SEPTA/Amtrak Statement No. 13

PM 3-10-86
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PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

SURREBUTTAL TESTIMONY OF
RICHARD J. RUDDEN

on behalf of

THE SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

and

THE NATIONAL RAILROAD PASSENGER CORPORATION

Concerning Rate Structure

March 5, 1986

SURREBUTTAL TESTIMONY OF RICHARD J. RUDDEN

Q. Mr. Rudden, what is the purpose of your surrebuttal testimony?

A. My purpose is to respond to portions of Mr. Williams' rebuttal testimony regarding the treatment of power delivered to Amtrak at Thorndale and Perryville and the demands metered at those points which are used by PECO in the computation of demand allocation factors for Amtrak.

Q. Please explain.

A. At lines 16 through 19 of page 8 of his testimony, Mr. Williams in effect asserts that the transactions at Thorndale and Perryville are precisely the same as all other PJM interchange transactions. This is not true. No other PJM transaction within the PECO territory is even remotely similar to Amtrak's situation, where:

(1) A single customer initially receives delivery of power from another utility (PP&L and/or BG&E) before that power enters PECO's franchise service territory, as it does in Amtrak's case;

(2) A customer transmits the power it receives from the other utilities over facilities that the customer has built, owns, operates and maintains, as Amtrak has and does;

(3) The power purchased is 25 Hz in frequency, is exclusively used by one customer, and does not provide electricity to PECO's general grid. (According to Mr. Williams, this power ". . . is not fed back into the PE 60 Hertz system.");

(4) The customer has a contractual right to coordinate the dispatch of power out of a utility-owned hydroelectric plant from which it purchases the power, as Amtrak does; and

(5) PECO never takes possession of the interchange power, maintains no facilities of its own at the interconnect point (except for metering equipment) and does not in any way transmit or distribute the power to the customer.

Q. Mr. Williams states that "[If] it . . . was judged to be justifiable to exclude the loads at Perryville and Thorndale, it would be logical to exclude load at all other interconnection points." Do you agree?

A. No. Because the service characteristics at Perryville and Thorndale are so exceptional, it does not follow at all that it would be logical to treat the deliveries of power at other interconnection points the same. In fact, it is <u>because</u> of their unique nature, that the demands at Thorndale and Perryville should be treated entirely differently from other PJM deliveries and, for that matter, from the balance of power provided by PECO at Amtrak's other delivery points.

Q. Does that conclude your surrebuttal testimony?

A. Yes it does.

City Statement No. 3

PY 3-10-86
Hbg

PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

REBUTTAL TESTIMONY OF
DR. MICHAEL J. ILEO

RATE STRUCTURE AND COST OF SERVICE

FEBRUARY 26, 1986

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

DOCKET NO. R-850152

REBUTTAL TESTIMONY OF

DR. MICHAEL J. ILEO

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Michael J. Ileo. My business address is 8 North Harrison Street, Richmond, Virginia 23220.

Q. WHAT IS YOUR PROFESSIONAL AND EDUCATIONAL BACKGROUND?

A. I am President and Senior Economist of Technical Associates, Incorporated, which is a business research and consulting firm located in Richmond, Virginia. Since its formation in 1969, the firm has provided a wide variety of economic, accounting, engineering, and other technical consulting services to private and government clients throughout the U.S. and Canada.

In connection with the work performed by Technical Associates, I have presented expert testimony on cost of capital, cost of service, cost separations and allocations, rate design, and other related issues before most federal regulatory agencies including the FERC, FPC, FCC, DOE, ICC, NRC, RMC, Federal Price Commission, and the National Energy Board in Canada. I have also appeared before state regulatory agencies in Alaska, Arizona, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Hawaii, Kentucky, Maine, Maryland, Minnesota, Missouri, Nevada, New Mexico, New York, Ohio, Oregon, Oklahoma, Ontario (Canada), Pennsylvania, Rhode Island, South Carolina, Texas, Virginia, and Wisconsin.

I hold a Ph.D. in economics from Virginia Polytechnic Institute and State University. A more complete statement of my professional and educational background appears in the Appendix to my testimony.

Q. FOR WHOM ARE YOU APPEARING IN THIS PROCEEDING, DR. ILEO?

A. I am appearing on behalf of the City of Philadelphia ("City").

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The City has asked me to review and analyze the application of Philadelphia Electric Company ("PECO" or

"Company") and the testimony of other intervenor witnesses in this proceeding in order to comment on the evidence offered regarding cost allocation and rate design issues, including the distribution of PECO's revenue requirement among customer classes. In accordance with this assignment, I have evaluated the positions of the parties as to the appropriateness of the various cost allocation and revenue distribution proposals being advanced. The purpose of my testimony is to set forth my findings and to offer certain recommendations for the consideration of the Pennsylvania Public Utility Commission ("Commission").

