BEFORE THE STATE OF NEW JERSEY
OFFICE OF ADMINISTRATIVE LAW

I/M/O THE PETITION OF PUBLIC SERVICE ELECTRIC & GAS COMPANY FOR APPROVAL OF AN INCREASE IN GAS RATES AND FOR CHARGES IN THE TARIFF FOR GAS SERVICE	**) BPU DOCKET NO. GR01050328) OAL DOCKET NO. PUC-5052-01**
I/M/O THE PETITION OF PUBLIC SERVICE ELECTRIC & GAS COMPANY FOR AUTHORITY TO REVISE ITS GAS PROPERTY DEPRECIATION RATES	**) BPU DOCKET NO. GR01050297) OAL DOCKET NO. PUC-5016-01)**

DIRECT TESTIMONY OF MICHAEL J. MAJOROS
ON BEHALF OF
THE NEW JERSEY DIVISION OF THE RATEPAYER ADVOCATE

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Introduction

Q. Please state your name.

A. My name is Michael J. Majoros, Jr.

Q. By whom and in what capacity are you employed?

A. I am Vice President of Snavely King Majoros O'Connor & Lee, Inc. ("Snavely King"), an economic consulting firm with offices at 1220 L Street, N.W., Suite 410, Washington, D.C. 20005.

Q. Have you attached a summary of qualifications and experience?

A. Yes. Appendix A is a brief description of my qualifications and experience. It also contains a listing of my appearances before state and Federal regulatory bodies.

Q. At whose request are you appearing?

A. I am appearing at the request of the New Jersey Division of the Ratepayer Advocate ("Ratepayer Advocate").

Subject of Testimony

Q. What is the subject of your testimony?

A. The subject of my testimony is depreciation.

Q. Do you have any specific experience in the field of public utility depreciation?

A. Yes. My firm specializes in the field of public utility depreciation. Our clients have ranged from consumer organizations such as the Ratepayer Advocate to carriers such as AT&T. We have appeared as expert witnesses on depreciation before the regulatory commissions of more than half the states in the country. I have testified

in over 80 proceedings on the subject of public utility depreciation, including several appearances before this Commission.

Purpose of Testimony

Q. What is the purpose of your testimony?

A. The Ratepayer Advocate asked me to review Public Service Electric and Gas Company's ("PSE&G") depreciation-related testimony and exhibits[1]. I was asked to express an opinion regarding the reasonableness of the Company's depreciation proposal and make an alternative recommendation if warranted.

Q. Do you have an opinion regarding the reasonableness of the Company's depreciation proposal?

A. Yes. In my opinion, the Company's depreciation proposal is unreasonable. It will produce excessive depreciation in this rate case and unnecessarily increase the revenue requirement. It will also contribute to any depreciation-related attrition which occurs between rate cases.

Q. Do you have any alternative recommendations?

A. Yes. I have several alternative recommendations. First, I disagree with all of the Company's net salvage proposals. They produce unnecessary and unreasonable revenue requirements. Second, I disagree with the Company's service life proposals for several of its Transmission and Distribution accounts. The lives are

[1] PSE&G's depreciation testimony and exhibits were prepared and sponsored by Company witness Roff.

too short. Third, I disagree with the Company's life span calculations for its Production and Storage Plant investment. They are based on unreasonable terminal retirement years and they erroneously include future additions. Finally, I disagree with several of the amortization periods the Company proposes for its General plant accounts. They are unsupportable, incorrect and too short. The table below compares the Company's overall proposal to my overall proposal based on the December 31, 1999 balances in the Company's study.

	Depreciation Based on December 31, 1999 Balances
Company	$129,059,269[2]
Majoros	46,759,266[3]
Difference	$82,300,003

Preparation of Testimony

Q. What did you do in order to prepare this testimony?

A. I reviewed the Company's filing and exhibits. I prepared several interrogatories and reviewed the resulting responses. I visited PSE&G's Harrison, Linden and Edison plants as well as a main and service replacement project in New Brunswick. Management and operating personnel provided detailed presentations and fielded

[2] Company Exhibit DSR-3, Schedule 1.

[3] Exhibit___(MJM-2), Statement A, p. 2.

numerous questions during the course of the tour. My associate, William M. Zaetz, photographed and videotaped the tour. Mr. Zaetz also attended and photographed a subsequent tour of the Burlington plant. We determined that a tour of Camden was not necessary because according to the Company those facilities are essentially the same as facilities we had already seen. Exhibit__ (MJM-1) is a report summarizing the tour.

I also accumulated data from the Company's depreciation data base and prepared several analyses and calculations that will be discussed later in this testimony. Finally, I calculated remaining life accruals and rates based on the results of my study. These calculations, analyses and summaries are contained in Exhibit____(MJM-2).

Excessive Depreciation

Q. What is an excessive depreciation rate?

A. An excessive depreciation rate is one that produces depreciation expense which is more than is necessary to return a company's capital investment to it over the life of the asset. In other words, since service lives and depreciation rates are inversely related, a life which is too short will result in a rate which is too high, thus producing excessive depreciation.

