current inflation" sinking fund with normalization is presented in Table B5. The annuities are the same as in Table A5, increasing from $6.90 in year 1 to $16.94 in year 10. The rate base which results from the accumulated deferred income taxes requires return and taxes of $29.13 for a total revenue requirement of $151.66. The present value of the revenue requirements is $93.20.

Figure B presents a graphical comparison of the revenue requirements in each year with the return and taxes related to the impact of deferred taxes on rate base included. The patterns of revenue requirements are similar to those presented in Figure A, with the exception of the sinking fund with full inflation method. As the result of the increasing return and taxes related to accumulated deferred income taxes, the revenue requirements for this method are no longer uniform, but are increasing.

Normalization with All Tax Effects. Tables C1 through C5 are the same as Tables B1 through B5 with the addition of the tax deduction for negative net salvage reflected in the determination of the ratemaking allowance for income taxes. This deduction for ratemaking purposes is what generates the deferral that is accumulated and added to rate base.

Table C1 presents the results for the straight line accrual method. The annual accrual and the return and taxes related to rate base are the same as in Table B1. However, the annual income tax decrease of $6.52 (40% of $16.29) is incorporated, reducing the total revenue requirement to $39.10 and the present value of the revenue requirements to $31.72.

The expensing method shown in Table C2 reflects the income tax reduction of $65.16 (40% of $162.90) resulting in revenue requirements of $97.74 and a present value of revenue requirements of $45.27.

The amortization method with normalization and all tax effects is set forth in Table C3. The amortization or accrual amounts and the return and taxes related to rate base are the same as in Table B3. A reduction in the ratemaking allowance for income taxes of $13.03 is reflected in each year 11 through 15. Revenue requirements are $65.15 less than in Table B3 and total $136.84. The present value of the revenue requirements is $51.35.

In the sinking fund method with full recognition of inflation as presented in Table C4, the annuities and the return and taxes are the same in each year as Table B4. The revenue requirements have been further adjusted to reflect an annual reduction in income taxes for ratemaking purposes of $4.50 (40% of $11.24). The total revenue requirements are reduced to $101.07 and their present value is $64.35.

In the methods other than the sinking fund methods, the reduced tax resulting from the negative net salvage deduction is the amount which is added to the accumulated deferred income taxes. However, in the sinking fund methods, there is both a tax deduction and income, i.e., the earnings on the sinking fund. The earnings create a current tax liability and the deduction is a deferred benefit. Thus, the tax related to net salvage for ratemaking purposes is based on the net of the earnings and the total accrual (annuity plus earnings), or the annuity. The deferred income tax is the accumulation of the tax reduction related solely to the total accrual, annuity and earnings.

Table C5 presents the sinking fund method with recognition of inflation to date and also adjusts the revenue requirements to reflect the reduction in income taxes related to the deduction of the negative net salvage accrual. The tax reduction is 40% of the annuity in each year and totals $49.01. The revenue requirements are reduced by this amount to $102.65 and the present value of these revenue requirements is $62.40.

Figure C presents a graphical comparison of the revenue requirements in each year for normalization with all tax effects. The pattern is similar to Figure B. It should be noted that the revenue requirements for the straight line accrual method are negative in years 9 and 10.

Flow-Through. Tables D1 through D5 present the same methods for accruing negative net salvage as presented in the A, B and C tables. The flow-through tables are very similar to the "no tax effect" tables. The differences are the use of the tax-effected rate of return of 13.33% rather than the rate of return of 10% and the tax reduction related to the experienced negative net salvage in year 10. Because the tax benefit is flowed through to customers in the revenue requirement during the year in which the unit is retired, there are no deferred tax impacts on the revenue requirements while the unit is in service.

In the straight line accrual method in Table D1, the annual provision for removal is $16.29 in each year 1 through 10. The return and taxes related to the rate base reduction caused by the accrual are $162.87 and result in total revenue requirements of $0.03 or, absent rounding differences, $0.00. This result is due to the combination of life, tax-effected rate of return and the income tax rate. The present value of the revenue requirements is $22.73.

The expensing method is presented in Table D2 and results in an accrual of $162.90, a tax deduction of $65.16 (40% of $162.90) and a revenue requirement of $97.74 in year 10, the year in which the unit is retired. The present value of the revenue requirement is $45.27.

The amortization method with flow-through is set forth in Table D3. The accruals equal one-fifth of the experienced negative net salvage and are recorded in the years 11 through 15. The return and taxes, including the tax deduction being flowed through total $0.02 or, absent rounding differences, $0.00. The total revenue requirements are $162.88 and their present value is $55.40.

The sinking fund method with full inflation recognition and flow-through is illustrated in Table D4. The constant annuity of $11.24 is the same as in Tables A4, B4 and C4. The return and taxes reflect taxes on the fund earnings in each year and the deduction in year 10 when the negative net salvage is incurred and total $(45.07). The total revenue requirement is $67.40 and its present value is $56.67.

The sinking fund method with recognition of current inflation and flow-through is presented in Table D5. The annuities are the same as those in Tables A5, B5 and C5. The return and taxes reflect taxes on the fund earnings in each year and the deduction in year 10 when the negative net salvage is incurred and total $(47.69). The total revenue requirement is $74.84 and its present value is $56.53.

Figure D presents a graphical comparison of the revenue requirements in each year with flow-through for four of the five methods of accruing for net salvage. The patterns are very similar to those shown in the other figures with the exception of the significant reduction in revenue requirement which occurs in the year of retirement due to the tax deduction.

Summary for Single Vintage. The straight line accrual method provides an equal amount of provision toward negative net salvage during each year of the asset's service life. The expensing and amortization methods provide for negative net salvage at the end of or after an asset has rendered service. The sinking fund methods provide, through the combination of annuity and earnings, an increasing amount toward the recovery of negative net salvage. Care must be taken in the sinking fund method which recognizes inflation to date in order to provide for the correct amount of net salvage.

The pattern of revenue requirements varies with the several alternative methods of accruing for net salvage, but the introduction of tax effects does not alter the basic pattern. The straight line method produces decreasing revenue requirements over the life of an asset. The sinking fund method with full recognition of inflation produces uniform or increasing revenue requirements. The sinking fund method with partial recognition of inflation produces revenue requirements that increase at a more rapid rate than sinking fund with full inflation. Expensing only has revenue requirements in the year of retirement. Amortization results in decreasing revenue requirements in the five years following retirement.

A comparison of the revenue requirements and their present value for each method and tax consideration is presented on the following page. The straight line method minimizes the total revenue requirements and their present value regardless of the tax effects because recovery of the cost occurs earlier. Methods such as the amortization of experienced net salvage maximize revenue requirements because recovery is delayed.

Inasmuch as the relative magnitude, timing and present value of the methods is not affected by the introduction of taxes, the analysis of multiple vintages which follows is conducted for the "no tax effect" consideration.

MULTIPLE VINTAGES

The multiple vintage example consists of twenty units, one unit added at the beginning of each year from 1 to 20. Each unit has a 10-year service life. The example account experiences growth during years 1 through 10, stability during years 11 through 20 and decay during years 21 through 29. The cost to remove a unit today is $100 and increases 5 percent each year throughout the period. When the first unit is retired at the end of year 10 the negative net salvage is $162.90. At the time of the final unit's retirement at the end of year 29, the negative net salvage is $411.66. The total negative net salvage is $5,386.69.

COMPARISON OF REVENUE REQUIREMENTS AND
THEIR PRESENT VALUE FOR FIVE ALTERNATIVE METHODS
OF ACCRUING FOR NEGATIVE NET SALVAGE

		Normalization		
	No Tax Effect	Deferred Tax Only	All Taxes	Flow-Through
REVENUE REQUIREMENTS				
Straight Line Accrual	89.59	104.30	39.10	0.03
Expensing	162.90	162.90	97.74	97.74
Amortization	211.77	201.99	136.84	162.88
Sinking Fund:				
Full Recognition of Inflation	112.47	146.09	101.07	67.40
Recognition of Inflation to Date	122.53	151.66	102.65	74.84
PRESENT VALUE OF REVENUE REQUIREMENT				
Straight Line Accrual	66.98	75.48	31.72	22.73
Expensing	75.45	75.45	45.27	45.27
Amortization	79.25	75.45	51.35	55.40
Sinking Fund:				
Full Recognition of Inflation	75.45	94.56	64.35	56.67
Recognition of Inflation to Date	77.00	93.20	62.40	56.53

The straight line accrual method for the multiple vintage example is presented in Table A6. As noted in the single vintage example, the accrual for negative net salvage prior to its occurrence results in a reduction in rate base which offsets the revenue required for the accrual. Although the total accrual equals the experienced negative net salvage of $5,386.69, the total revenue requirement is only $2,693.28. The present value of the revenue requirement is $954.11. The revenue requirement increases during the periods of growth and stability and decreases during the period of decay. The revenue requirement per unit decreases during the period of growth, increases at the rate of inflation during stability and decreases during the period of decay.

The expensing method as shown in Table A7 also has an accrual of $5,386.69, but the revenue requirement is equal to, not less than, the accrual amount. The present value of the revenue requirements is $1,170.06. There is no revenue requirement during the period of growth and increasing revenue requirements during both the period of stability and the period of decay. The revenue requirements per unit in service increase from $16.29 in year 10 to $411.66 in year 29.

The amortization method for the multiple vintage example is presented in Table A8. The total accruals equal the experienced net salvage of $5,386.69 and the revenue requirement includes an additional amount of $1,346.67 because the negative net salvage increases rate base prior to the accrual. The present value of the revenue requirements is $1,182.29. There are no revenue requirements during the period of growth, increasing revenue requirements during the period of stability and decay and decreasing revenue requirements for the five years following the retirement of the final unit. The revenue requirements per unit increase from $4.29 in year 11 to $449.05 in year 29 and cannot be defined thereafter, as no units are in service.

The sinking fund method that recognizes the estimated price level in the year of retirement as shown in Table A9 has a total accrual and revenue requirement of $3,718.40. The present value of the revenue requirements is $1,170.06. The revenue

requirements increase during the periods of growth and stability and decrease during the period of decay. The revenue requirement or annuity per unit increases at a rate less than inflation during growth and decay and at the rate of inflation during stability.

The sinking fund method that recognizes the price level at the time of calculation is presented in Table A10. The total accrual and revenue requirement are $3,970.09 and have a present value of $1,171.14. The revenue requirements increase during the period of growth and stability and decrease during the period of decay. The revenue requirement or annuity per unit increases at a rate greater than inflation during growth and decay and at the rate of inflation during stability.

Figures E and F present the accrual per unit and the revenue requirements per unit, respectively, for the multiple vintage example. The straight line method produces the lowest revenue requirement per unit during the period of stability and decay. The sinking fund methods provide lower revenue requirements per unit during the period of growth.

ADDITIONAL ANALYSES REQUIRED

A more complex, longer life model with greater negative net salvage should be prepared for each of the alternative methods. The simple models presented herein assist in gaining an understanding of the factors at work. A more complex model that simulates an actual account such as distribution mains, poles or conductor that experiences significant negative net salvage should provide an indication of the manner in which the methods would actually impact a utility.

CONCLUSIONS

Each of the five alternatives can be designed to provide recovery of negative net salvage. The straight line accrual method minimizes the revenue requirements and the present value of revenue requirements in each of the examples. This minimization results from the significant amount of early accruals. The sinking fund

methods result in lower total revenue requirements than the expensing and amortization methods.

The accruals in the straight line accrual method are in accord with the loss in service value. The accruals in the sinking fund methods increase over the life of an asset. It could be argued that this delay in recovery increases the utility's risk and a greater rate of return would be required if a sinking fund method were used. The expensing and amortization methods do not provide for accruals in the early years of a group's life cycle and provide for the highest level of accruals when the service rendered is decreasing.

The selection of the most appropriate method for a utility depends on its circumstances and policies. Is uniform recovery or uniform revenue requirements most appropriate? Uniform recovery, the straight line accrual method, matches costs with the loss in service value. Uniform revenue requirements, the sinking fund method with full recognition of inflation, may be considered more in line with some policies. Perhaps, increasing revenue requirements, in keeping with all other costs, would be more palatable to today's customers.

There is much to be said for the straight line accrual method. The provision for negative net salvage is accrued in accord with the loss in service value of the assets. For a single asset, the revenue requirements decrease over time, offsetting likely increases in operation and maintenance expense. The total revenue requirements and their present value are less for the straight line method than any of the four other methods evaluated.

Finally, as noted in the multiple vintage example, the revenue requirements per unit increase at the rate of inflation during periods of stability and at a level less than both of the sinking fund methods.