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR ANALYSIS.

A. In this proceeding, PECO has decided not to propose any increase in rates for streetlighting service provided to the City under Schedule SLP. This decision is well-justified, for under a properly conducted cost allocation study it would be clear that the rate of return produced by this service greatly exceeds the system average rate of return. Even the Company's class cost of service study ("CCOSS"), as described by Mr. Sundermeir and set forth in Exhibit WFS-1, demonstrates the reasonableness of leaving the rates for City streetlighting service at their present levels. In this regard, the Company's CCOSS shows that the ratio of the Schedule SLP rate of return to the system average rate of return is 174% at present rates--suggesting that City streetlighting service may be subsidizing other uses.

This is not to say that I concur fully with the procedures and results of the Company's CCOSS. While the CCOSS appears reasonable in a number of respects, it also has certain limitations. For example, the CCOSS is deficient in the method by which distribution plant and expenses are classified into demand and customer-related components. Additionally, greater accuracy in assigning cost responsibility would be achieved in the CCOSS if it reflected the fact that energy (KWH) costs are higher during peak than off-peak periods. If these limitations were rectified, there is no doubt that a strong factual case would exist for actually decreasing the rates for streetlighting service to the City. This is true not only because such service is largely provided off-peak, but also because the Company's CCOSS misclassifies customer costs which results in an overallocation to City streetlighting service. Thus, although PECO has not proposed a decrease, it has at least recognized that there is no cost justification for an increase in the streetlighting rates paid by the City. This, along with other Company proposals is designed to move rates of return closer to the system average.

There are, however, several parties in this proceeding who would increase the rates in Schedule SLP based on the results of demand (KW) cost allocation procedures that differ significantly from those of the Company. But in examining these procedures, it is obvious that they have no rational basis from a utility system planning and operation perspective. Rather, they are motivated by a desire to shift costs from peak to off-peak usage under the guise of ill-founded theories and despite the actual pattern of cost incurrence. Accordingly, while the Company's CCOSS has its limitations, it does not appear to purposely misrepresent the way costs are incurred as is inherent in other demand cost allocation procedures before the Commission. From the City's standpoint, moreover, this misrepresentation results in an overstatement of the cost of serving an off-peak service such as streetlighting. Cost allocation procedures which produce such results that effectively penalize off-peak usage should be rejected by the Commission.

Q. PLEASE DESCRIBE THE PURPOSE OF A CLASS COST OF SERVICE STUDY OR CCOSS PERFORMED ON AN EMBEDDED COST BASIS.

A. The purpose of a CCOSS is to assign the embedded costs of electricity production, incurred largely on a joint basis, among the various customer groups in a manner which is consistent with the engineering standards and economic principles underlying the design, construction, and operation of the system. An embedded CCOSS attempts to reasonably assign responsibility for total test year accounting costs to customer classes so that rates of return on allocated rate base for each class may be derived. These results, in turn, can then be used to make assessments as to levels of revenue excess and deficiency among customer classes.

Q. WHAT PROCEDURES ARE TYPICALLY EMPLOYED IN THE DEVELOPMENT OF A CCOSS?

A. An embedded CCOSS typically includes three overall steps: (1) functionalization; (2) classification; and (3) allocation. Functionalization is the categorization of plant and associated costs according to the major functions of production, transmission, and distribution.

The production function is generally thought of as including costs incurred in the generation of power or its wholesale purchases. The transmission function includes the costs of transferring bulk power throughout the system or to adjoining systems. The distribution function includes the costs associated with the delivery of power from the transmission system to the ultimate consumer.

The functionalization of facilities into transmission and distribution categories is to a degree judgmental. For example, conductors and associated equipment are distinguished from one another on the basis of their operating voltages. The facilities operating at voltages of 69 kilovolts (KV) may be considered definitely transmission-related if they are clearly designed to meet system coincident peak demand requirements. At voltage levels of 13 KV and below, the facilities may be considered distribution-related if they are clearly designed to meet localized peak demand. Facilities operating in the intervening range may be difficult to functionalize.

After functionalization, the next step in a CCOSS is classification. That is, the functionalized plant is classified as demand-related, energy-related, customer-related, or a combination thereof. The demand-related facilities and expenses are those associated with the kilowatt (KW) production--typically generation and transmission (bulk power supply) facilities. The energy-related facilities and expenses are those that are associated with kilowatt-hours (KWH) generated and consumed--the single most significant item being the cost of fuel. Customer-related facilities are those for which the level of investment is said to be a function of the number of customers served.

Within the distribution function, there are facilities which have been traditionally considered as being a function of the KW demands placed on the system, as well as the number of customers served. Moreover, it is generally theorized that there is no energy-related component of distribution facilities.