Q. Have any courts addressed the concept of excessive depreciation?

A. Yes, the concept of excessive depreciation was explained by the U.S. Supreme Court in a landmark 1934 decision, Lindheimer v. Illinois Bell Telephone Company

as follows:

> If the predictions of service life were entirely accurate and retirements were made when and as these predictions were precisely fulfilled, the depreciation reserve would represent the consumption of capital, on a cost basis, according to the method which spreads that loss over the respective service periods. But if the amounts charged to operating expenses and credited to the account for depreciation reserve are excessive, to that extent subscribers for the telephone service are required to provide, in effect, capital contributions, not to make good losses incurred by the utility in the service rendered and thus to keep its investment unimpaired, but to secure additional plant and equipment upon which the utility expects a return.
>
> Confiscation being the issue, the company has the burden of making a convincing showing that the amounts it has charged to operating expenses for depreciation have not been excessive. That burden is not sustained by proof that its general accounting system has been correct. The calculations are mathematical, but the predictions underlying them are essential matters of opinion. They proceed from studies of the 'behavior of large groups' of items. These studies are beset with a host of perplexing problems. Their determination involves the examination of many variable elements and opportunities for excessive allowances, even under a correct system of accounting, [are] always present. The necessity of checking the results is not questioned. The predictions must meet the controlling test of experience.[4]

[4] Lindheimer v. Illinois Bell Telephone Company, 292 U.S. 151, 168-170, 54 S.Ct. 658, 665-666 (1934). (Emphasis added; Footnote deleted.)

Q. How does the Company's proposal produce excessive depreciation?

A. The Company's depreciation proposal is excessive because several of the remaining lives it has calculated are too short, and it has exacerbated this condition by including an unsupportable and unreasonable request for negative net salvage in its depreciation rate calculations.

Q. How did the Company calculate its depreciation rates?

A. The Company generally used the remaining life technique to calculate its recommended depreciation rates. Remaining life depreciation is calculated as shown below:

$$\text{Accrual} = \frac{\text{Remaining Life Depreciation}}{\text{Plant in Service - Depreciation Reserve}}{\text{Remaining Life}}$$

In a depreciation study it is axiomatic that the shorter the remaining life - the higher the resulting depreciation. If the life is too short, the resulting depreciation is excessive. Accruals are converted to percentage rates and then applied to plant balances. When the accruals are too high, the resulting rates are also too high.

Q. How do excessive depreciation rates produce excessive revenue requirements?

A. Excessive depreciation rates produce excessive depreciation expense. Since depreciation expense flows dollar-for-dollar into the revenue requirement, excessive depreciation expense results in an excessive revenue requirement.

Q. Who pays for excessive depreciation rates?

A. Ratepayers pay for excessive depreciation rates.

Q. If depreciation can be excessive, can it also be deficient?

A. Yes, depreciation can be deficient and in those circumstances the Company would be in an underrecovery situation.

Q. Is the Company protected from underrecovery?

A. Yes, the remaining life technique provides an automatic true-up to account for service life changes and actual net salvage activity because it is based on net plant, i.e., original cost minus the depreciation reserve. The remaining life technique also protects the Company from any early retirements resulting from mistakes it may have made. Again, that is because these retirements are charged to the depreciation reserve. The remaining life technique provides substantial protection to the Company. The remaining life technique does not, however, protect ratepayers from excessive depreciation resulting from lives which are too short or from unsupportable and unreasonable negative net salvage proposals.

Net Salvage

Q. What is net salvage?

A. Net salvage is the difference between gross salvage and cost of removal.[5] Net

[5] "Gross salvage is the amount recorded for the property retired due to the sale, reimbursement, or reuse of the property." "Cost of removal is the cost incurred in connection with the retirement from service and the disposition of depreciable plant." Public Utility Depreciation Practices, 1996, National Association of Regulatory

salvage is positive when gross salvage exceeds cost of removal. Conversely, net salvage is negative when cost of removal exceeds gross salvage.

A positive net salvage ratio reduces the depreciation rate and revenue requirement whereas a negative net salvage ratio increases a depreciation rate and revenue requirement to collect for estimated future cost of removal.

Q. In general what is the impact of the Company's net salvage proposals?

A. Exhibit___(MJM-3) is copy of Mr. Roff's response to Staff data request SR-DEP-11. The table below summarizes Mr. Roff's response. According to Mr. Roff's calculations, he has included a $60.4 million annual charge for negative net salvage (cost of removal) in his depreciation proposal.[6]

Effect of Roff's Proposed Changes To Depreciation Expense
Increase (Decrease)
($000)

	Product and Storage	Transmission	Distribution	General	Total
Net Salvage	$1,136	$5,213	$54,063	$-----	$60,412
Lives	(800)	(499)	(12,034)	5,501	(7,832)
Interim Adds.	328	----	----	-----	328
Reserve Positions and Interrelationships	616	(4,681)	830	501	(2,734)
Total	$1,280	$33	$42,859	$6,002	

Commissioner's ("NARUC Manual"), pages 320 and 317.

[6] Response to SRDEP-11, p. 2, Column (9). See Exhibit___(MJM-3).

	$50,174

Q. How did Mr. Roff arrive at such a high number?

A. Mr. Roff performed two types of studies to incorporate net salvage into his depreciation rate requests. Mr. Roff made adjustments to 1989 dismantlement cost studies for the Production and Storage plant accounts. Mr. Roff compared historical net salvage to retirements or relied on pure judgement for the Transmission and Distribution accounts.