FIGURES

Figure A

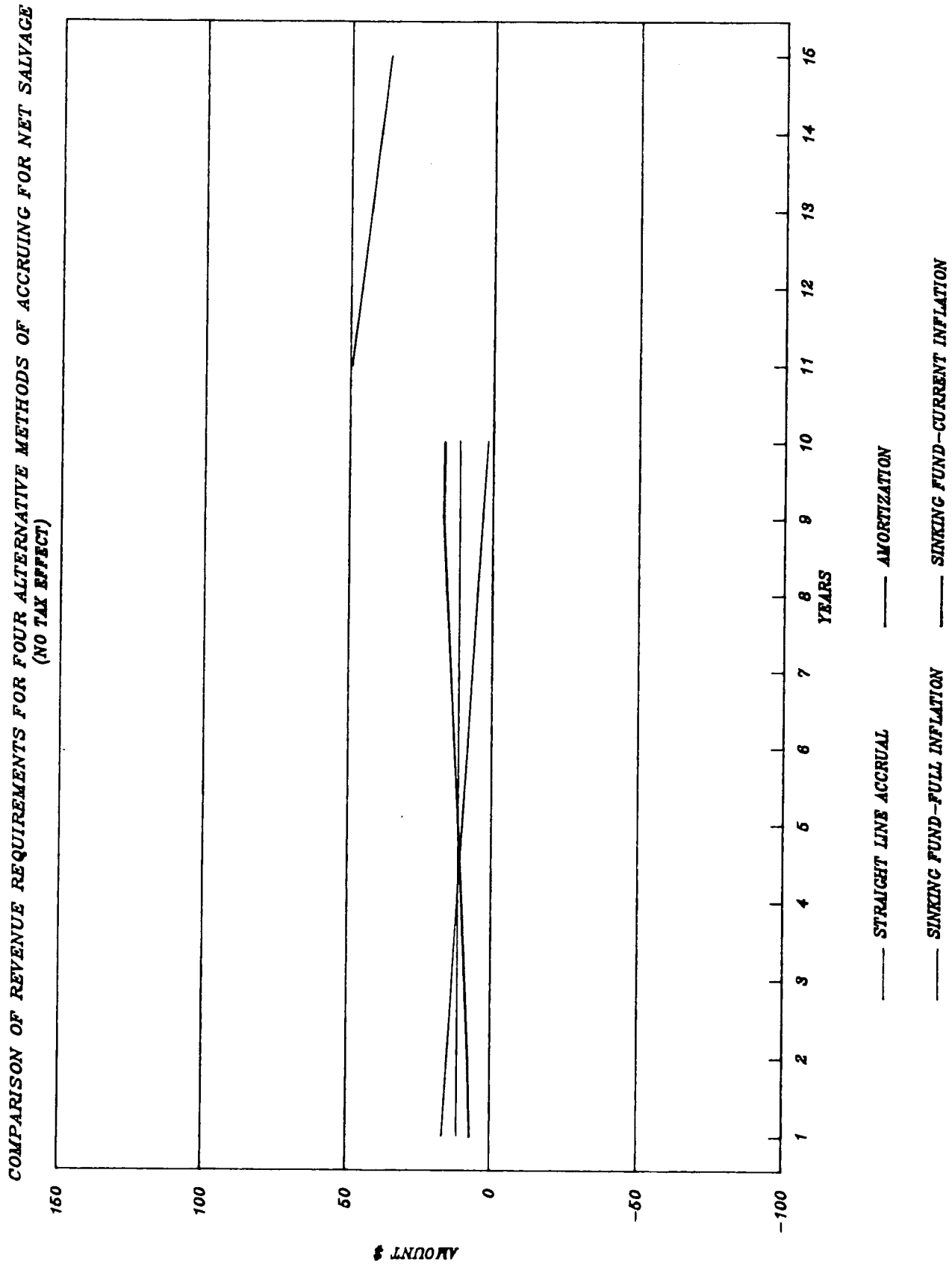

COMPARISON OF REVENUE REQUIREMENTS FOR FOUR ALTERNATIVE METHODS OF ACCRUING FOR NET SALVAGE
(NO TAX EFFECT)
AMOUNT $
150
100
50
0
-50
-100
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
YEARS
STRAIGHT LINE ACCRUAL
AMORTIZATION
SINKING FUND-FULL INFLATION
SINKING FUND-CURRENT INFLATION

Figure B

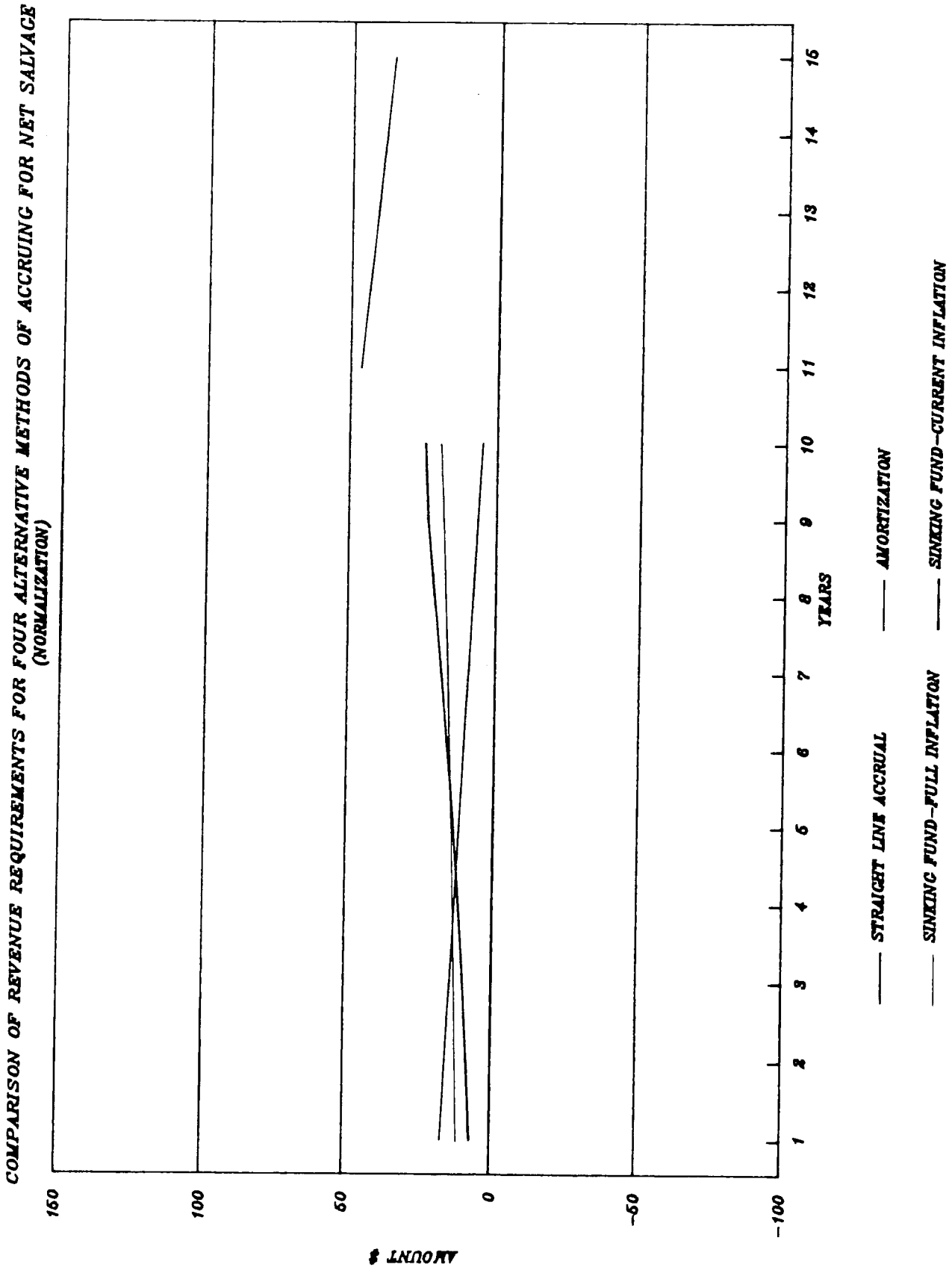
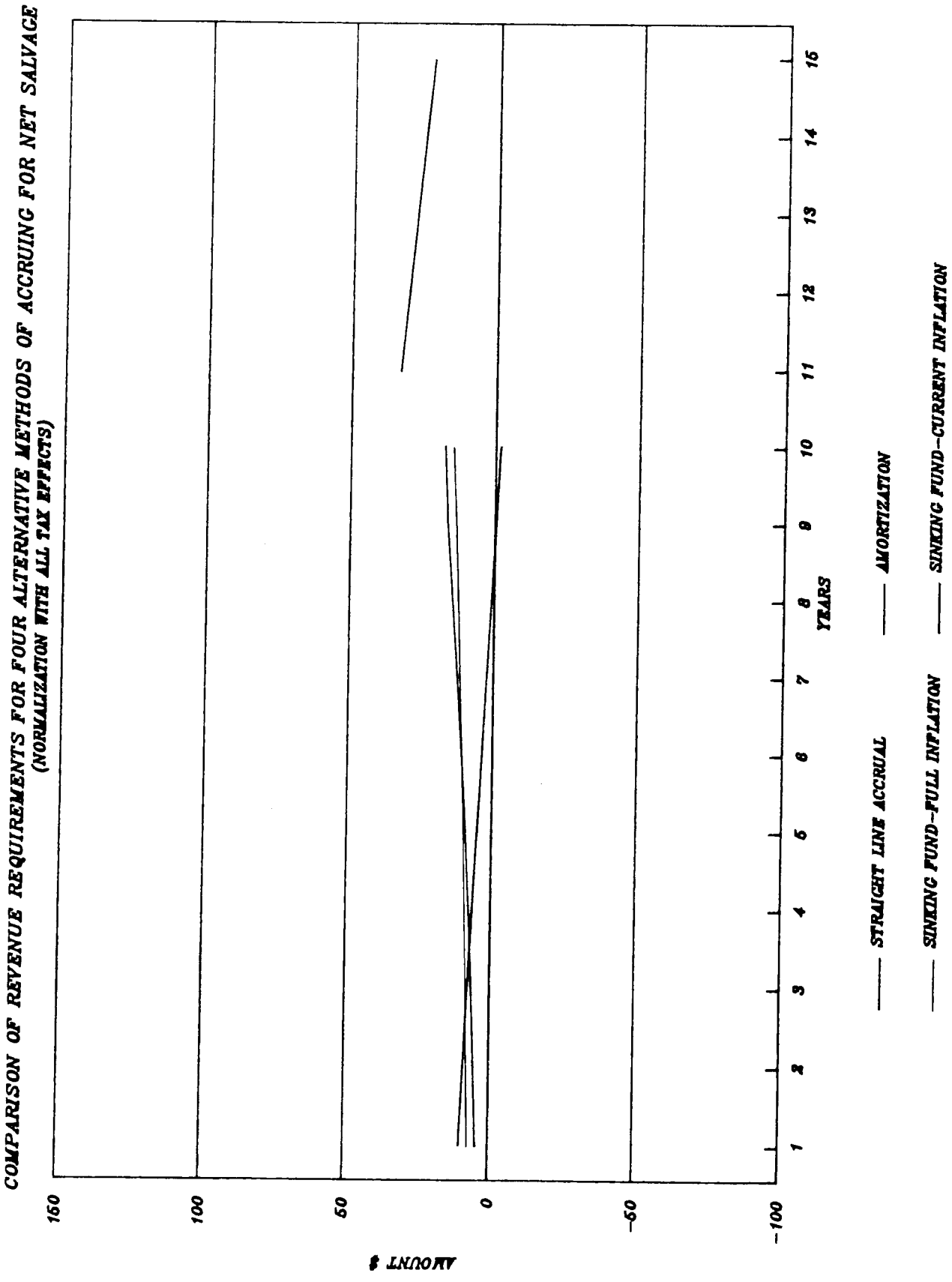

COMPARISON OF REVENUE REQUIREMENTS FOR FOUR ALTERNATIVE METHODS OF ACCRUING FOR NET SALVAGE
(NORMALIZATION)
AMOUNT $
160
100
50
0
-50
-100
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
YEARS
STRAIGHT LINE ACCRUAL
AMORTIZATION
SINKING FUND-FULL INFLATION
SINKING FUND-CURRENT INFLATION

Figure C


COMPARISON OF REVENUE REQUIREMENTS FOR FOUR ALTERNATIVE METHODS OF ACCRUING FOR NET SALVAGE
(NORMALIZATION WITH ALL TAX EFFECTS)
AMOUNT $
160
100
50
0
-50
-100
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
YEARS
STRAIGHT LINE ACCRUAL
AMORTIZATION
SINKING FUND-FULL INFLATION
SINKING FUND-CURRENT INFLATION