The final step, allocation, is the procedure which assigns the plant and expenses in each functional category (and by demand, energy, and customer classifications) to each of the customer classes. Allocation procedures should follow consistently with the other two steps in the cost study process. Therefore, demand (KW)-related plant and expenses should be allocated to the utility's customer groups according to the relative demand (KW) levels exhibited by the respective customer groups. Likewise, energy (KWH)-related plant and expenses should be allocated to the customer groups according to relative levels of energy (KWH) use among customer classes. Customer-related costs should be allocated on some basis that reflects the nature and number of customers served in each group.

Q. WHAT METHODOLOGICAL PROCEDURES ARE EMPLOYED BY THE COMPANY IN ITS CCOSS?

A. With respect to the functionalization of plant and expenses into the generation, transmission, and distribution categories, it appears from my review that the Company's methodology reflects the accounting and engineering practices which it follows in maintaining its books and records. As to the Company's methods of allocating plant and expenses to customer classes, PECO classifies production and transmission plant (including associated expenses) as demand or (KW)-related. It then allocates this plant (and corresponding expenses) to customer classes based on the average contribution of each class to the hourly system peak KW demand in each of the summer months, June through September. This procedures is one which PECO has used in the past and is consistent with the Commission's Opinion and Order in its last rate case, Docket No. R-842590.

The primary method of allocating production and transmission plant and related expenses in PECO Exhibit WFS-1 might be characterized as an "average of the summer peak demands method" or 4-CP method. This is distinct, for example, from a sole peak responsibility method which would utilize only the Company's annual peak demand, or from a method that would consider loads in all hours of the year which might qualify as peak hours.

The Company's CCOSS also classifies other electric plant and expenses into the traditional demand-related, energy-related, and customer-related categories. As indicated in Exhibit WFS-1, distribution plant is classified as either demand or customer-related and then allocated to the respective customer classes based on relative demand levels or the relative numbers of customers (except for some direct assignments). A significant portion of the expense incurred by PECO is directly attributable to the production of energy. Thus, relative KWH use is employed by PECO in the assignment of energy costs to customer classes.

Q. DR. ILEO, DO YOU AGREE WITH THE COST ALLOCATION PROCEDURES USED BY THE COMPANY IN ITS CCOSS?

A. I have only one major disagreement with the procedures employed by PECO in its CCOSS, i.e., classification of distribution plant and expenses into demand-related and customer-related portions. In the last PECO rate case (Docket No. R-842590), my testimony included a detailed analysis and evaluation of the problems inherent in the Company's approach to the classification of distribution plant. The Company has, however, followed the same method in this proceeding with the same result, i.e., an excessive portion of distribution plant and expenses is classified as customer-related. As a consequence, the CCOSS of PECO understates the rates of return earned by services which are largely provided on an off-peak basis such as City streetlighting. That is, whereas the Company's CCOSS shows a 174% relationship between City streetlighting and the system average rate of return, the true relationship is actually much higher.

In addition to this problem, I believe certain other improvements could be made to the Company's CCOSS. I refer specifically to the fact that greater accuracy in customer class cost assignment could be achieved if more reliance were placed on time-of-use considerations in the CCOSS. PECO does this only in a limited manner with respect to the allocation of demand-related costs, i.e., the use of the 4-CP. But no time-of-use considerations are taken into account in the allocation of energy-related costs. Specifically, by allocating energy-related costs on a simple KWH basis, the CCOSS fails to recognize that such costs are higher during peak as opposed to off-peak hours. For this reason alone, it is likely that PECO's cost allocation methodology tends to overstate the costs incurred in providing services which are largely off-peak, e.g., streetlighting service.

Q. DO THE COST ALLOCATION PROCEDURES ADVANCED BY OTHER PARTIES TO THIS PROCEEDING IMPROVE UPON THE COMPANY'S CCOSS?

A. There is improvement in certain respects, for the cost studies of some of the other parties classify distribution costs differently (and more appropriately) than in the Company's CCOSS. In other respects, however, the alternative cost allocation studies recommended by the other parties are inferior to that of PECO. This is true because they allocate demand (KW)-related production and transmission costs partially on the basis of annual energy (KWH) consumption without regard to time-of-use. Such procedures run counter to the way utility systems are actually planned and operated, i.e., the way costs are actually incurred. Thus, since embedded cost studies are supposed to assign costs in a manner that reflects cost incidence, the demand allocation procedures of the intervenors should be rejected by the Commission.

Q. TO WHICH DEMAND COST ALLOCATION PROCEDURES DO YOU REFER?

A. There are four intervenor witnesses in this proceeding who offer testimony regarding methodologies for allocating KW-related costs differently than that of PECO: Dr. Robert Wirtshafter on behalf of the Utility Users Committee/University of Pennsylvania; Mr. George Sterzinger on behalf of the Consumers' Education and Protective Association, et al.; Mr. Robert Figley on behalf of the Pennsylvania Business Users Group; and Mr. Bruce Oliver on behalf of the Office of Consumer Advocate.