Q. What is your overall conclusion regarding Mr. Roff's net salvage proposals?

A. My overall conclusion is that Mr. Roff has made net salvage the major issue in his filing given the magnitude of $60.4 million net salvage increase relative to the other aspects of his proposals.[7] In my opinion, several of Mr. Roff's proposals are beyond the bounds of rationality and reasonableness thus producing a need to consider a better approach to net salvage recovery.

Q. Why do you say that several of Mr. Roff's proposals are beyond the bounds of rationality and reasonableness?

A. They are beyond the bounds of rationality and reasonableness because they are an attempt to recover inflated future removal costs that for the most part will not be incurred. I will explain this in detail below.

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[7] In fact , even before I began to prepare my testimony, I received a sixteen question data request from the Company. A majority of the questions in that request were directed at how I intended to treat net salvage. Obviously Mr. Roff was cognizant that net salvage would be a major issue in this proceeding.

Q. Please discuss Mr. Roff's net salvage proposals for PSE&G's Production and Storage accounts.

A. Exhibit___(MJM-4) is a multipage exhibit containing Mr. Roff's net salvage workpaper containing his calculations for the Production and Storage functions. It also includes his response to RAR-DEP-17 containing the 1989 terminal removal cost dismantlement studies.[8] Mr. Roff started with 1990 dismantlement cost studies and then subtracted the actual cost of removal the Company incurred in the early 1990's. This cost of removal resulted from the dismantling of the structures at all of PSE&G's Production and Storage plants. Mr. Roff assumed that the remaining dismantlement cost would still be incurred in the future even though a majority of the plant has already been removed. Finally, he applied a 3 percent inflation factor to the remaining amount and inflated the cost over time through his proposed terminal retirement date. The following table summarizes Mr. Roff's net salvage estimates for PSE&G's Production and Storage Plant.

Summary of Roff
Net Salvage Proposal
for Production and Storage Plant[9]

1. 1989 Dismantlement Cost Estimate	$43,300
2. Actual Cost of Removal 1992-93	(12,500)
3. Remaining Estimate	30,800
4. Roff's Inflation Adjustment	10,593
5. Roff's Net Salvage Estimate (L3+L4)	41,393
6. Dec. 31, 2000 Plant Balance	$52,493

[8] These studies were prepared for a 1990 Depreciation study.

[9] Exhibit___(MJM-4).

7. Roff negative net salvage ratio (L5/L6) -79%

Q. Can you draw any conclusions regarding the 1989 dismantlement estimate?

A. Yes. The 1989 dismantlement cost estimate appears to have been vastly overstated. That is because a majority of the dismantlement work contemplated in the 1989 estimate was completed in 1992 and 1993. It is hard to imagine, based on my observations during the plant tour, that PSE&G will experience another removal effort at these plants similar to the 1992 and 1993 dismantlements. Mr. Roff could have seen that if he had taken a tour.[10]

Q. What is wrong with Mr. Roff's approach on a going-forward basis?

A. Mr. Roff's approach is wrong because the Company has already removed a majority of the assets to which the prior dismantlement cost studies related. If Mr. Roff had gone on a plant tour for his study, he would have seen many empty fields where the prior Production and Storage plants had once been.[11] The 1989 dismantlement studies do not relate to the current plants.

A good example is shown in the photos of the Harrison plant. One of the photos (number 9) shows the old boiler and gas holder structures that were used in the old LPA process at the Harrison plant. They were huge and they no longer exist. Harrison is now a state-of-the-art peaking plant and empty space (photo numbers 1-8, 10-12.)

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[10] For example, see Exhibit___(MJM-1) photo number 9 showing what was dismantled at the Harrison site versus photo numbers 2 through 8 showing what is there now.

[11] See Exhibit___(MJM-1) photo numbers 11, 12, and 16 for example.

As explained above, the dismantlement costs contemplated in the 1989 dismantlement cost studies were significantly overstated and the remaining dismantlement costs will not be incurred because they do not relate to the existing plant. That is not to say that there will never be any removal costs relating to any of these plants, but those costs certainly cannot be supported by the 1989 dismantlement studies. The same is true for the other Production and Storage plants. Given this fact, it is senseless to discuss Mr. Roff's application of an inflation factor to those estimates because to do so would imply some validity to the erroneous estimates. Mr. Roff's approach is unreasonable and unrealistic. The Company will not incur the costs Mr. Roff has included in his depreciation rates.

Q. Why are Mr. Roff's net salvage proposals for PSE&G's Transmission and Distribution ("T&D") accounts unreasonable and beyond the bounds of rationality?

A. The two T&D accounts creating a majority of Mr. Roff's proposed annual net salvage charge are the Distribution Mains and Services accounts. The following table summarizes Mr. Roff's requests for these two accounts.

Summary of Roff Net Salvage
Requests for Distribution
Mains and Services

	Net Salvage Ratio%[12]	Annual Net Salvage Charge$[13]
376 Mains	-125%	$34.2 million
380 Services	-140%	$35.7 million

Mr. Roff arrived at these very negative ratios by comparing current removal costs to retirements of very old assets stated at their original cost. The comparison of current removal costs to these retirements of old plant resulted in the extreme negative salvage ratios shown above.