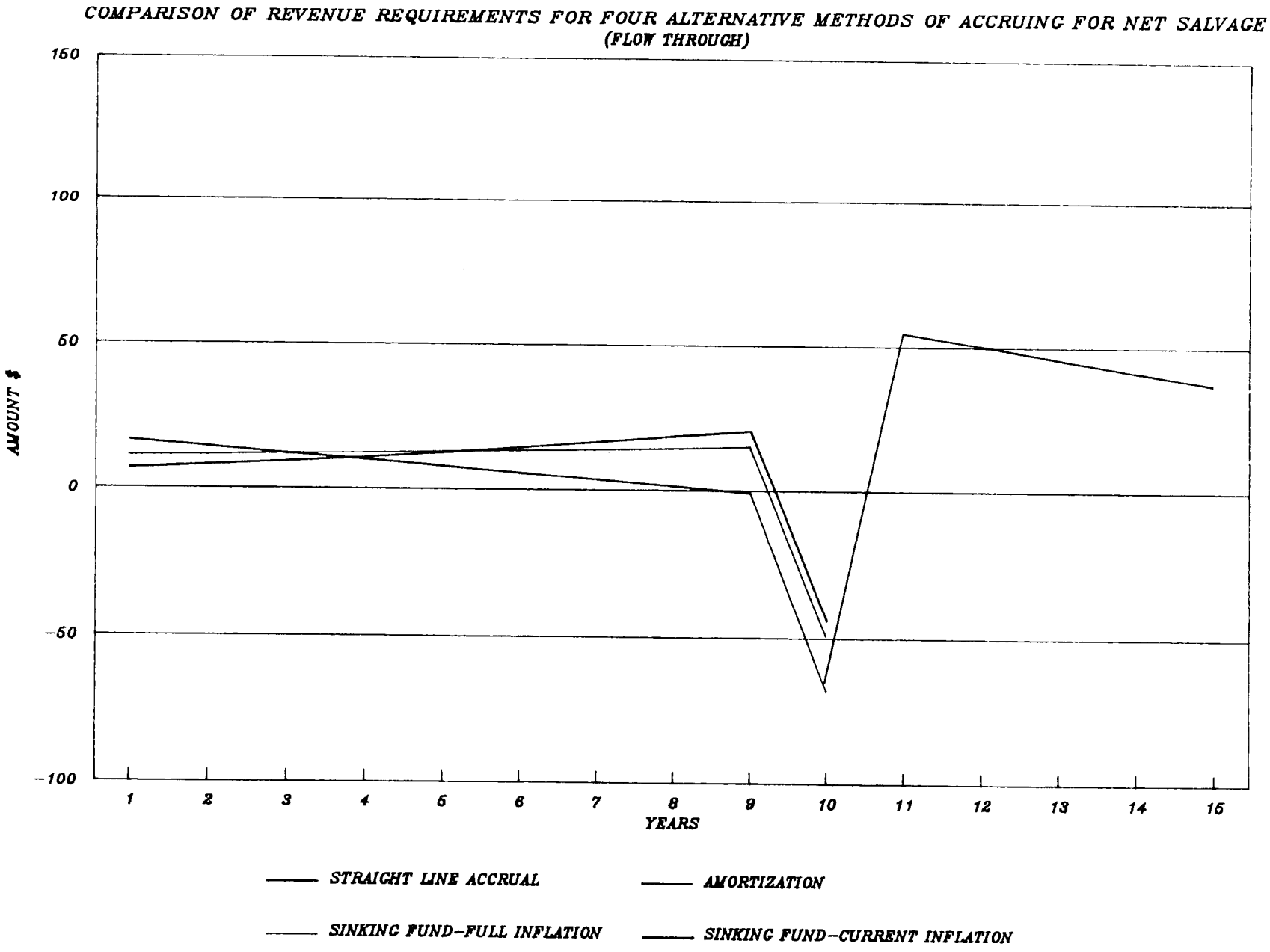
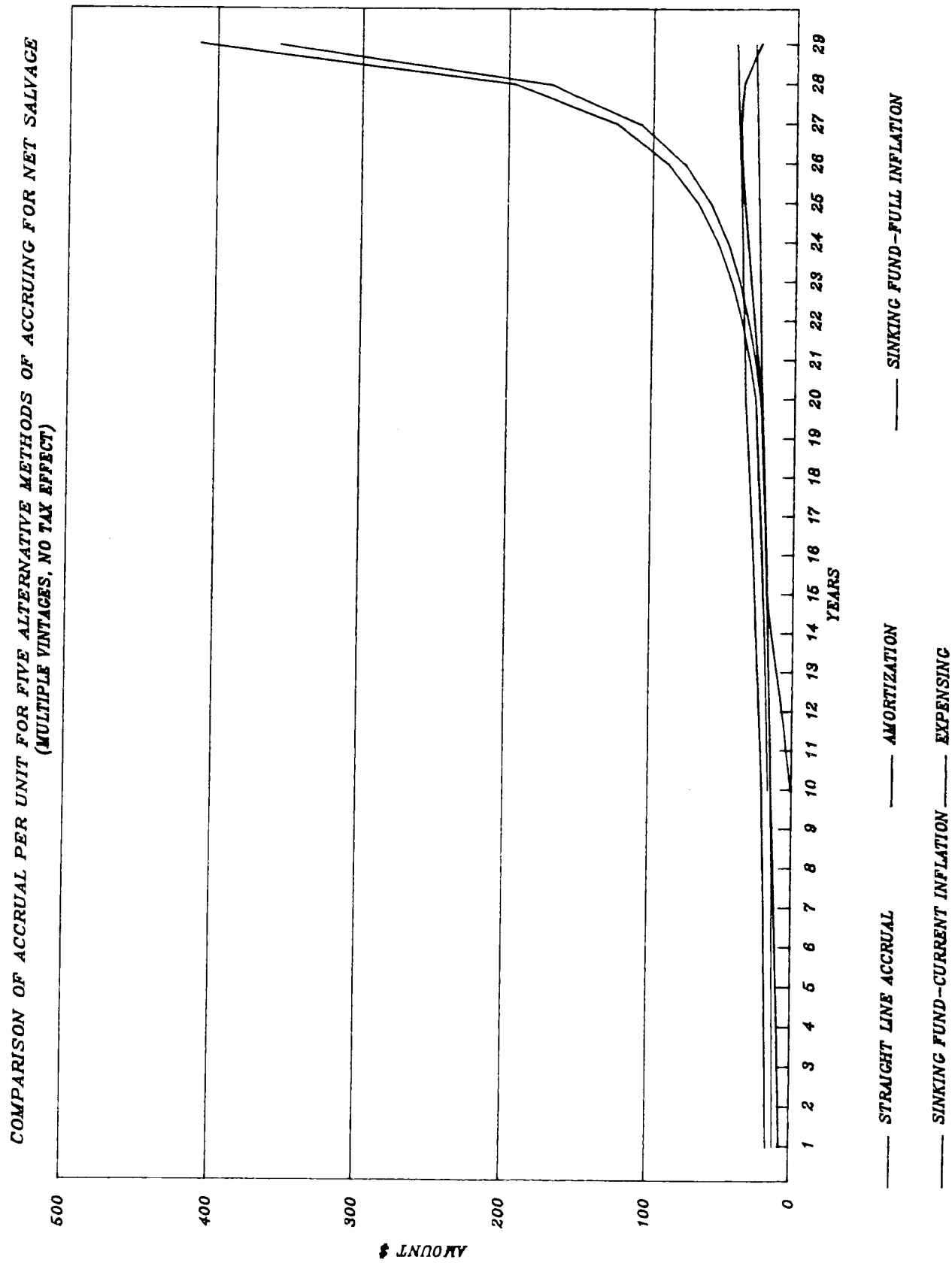

COMPARISON OF REVENUE REQUIREMENTS FOR FOUR ALTERNATIVE METHODS OF ACCRUING FOR NET SALVAGE
(FLOW THROUGH)
150
100
50
0
-50
-100
AMOUNT $
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
YEARS
STRAIGHT LINE ACCRUAL
AMORTIZATION
SINKING FUND-FULL INFLATION
SINKING FUND-CURRENT INFLATION

Figure D

Figure E


COMPARISON OF ACCRUAL PER UNIT FOR FIVE ALTERNATIVE METHODS OF ACCRUING FOR NET SALVAGE
(MULTIPLE VINTAGES, NO TAX EFFECT)
AMOUNT $
600
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
YEARS
STRAIGHT LINE ACCRUAL
AMORTIZATION
SINKING FUND-FULL INFLATION
SINKING FUND-CURRENT INFLATION
EXPENSING

COMPARISON OF REVENUE REQUIREMENTS PER UNIT FOR FIVE ALTERNATIVE METHODS OF ACCRUING FOR NET SALVAGE
(MULTIPLE VINTAGES, NO TAX EFFECT)

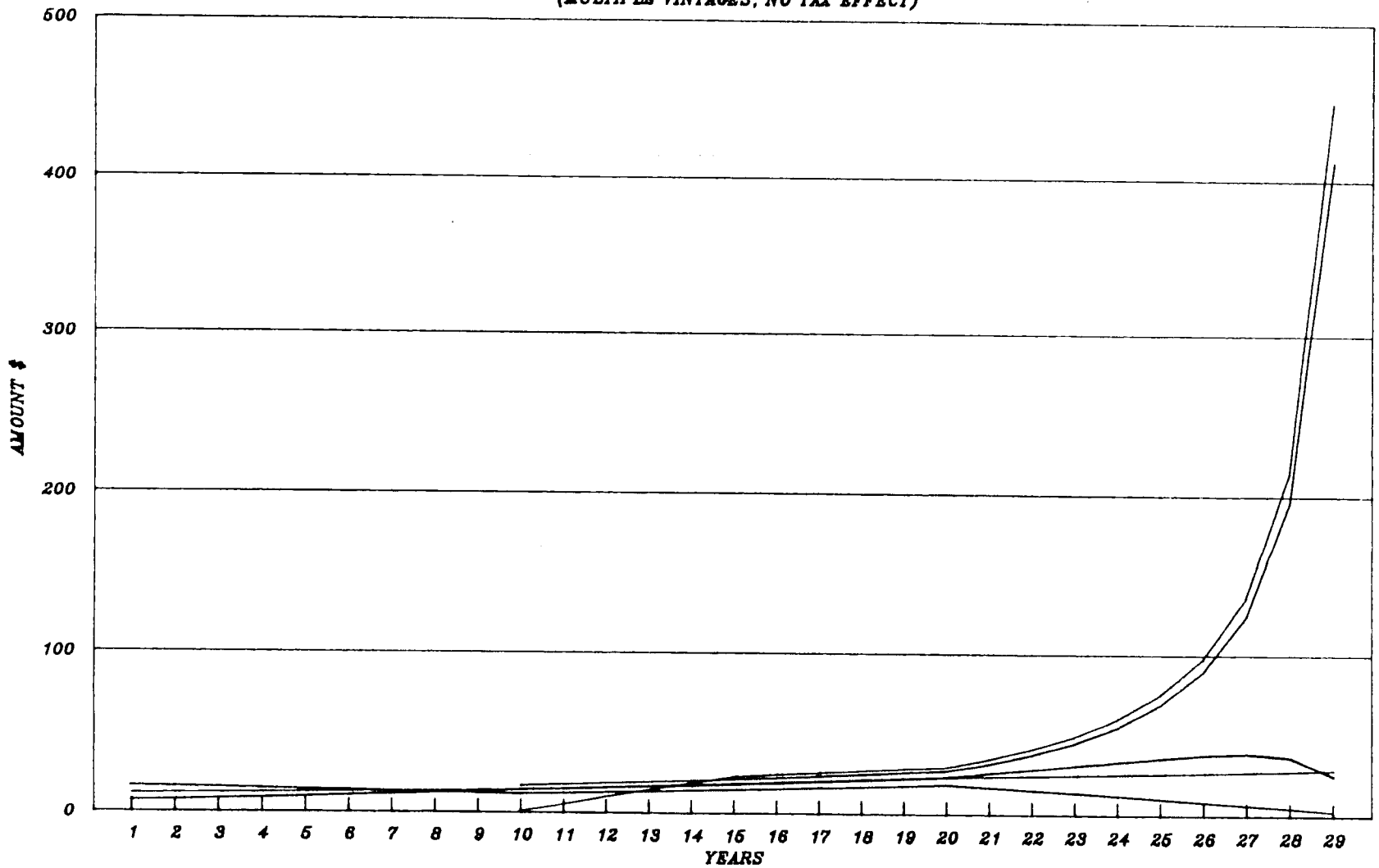


Figure F

TABLES

TABLE A1

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE STRAIGHT LINE ACCRUAL METHOD
(SINGLE VINTAGE, 10-SQUARE, NO TAX EFFECT)

	NET SALVAGE		BEGINNING OF YEAR		REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	RATE BASE	RETURN	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5) = (4) x 10%	(6) = (2) + (5)	(7)
1	16.29		-	-	16.29	15.08
2	16.29		(16.29)	(1.63)	14.66	12.57
3	16.29		(32.58)	(3.26)	13.03	10.34
4	16.29		(48.87)	(4.89)	11.40	8.38
5	16.29		(65.16)	(6.52)	9.77	6.65
6	16.29		(81.45)	(8.15)	8.14	5.13
7	16.29		(97.74)	(9.77)	6.52	3.80
8	16.29		(114.03)	(11.40)	4.89	2.64
9	16.29		(130.32)	(13.03)	3.26	1.63
10	16.29	(162.90)	(146.61)	(14.66)	1.63	0.76
11						
12						
13						
14						
15						
TOTAL	162.90	(162.90)		(73.31)	89.59	66.98

TABLE A2

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE EXPENSING METHOD
(SINGLE VINTAGE, 10-SQUARE, NO TAX EFFECT)

YEAR	NET SALVAGE		BEGINNING OF YEAR		REVENUE REQUIREMENT	
	ACCRUAL	EXPERIENCE	RATE BASE	RETURN	AMOUNT	PRESENT VALUE
	(1)	(2)	(3)	(4)	(5)=(4)x10%	(6)=(2)+(5)	(7)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10	162.90	(162.90)	0.00	0.00	162.90	75.45
11						
12						
13						
14						
15						
TOTAL	162.90	(162.90)		0.00	162.90	75.45

TABLE A3

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE AMORTIZATION METHOD
(SINGLE VINTAGE, 10-SQUARE, NO TAX EFFECT)

	NET SALVAGE		BEGINNING OF YEAR		REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	RATE BASE	RETURN	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)=(4)x10%	(6)=(2)+(5)	(7)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10		(162.90)				
11	32.58		162.90	16.29	48.87	20.96
12	32.58		130.32	13.03	45.61	18.11
13	32.58		97.74	9.77	42.35	15.57
14	32.58		65.16	6.52	39.10	13.31
15	32.58		32.58	3.26	35.84	11.30
TOTAL	162.90	(162.90)		48.87	211.77	79.25

TABLE A4

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE SINKING FUND METHOD
AND FULL RECOGNITION OF INFLATION
(SINGLE VINTAGE, 10-SQUARE, NO TAX EFFECT)