Dr. Wirtshafter, although stopping short of advocating the "average and excess" method, does suggest that demand (KW) related production and transmission costs should be allocated based on energy (KWH) usage. Specifically in this regard, he states that "the average and excess method recognizes that energy savings is a major factor in determining PECO capacity related expenditures" (p. 10). Mr. Sterzinger goes one step further than Dr. Wirtshafter by actually using the average and excess method to allocate KW-related costs on a KWH basis.

In contrast, Mr. Figley appears to accept PECO's 4-CP allocation of KW-related costs except with respect to Limerick 1. For this plant, Mr. Figley treats Limerick 1 as if it were a peaking plant designed only to meet system peak demands over a few hours of the year. He assigns a portion of the capital cost of Limerick 1 to the "demand component" through substituting the estimated per KW cost of a peaker unit ($396/KW) for the actual installed cost of Limerick 1. Mr. Figley then subtracts the product of the unit peaker capacity cost and the KW generation capacity of Limerick 1 ($396 X 1055 MW, or $417.8 million) from the total installed cost of Limerick 1, $3.82 billion, to obtain the "energy component", approximately $3.4 billion. The remainder or "demand component" is then allocated to the customer classes based on PECO's 4-CP method, while the "energy component" is allocated to customer classes based on KWH usage.

Mr. Oliver follows a somewhat different track since, unlike Mr. Figley, he does not single out a particular plant and, unlike Dr. Wirtshafter and Mr. Sterzinger, he rejects use of the average and excess method. This rejection is based on the fact that the average and excess method rests on the use of non-coincident rather than coincident demands (p. 15). Consequently, Mr. Oliver employs the "peak and average demand" method to allocate PECO's capacity-related costs. His rationale is "that this method of cost allocation reasonably reflects the duality of the Company's generating capacity planning decisions" (p. 15). The term "duality" apparently refers to Mr. Oliver's view of the relationship between capital and energy costs in utility planning (p. 14).

In examining the positions of the four witnesses cited above, a number of facts become obvious regarding the cost allocation methodologies being advanced: (1) they ignore the way utility systems are actually planned and operated; (2) they ignore the manner in which utility costs are actually incurred; (3) they ignore the distinction between on-peak and off-peak energy costs; and (4) they arbitrarily reassign costs from the demand (KW) to the energy (KWH)-related category. Because of this, I think it is fair to conclude that the methodologies being advanced are motivated by a desire to shift costs to off-peak customers who impose the least cost on utilities and create the greatest benefit for other customers.

Q. PLEASE EXPLAIN WHY IT IS IMPORTANT THAT COST ALLOCATION METHODS REFLECT THE WAY UTILITY SYSTEMS ARE PLANNED AND OPERATED, AS WELL AS THE WAY COSTS ARE INCURRED.

A. As indicated previously, cost allocation studies performed on an embedded cost basis provide an indication of how much revenue should be forthcoming from customer classes. That is, such studies should provide a measure of the cost incurred by a utility in providing service to each class. However, since utilities plan and operate their systems to meet the composite needs of customers, rather than on the basis of individual class requirements, costs cannot be specifically assigned except in rare instances. An allocation of costs is, therefore, necessary. And, in order to reflect the way system costs are actually incurred, such an allocation should represent the responsibility of customer classes for the composite electrical requirements which utilities fulfill.

In the planning and operation of utility systems, a major objective is to minimize total demand (KW) and energy (KWH) costs in meeting total system load requirements. In the planning phase, this goal is achieved by determining the least-cost mix of peak, intermediate, and base load generation facilities which, on a combined basis, consists of sufficient capacity (and attendant reliability) to meet system KW demands in peak hours. This-least cost mix will depend on plant specific capital costs/KW and energy costs/KWH, as well as the shape of the annual load duration curve.

If this curve, for example, is fairly flat, the least-cost mix will consist entirely of base load plants, since the relatively high capital costs/KW can be spread over many hours of load duration. On the other hand, when the load duration curve is steep, peaking units will play an important role in meeting capacity requirements. This is true because combined capital and energy costs are minimized when peaking units are operated for short periods of time, i.e., the comparatively high energy costs/KWH are offset by the comparatively low capital costs/KW.

An additional important aspect of system planning is that the need to meet KW demands in the peak period drives selection of the least-cost generation mix. In fact, off-peak loads play virtually no role in this process. This is the case because once a least-cost generation mix is found for the peak hours of the load duration curve, planning for the remaining hours automatically occurs in a least costly manner. That is, if the use of base load facilities with relatively low energy costs/KWH is appropriate for peak hours, the same must be true for off-peak hours.