Q. What is the result of Mr. Roff's approach?

A. The table below compares Mr. Roff's proposed annual charge for future net salvage to the Company's average actual experience for these two accounts over the last 10 years and the last 5 years.

Comparison of Roff's Proposes Annual
Net Salvage Charge to Actual Experience

	Roff's Proposed Annual Charge	Average Annual Experience[14] 10 years	5 years
376 Mains	$34.2 million	$2.7 million	$2.7 million
380 Services	$35.7 million	$2.9 million	$3.3 million

[12] Roff Exhibit DSR-3, page 17.

[13] This is the difference between Mr. Roff's accruals with and without net salvage.

[14] From salvage tables in individual account section of Exhibit___(MJM-2) pages 92 and 111.

Mr. Roff's annual charge is more than 10 times PSE&G's actual experience. It is beyond the bounds of reasonableness.

Q. Are Mr. Roff's proposals for these accounts in New Jersey comparable to his recommendations in other jurisdictions?

A. Mr. Roff's proposals in this case do not appear comparable to his proposals in at least one other jurisdiction. The following table compares Mr. Roff's proposals for PSE&G to his proposals from his three most current gas proceedings in other jurisdictions. [15] Mr. Roff's New Jersey proposals are much more negative than his proposals for the other three companies in Texas.

Comparison of Roff Net Salvage Proposals in New Jersey to His Three Recent Proposals[16]

	Mains	Service
New Jersey	-125%	-140%
Texas		
Atmos Energy Corporation	-15	-25
TXU Gas Distribution	-30	-30
Reliant Energy Entex	-30	-85

Q. Why is Mr. Roff's annual net salvage charge for Mains and Services beyond the bounds of rationality?

A. It is beyond the bounds of rationality because a majority of the cost of removal will not be incurred.

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[15] Response to SRDEP-4.

[16] Id.

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Q. Why won't the cost of removal be incurred?

A. During our plant tour we visited a main and service replacement project at Hamilton Avenue in New Brunswick.[17] During the course of that visit it became clear that the mains and services that are being replaced are not being removed. That is because plastic mains and services are either placed next to the existing metallic main or service, or alternatively, are being inserted into the existing main or service. See Exhibit___(MJM-1), Photograph numbers 17 and 18.

This is being done for at least two reasons. First, if an insertion can be made, it avoids the excavation (digging) cost. Second, and more importantly, even though plastic is a superior technology (photographs 19 and 20), it has a disadvantage. Plastic mains and services cannot be located with magnetic devices once they are buried. The metallic mains and services are left in place in order to locate the plastic mains. They continue to provide service. When insertion is used, the existing main or service also provides some level of protection to the newly installed pipe. In reality, the mains and services being replaced continue to provide service and should not be retired. In my opinion, the entire replacement work effort is to install the new main or service, not to remove the old main or service.

Q. If the existing metallic mains and services are not being removed, why does PSE&G have cost of removal recorded on its books?

A. This is the result of an arbitrary assignment of part of the replacement project

[17] See Exhibit___(MJM-1), Photo numbers 17-20.

cost to the cost of removal. But in reality the metallic main and service are not removed and they still provide service.

Q. Mr. Roff extends some lives in the T&D function. Does this mitigate his excessive cost of removal charges?

A. No. Consider the Distribution Mains and Services accounts for example. Mr. Roff states that he is proposing extended lives for these accounts. The implication is either that a longer life requires a more negative salvage ratio or alternatively that a longer life provides some mitigation for more negative salvage ratio. In either case the implication is wrong.

A longer life does not require a more negative salvage ratio if the longer life is still too short. As can be seen by the earlier table summarizing Mr. Roff's proposal, the effects of his longer lives are consumed by his negative net salvage proposals.

Q. Did you test Mr. Roff's life proposals in the T&D function?

A. Yes. I performed geometric mean turnover analyses to test Mr. Roff's life proposals. These analyses are included in the individual account sections of my study.

Q. What is a turnover analysis?

A. Turnover analyses are based on the general theory that the time it takes the plant to "turn over" (i.e., the time it takes the retirements to exhaust a previous plant balance) is a measure of service life. These geometric mean turnover analyses are included in the individual account sections of Exhibit___(MJM-2).

Pages 86 to 88 of the Exhibit is the turnover analysis for account 376-Mains and pages 105 to 107 is the turnover analysis for account 380-Services.

Q. What are the results of your turnover analyses?

A. The following table compares Mr. Roff's "extended" life to the most recent life indications for the Mains and Services accounts. It demonstrates that Mr. Roff's life is much shorter than the most recent life indications. Thus, he is not only proposing a salvage charge which is unreasonable and irrational, but he is also proposing a life which is too short.

Comparison of Roff's
Life Proposals to Actual Indications

	Roff[18]	Recent Indications[19]
376 Mains	60 yrs	108 yrs
380 Services	50 yrs	87 yrs

Q. What do you recommend?

A. Mr. Roff has made net salvage a major depreciation issue in this proceeding. The sheer magnitude of his proposed charge demonstrates the need for a different approach than Mr. Roff has used. Consequently, I am recommending a different approach for net salvage. I am also recommending several different lives as will be explained later in this testimony.

Q. Please explain your net salvage recommendation?

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[18] Exhibit DSR-3, page 17.