YEAR	NET SALVAGE ANNUITY	CUMULATIVE ACCRUALS AT BEG. OF YEAR	NET SALVAGE ACCRUAL	PRESENT VALUE OF REVENUE REQUIREMENT
(1)	(2)	(3)	(4)=(2)+.08(3)	(5)
1	11.24	0.00	11.24	10.41
2	11.24	11.24	12.14	9.64
3	11.24	23.38	13.11	8.92
4	11.24	36.49	14.16	8.26
5	11.24	50.65	15.29	7.65
6	11.24	65.94	16.52	7.08
7	11.24	82.46	17.84	6.56
8	11.24	100.29	19.26	6.07
9	11.24	119.56	20.80	5.62
10	11.31	140.36	22.54	5.24
11				
12				
13				
14				
15				
TOTAL	112.47		162.90	75.45

TABLE A5

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE SINKING FUND METHOD
AND RECOGNITION OF INFLATION TO DATE
(SINGLE VINTAGE, 10-SQUARE, NO TAX EFFECT)

	BEGINNING OF YEAR					PRESENT
	NET SALVAGE	NET SALVAGE	NET SALVAGE	CUMULATIVE ACCRUALS AT	NET SALVAGE	VALUE OF REVENUE
YEAR	IN CURRENT $	TO BE ACCRUED	ANNUITY	BEG. OF YEAR	ACCRUAL	REQUIREMENT
(1)	(2)	(3)=(2)-(5)	(4)	(5)	(6)=(4)+.08(5)	(7)
1	100.00	100.00	6.90	0.00	6.90	6.39
2	105.00	98.10	7.86	6.90	8.41	6.74
3	110.25	94.94	8.93	15.31	10.15	7.09
4	115.76	90.29	10.12	25.47	12.16	7.44
5	121.55	83.93	11.44	37.62	14.45	7.79
6	127.63	75.56	12.88	52.07	17.05	8.12
7	134.01	64.89	14.40	69.12	19.93	8.40
8	140.71	51.66	15.91	89.05	23.03	8.60
9	147.75	35.67	17.15	112.08	26.12	8.58
10	155.14	16.94	16.94	138.20	28.00	7.85
11						
12						
13						
14						
15						
TOTAL			122.53		166.20	77.00

TABLE A6

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE STRAIGHT LINE ACCRUAL METHOD
(MULTIPLE VINTAGES, 10-SQUARE, NO TAX EFFECT)

		NET SALVAGE					REVENUE REQUIREMENT		
YEAR	UNITS	ACCRUAL	ACCRUAL PER UNIT	EXPERIENCE	RATE BASE	RETURN	AMOUNT	AMOUNT PER UNIT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(6)x10%	(8)=(3)+(7)	(9)	(10)
1	1	16.29	16.29		(8.15)	(0.81)	15.48	15.48	14.33
2	2	33.40	16.70		(32.99)	(3.30)	30.10	15.05	25.81
3	3	51.36	17.12		(75.37)	(7.54)	43.82	14.61	34.79
4	4	70.21	17.55		(136.16)	(13.62)	56.59	14.15	41.60
5	5	90.01	18.00		(216.27)	(21.63)	68.38	13.68	46.54
6	6	110.81	18.47		(316.68)	(31.67)	79.14	13.19	49.87
7	7	132.64	18.95		(438.40)	(43.84)	88.80	12.69	51.81
8	8	155.56	19.45		(582.50)	(58.25)	97.31	12.16	52.57
9	9	179.63	19.96		(750.10)	(75.01)	104.62	11.62	52.34
10	10	204.90	20.49	(162.90)	(942.36)	(94.24)	110.66	11.07	51.26
11	10	215.15	21.52	(171.05)	(989.49)	(98.95)	116.20	11.62	49.84
12	10	225.90	22.59	(179.60)	(1,038.96)	(103.90)	122.00	12.20	48.45
13	10	237.20	23.72	(188.58)	(1,090.91)	(109.09)	128.11	12.81	47.11
14	10	249.06	24.91	(198.01)	(1,145.46)	(114.55)	134.51	13.45	45.80
15	10	261.52	26.15	(207.91)	(1,202.74)	(120.27)	141.25	14.13	44.53
16	10	274.59	27.46	(218.31)	(1,262.89)	(126.29)	148.30	14.83	43.29
17	10	288.32	28.83	(229.23)	(1,326.03)	(132.60)	155.72	15.57	42.09
18	10	302.74	30.27	(240.69)	(1,392.33)	(139.23)	163.51	16.35	40.92
19	10	317.88	31.79	(252.72)	(1,461.95)	(146.20)	171.68	17.17	39.78
20	10	333.77	33.38	(265.36)	(1,535.06)	(153.51)	180.26	18.03	38.67
21	9	307.23	34.14	(278.63)	(1,590.20)	(159.02)	148.21	16.47	29.44
22	8	279.37	34.92	(292.56)	(1,604.87)	(160.49)	118.88	14.86	21.87
23	7	250.11	35.73	(307.19)	(1,577.05)	(157.70)	92.41	13.20	15.74
24	6	219.40	36.57	(322.55)	(1,504.61)	(150.46)	68.94	11.49	10.87
25	5	187.14	37.43	(338.68)	(1,385.33)	(138.53)	48.61	9.72	7.10
26	4	153.27	38.32	(355.61)	(1,216.86)	(121.69)	31.58	7.90	4.27
27	3	117.71	39.24	(373.39)	(996.74)	(99.67)	18.04	6.01	2.26
28	2	80.37	40.19	(392.06)	(722.39)	(72.24)	8.13	4.07	0.94
29	1	41.15	41.15	(411.66)	(391.09)	(39.11)	2.04	2.04	0.22
30									
31									
32									
33									
34									
TOTAL		5,386.69		(5,386.69)		(2,693.41)	2,693.28		954.11

TABLE A7

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE EXPENSING METHOD
(MULTIPLE VINTAGES, 10-SQUARE, NO TAX EFFECT)

		NET SALVAGE					REVENUE REQUIREMENT		
YEAR	UNITS	ACCRUAL	ACCRUAL PER UNIT	EXPERIENCE	RATE BASE	RETURN	AMOUNT	AMOUNT PER UNIT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(6)x10%	(8)=(3)+(7)	(9)	(10)
1	1								
2	2								
3	3								
4	4								
5	5								
6	6								
7	7								
8	8								
9	9								
10	10	162.90	16.29	(162.90)	0.00	0.00	162.90	16.29	75.45
11	10	171.05	17.11	(171.05)	0.00	0.00	171.05	17.11	73.36
12	10	179.60	17.96	(179.60)	0.00	0.00	179.60	17.96	71.32
13	10	188.58	18.86	(188.58)	0.00	0.00	188.58	18.86	69.34
14	10	198.01	19.80	(198.01)	0.00	0.00	198.01	19.80	67.41
15	10	207.91	20.79	(207.91)	0.00	0.00	207.91	20.79	65.54
16	10	218.31	21.83	(218.31)	0.00	0.00	218.31	21.83	63.72
17	10	229.23	22.92	(229.23)	0.00	0.00	229.23	22.92	61.95
18	10	240.69	24.07	(240.69)	0.00	0.00	240.69	24.07	60.23
19	10	252.72	25.27	(252.72)	0.00	0.00	252.72	25.27	58.56
20	10	265.36	26.54	(265.36)	0.00	0.00	265.36	26.54	56.93
21	9	278.63	30.96	(278.63)	0.00	0.00	278.63	30.96	55.35
22	8	292.56	36.57	(292.56)	0.00	0.00	292.56	36.57	53.81
23	7	307.19	43.88	(307.19)	0.00	0.00	307.19	43.88	52.32
24	6	322.55	53.76	(322.55)	0.00	0.00	322.55	53.76	50.87
25	5	338.68	67.74	(338.68)	0.00	0.00	338.68	67.74	49.45
26	4	355.61	88.90	(355.61)	0.00	0.00	355.61	88.90	48.08
27	3	373.39	124.46	(373.39)	0.00	0.00	373.39	124.46	46.74
28	2	392.06	196.03	(392.06)	0.00	0.00	392.06	196.03	45.45
29	1	411.66	411.66	(411.06)	0.00	0.00	411.66	411.66	44.18
30									
31									
32									
33									
34									
TOTAL		5,386.69		(5,386.09)		0.00	5,386.69		1,170.06

TABLE A8

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE AMORTIZATION METHOD
(MULTIPLE VINTAGES, 10-SQUARE, NO TAX EFFECT)

		NET SALVAGE					REVENUE REQUIREMENT		
YEAR	UNITS	ACCRUAL	ACCRUAL PER UNIT	EXPERIENCE	RATE BASE	RETURN	AMOUNT	AMOUNT PER UNIT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(6)x10%	(8)=(3)+(7)	(9)	(10)
1	1								
2	2								
3	3								
4	4								
5	5								
6	6								
7	7								
8	8								
9	9								
10	10	0.00	0.00	(162.90)	0.00	0.00	0.00	0.00	0.00
11	10	32.58	3.26	(171.05)	146.61	14.66	47.24	4.72	20.26
12	10	66.79	6.68	(179.60)	267.98	26.80	93.59	9.36	37.17
13	10	102.71	10.27	(188.58)	362.83	36.28	138.99	13.90	51.11
14	10	140.43	14.04	(198.01)	429.84	42.98	183.41	18.34	62.44
15	10	180.03	18.00	(207.91)	467.62	46.76	226.79	22.68	71.49
16	10	189.03	18.90	(218.31)	491.00	49.10	238.13	23.81	69.51
17	10	198.48	19.85	(229.23)	515.55	51.56	250.04	25.00	67.58
18	10	208.41	20.84	(240.69)	541.34	54.13	262.54	26.25	65.70
19	10	218.83	21.88	(252.72)	568.41	56.84	275.67	27.57	63.88
20	10	229.77	22.98	(265.36)	596.83	59.68	289.45	28.95	62.10
21	9	241.26	26.81	(278.63)	626.67	62.67	303.93	33.77	60.38
22	8	253.33	31.67	(292.56)	658.01	65.80	319.13	39.89	58.70
23	7	265.99	38.00	(307.19)	690.91	69.09	335.08	47.87	57.07
24	6	279.29	46.55	(322.55)	725.46	72.55	351.84	58.64	55.48
25	5	293.26	58.65	(338.68)	761.73	76.17	369.43	73.89	53.94
26	4	307.92	76.98	(355.61)	799.82	79.98	387.90	96.98	52.44
27	3	323.32	107.77	(373.39)	839.81	83.98	407.30	135.77	50.99
28	2	339.48	169.74	(392.06)	881.80	88.18	427.66	213.83	49.57
29	1	356.46	356.46	(411.06)	925.89	92.59	449.05	449.05	48.20
30	-	374.28			972.18	97.22	471.50		46.86
31	-	306.54			631.77	63.18	369.72		34.02
32	-	235.42			360.79	36.08	271.50		23.13
33	-	160.74			162.71	16.27	177.01		13.96
34	-	82.33			41.18	4.12	86.45		6.31
TOTAL		5,386.68		(5,386.09)		1,346.67	6,733.35		1,182.29

TABLE A9

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE SINKING FUND METHOD
AND FULL RECOGNITION OF INFLATION
(MULTIPLE VINTAGES, 10-SQUARE, NO TAX EFFECT)

		NET SALVAGE					PRESENT
			ANNUITY		CUMULATIVE ACCRUALS AT	NET SALVAGE	VALUE OF REVENUE
YEAR	UNITS	ACCRUAL	PER UNIT	EXPERIENCE	BEG. OF YEAR	ACCRUAL	REQUIREMENT
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(3)+.08(6)	(8)
1	1	11.24	11.24		0.00	11.24	10.41
2	2	23.05	11.53		11.24	23.95	19.76
3	3	35.45	11.82		35.19	38.27	28.14
4	4	48.47	12.12		73.45	54.35	35.63
5	5	62.14	12.43		127.80	72.36	42.29
6	6	76.49	12.75		200.16	92.50	48.20
7	7	91.56	13.08		292.67	114.97	53.42
8	8	107.38	13.42		407.64	139.99	58.01
9	9	124.00	13.78		547.63	167.81	62.03
10	10	141.44	14.14	(162.90)	715.44	198.68	65.51
11	10	148.51	14.85	(171.05)	751.22	208.61	63.69
12	10	155.94	15.59	(179.60)	788.78	219.04	61.93
13	10	163.74	16.37	(188.58)	828.22	230.00	60.21
14	10	171.93	17.19	(198.01)	869.64	241.50	58.54
15	10	180.52	18.05	(207.91)	913.13	253.57	56.91
16	10	189.55	18.96	(218.31)	958.79	266.25	55.33
17	10	199.03	19.90	(229.23)	1,006.73	279.57	53.79
18	10	208.98	20.90	(240.69)	1,057.07	293.55	52.30
19	10	219.43	21.94	(252.72)	1,109.92	308.22	50.84
20	10	230.40	23.04	(265.36)	1,165.43	323.63	49.43
21	9	212.08	23.56	(278.63)	1,223.70	309.98	42.13
22	8	192.85	24.11	(292.56)	1,255.05	293.25	35.47
23	7	172.65	24.66	(307.19)	1,255.74	273.11	29.40
24	6	151.45	25.24	(322.55)	1,221.66	249.18	23.88
25	5	129.18	25.84	(338.68)	1,148.29	221.04	18.86
26	4	105.80	26.45	(355.61)	1,030.66	188.25	14.30
27	3	81.26	27.09	(373.39)	863.30	150.32	10.17
28	2	55.48	27.74	(392.06)	640.23	106.70	6.43
29	1	28.40	28.40	(411.66)	354.87	56.79	3.05
30							
31							
32							
33							
34							
TOTAL		3,718.40		(5,386.69)		5,386.69	1,170.06