In the operations phase, which directly reflects the planning process, total costs are minimized by operating generation units in a manner where the plants with the highest energy costs/KWH are used last, i.e., economic dispatch. This means that only base load units will be used to meet KW demands in off-peak periods, with peaking units being added to this capacity as KW demands grow to a peaking nature. For this reason, the energy cost/KWH incurred in peak hours is greater than its counterpart in off-peak hours.

Q. HOW DO THE COST ALLOCATION METHODS OF THE FOUR INTERVENOR WITNESSES THAT YOU CITED RELATE TO THE PLANNING AND OPERATION OF UTILITY SYSTEMS?

First of all, the integrated nature of utility system planning and operation makes it clear that the allocation procedure of Mr. Figley totally misses the mark since it carves out Limerick 1 for special treatment. The planning process described above, however, is applicable to both the design of an initial system and a capacity addition to such a system. But under Mr. Figley's approach, this fact is denied.

Note in this regard that Mr. Figley's approach treats an individual plant as an island, i.e., as if it existed independently of other generation faciliites. Consider, for example, how one might apply such a methodology through time for each type of plant addition? If the two category separation (peak and base) were employed for each plant increment, all capacity would be treated as peaking capacity--even increments as large as 1055 MW. Not only is it obvious that peaking capacity in units of 1055 MW do not exist, but such a system configuration would be irrational and exceedingly costly to operate.

Even if Mr. Figley were able to demonstrate the appropriateness of his methodology from an integrated system planning and operations standpoint, i.e., the way costs are actually incurred, there is an additional flaw in his approach. His so-called "energy component" of Limerick 1 (which is about 89% of the installed cost) is allocated to customer classes on a KWH basis without regard to time-of-use. Thus, while Mr. Figley's method assigns a time-of-use dimension to a small part of Limerick 1, that same dimension is not given to the vast bulk of the installed cost of Limerick. For this reason, Mr. Figley's method is not only at odds with the way utility systems are planned and operated, but it ignores the fact that costs differ significantly by time-of-use. The 4-CP methodology of the Company at least gives some recognition to this fact, particularly since it is applied to a much greater amount of cost.

The system planning and operation process also makes it clear that the traditional categorization of costs into demand-related and energy-related reflects the way such costs are actually incurred. While trade-offs between capital and energy costs are recognized in the planning process, those trade-offs no longer exist once the least-cost generation mix is determined and becomes operational. Thus, to categorize capital costs already incurred as energy rather than demand-related and to allocate such costs on an energy (KWH) basis without regard to time-of-use, is to deny the existence of a total system generation mix which presumably was determined under the least-cost criteria. Yet, use of the allocation method advanced by Mr. Figley does precisely this despite the fact that it is being employed in an embedded cost framework.

Q. DO THE ALLOCATION PROCEDURES OF THE OTHER INTERVENORS SUFFER FROM THE SAME INFIRMITIES?

A. Advocates of the "average and excess" and "peak and average" methods do not carve out individual plants for special treatment. But significant problems exist in these procedures as well.

Mr. Oliver apparently sees at least one of the flaws in the average and excess method advocated by Dr. Wirtshafter and Mr. Sterzinger, i.e., its reliance on non-coincident demands which have absolutely no relationship to system planning and cost incurrence. He also recognizes (and attempts to correct) the problems in PECO's treatment of distribution costs.

However, in selecting an alternative method of allocating demand-related costs, Mr. Oliver ignores the other failings which continue to prevail in the transfer from "average and excess" to "peak and average". More succinctly, the peak and average method is not only an arbitrary method of allocation, but it disregards the way costs are incurred in the planning and operation of utility systems. This is further exemplified in Mr.

Oliver's failure to allocate energy (KWH)-related costs in a manner that reflects peak and off-peak differentials.

Q. WILL YOU EXPLAIN WHY THE PEAK AND AVERAGE METHOD IS ARBITRARY AND DOES NOT REFLECT THE WAY COSTS ARE INCURRED?

A. Yes. As is true for the average and excess method, there is no basis for the peak and average method which can be logically traced to the way costs are incurred in planning and operating utility systems. This is easily understood by carefully examining Mr. Oliver's statements at page 16 of his testimony.