[19] Exhibit___(MJM-2), pages 88 and 107.

A. I recommend the Pennsylvania Public Utility Commission's five-year salvage allowance approach. Instead of including net salvage ratios in remaining life depreciation rates, the rates are calculated without net salvage ratios. A separate calculation of the average annual net salvage is calculated and then added to the annual depreciation expense and included in the reserve. This is similar to a normalized expense allowance being included in the Company's revenue requirement.

Statement B of Exhibit___(MJM-2) shows the rolling five year average of PSE&G's actual net salvage experience. The most recent $6.7 million of negative net salvage experience should be added to PSE&G's depreciation expense and incorporated into its revenue requirement. Each year the amount should be debited to depreciation expense and credited to accumulated depreciation, just as the rest of the Company's depreciation expense.

Q. What if the actual net salvage is more or less than the five-year allowance?

A. The Company is fully protected by virtue of the use of the remaining life technique. Any difference between the actual experience and the allowance is captured in the accumulated depreciation reserve and trued-up the next time depreciation rates are calculated. Consequently, the Company is fully protected.

Q. What is the effect on ratepayers?

A. Ratepayers provide full recovery to the Company, but they avoid the excessive charges resulting from Mr. Roff's various approaches.

Q. Have any other Commissions besides the Pennsylvania Commission

adopted this approach?

A. Yes. Recently the Kentucky Pubic Service Commission adopted this approach for the Jackson Energy Cooperative in Case No. 2000-373.

Q. Have you calculated the five year average net salvage allowance for PSE&G?

A. Yes, the calculation is shown in Exhibit___(MJM-2), Statement B.

Q. How have you calculated your recommended depreciation rates?

A. I have calculated depreciation rates excluding net salvage. I have also calculated the five year net salvage allowance. I have added this amount to the total expense. These calculations are shown in the Statements A and B in the summary section of Exhibit___(MJM-2).

<u>Transmission and Distribution Lives</u>

Q. How did Mr. Roff study Transmission and Distribution plant lives?

A. Mr. Roff used either the actuarial method or the simulated plant record method ("SPR") to study T&D lives. The actuarial method is the most refined approach because it relies on the highest level of data, i.e., aged additions and retirements. The SPR method only requires annual additions and retirements. These are the same data requirements for the geometric mean turnover analyses that I prepared and discussed earlier.

All of these methods are used to obtain an indication of the average service life that has been experienced by the dollars invested in a particular

plant account. I reviewed all of Mr. Roff's actuarial and SPR analyses and, as explained earlier, I also prepared geometric mean turnover analyses to test Mr. Roff's recommendations. As a result of my review and analyses, I disagree with several of Mr. Roff's proposals. The following table summarizes both my agreements and disagreements with Mr. Roff's T&D life proposals.

Snavely King's T&D Life Analyses

Acct. No.	Acct. Name	Life Analysis	Exhibit__(MJM-2) Page Nos.
366.00	Transmission - Structures & Improvements	No analyses, accept Company.	71-72
367.00	Transmission - Mains	Used same approach as Company, i.e. 75 R2 based on recommendation for 376 - Distribution Mains.	73-76
369.00	Transmission - M&R Equipment	Accept Company.	77-78
374.30	Distribution - Sidewalks & Curbs	Accept Company.	79-80
375.00	Distribution - Structures & Improvements	Accept Company based on actuarial analysis.	81-83
376.00	Distribution - Mains	All life indications are more than 60 and are getting longer. Roff uses 83 R2 to age the account. Broadest bands in turnover analysis support life in the range of 75 years. Use 75 R2.	84-92
377.00	Distribution - Compressor Station Equipment	Accept Company based on actuarial analysis.	93-95

Acct. No.	Acct. Name	Life Analysis	Exhibit__(MJM-2) Page Nos.
378.00	Distribution - M&R Equipment	Accept Company based on geometric mean study. Most recent indications are unreasonable, but prior to 1995 they tend to support a 45 year life.	96-99
379.00	Distribution - City Gate Equipment	Accept Company based on actuarial study.	100-102
380.00	Distribution - Services	Indications exceed 50 beginning with the 1988-90 band, then get longer. It is evident from examination of life indications chart (next page) that beginning in 1990 a 55 year life is reasonable and conservative. Use 55 R1.5.	103-111
381.00 382.00	Distribution - Meters and Meter Installations	Life indications have increased continuously. They exceeded 50 years beginning with 1992-94 band. Although life studies support a much longer life, SK believes 50 years is reasonable for Meters, thus the Company's 50-year life is accepted.	112-118
383.00 384.00	Distribution - Regulators & Regulator Installations	Most recent indications are extremely long, however prior to 1991 band, indications tended to support a life in 70-80 year range. Use 75.	119-126
385.00	Distribution - Industrial M&R Equipment	Accept Company. Overall geometric mean indicates that 50-year life is reasonable.	127-130

Acct. No.	Acct. Name	Life Analysis	Exhibit__(MJM-2) Page Nos.
387.00	Distribution - Other Equipment	Although Roff SPR's support longer life, SK accepted Company proposal due to the relatively small magnitude of the account and because of the reserve position.	131-132

Production & Storage Plant Life Span Depreciation Rate Calculations

Q. Please explain a Life Span depreciation rate calculation.

A. The life span method is actually a procedure to calculate an average service life and average remaining life for a property group. It is based on the assumption that a property group is comprised of a small number of large units subject to concurrent terminal (final) retirement. The period between the original installation and the terminal retirement date is the life span. The period between the study date and the terminal retirement date is the remaining life span. The life span method also recognizes “interim” additions and retirements prior to the terminal date. Importantly, only interim additions that have actually occurred are properly included in life span calculations.