TABLE A10

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE SINKING FUND METHOD
AND RECOGNITION OF INFLATION TO DATE
(MULTIPLE VINTAGES, 10-SQUARE, NO TAX EFFECT)

		AT BEGINNING OF YEAR		NET SALVAGE					PRESENT
YEAR	UNITS	NET SALVAGE IN CURRENT $	NET SALVAGE TO BE ACCRUED	ACCRUAL	ANNUITY PER UNIT	EXPERIENCE	CUMULATIVE ACCRUALS AT BEG. OF YEAR	NET SALVAGE ACCRUAL	VALUE OF REVENUE REQUIREMENT
(1)	(2)	(3)	(4)=(3)-(7)	(5)	(6)	(7)	(8)	(9)=(5)+.08(8)	(10)
1	1	100.00	100.00	6.90	6.90		0.00	6.90	6.39
2	2	210.00	203.10	15.08	7.54		6.90	15.63	12.93
3	3	330.75	308.22	24.68	8.23		22.53	26.48	19.59
4	4	463.04	414.03	35.86	8.97		49.01	39.78	26.36
5	5	607.75	518.95	48.79	9.76		88.80	55.89	33.21
6	6	765.78	621.09	63.62	10.60		144.69	75.20	40.09
7	7	938.07	718.19	80.49	11.50		219.88	98.08	46.97
8	8	1,125.68	807.71	99.54	12.44		317.97	124.98	53.78
9	9	1,329.75	886.81	120.89	13.43		442.94	156.33	60.48
10	10	1,551.40	952.13	144.54	14.45	(162.90)	599.27	192.48	66.95
11	10	1,629.00	1,000.15	151.83	15.18	(171.05)	628.85	202.14	65.12
12	10	1,710.50	1,050.56	159.49	15.95	(179.60)	659.94	212.29	63.34
13	10	1,796.00	1,103.38	167.51	16.75	(188.58)	692.62	222.92	61.59
14	10	1,885.80	1,158.84	175.92	17.59	(198.01)	726.96	234.08	59.89
15	10	1,980.10	1,217.07	184.76	18.48	(207.91)	763.03	245.80	58.24
16	10	2,079.10	1,278.18	194.04	19.40	(218.31)	800.92	258.11	56.64
17	10	2,183.10	1,342.37	203.79	20.38	(229.23)	840.73	271.05	55.08
18	10	2,292.30	1,409.76	214.02	21.40	(240.69)	882.54	284.62	53.56
19	10	2,406.90	1,480.42	224.74	22.47	(252.72)	926.48	298.86	52.07
20	10	2,527.20	1,554.59	236.00	23.60	(265.36)	972.61	313.81	50.63
21	9	2,388.24	1,367.18	233.04	25.89	(278.63)	1,021.06	314.73	46.29
22	8	2,229.04	1,171.88	226.53	28.32	(292.56)	1,057.16	311.10	41.67
23	7	2,047.92	972.22	215.76	30.82	(307.19)	1,075.70	301.82	36.75
24	6	1,843.14	772.81	200.00	33.33	(322.55)	1,070.33	285.63	31.54
25	5	1,612.75	579.35	178.46	35.69	(338.68)	1,033.40	261.13	26.06
26	4	1,354.72	398.86	150.40	37.60	(355.61)	955.86	226.87	20.33
27	3	1,066.83	239.72	115.25	38.42	(373.39)	827.11	181.42	14.43
28	2	746.78	111.64	72.98	36.49	(392.06)	635.14	123.79	8.46
29	1	392.06	25.18	25.18	25.18	(411.66)	366.88	54.53	2.70
30									
31									
32									
33									
34									
TOTAL				3,970.09		(5,386.69)		5,396.44	1,171.14

TABLE B1

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE STRAIGHT LINE ACCRUAL METHOD
(SINGLE VINTAGE, 10-SQUARE, NORMALIZATION)

	NET SALVAGE		BEGINNING OF YEAR			REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	DEFERRED TAXES	RATE BASE	RETURN AND TAXES	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	16.29		-	-	-	16.29	15.08
2	16.29		6.52	(9.77)	(1.30)	14.99	12.85
3	16.29		13.04	(19.54)	(2.60)	13.69	10.87
4	16.29		19.56	(29.31)	(3.91)	12.38	9.10
5	16.29		26.08	(39.08)	(5.21)	11.08	7.54
6	16.29		32.60	(48.85)	(6.51)	9.78	6.16
7	16.29		39.12	(58.62)	(7.81)	8.48	4.95
8	16.29		45.64	(68.39)	(9.12)	7.17	3.87
9	16.29		52.16	(78.16)	(10.42)	5.87	2.94
10	16.29	(162.90)	58.68	(87.93)	(11.72)	4.57	2.12
11							
12							
13							
14							
15							
TOTAL	162.90	(162.90)			(58.60)	104.30	75.48

TABLE B2

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE EXPENSING METHOD
(SINGLE VINTAGE, 10-SQUARE, NORMALIZATION)

	NET SALVAGE		BEGINNING OF YEAR			REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	DEFERRED TAXES	RATE BASE	RETURN AND TAXES	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10	162.90	(162.90)	-	-	-	162.90	75.45
11							
12							
13							
14							
15							
TOTAL	162.90	(162.90)	-	-	-	162.90	75.45

TABLE B3

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE AMORTIZATION METHOD
(SINGLE VINTAGE, 10-SQUARE, NORMALIZATION)

	NET SALVAGE		BEGINNING OF YEAR			REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	DEFERRED TAXES	RATE BASE	RETURN AND TAXES	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10		(162.90)					
11	32.58		(65.16)	97.74	13.03	45.61	19.56
12	32.58		(52.13)	78.19	10.42	43.00	17.08
13	32.58		(39.10)	58.64	7.82	40.40	14.85
14	32.58		(26.06)	39.10	5.21	37.79	12.87
15	32.58		(13.03)	19.55	2.61	35.19	11.09
TOTAL	162.90	(162.90)			39.09	201.99	75.45

TABLE B4

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE SINKING FUND METHOD
AND FULL RECOGNITION OF INFLATION
(SINGLE VINTAGE, 10-SQUARE, NORMALIZATION)

YEAR	NET SALVAGE ANNUITY	CUMULATIVE ACCRUALS AT BEG. OF YEAR	NET SALVAGE ACCRUALS	BEGINNING OF YEAR DEFERRED TAXES	RETURN AND TAXES	REVENUE REQUIREMENT	
						AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	11.24	-	11.24	-	-	11.24	10.41
2	11.24	11.24	12.14	4.50	0.60	11.84	10.15
3	11.24	23.38	13.11	9.35	1.25	12.49	9.91
4	11.24	36.49	14.16	14.60	1.95	13.19	9.70
5	11.24	50.65	15.29	20.26	2.70	13.94	9.49
6	11.24	65.94	16.52	26.38	3.52	14.76	9.30
7	11.24	82.46	17.84	32.98	4.40	15.64	9.13
8	11.24	100.29	19.26	40.12	5.35	16.59	8.96
9	11.24	119.56	20.80	47.82	6.37	17.61	8.81
10	11.31	140.36	22.54	56.14	7.48	18.79	8.70
11							
12							
13							
14							
15							
TOTAL	112.47		162.90		33.62	146.09	94.56

TABLE B5

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE SINKING FUND METHOD
AND RECOGNITION OF INFLATION TO DATE
(SINGLE VINTAGE, 10-SQUARE, NORMALIZATION)

	BEGINNING OF YEAR					BEGINNING		REVENUE REQUIREMENT	
YEAR	NET SALVAGE IN CURRENT $	NET SALVAGE TO BE ACCRUED	NET SALVAGE ANNUITY	CUMULATIVE ACCRUALS AT BEG. OF YEAR	NET SALVAGE ACCRUAL	OF YEAR DEFERRED TAXES	RETURN AND TAXES	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	100.00	100.00	6.90	-	6.90	-	-	6.90	6.39
2	105.00	98.10	7.86	6.90	8.41	2.76	0.37	8.23	7.06
3	110.25	94.94	8.93	15.31	10.15	6.12	0.82	9.75	7.74
4	115.76	90.29	10.12	25.47	12.16	10.19	1.36	11.48	8.44
5	121.55	83.93	11.44	37.62	14.45	15.05	2.01	13.45	9.15
6	127.63	75.56	12.88	52.07	17.05	20.83	2.78	15.66	9.87
7	134.01	64.89	14.40	69.12	19.93	27.65	3.69	18.09	10.56
8	140.71	51.66	15.91	89.05	23.03	35.62	4.75	20.66	11.16
9	147.75	35.67	17.15	112.08	26.12	44.83	5.98	23.13	11.57
10	155.14	16.94	16.94	138.20	28.00	55.28	7.37	24.31	11.26
11									
12									
13									
14									
15									
TOTAL			122.53		166.20		29.13	151.66	93.20

TABLE C1

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE STRAIGHT LINE ACCRUAL METHOD
(SINGLE VINTAGE, 10-SQUARE, NORMALIZATION WITH ALL TAX EFFECTS)

	NET SALVAGE		BEGINNING OF YEAR			TAX	REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	DEFERRED TAXES	RATE BASE	RETURN AND TAXES	RELATED TO NET SALVAGE	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	16.29		-	-	-	(6.52)	9.77	9.05
2	16.29		6.52	(9.77)	(1.30)	(6.52)	8.47	7.26
3	16.29		13.04	(19.54)	(2.60)	(6.52)	7.17	5.69
4	16.29		19.56	(29.31)	(3.91)	(6.52)	5.86	4.31
5	16.29		26.08	(39.08)	(5.21)	(6.52)	4.56	3.10
6	16.29		32.60	(48.85)	(6.51)	(6.52)	3.26	2.05
7	16.29		39.12	(58.62)	(7.81)	(6.52)	1.96	1.14
8	16.29		45.64	(68.39)	(9.12)	(6.52)	0.65	0.35
9	16.29		52.16	(78.16)	(10.42)	(6.52)	(0.65)	(0.33)
10	16.29	(162.90)	58.68	(87.93)	(11.72)	(6.52)	(1.95)	(0.90)
11								
12								
13								
14								
15								
TOTAL	162.90	(162.90)			(58.60)	(65.20)	39.10	31.72

TABLE C2

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE EXPENSING METHOD
(SINGLE VINTAGE, 10-SQUARE, NORMALIZATION WITH ALL TAX EFFECTS)

	NET SALVAGE		BEGINNING OF YEAR			TAX	REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	DEFERRED TAXES	RATE BASE	RETURN AND TAXES	RELATED TO NET SALVAGE	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(7)	(8)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10	162.90	(162.90)	-	-	-	(65.16)	97.74	45.27
11								
12								
13								
14								
15								
TOTAL	162.90	(162.90)	-	-	-	(65.16)	97.74	45.27

TABLE C3

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE AMORTIZATION METHOD
(SINGLE VINTAGE, 10-SQUARE, NORMALIZATION WITH ALL TAX EFFECTS)

	NET SALVAGE		BEGINNING OF YEAR			TAX	REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	DEFERRED TAXES	RATE BASE	RETURN AND TAXES	RELATED TO NET SALVAGE	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10		(162.90)						
11	32.58		(65.16)	97.74	13.03	(13.03)	32.58	13.97
12	32.58		(52.13)	78.19	10.42	(13.03)	29.97	11.90
13	32.58		(39.10)	58.64	7.82	(13.03)	27.37	10.06
14	32.58		(26.06)	39.10	5.21	(13.03)	24.76	8.43
15	32.58		(13.03)	19.55	2.61	(13.03)	22.16	6.99
TOTAL	162.90	(162.90)			39.09	(65.15)	136.84	51.35

TABLE C4

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE SINKING FUND METHOD
AND FULL RECOGNITION OF INFLATION
(SINGLE VINTAGE, 10-SQUARE, NORMALIZATION WITH ALL TAX EFFECTS)

YEAR	NET SALVAGE ANNUITY	CUMULATIVE ACCRUALS AT BEG. OF YEAR	NET SALVAGE ACCRUALS	BEGINNING OF YEAR DEFERRED TAXES	RETURN AND TAXES	TAX RELATED TO NET SALVAGE	REVENUE REQUIREMENT	
							AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	11.24	-	11.24	-	-	(4.50)	6.74	6.24
2	11.24	11.24	12.14	4.50	0.60	(4.50)	7.34	6.29
3	11.24	23.38	13.11	9.35	1.25	(4.50)	7.99	6.34
4	11.24	36.49	14.16	14.60	1.95	(4.50)	8.69	6.39
5	11.24	50.65	15.29	20.26	2.70	(4.50)	9.44	6.42
6	11.24	65.94	16.52	26.38	3.52	(4.50)	10.26	6.47
7	11.24	82.46	17.84	32.98	4.40	(4.50)	11.14	6.50
8	11.24	100.29	19.26	40.12	5.35	(4.50)	12.09	6.53
9	11.24	119.56	20.80	47.82	6.37	(4.50)	13.11	6.56
10	11.31	140.36	22.54	56.14	7.48	(4.52)	14.27	6.61
11								
12								
13								
14								
15								
TOTAL	112.47		162.90		33.62	(45.02)	101.07	64.35

TABLE C5

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE SINKING FUND METHOD
AND RECOGNITION OF INFLATION TO DATE
(SINGLE VINTAGE, 10-SQUARE, NORMALIZATION WITH ALL TAX EFFECTS)