First of all, and despite the manner of Mr. Oliver's discussion, the infirmities of the peak and average method can be observed by examining its mathematical properties. I begin by first defining the following terms:

CA: class allocator;

CA-P: peak portion of CA;

CA-A: average portion of CA;

CCPD: class coincident peak demand;

SCPD: system coincident peak demand;

CKWH: class total kilowatt-hour consumption;

SKWH: system total kilowatt-hour consumption;

SLF: system load factor defined as SKWH/(SCPD X 8760)

Based on the above definitions and Mr. Oliver's discussion at page 16, the peak and average method is given by:

(1) CA = CA-P + CA-A; or

$$(2)\quad CA = \left[\frac{CCPD}{SCPD}\right]\left\{1 - \left[\frac{SKWH}{(SCPD)\ (8760)}\right]\right\} + \left\{\left[\frac{CKWH}{SKWH}\right]\left[\frac{SKWH}{(SCPD)\ (8760)}\right]\right\};$$

or

$$(3)\quad CA = \left[\frac{CCPD}{SCPD}\right] - \left[\frac{(CCPD)\ (SKWH)}{(SCPD)^2\ (8760)}\right] + \left[\frac{CKWH}{(SCPD)\ (8760)}\right]$$

If one defines SAD as system average demand, i.e., SAD = SKWH/8760, and CAD as class average demand, i.e., CAD = CKWH/8760; we can write:

$$(4)\quad CA = \left[\frac{CCPD}{SCPD}\right] - \left[\frac{(CCPD)\ (SAD)}{(SCPD)^2}\right] + \left[\frac{CAD}{SCPD}\right]; \text{ or}$$

$$(5)\quad CA = \left[\frac{1}{SCPD}\right]\left[CCPD\left(1 - \frac{SAD}{SCPD}\right) + CAD\right].$$

The above mathematical machinations, implicitly inherent in the peak and average method, highlight its arbitrary nature. For example, note in formula (3) the major roles played by kilowatt-hours that are undifferentiated by time-of-use, i.e., SKWH and CKWH. Not only do they appear in different terms of the formula, but SKWH and CKWH play virtually no role in system planning and operation since they have no time-of-use dimension. In this regard, it should be understood the the SKWH in the hypothetical could result from an infinite number of annual load duration curves, but without knowing the time-of-use shape of the curve, the system could not be planned and operated in a least-cost manner.

When formula (5) is examined, we see that average demands (SAD and CAD) also play a major (implicit) role in the peak and average method. Average demands are even of less value to system planning and operation than time undifferentiated KWH. Moreover, the average demands used in the peak and average method are essentially of a non-coincident nature--something which Mr. Oliver finds objectionable in the average and excess method since they are immaterial to the system planning and operations process.

However, Mr. Oliver goes on to claim that the SLF weighting mechanism in the peak and average method "can also be tied to the Company's capacity planning considerations since, for any given amount of capacity, the average capacity factor for the system will increase with the system load factor" (p. 16). Assuming that by the term 'average capacity factor for the system" Mr. Oliver means the ratio of system actual kilowatt-hours to system potential kilowatt-hours, his statement is erroneous. To use a hypothetical example, suppose: SKWH = 4,380,000 KWH; SCPD = 900 KW; and system capacity (SCAP) = 1000 KW. Under such conditions, the SLF is 55.6% = 4,380,000/(900 X 8760) while the system capacity factor (SCF) is 50% = 4,380,000/(1000 X 8760).

Assume now there is a 2% reduction in SCPD in the peak hour from 900 KW to 882KW with an attendant decline (18KWH) in SKWH to 4,379,982. The SLF increases from 55.6% to 56.7% where 56.7% = 4,379,982/(882 X 8760). But while the SLF increases, the SCF decreases from exactly 50% to slightly below 50% (49.99979%) = 4,379,982/(1000 X 8760). This simple illustration, one of many that could be cited, proves that Mr. Oliver is mistaken in his assertion about the properties of the peak and average method. That is, contrary to Mr. Oliver's view, the SCF may decrease as the SLF increases.

In view of the above demonstrations, I believe it is fair to conclude that advocacy of the peak and average method, as well as others being offered by intervenors in this proceeding, is based solely on a desire to shift costs to off-peak usage such as streetlighting service. The shift is clearly not based on system planning and operation precepts, nor does it reflect the way system costs are actually incurred. The motivation of the intervenors is further highlighted by the fact that they propose no modification to the way PECO allocates KWH-related costs despite the fact that such costs are higher during on-peak hours.

Q. WHAT IS YOUR RESPONSE TO MR. OLIVER'S INFERENCE THAT THE PEAK AND AVERAGE METHOD IS A MORE EQUITABLE WAY OF CUSTOMER CLASSES SHARING IN THE BENEFITS OF UTILITY PLANNING AND OPERATION?

A. I do not believe that the peak and average method warrants such an acclamation. To demonstrate why this is the case, consider the following hypothetical example:

	System	Customer Class A	Customer Class B	Other Customer Classes
Coin. Peak KW	1,000	200	180	620
Total KWH	5,256,000	1,000,000	1,200,000	3,056,000
On-Peak KWH	3,256,000	800,000	400,000	2,056,000
Off-Peak KWH	2,000,000	200,000	800,000	1,000,000
Load Factor	60%	57.1%	76.1%	56.3%

Given the above data, the peak and average method would assign the following allocation factors to Customer Classes A and B for KW-related costs:

For A: $\left[\frac{1,000,000}{5,256,000}\right](60\%) + \left[\frac{200}{1,000}\right](40\%) = 19.42\%$

For B: $\left[\frac{1,200,000}{5,256,000}\right](60\%) + \left[\frac{180}{1,000}\right](40\%) = 20.90\%$

Thus, despite the fact that it contributes less to system peak demand, has a higher load factor, and has less on-peak KWH consumption, B would be assigned a larger portion of system KW-related costs than A under the peak and average method.