Given the ease of visualizing a concurrent final retirement of major structures, the life span method has obvious intuitive appeal. The method also has limitations and strenuous rules for its application.

Q. Why do you disagree with the Company’s application of the life span method?

A. I disagree with three aspects of the Company’s application of the life span method. They are: (1) its cost of removal estimates, (2) its final retirement year estimates, and (3) its inclusion of future additions in its calculations. I discussed the cost of removal estimates in the previous net salvage section of this testimony. I will discuss the terminal retirement years and future additions below.

Q. Is the fundamental life span assumption of a concurrent terminal retirement always valid?

A. Not necessarily. I have discovered problems with the life span method within the last several years. For example, in the early 1990's I visited a major water treatment plant where the structures and treatment process were being upgraded. A few years later I revisited the same plant and discovered that a majority of the original structures were still in service. They had merely been modernized and expanded. A final retirement assumption was inappropriate because the treatment plant is fundamental and critical to the operation of that Company. The most reasonable depreciation assumption was that the plant will be well maintained and upgraded as long as the water it treats continues to flow. A specific terminal retirement year estimate was specious in those circumstances. A supportable average service life assumption based on the flow of dollars in and out of the accounts was much more reasonable.

Recent thinking from the 1996 NARUC Public Utility Depreciation Practices Manual demonstrates the importance of obtaining well founded plans to support final retirement year estimates. Otherwise, as stated by NARUC:

> ...the [life span] study is analogous to a building which is structurally well built from the ground up but lacking a sound and proper foundation.[20]

[20] National Association of Regulatory Utility Commissioners, Public Utility Depreciation Practices, 1996 ("NARUC Manual"), p. 146.

Q. What terminal retirement years is the Company proposing for its Production and Storage plant investment?

A. The Company is proposing the following terminal retirement years and remaining life spans:

PSE&G Proposed Terminal Retirement Years and Remaining Life Spans[21]

Production and Storage Plant	Terminal Remaining Year	Retirement Life Spans
Camden	2010	11
Linden	2010	11
Central	2017	18
Burlington	2010	11
Harrison	2017	18
Orange Headquarters	2017	18

Q. Are these terminal retirement years and remaining life spans realistic?

A. No. In my opinion, they are way too short.

Q. Can the Company support these retirement years?

A. Only with the most cursory comments from its operating personnel.

Q. Are these terminal retirement years important?

A. The terminal (final) retirement year is the most important factor in the determination of a depreciation rate using the life span method.

Q. What is the National Association of Regulatory Utility Commissioner's thinking on this subject?

A. In August 1996, the National Association of Regulatory Utility Commissioners

[21] Company Exhibit DSR-3, Schedule 5.

issued an update version of its Public Utility Depreciation Practices Manual. Chapter X of the manual addresses the life span method. It stresses that the final retirement date is the most important factor in the determination of depreciation rate using the life span method. The NARUC Depreciation Practice Manual requires consideration of several factors, including: economic studies, retirement plans, forecasts, technological obsolescence, adequacy of capacity and competitive pressures, in order to develop an informed estimate of the final retirement date.[22] The NARUC Manual elaborates on the need for the consideration of these factors as follows:

Selecting Retirement Dates

> As indicated in the above discussion, the final retirement date in the most important factor in the determination of a depreciation rate for life span properties. Therefore, an informed estimate of the final retirement date is essential to ensure adequate recognition of depreciation over the life of the property. Several factors are considered in selecting retirement dates, e.g. economic studies, retirement plans, forecasts, technological obsolescence, adequacy of capacity and competitive pressure.[23]

Q. Does the Company have any of the studies, plans, or forecasts specified in the NARUC Manual to support any of its terminal retirement year estimates?

A. No. The Ratepayer Advocate's data request RAR-DEP-3 addressed the issue. The

[22] NARUC Manual, p. 146.

[23] Id.

question and PSE&G's response follow:

QUESTION:

For all accounts and locations for which Mr. Roff is proposing the life span, provide the following information to support Mr. Roff's final retirement dates. Please respond to each item.

(a) Economic studies (NARUC, p. 146)
(b) Retirement plans (NARUC, p. 146)
(c) Forecasts (NARUC, p. 146)
(d) Studies and technological obsolescence (NARUC, p. 146)
(e) Studies of adequacy of capacity (NARUC, p. 146)
(f) Studies of competitive pressure (NARUC, p. 146)
(g) Relationship of type construction to remaining life span
(h) Relationship of observed features and conditions at the time field visits to remaining life span.
(i) Relationship of observed features and conditions at the time of field visits to remaining life span.
(j) Relationship of specific plans of management to remaining life span

ANSWER:

The life span method was utilized for production plant. The retirement dates were developed using the best engineering judgments of the personnel involved with the operations of the facilities taking into account the existing age, use and reliability of the equipment , how quickly changes are occurring in control equipment, how quickly changes are occurring in control equipment technology and other engineering considerations. No specific detailed studies are available.