	BEGINNING OF YEAR					BEGINNING			REVENUE REQUIREMENT	
YEAR	NET SALVAGE IN CURRENT $	NET SALVAGE TO BE ACCRUED	NET SALVAGE ANNUITY	CUMULATIVE ACCRUALS AT BEG. OF YEAR	NET SALVAGE ACCRUAL	OF YEAR DEFERRED TAXES	RETURN AND TAXES	TAX RELATED TO NET SALVAGE	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	100.00	100.00	6.90	-	6.90	-	-	(2.76)	4.14	3.83
2	105.00	98.10	7.86	6.90	8.41	2.76	0.37	(3.14)	5.09	4.36
3	110.25	94.94	8.93	15.31	10.15	6.12	0.82	(3.57)	6.18	4.91
4	115.76	90.29	10.12	25.47	12.16	10.19	1.36	(4.05)	7.43	5.46
5	121.55	83.93	11.44	37.62	14.45	15.05	2.01	(4.58)	8.87	6.04
6	127.63	75.56	12.88	52.07	17.05	20.83	2.78	(5.15)	10.51	6.62
7	134.01	64.89	14.40	69.12	19.93	27.65	3.69	(5.76)	12.33	7.19
8	140.71	51.66	15.91	89.05	23.03	35.62	4.75	(6.36)	14.30	7.73
9	147.75	35.67	17.15	112.08	26.12	44.83	5.98	(6.86)	16.27	8.14
10	155.14	16.94	16.94	138.20	28.00	55.28	7.37	(6.78)	17.53	8.12
11										
12										
13										
14										
15										
TOTAL			122.53		166.20		29.13	(49.01)	102.65	62.40

TABLE D1

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE STRAIGHT LINE ACCRUAL METHOD
(SINGLE VINTAGE, 10-SQUARE, FLOW THROUGH)

	NET SALVAGE		BEGINNING OF YEAR	RETURN	REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	RATE BASE	AND TAXES	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	16.29		-	-	16.29	15.08
2	16.29		(16.29)	(2.17)	14.12	12.11
3	16.29		(32.58)	(4.34)	11.95	9.49
4	16.29		(48.87)	(6.51)	9.78	7.19
5	16.29		(65.16)	(8.69)	7.60	5.17
6	16.29		(81.45)	(10.86)	5.43	3.42
7	16.29		(97.74)	(13.03)	3.26	1.90
8	16.29		(114.03)	(15.20)	1.09	0.59
9	16.29		(130.32)	(17.37)	(1.08)	(0.54)
10	16.29	(162.90)	(146.61)	(84.70)	(68.41)	(31.68)
11						
12						
13						
14						
15						
TOTAL	162.90	(162.90)		(162.87)	0.03	22.73

TABLE D2

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE EXPENSING METHOD
(SINGLE VINTAGE, 10-SQUARE, FLOW THROUGH)

	NET SALVAGE		BEGINNING		REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	OF YEAR RATE BASE	RETURN AND TAXES	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10	162.90	(162.90)	0.00	(65.16)	97.74	45.27
11						
12						
13						
14						
15						
TOTAL	162.90	(162.90)		(65.16)	97.74	45.27

TABLE D3

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE AMORTIZATION METHOD
(SINGLE VINTAGE, 10-SQUARE, FLOW THROUGH)

	NET SALVAGE		BEGINNING OF YEAR		REVENUE REQUIREMENT	
YEAR	ACCRUAL	EXPERIENCE	RATE BASE	RETURN AND TAXES	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10		(162.90)		(65.16)	(65.16)	(30.18)
11	32.58		162.90	21.71	54.29	23.28
12	32.58		130.32	17.37	49.95	19.84
13	32.58		97.74	13.03	45.61	16.77
14	32.58		65.16	8.69	41.27	14.05
15	32.58		32.58	4.34	36.92	11.64
TOTAL	162.90	(162.90)		(0.02)	162.88	55.40

TABLE D4

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE SINKING FUND METHOD
AND FULL RECOGNITION OF INFLATION
(SINGLE VINTAGE, 10-SQUARE, FLOW THROUGH)

YEAR	NET SALVAGE ANNUITY	CUMULATIVE ACCRUALS AT BEG. OF YEAR	NET SALVAGE ACCRUALS	RETURN AND TAXES	REVENUE REQUIREMENT	
					AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	11.24	-	11.24	-	11.24	10.41
2	11.24	11.24	12.14	0.28	11.52	9.88
3	11.24	23.38	13.11	0.75	11.99	9.52
4	11.24	36.49	14.16	1.17	12.41	9.12
5	11.24	50.65	15.29	1.62	12.86	8.75
6	11.24	65.94	16.52	2.11	13.35	8.41
7	11.24	82.46	17.84	2.64	13.88	8.10
8	11.24	100.29	19.26	3.21	14.45	7.81
9	11.24	119.56	20.80	3.82	15.06	7.53
10	11.31	140.36	22.54	(60.67)	(49.36)	(22.86)
11						
12						
13						
14						
15						
TOTAL	112.47		162.90	(45.07)	67.40	56.67

TABLE D5

REVENUE REQUIREMENTS RELATED TO NET SALVAGE ACTIVITY
USING THE SINKING FUND METHOD
AND RECOGNITION OF INFLATION TO DATE
(SINGLE VINTAGE, 10-SQUARE, FLOW THROUGH)

	BEGINNING OF YEAR						REVENUE REQUIREMENT	
YEAR	NET SALVAGE IN CURRENT $	NET SALVAGE TO BE ACCRUED	NET SALVAGE ANNUITY	CUMULATIVE ACCRUALS AT BEG. OF YEAR	NET SALVAGE ACCRUAL	RETURN AND TAXES	AMOUNT	PRESENT VALUE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	100.00	100.00	6.90	-	6.90	-	6.90	6.39
2	105.00	98.10	7.86	6.90	8.41	0.22	8.08	6.93
3	110.25	94.94	8.93	15.31	10.15	0.49	9.42	7.48
4	115.76	90.29	10.12	25.47	12.16	0.82	10.94	8.04
5	121.55	83.93	11.44	37.62	14.45	1.20	12.64	8.60
6	127.63	75.56	12.88	52.07	17.05	1.67	14.55	9.17
7	134.01	64.89	14.40	69.12	19.93	2.21	16.61	9.69
8	140.71	51.66	15.91	89.05	23.03	2.85	18.76	10.14
9	147.75	35.67	17.15	112.08	26.12	3.59	20.74	10.38
10	155.14	16.94	16.94	138.20	28.00	(60.74)	(43.80)	(20.29)
11								
12								
13								
14								
15								
TOTAL			122.53		166.20	(47.69)	74.84	56.53

MISSOURI-AMERICAN WATER COMPANY

TABLE 1. ESTIMATED SURVIVOR CURVE, NET SALVAGE, ORIGINAL COST, CALCULATED ANNUAL AND ACCRUED DEPRECIATION RELATED TO UTILITY PLANT AT DECEMBER 31, 2002 (WHOLE LIFE WITH NET SALVAGE)

	DEPRECIABLE GROUP	SURVIVOR CURVE		NET SALVAGE	ORIGINAL COST AT DECEMBER 31, 2002	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	CALCULATED ACCRUED DEPRECIATION
	(1)	(2)		(3)	(4)	(5)	(6)	(7)
	STRUCTURES & IMPROVEMENTS							
304.10	SOURCE OF SUPPLY	45-L1		0	149,813.87	3,326	2.22	20,870
304.20	POWER AND PUMPING	55-R2.5		(15)	6,648,260.23	138,846	2.09	688,863
304.30	WATER TREATMENT	80-R1	*	(15)	27,855,028.25	546,647	1.96	1,495,066
304.40	TRANSMISSION AND DISTRIBUTION	27-S3		(5)	1,310,727.54	50,922	3.89	217,684
304.61	OFFICE BUILDINGS	42-L0.5		(5)	1,509,846.58	37,731	2.50	341,184
304.70	SHOP AND GARAGE	45-R3		(5)	254,343.52	5,511	2.17	127,081
304.80	MISCELLANEOUS	50-R2.5		(5)	1,225,056.22	25,696	2.10	102,957
	TOTAL STRUCTURES & IMPROVEMENTS				38,953,076.21	808,679		2,993,705
305.00	COLLECTING AND IMPOUNDING RESERVIORS	80-R2.5	*	0	111,065.96	2,162	1.95	77,099
306.00	LAKE, RIVER AND OTHER INTAKES	65-R1.5	*	(10)	58,979.57	1,520	2.58	42,932
307.00	WELLS AND SPRINGS	60-R1		0	3,990,825.53	66,647	1.67	348,507
309.00	SUPPLY MAINS	80-R2		(10)	10,936,028.16	150,370	1.37	658,577
310.10	POWER GENERATION EQUIPMENT	50-R2.5		0	323,229.99	6,465	2.00	56,538
310.20	BOILER PLANT EQUIPMENT	50-R2.5		0	347.27	7	2.02	259
311.00	ELECTRIC PUMPING EQUIPMENT	30-R0.5		(5)	11,359,511.80	396,994	3.49	1,996,137
320.00	WATER TREATMENT EQUIPMENT	30-L0.5		(10)	31,461,145.03	1,152,422	3.66	3,603,197
330.00	DISTRIBUTION RESERVOIRS & STANDPIPES	60-R3		(20)	8,201,531.53	164,359	2.00	2,481,704
331.00	MAINS - TRANSMISSION AND DISTRIBUTION	90-R2.5		(25)	97,345,674.20	1,350,671	1.39	17,662,283
332.00	MAINS - FIRE	90-R2.5		(25)	413,649.09	5,739	1.39	46,990
333.00	SERVICES	75-R1.5		(60)	16,560,093.46	352,399	2.13	3,325,663
334.00	METERS AND METER INSTALLATIONS	20-L1.5		0	12,599,193.99	627,449	4.98	4,299,158
335.00	FIRE HYDRANTS	67-R2.5		(20)	8,373,079.23	149,711	1.79	1,871,048
339.10	MISCELLANEOUS INTANGIBLE PLANT - OTHER	25-SQ		0	2,294.00	92	4.01	229
339.40	MISCELLANEOUS WATER TREATMENT - OTHER	30-SQ		0	1,375,031.68	45,789	3.33	24,602
339.50	MISCELLANEOUS TRANS. & DISTR. - OTHER	50-R3		0	18,610.15	372	2.00	11,535
339.60	MISCELLANEOUS INTANGIBLE PLANT - SOFTWARE	30-SQ		0	284,734.98	9,482	3.33	52,192
	TOTAL ACCOUNT 339				1,680,670.81	55,735		88,558
340.10	OFFICE FURNITURE	20-SQ		0	673,338.97	31,428	4.67	305,846
340.20	COMPUTER HARDWARE	10-SQ		0	1,136,679.41	84,418	7.43	683,746

MISSOURI-AMERICAN WATER COMPANY

TABLE 1. ESTIMATED SURVIVOR CURVE, NET SALVAGE, ORIGINAL COST, CALCULATED ANNUAL AND ACCRUED DEPRECIATION RELATED TO UTILITY PLANT AT DECEMBER 31, 2002
(WHOLE LIFE WITH NET SALVAGE)

	DEPRECIABLE GROUP	SURVIVOR CURVE	NET SALVAGE	ORIGINAL COST AT DECEMBER 31, 2002	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	CALCULATED ACCRUED DEPRECIATION
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
340.30	COMPUTER SOFTWARE	8-SQ	0	1,268,714.40	151,043	11.91	604,116
340.50	OTHER EQUIPMENT	15-SQ	0	236,171.07	13,613	5.76	74,925
	TOTAL ACCOUNT 340			3,314,903.85	280,502		1,668,633
	TRANSPORTATION EQUIPMENT						
341.10	LIGHT TRUCKS	7.5-L2	25	1,145,553.58	114,211	9.97	318,100
341.20	HEAVY TRUCKS	10-S2.5	25	96,394.79	7,230	7.50	47,856
341.30	AUTOS	5.5-L1.5	25	315,463.22	43,013	13.63	87,123
341.40	OTHER	15-S4	0	64,599.06	4,309	6.67	15,171
	TOTAL ACCOUNT 341			1,622,010.65	168,763		468,250
342.00	STORES EQUIPMENT	25-SQ	0	207,997.27	7,756	3.73	37,329
343.00	TOOLS, SHOP AND GARAGE EQUIPMENT	20-SQ	0	1,135,336.89	53,892	4.75	425,855
344.00	LABORATORY EQUIPMENT	15-SQ	0	540,063.99	34,727	6.43	164,298
345.00	POWER OPERATED EQUIPMENT	16-L2	20	525,709.41	26,273	5.00	147,391
346.10	COMMUNICATION EQUIPMENT - NON-TELEPHONE	15-SQ	0	281,387.12	14,065	5.00	147,417
346.20	COMMUNICATION EQUIPMENT - TELEPHONE	10-SQ	0	74,461.39	7,446	10.00	55,543
347.00	MISCELLANEOUS EQUIPMENT	15-SQ	0	348,146.61	21,235	6.10	103,184
348.00	OTHER TANGIBLE PROPERTY	20-SQ	0	885,577.82	44,279	5.00	681,235
	TOTAL DEPRECIABLE PLANT			251,303,696.83	5,950,267		43,451,490
	NONDEPRECIABLE PLANT						
301.00	ORGANIZATION			509,797.88			
302.00	FRANCHISES AND CONSENTS			39,650.89			
303.20	LAND AND LAND RIGHTS - SOURCE OF SUPPLY			1,372,144.50			
303.30	LAND AND LAND RIGHTS - PUMPING			81,483.30			
303.40	LAND AND LAND RIGHTS - WATER TREATMENT			33,419.10			
303.50	LAND AND LAND RIGHTS - TRANSMISSION & DISTRIBUTION			395,380.09			
303.60	LAND AND LAND RIGHTS - ADMINISTRATIVE			201,703.43			
	TOTAL NONDEPRECIABLE PLANT			2,633,579.19			
	TOTAL UTILITY PLANT			253,937,276.02	5,950,267		43,451,490

* LIFE SPAN PROCEDURE IS USED. SURVIVOR CURVE SHOWN IS INTERIM CURVE.