Suppose further that system costs were $1 million comprised of $0.3 million in KW-related costs and $0.7 million in KWH-related costs, where the latter is comprised of $0.5 million in on-peak energy costs and $0.2 million in off-peak energy costs. Under the allocation method proposed by Mr. Oliver, A and B would bear the following shares of total system costs:

	A	B
KW-Related	$58,260	$62,700
KWH-Related	133,181	159,817
TOTAL	$191,441	$222,517

Customer Class B, accordingly, would bear about 16% more than the cost assigned to A. This would occur despite the fact that A has a higher peak demand and is responsible for more energy costs. The latter is true because A is responsible for KWH-related costs in the amount of $142,850 = (800,000/ 3,256,000) ($0.5 million) + (200,000/2,000,000) ($0.2 million) while B's responsibility is $141,425 = (400,000/3,256,000) ($0.5 million) + (800,000/2,000,000) ($0.2 million). This occurs because Mr. Oliver's allocation proposal does not take into account time-of-use considerations.

While this is also a shortcoming in the Company's CCOSS, the degree of bias is not as pronounced. For example, within the context of the hypothetical, PECO would assign the following costs to A and B:

	A	B
KW-Related	$60,000	$54,000
KWH-Related	133,181	159,817
TOTAL	$193,181	$213,817

Thus, while PECO's allocation methodology also fails to take account of the fact that a differential exists between peak and off-peak energy costs, the magnitude of the bias taken as a whole is not as great as under Mr. Oliver's approach.

For this and the other reasons cited, the attributes of the peak and average method cited by Mr. Oliver are not really present. If this were the case, a customer class (such as B in the hypothtical) which confers benefits on other classes would not bear such a disproportionately large share of system costs.

Q. WHAT ARE THE IMPLICATIONS OF IMPROPERLY SHIFTING COSTS TO OFF-PEAK USERS?

A. Assuming that such cost shifts are actually incorporated in rates, adverse inpacts are likely to occur for both the customers directly effected and the system overall. That is, an increase in rates for off-peak service will tend to depress off-peak sales and worsen system load factor. In turn, this will raise system unit production costs and, hence, the cost for all consumers.

It is for this reason that the allocation procedures recommended by the intervenors make little sense from either a costing or pricing standpoint. Ideally, off-peak consumption should be encouraged to the maximum extent practicable. This is true because increases in off-peak sales can be met without adding capacity such that all customers confront a lower system unit cost. The allocation methodologies advanced by the intervenors, however, totally ignore this benefit which off-peak consumption confers on other usage.

Q. DR. ILEO, YOU STATED EARLIER THAT PROBLEMS EXIST IN THE WAY PECO CLASSIFIES DISTRIBUTION COSTS INTO DEMAND AND CUSTOMER-RELATED PORTIONS. PLEASE DESCRIBE THESE PROBLEMS.

A. In the Company's CCOSS, the seven distribution plant accounts are classified as being both customer and demand-related. These are: Account 360 - Land and Land Rights; Account 364 - Poles, Towers, and fixtures; Account 365 - Overhead Conductors and Devices; Account 366 - Underground Conduit; Account 367 - Underground Conductors and Devices; Account 368 - Line Transformers; and Account 369 - Services.

Expenses associated with these seven plant accounts are also split between demand and customer classifications. These are found in six expense accounts: Account 583 - Overhead Lines Expenses; Account 584 - Underground Line Expenses; Account 593 - Maintenance of Overhead Lines; Account 594 - Maintenance of Underground Lines; Account 595 - Maintenance of Line Transformers; and Account 940 - Depreciation Expense.

The fundamental problem with PECO's classification procedure is that it is based on the "predominant" size of each of the types of facilities found in each distribution plant account. This approach is distinct from, and inferior to, the more frequently encountered zero-intercept and minimum system methods of classifying distribution plant.

The Predominant Minimum Size ("PMS") approach employed by PECO essentially determines the predominant size facility found in a particular distribution plant account and uses the average installed cost of the predominant size facility as the basis for calculating the customer component of the distribution facility.

The use of the PMS method is biased in that it determines a customer component in excess of the minimum distribution system required to serve customers regardless of their load requirements. The effect of utilizing the PMS method is that the customer portion of each of the distribution plant and expense accounts is overstated.