Q. How did PSE&G arrive at its final retirement years?

A. PSE&G relied on a back of the envelope approach to estimate final retirement years. Exhibit___(MJM-5) is an internal Email describing the Company's approach

to terminal years.[24]

[24] Obtained from Roff workpapers.

Q. Do you agree with PSE&G's approach?

A. No. The Company should be able to support its terminal retirement year estimates.

Q. What do you recommend?

A. Ordinarily I would recommend that the life-span method not be used for PSE&G's Production and Storage plant. A better approach would be to use an average service life approach based on statistical studies such as that used for T&D accounts. Unfortunately, Mr. Roff's statistical studies of PSE&G's Production & Storage plant reflect a massive dismantlement and replacement in the early 1990's which I do not expect will occur again. Those studies are inappropriate to use for life estimates.

Given a lack of empirical data, I recommend a 10-year extension to Mr. Roff's proposed terminal retirement years. The following table compares Mr. Roff's terminal retirement years to my recommendations.

Comparison of Terminal Retirement Years

Production & Storage Plant	Roff	Majoros
Camden	2010	2020
Linden	2010	2020
Central	2017	2027
Burlington	2010	2020
Harrison	2017	2027
Orange Headquarters	2017	2027

Q. Is your adjustment based on your judgment?

A. Yes. This adjustment is based on my judgment. The adjustment is reasonable and

conservative. Although the 10 year adjustment is based primarily on my judgment, its reasonableness and conservative nature are corroborated by account 311-LPG Equipment. This is the account where the bulk of the production plant investment is recorded. The average age of that investment is 14.4 years which, when combined with my 26 year remaining life estimate for that account, results in a 40 year average service life. This is at the low end of the results of Mr. Roff's actuarial analyses of this account. Those lives are 43, 44, 75, and 77.[25] Consequently, the 40 years resulting from my 10 year adjustment are eminently reasonable.

These new plants are state-of-the-art, very well maintained, and critical to the company's operations. See Exhibit__(MJM-1) photo number 2-5, 7-8, 10, 13-15, 21-24. PSE&G has no plans whatsoever to retire these plants. The assumption that they will be fully dismantled in 9 to 16 years from now is unreasonable. In all likelihood, they will survive far beyond the terminal retirement years I am recommending. Ratepayers should not be required to pay for an early retirement of these new plants when it is unlikely that such an early retirement will occur.

Future Additions

Q. Why does the inclusion of future additions in life span depreciation rates result in an error?

A. First of all, it is specifically precluded by NARUC. The NARUC manual states:

> For example, a building may have a structural

[25] Roff workpapers.

> addition that will remain until the entire building is retired, whereas an addition such as a roof, plumbing, or internal partitions may be retired prior to the final building retirement. Appropriate estimates must be made for such interim retirements; however [future] interim additions are not considered in the depreciation base or rate until they occur.[26]

The inclusion of future additions in life span depreciation rate calculations produces an incorrect result. The remaining life depreciation rate equation is premised on the basic assumption that the denominator, i.e., the remaining life, reflects the remaining years of service to be provided by existing plant-in-service as of the study date. A remaining life of existing plant can be calculated from estimated future retirements whether they are interim or terminal. For example, assume that the existing plant balance is $1,000 and that the overall life span is 10 years. Also assume that 20 percent of the plant is expected to be retired in 5 years (interim retirements). The average remaining life can be calculated as follows:

Life Span-Average Remaining Life

		Plant Balance	Remaining Life	Weight
Subject to Final Retirement	(80%)	$800	10 yrs	8,000
Subject to Int. Retirement	(20%)	200	5	1,000
	100%	$1,000		9,000
Average Remaining Life	9,000 ÷ 1,000 = 9 yrs.			

The example deals with estimated retirements from existing plant. Mr. Roff, however, included future additions in his calculations. Future additions do not fit

[26] NARUC Manual. P. 142 [Emphasis added.]

into the example. Since a future addition does not exist at the study date, it cannot have a remaining life at the study date. Public utility depreciation rates are supposed to be designed to recover the existing net plant over the remaining life of existing plant. Mr. Roff's inclusion of future additions merely serves to reduce the remaining life relating to existing plant, thus increasing revenue requirements.

Mr. Roff's procedure charges current ratepayers for future plant additions. Future additions should not be included in life-span depreciation rate calculations. They are precluded by NARUC, they violate normal ratemaking principles, and they render the resulting depreciation rate incorrect.

Q. At page 7 of his testimony, Mr. Roff states "recognition of the effect of these interim additions in a depreciation rate calculation is necessary because the estimated [terminal] retirement dates cannot occur without replacement activity, and the estimated retirement dates assume this activity will occur." Do you agree?

A. I agree to the extent of interim additions that have already occurred. I disagree to the extent of future additions. Mr. Roff is obviously attempting to draw a nexus between his future interim additions estimates and the life spans he is proposing. Above I discussed why future additions are not reflected in life span depreciation rates. However, as far as PSE&G goes, based on my observations of this Company's plants, it is obvious that very few interim additions will be required in the future and it is highly probable that these plants will live far longer than the terminal retirement years Mr. Roff is using. Hence, Mr. Roff's theory is debunked not only

by NARUC but also by common sense.