MISSOURI-AMERICAN WATER COMPANY

TABLE 2. ESTIMATED SURVIVOR CURVE, NET SALVAGE, ORIGINAL COST, CALCULATED ANNUAL AND ACCRUED DEPRECIATION RELATED TO UTILITY PLANT AT DECEMBER 31, 2002
(WHOLE LIFE WITH 0% NET SALVAGE)

	DEPRECIABLE GROUP	SURVIVOR CURVE		NET SALVAGE	ORIGINAL COST AT DECEMBER 31, 2002	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	CALCULATED ACCRUED DEPRECIATION
	(1)	(2)		(3)	(4)	(5)	(6)	(7)
	STRUCTURES & IMPROVEMENTS							
304.10	SOURCE OF SUPPLY	45-L1		0	149,813.87	3,326	2.22	20,870
304.20	POWER AND PUMPING	55-R2.5		0	6,648,260.23	120,736	1.82	599,011
304.30	WATER TREATMENT	80-R1	*	0	27,855,028.25	475,346	1.71	1,300,057
304.40	TRANSMISSION AND DISTRIBUTION	27-S3		0	1,310,727.54	48,497	3.70	207,320
304.61	OFFICE BUILDINGS	42-L0.5		0	1,509,846.58	35,934	2.38	324,938
304.70	SHOP AND GARAGE	45-R3		0	254,343.52	5,249	2.06	121,027
304.80	MISCELLANEOUS	50-R2.5		0	1,225,056.22	24,472	2.00	98,055
	TOTAL STRUCTURES & IMPROVEMENTS				38,953,076.21	713,560		2,671,278
305.00	COLLECTING AND IMPOUNDING RESERVIORS	80-R2.5	*	0	111,065.96	2,162	1.95	77,099
306.00	LAKE, RIVER AND OTHER INTAKES	65-R1.5	*	0	58,979.57	1,382	2.34	39,030
307.00	WELLS AND SPRINGS	60-R1		0	3,990,825.53	66,647	1.67	348,507
309.00	SUPPLY MAINS	80-R2		0	10,936,028.16	136,700	1.25	598,710
310.10	POWER GENERATION EQUIPMENT	50-R2.5		0	323,229.99	6,465	2.00	56,538
310.20	BOILER PLANT EQUIPMENT	50-R2.5		0	347.27	7	2.02	259
311.00	ELECTRIC PUMPING EQUIPMENT	30-R0.5		0	11,359,511.80	378,089	3.33	1,901,086
320.00	WATER TREATMENT EQUIPMENT	30-L0.5		0	31,461,145.03	1,047,656	3.33	3,275,633
330.00	DISTRIBUTION RESERVOIRS & STANDPIPES	60-R3		0	8,201,531.53	136,966	1.67	2,068,085
331.00	MAINS - TRANSMISSION AND DISTRIBUTION	90-R2.5		0	97,345,674.20	1,080,537	1.11	14,129,823
332.00	MAINS - FIRE	90-R2.5		0	413,649.09	4,591	1.11	37,592
333.00	SERVICES	75-R1.5		0	16,560,093.46	220,249	1.33	2,078,541
334.00	METERS AND METER INSTALLATIONS	20-L1.5		0	12,599,193.99	627,449	4.98	4,299,158
335.00	FIRE HYDRANTS	67-R2.5		0	8,373,079.23	124,759	1.49	1,559,207
339.10	MISCELLANEOUS INTANGIBLE PLANT - OTHER	25-SQ		0	2,294.00	92	4.01	229
339.40	MISCELLANEOUS WATER TREATMENT - OTHER	30-SQ		0	1,375,031.68	45,789	3.33	24,602
339.50	MISCELLANEOUS TRANS. & DISTR. - OTHER	50-R3		0	18,610.15	372	2.00	11,535
339.60	MISCELLANEOUS INTANGIBLE PLANT - SOFTWARE	30-SQ		0	284,734.98	9,482	3.33	52,192
	TOTAL ACCOUNT 339				1,680,670.81	55,735		88,558
340.10	OFFICE FURNITURE	20-SQ		0	673,338.97	31,428	4.67	305,846
340.20	COMPUTER HARDWARE	10-SQ		0	1,136,679.41	84,418	7.43	683,746

MISSOURI-AMERICAN WATER COMPANY

TABLE 2. ESTIMATED SURVIVOR CURVE, NET SALVAGE, ORIGINAL COST, CALCULATED ANNUAL AND ACCRUED DEPRECIATION RELATED TO UTILITY PLANT AT DECEMBER 31, 2002
(WHOLE LIFE WITH 0% NET SALVAGE)

	DEPRECIABLE GROUP	SURVIVOR CURVE	NET SALVAGE	ORIGINAL COST AT DECEMBER 31, 2002	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	CALCULATED ACCRUED DEPRECIATION
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
340.30	COMPUTER SOFTWARE	8-SQ	0	1,268,714.40	151,043	11.91	604,116
340.50	OTHER EQUIPMENT	15-SQ	0	236,171.07	13,613	5.76	74,925
	TOTAL ACCOUNT 340			3,314,903.85	280,502		1,668,633
	TRANSPORTATION EQUIPMENT						
341.10	LIGHT TRUCKS	7.5-L2	0	1,145,553.58	152,282	13.29	424,133
341.20	HEAVY TRUCKS	10-S2.5	0	96,394.79	9,639	10.00	63,810
341.30	AUTOS	5.5-L1.5	0	315,463.22	57,351	18.18	116,164
341.40	OTHER	15-S4	0	64,599.06	4,309	6.67	15,171
	TOTAL ACCOUNT 341			1,622,010.65	223,581		619,278
342.00	STORES EQUIPMENT	25-SQ	0	207,997.27	7,756	3.73	37,329
343.00	TOOLS, SHOP AND GARAGE EQUIPMENT	20-SQ	0	1,135,336.89	53,892	4.75	425,855
344.00	LABORATORY EQUIPMENT	15-SQ	0	540,063.99	34,727	6.43	164,298
345.00	POWER OPERATED EQUIPMENT	16-L2	0	525,709.41	32,841	6.25	184,239
346.10	COMMUNICATION EQUIPMENT - NON-TELEPHONE	15-SQ	0	281,387.12	14,065	5.00	147,417
346.20	COMMUNICATION EQUIPMENT - TELEPHONE	10-SQ	0	74,461.39	7,446	10.00	55,543
347.00	MISCELLANEOUS EQUIPMENT	15-SQ	0	348,146.61	21,235	6.10	103,184
348.00	OTHER TANGIBLE PROPERTY	20-SQ	0	885,577.82	44,279	5.00	681,235
	TOTAL DEPRECIABLE PLANT			251,303,696.83	5,323,278		37,316,115
	NONDEPRECIABLE PLANT						
301.00	ORGANIZATION			509,797.88			
302.00	FRANCHISES AND CONSENTS			39,650.89			
303.20	LAND AND LAND RIGHTS - SOURCE OF SUPPLY			1,372,144.50			
303.30	LAND AND LAND RIGHTS - PUMPING			81,483.30			
303.40	LAND AND LAND RIGHTS - WATER TREATMENT			33,419.10			
303.50	LAND AND LAND RIGHTS - TRANSMISSION & DISTRIBUTION			395,380.09			
303.60	LAND AND LAND RIGHTS - ADMINISTRATIVE			201,703.43			
	TOTAL NONDEPRECIABLE PLANT			2,633,579.19			
	TOTAL UTILITY PLANT			253,937,276.02	5,323,278		37,316,115

* LIFE SPAN PROCEDURE IS USED. SURVIVOR CURVE SHOWN IS INTERIM CURVE.

MISSOURI-AMERICAN WATER COMPANY

COMPARISON OF FUTURE ESTIMATED NET SALVAGE COSTS AND NET SALVAGE ACCRUAL
DURING THE PERIOD 2003 THROUGH 2169 FOR ACCOUNT 331.00, MAINS - TRANSMISSION AND DISTRIBUTION

YEAR	HARDCOPY RETIREMENTS	FORMULA ENDING BALANCE	ESTIMATED NET SALVAGE COSTS	CUMULATIVE EST. NET SALVAGE	NET SALVAGE ACCRUAL	CUMULATIVE NET SALVAGE ACCRUAL
PREVIOUS THEORETICAL NET SALVAGE ACTIVITY						(3,667,885)
2003	179,878.36	97,165,795.84	(44,970)	(44,970)	(269,905)	(3,937,790)
2004	184,798.53	96,980,997.31	(46,200)	(91,170)	(269,392)	(4,207,182)
2005	189,897.67	96,791,099.64	(47,474)	(138,644)	(268,864)	(4,476,046)
2006	195,162.30	96,595,937.34	(48,791)	(187,435)	(268,322)	(4,744,368)
2007	200,585.53	96,395,351.81	(50,146)	(237,581)	(267,765)	(5,012,133)
2008	206,165.39	96,189,186.42	(51,541)	(289,122)	(267,192)	(5,279,325)
2009	211,955.30	95,977,231.12	(52,989)	(342,111)	(266,603)	(5,545,928)
2010	217,921.99	95,759,309.13	(54,480)	(396,591)	(265,998)	(5,811,926)
2011	224,094.46	95,535,214.67	(56,024)	(452,615)	(265,376)	(6,077,302)
2012	230,435.99	95,304,778.68	(57,609)	(510,224)	(264,735)	(6,342,037)
2013	237,010.11	95,067,768.57	(59,253)	(569,477)	(264,077)	(6,606,114)
2014	243,841.84	94,823,926.73	(60,960)	(630,437)	(263,400)	(6,869,514)
2015	250,892.83	94,573,033.90	(62,723)	(693,160)	(262,703)	(7,132,217)
2016	258,165.84	94,314,868.06	(64,541)	(757,701)	(261,986)	(7,394,203)
2017	265,648.16	94,049,219.90	(66,412)	(824,113)	(261,248)	(7,655,451)
2018	273,410.70	93,775,809.20	(68,353)	(892,466)	(260,488)	(7,915,939)
2019	281,406.31	93,494,402.89	(70,352)	(962,818)	(259,707)	(8,175,646)
2020	289,695.36	93,204,707.53	(72,424)	(1,035,242)	(258,902)	(8,434,548)
2021	298,193.35	92,906,514.18	(74,548)	(1,109,790)	(258,074)	(8,692,622)
2022	306,989.83	92,599,524.35	(76,747)	(1,186,537)	(257,221)	(8,949,843)
2023	316,120.25	92,283,404.10	(79,030)	(1,265,567)	(256,343)	(9,206,186)
2024	325,522.62	91,957,881.48	(81,381)	(1,346,948)	(255,439)	(9,461,625)
2025	335,209.10	91,622,672.38	(83,802)	(1,430,750)	(254,507)	(9,716,132)
2026	345,155.74	91,277,516.64	(86,289)	(1,517,039)	(253,549)	(9,969,681)
2027	355,446.41	90,922,070.23	(88,862)	(1,605,901)	(252,561)	(10,222,242)
2028	366,020.77	90,556,049.46	(91,505)	(1,697,406)	(251,545)	(10,473,787)
2029	376,973.67	90,179,075.79	(94,243)	(1,791,649)	(250,497)	(10,724,284)
2030	388,158.53	89,790,917.26	(97,040)	(1,888,689)	(249,419)	(10,973,703)
2031	399,683.08	89,391,234.18	(99,921)	(1,988,610)	(248,309)	(11,222,012)
2032	411,603.92	88,979,630.26	(102,901)	(2,091,511)	(247,166)	(11,469,178)
2033	423,812.88	88,555,817.38	(105,953)	(2,197,464)	(245,988)	(11,715,166)
2034	436,344.75	88,119,472.63	(109,086)	(2,306,550)	(244,776)	(11,959,942)
2035	449,130.84	87,670,341.79	(112,283)	(2,418,833)	(243,529)	(12,203,471)
2036	462,294.54	87,208,047.25	(115,574)	(2,534,407)	(242,245)	(12,445,716)
2037	475,746.12	86,732,301.13	(118,937)	(2,653,344)	(240,923)	(12,686,639)
2038	489,613.20	86,242,687.93	(122,403)	(2,775,747)	(239,563)	(12,926,202)
2039	503,686.38	85,739,001.55	(125,922)	(2,901,669)	(238,164)	(13,164,366)
2040	518,093.65	85,220,907.90	(129,523)	(3,031,192)	(236,725)	(13,401,091)
2041	532,914.89	84,687,993.01	(133,229)	(3,164,421)	(235,244)	(13,636,335)
2042	547,994.47	84,139,998.54	(136,999)	(3,301,420)	(233,722)	(13,870,057)
2043	563,390.91	83,576,607.63	(140,848)	(3,442,268)	(232,157)	(14,102,214)
2044	579,005.87	82,997,601.76	(144,751)	(3,587,019)	(230,549)	(14,332,763)
2045	594,978.97	82,402,622.79	(148,745)	(3,735,764)	(228,896)	(14,561,659)
2046	611,207.81	81,791,414.98	(152,802)	(3,888,566)	(227,198)	(14,788,857)
2047	627,841.28	81,163,573.70	(156,960)	(4,045,526)	(225,454)	(15,014,311)
2048	644,593.96	80,518,979.74	(161,148)	(4,206,674)	(223,664)	(15,237,975)
2049	661,600.15	79,857,379.59	(165,400)	(4,372,074)	(221,826)	(15,459,801)
2050	678,968.16	79,178,411.43	(169,742)	(4,541,816)	(219,940)	(15,679,741)
2051	696,462.94	78,481,948.49	(174,116)	(4,715,932)	(218,005)	(15,897,746)
2052	714,202.70	77,767,745.79	(178,551)	(4,894,483)	(216,022)	(16,113,768)
2053	732,022.57	77,035,723.22	(183,006)	(5,077,489)	(213,988)	(16,327,756)
2054	750,082.35	76,285,640.87	(187,521)	(5,265,010)	(211,905)	(16,539,661)
2055	768,274.79	75,517,366.08	(192,069)	(5,457,079)	(209,770)	(16,749,431)
2056	786,762.84	74,730,603.24	(196,691)	(5,653,770)	(207,585)	(16,957,016)
2057	805,177.51	73,925,425.73	(201,294)	(5,855,064)	(205,348)	(17,162,364)
2058	823,685.63	73,101,740.10	(205,921)	(6,060,985)	(203,060)	(17,365,424)
2059	842,426.38	72,259,313.72	(210,607)	(6,271,592)	(200,720)	(17,566,144)
2060	861,071.09	71,398,242.63	(215,268)	(6,486,860)	(198,328)	(17,764,472)
2061	879,826.25	70,518,416.38	(219,957)	(6,706,817)	(195,884)	(17,960,356)
2062	898,441.56	69,619,974.82	(224,610)	(6,931,427)	(193,389)	(18,153,745)
2063	917,084.32	68,702,890.50	(229,271)	(7,160,698)	(190,841)	(18,344,586)
2064	935,652.74	67,767,237.76	(233,913)	(7,394,611)	(188,242)	(18,532,828)
2065	954,326.48	66,812,911.28	(238,582)	(7,633,193)	(185,591)	(18,718,419)
2066	972,642.84	65,840,268.44	(243,161)	(7,876,354)	(182,890)	(18,901,309)

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YEAR	HARDCOPY RETIREMENTS	FORMULA ENDING BALANCE	ESTIMATED NET SALVAGE COSTS	CUMULATIVE EST. NET SALVAGE	NET SALVAGE ACCRUAL	CUMULATIVE NET SALVAGE ACCRUAL
PREVIOUS THEORETICAL NET SALVAGE ACTIVITY						(3,667,885)
2067	990,786.95	64,849,481.49	(247,697)	(8,124,051)	(180,137)	(19,081,446)
2068	1,008,940.66	63,840,540.83	(252,235)	(8,376,286)	(177,335)	(19,258,781)
2069	1,026,642.13	62,813,898.70	(256,661)	(8,632,947)	(174,483)	(19,433,264)
2070	1,044,215.61	61,769,683.09	(261,054)	(8,894,001)	(171,582)	(19,604,846)
2071	1,061,301.15	60,708,381.94	(265,325)	(9,159,326)	(168,634)	(19,773,480)
2072	1,078,054.21	59,630,327.73	(269,514)	(9,428,840)	(165,640)	(19,939,120)
2073	1,094,384.38	58,535,943.35	(273,596)	(9,702,436)	(162,600)	(20,101,720)
2074	1,110,478.24	57,425,465.11	(277,620)	(9,980,056)	(159,515)	(20,261,235)
2075	1,125,792.34	56,299,672.77	(281,448)	(10,261,504)	(156,388)	(20,417,623)
2076	1,140,515.59	55,159,157.18	(285,129)	(10,546,633)	(153,220)	(20,570,843)
2077	1,154,845.75	54,004,311.43	(288,711)	(10,835,344)	(150,012)	(20,720,855)
2078	1,168,195.05	52,836,116.38	(292,049)	(11,127,393)	(146,767)	(20,867,622)
2079	1,180,992.28	51,655,124.10	(295,248)	(11,422,641)	(143,486)	(21,011,108)
2080	1,192,767.59	50,462,356.51	(298,192)	(11,720,833)	(140,173)	(21,151,281)
2081	1,203,629.99	49,258,726.52	(300,907)	(12,021,740)	(136,830)	(21,288,111)
2082	1,213,540.21	48,045,186.31	(303,385)	(12,325,125)	(133,459)	(21,421,570)
2083	1,222,624.20	46,822,562.11	(305,656)	(12,630,781)	(130,063)	(21,551,633)
2084	1,230,376.24	45,592,185.87	(307,594)	(12,938,375)	(126,645)	(21,678,278)
2085	1,236,955.85	44,355,230.02	(309,239)	(13,247,614)	(123,209)	(21,801,487)
2086	1,242,516.44	43,112,713.58	(310,629)	(13,558,243)	(119,758)	(21,921,245)
2087	1,246,486.20	41,866,227.38	(311,622)	(13,869,865)	(116,295)	(22,037,540)
2088	1,249,299.19	40,616,928.19	(312,325)	(14,182,190)	(112,825)	(22,150,365)
2089	1,250,511.63	39,366,416.56	(312,628)	(14,494,818)	(109,351)	(22,259,716)
2090	1,250,170.11	38,116,246.45	(312,543)	(14,807,361)	(105,878)	(22,365,594)
2091	1,248,344.76	36,867,901.69	(312,086)	(15,119,447)	(102,411)	(22,468,005)
2092	1,245,026.23	35,622,875.46	(311,257)	(15,430,704)	(98,952)	(22,566,957)
2093	1,240,005.11	34,382,870.35	(310,001)	(15,740,705)	(95,508)	(22,662,465)
2094	1,233,361.31	33,149,509.04	(308,340)	(16,049,045)	(92,082)	(22,754,547)
2095	1,225,148.57	31,924,360.47	(306,287)	(16,355,332)	(88,679)	(22,843,226)
2096	1,215,082.75	30,709,277.72	(303,771)	(16,659,103)	(85,304)	(22,928,530)
2097	1,203,474.22	29,505,803.50	(300,869)	(16,959,972)	(81,961)	(23,010,491)
2098	1,190,112.97	28,315,690.53	(297,528)	(17,257,500)	(78,655)	(23,089,146)
2099	1,175,008.22	27,140,682.31	(293,752)	(17,551,252)	(75,391)	(23,164,537)
2100	1,158,348.53	25,982,333.78	(289,587)	(17,840,839)	(72,173)	(23,236,710)
2101	1,140,004.73	24,842,329.05	(285,001)	(18,125,840)	(69,006)	(23,305,716)
2102	1,120,265.74	23,722,063.31	(280,066)	(18,405,906)	(65,895)	(23,371,611)
2103	1,099,091.21	22,622,972.10	(274,773)	(18,680,679)	(62,842)	(23,434,453)
2104	1,076,409.67	21,546,562.43	(269,102)	(18,949,781)	(59,852)	(23,494,305)
2105	1,052,471.40	20,494,091.03	(263,118)	(19,212,899)	(56,928)	(23,551,233)
2106	1,027,304.77	19,466,786.26	(256,826)	(19,469,725)	(54,074)	(23,605,307)
2107	1,001,110.38	18,465,675.88	(250,278)	(19,720,003)	(51,294)	(23,656,601)
2108	973,824.04	17,491,851.84	(243,456)	(19,963,459)	(48,588)	(23,705,189)
2109	945,691.17	16,546,160.67	(236,423)	(20,199,882)	(45,962)	(23,751,151)
2110	916,523.33	15,629,637.34	(229,131)	(20,429,013)	(43,416)	(23,794,567)
2111	887,012.92	14,742,624.42	(221,753)	(20,650,766)	(40,952)	(23,835,519)
2112	856,973.93	13,885,650.49	(214,243)	(20,865,009)	(38,571)	(23,874,090)
2113	826,251.19	13,059,399.30	(206,563)	(21,071,572)	(36,276)	(23,910,366)
2114	795,490.98	12,263,908.32	(198,873)	(21,270,445)	(34,066)	(23,944,432)
2115	764,392.09	11,499,516.23	(191,098)	(21,461,543)	(31,943)	(23,976,375)
2116	733,492.06	10,766,024.17	(183,373)	(21,644,916)	(29,906)	(24,006,281)
2117	702,621.12	10,063,403.05	(175,655)	(21,820,571)	(27,954)	(24,034,235)
2118	671,887.54	9,391,515.51	(167,972)	(21,988,543)	(26,088)	(24,060,323)
2119	641,143.97	8,750,371.54	(160,286)	(22,148,829)	(24,307)	(24,084,630)
2120	611,115.08	8,139,256.46	(152,779)	(22,301,608)	(22,609)	(24,107,239)
2121	581,520.63	7,557,735.83	(145,380)	(22,446,988)	(20,994)	(24,128,233)
2122	552,128.14	7,005,607.69	(138,032)	(22,585,020)	(19,460)	(24,147,693)
2123	523,622.34	6,481,985.35	(130,906)	(22,715,926)	(18,006)	(24,165,699)
2124	495,550.95	5,986,434.40	(123,888)	(22,839,814)	(16,629)	(24,182,328)
2125	468,435.14	5,517,999.26	(117,109)	(22,956,923)	(15,328)	(24,197,656)
2126	441,987.55	5,076,011.71	(110,497)	(23,067,420)	(14,100)	(24,211,756)
2127	416,285.91	4,659,725.80	(104,071)	(23,171,491)	(12,944)	(24,224,700)
2128	391,083.45	4,268,642.35	(97,771)	(23,269,262)	(11,857)	(24,236,557)
2129	366,986.62	3,901,655.73	(91,747)	(23,361,009)	(10,838)	(24,247,395)
2130	343,680.09	3,557,975.64	(85,920)	(23,446,929)	(9,883)	(24,257,278)

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PREVIOUS THEORETICAL NET SALVAGE ACTIVITY						(3,667,885)
2131	320,915.59	3,237,060.05	(80,229)	(23,527,158)	(8,992)	(24,266,270)
2132	299,266.38	2,937,793.67	(74,817)	(23,601,975)	(8,161)	(24,274,431)
2133	278,283.63	2,659,510.04	(69,571)	(23,671,546)	(7,388)	(24,281,819)
2134	258,398.66	2,401,111.38	(64,600)	(23,736,146)	(6,670)	(24,288,489)
2135	239,356.00	2,161,755.38	(59,839)	(23,795,985)	(6,005)	(24,294,494)
2136	221,176.57	1,940,578.81	(55,294)	(23,851,279)	(5,390)	(24,299,884)
2137	203,680.20	1,736,898.61	(50,920)	(23,902,199)	(4,825)	(24,304,709)
2138	187,286.25	1,549,612.36	(46,822)	(23,949,021)	(4,304)	(24,309,013)
2139	171,744.14	1,377,868.22	(42,936)	(23,991,957)	(3,827)	(24,312,840)
2140	156,854.97	1,221,013.25	(39,214)	(24,031,171)	(3,392)	(24,316,232)
2141	143,036.79	1,077,976.46	(35,759)	(24,066,930)	(2,994)	(24,319,226)
2142	129,922.11	948,054.35	(32,481)	(24,099,411)	(2,633)	(24,321,859)
2143	117,814.05	830,240.30	(29,454)	(24,128,865)	(2,306)	(24,324,165)
2144	106,501.33	723,738.97	(26,625)	(24,155,490)	(2,010)	(24,326,175)
2145	95,979.11	627,759.86	(23,995)	(24,179,485)	(1,744)	(24,327,919)
2146	86,119.52	541,640.34	(21,530)	(24,201,015)	(1,505)	(24,329,424)
2147	77,130.39	464,509.95	(19,283)	(24,220,298)	(1,290)	(24,330,714)
2148	68,835.74	395,674.21	(17,209)	(24,237,507)	(1,099)	(24,331,813)
2149	61,096.85	334,577.36	(15,274)	(24,252,781)	(929)	(24,332,742)
2150	54,101.53	280,475.83	(13,525)	(24,266,306)	(779)	(24,333,521)
2151	47,602.30	232,873.53	(11,901)	(24,278,207)	(647)	(24,334,168)
2152	41,729.12	191,144.41	(10,432)	(24,288,639)	(531)	(24,334,699)
2153	36,340.22	154,804.19	(9,085)	(24,297,724)	(430)	(24,335,129)
2154	31,365.17	123,439.02	(7,841)	(24,305,565)	(343)	(24,335,472)
2155	26,716.54	96,722.48	(6,679)	(24,312,244)	(269)	(24,335,741)
2156	22,501.96	74,220.52	(5,625)	(24,317,869)	(206)	(24,335,947)
2157	18,639.36	55,581.16	(4,660)	(24,322,529)	(154)	(24,336,101)
2158	15,081.11	40,500.05	(3,770)	(24,326,299)	(113)	(24,336,214)
2159	11,965.71	28,534.34	(2,991)	(24,329,290)	(79)	(24,336,293)
2160	9,187.62	19,346.72	(2,297)	(24,331,587)	(54)	(24,336,347)
2161	6,852.35	12,494.37	(1,713)	(24,333,300)	(35)	(24,336,382)
2162	4,895.98	7,598.39	(1,224)	(24,334,524)	(21)	(24,336,403)
2163	3,314.13	4,284.26	(829)	(24,335,353)	(12)	(24,336,415)
2164	2,106.39	2,177.87	(527)	(24,335,880)	(6)	(24,336,421)
2165	1,234.44	943.43	(309)	(24,336,189)	(3)	(24,336,424)
2166	619.79	323.64	(155)	(24,336,344)	(1)	(24,336,425)
2167	248.46	75.18	(62)	(24,336,406)	0	(24,336,425)
2168	71.69	3.49	(18)	(24,336,424)	0	(24,336,425)
2169	3.49	0.00	(1)	(24,336,425)	0	(24,336,425)