Q. Have you calculated life span rates without future additions?

A. Yes. The calculations are included in each of the Production and Storage plant sections of Exhibit___(MJM-2).

Amortization Periods

Q. Please discuss the Company's new amortization proposal.

A. Mr. Roff states that "in 1994 the Company implemented an amortization accounting practice for certain asset categories as authorized by the Federal Energy Regulatory Commission." Mr. Roff also states that "under this method of accounting amounts recorded as additions to utility plant are recorded in the Continuing Property Records ("CPR") at a vintage account level only. These vintage amounts are then amortized over their average service lives consistent with the Company's other General Plant Equipment."[27] In simple terms, assume that a three-year amortization period is selected for Personal Computers. Each year's additions are amortized over a three-year period regardless of how long the PC's are actually in service. If all additions are assumed to have been made on the first of the year, then the additions in 2001 would be fully amortized by the end of 2003; the 2002 additions would be fully amortized by the end of 2004, etc. Mr. Roff proposes to continue this process, but he also proposes to change the amortization periods for

[27] Roff Testimony, p. 17.

all General Plant accounts except 390, Structure and Improvements."[28]

Q. Did you test Mr. Roff's revised amortization periods?

A. Yes. I conducted geometric mean turnover analyses to test Mr. Roff's revised amortization periods.

Q. What do you conclude regarding Mr. Roff's revised amortization periods?

A. I conclude that Mr. Roff's revised amortization periods result in overstated amortization expense. Most of his revised amortization periods are much shorter than the historical retirement levels indicate. In my opinion, the revised amortization periods should bear at least some relationship to the lives being experienced in these accounts.

Q. Do you disagree with Mr. Roff's revised amortization periods?

A. Yes, I disagree with several of Mr. Roff's revised amortization periods in the General Plant function. The following table summarizes these disagreements.

Comparison of Amortization
Periods in General Plant Functions

Description	Existing	Roff	Majoros
391.10 Office Furniture	29	20	20
391.20 Office Equipment	29	4	4
391.30 Office Computer Equipment	29	7	10
391.33 Office Personal Computer Equip	29	3	3
393.00 Stores Equipment	29	7	20
394.00 Tools, Shop & Garage Equip	29	7	15
395.00 Laboratory Equipment	29	5	15
397.00 Communications Equipment	29	10	15
398.00 Miscellaneous Equipment	29	7	20

[28] Id., p. 18

Where my recommendations are different than Mr. Roff's, I have determined that his so-called average service lives bear no relationship at all to the life indications resulting from historical studies of actual retirements. On the other hand, each of my recommendations is extremely reasonable when compared to the average service life indications resulting from the turnover analyses. In many instances my recommendations are much shorter than recent life indications and are therefore, very fair to the Company.

Q. Would you please explain your recommendations relating to the revised amortization periods?

A. Yes, I will explain each of my recommendations that is different than Mr. Roff's.

391.30-Office Computer Equipment. Mr. Roff proposes a 7 year amortization period based on judgment. I propose 10 years based on the 9.6 year average age of the dollars in the account. Exhibit___(MJM-2) page 146.

393 - Stores Equipment. Mr. Roff proposes a 7 year amortization period, but life indications have never been that short as demonstrated on pages 152 to 153 of Exhibit___(MJM-2). I recommend a 20 year amortization period which is also shorter than life indications, but is clearly closer to those indications than Mr. Roff's 7 year period.

394-Tools, Shop and Garage Equipment. Mr. Roff proposes a 7 year amortization period. I propose a 15 year amortization period giving recognition to recent life indications. See Exhibit___(MJM-2), pages 157, 158 and160.

395-Laboratory Equipment. Mr. Roff proposes a 5 year amortization period. I

propose a 15 year amortization period giving recognition to recent life indications. See Exhibit___(MJM-2), pages 162, 163 and 165.

397-Communications Equipment. Mr. Roff proposes a 10 year amortization period. I proposes a 15 year amortization period giving recognition to recent life indications. See Exhibit___(MJM-2) pages 167, 168, and 170.

398-Miscellaneous Equipment. Mr. Roff proposes a 7 year amortization period. I propose 20 years giving recognition to recent life indications. See Exhibit___(MJM-2) pages 172, 173 and 175.

Summary

Q. Please summarize your conclusions and recommendations.

A. I conclude that Mr. Roff's net salvage proposals produce unreasonable and irrational increases to revenue requirements. I recommend the Pennsylvania Public Utility Commission's net salvage approach. This approach keeps the Company whole, reflects reality, and eliminates the excessive net salvage charge from depreciation rates and revenue requirements. I also conclude that several of Mr. Roff's Transmission and Distribution lives are understated. Accordingly, I am recommending alternative lives based on my studies. I conclude that Mr. Roff's Production and Storage plant life span proposals are deficient for two reasons. The terminal retirement years are understated and he has erroneously included future additions in his calculations. I have corrected these deficiencies. Finally, I conclude that Mr. Roff understated several of his revised amortization periods in the

General Plant function. I recommend revised amortization periods which give recognition to the actual experience in each account. All of these calculations are included in Exhibit___(MJM-2).

Q. Does this conclude you testimony?

A. Yes, it does.