Indeed, the Company's PMS method serves to maximize the amount of distribution plant and expenses which are treated as customer-related. This is the case because PECO's choice of the component within a particular plant account to represent the predominant size facility is necessarily a function of the change in the size of the plant components booked in the account over time. In turn, this change is a function of: (1) the choice made by the Company as to the sizes and types of facilities installed; and (2) the altered electrical needs of PECO's customers. Note also that (1) is dependent on (2).

Thus, the predominant size components within a distribution plant account today reflect an upgrading to meet customer electrical needs over time due to the increasing electrical demands of households, as well as to the increased demands of commercial and industrial customers. At any point in time, the use of the PMS method inherently assigns considerably more costs to the customer-related classification for "[P]oles, wires, etc.--required [than] if the customer had only a 25-watt light bulb" as set forth in <u>Electric Utility Cost Allocation Manual</u>, NARUC, 1973, Chapter VI, Page 56. In effect, the PMS method of the Company serves to transfer costs which are truly a function of demand to the customer classification. This occurs because the amount considered as customer-related is actually a function of demand--a contradiction which does not exist in other classification methods.

The net result of the use of the PMS method is to overstate the cost of serving customer classes, such as streetlighting, which have a large number of "customers" (locations) relative to the demand placed on the system.

As a consequence, the rate of return shown for streetlighting service in the Company's CCOSS is understated.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS TO THE COMMISSION.

A. First and foremost, the Commission should approve PECO's proposal to leave the rates for City streetlighting service unchanged. Such a decision is appropriate given that the rates under Schedule SLP should actually be decreased, as a more accurate and properly performed cost allocation study would demonstrate. Even the Company's CCOSS, with its limitations, indicates that streetlighting service is bearing a disproportionate share of PECO's revenue requirement.

The Commission should also reject the schemes being proposed by various intervenors in this proceeding to reclassify and reallocate demand (KW)-related costs. This is true because they have no logical foundation, but are driven by a desire to shift cost responsibility in an unfair (and economically irrational) manner to an off-peak service such as streetlighting.

Finally, I believe that the Commission should accept PECO's CCOSS with one exception and with certain qualifications. The exception rests with PECO's classification of distribution plant and expenses into demand and customer-related components. The Company's treatment is so seriously flawed that it should be rejected outright by the Commission. The qualifications to which I refer focus on improving the accuracy of the Company's CCOSS. In this regard, I urge the Commission to instruct PECO to incorporate greater time-of-use considerations into its CCOSS, particularly with respect to KWH costs.

Q. HAVE YOU CONCLUDED YOUR REBUTTAL TESTIMONY?

A. Yes, I have.

APPENDIX

BACKGROUND AND EXPERIENCE PROFILE
DR. MICHAEL J. ILEO
PRESIDENT AND SENIOR ECONOMIST

EDUCATION

1969-1972	Ph.D., Economics, Virginia Polytechnic Institute and State University (Blacksburg)
1967-1969	Graduate Economics, University of Missouri (Columbia)
1965-1967	M.S., Economics, University of Rhode Island (Kingston)
1963-1965	B.S., Business Economics, University of Rhode Island (Kingston)
1961-1963	A.S., Accounting, Roger Williams College Bristol, Rhode Island

POSITIONS

1972-Present	President and Senior Economist, Technical Associates, Inc., Adjunct Professor of Economics, Virginia Commonwealth University (Richmond)
1971-1972	Vice President and Senior Economist, Technical Associates, Inc.
1969-1971	Staff Economist, Technical Associates, Inc. Economics Instructor, Department of Economics, Virginia Polytechnic Institute and State University (Blacksburg)
1968-1969	Research Associate, Department of Electrical Engineering, University of Missouri (Columbia)
1967-1968	Economics Instructor, Department of Economics, University of Missouri (Columbia)
1965-1967	Consulting Economist, National Economic Research Associates, Inc.

EXPERIENCE

<u>Utility Economics</u> -- Testified before many state and federal regulatory commissions and legislative bodies on various issues concerning electric, gas, telephone, water and steam utilities. Testimony has focused on such issues as rate design, cost allocations and separations, access charges, rate of return, capital structure, cost of capital, revenue requirements, cost of service, demand forecasting, capacity planning, site location, utility integration, congeneration and avoidable costs, marginal cost pricing, accounting treatments, and computer modeling.

Conducted jurisdictional, interclass and intraclass cost of service studies of electric, telephone, gas, and water utilities using embedded and marginal cost methodologies. Presented computer based sensitivity analyses of alternative allocation and separaration procedures employing different measures of utilization such as time and volume of use. Prepared alternative rate designs based on results of cost of service studies. Developed computer based transmission and distribution system routing model.

Prepared numerous rate of return studies incorporating cost of equity determination based on DCF, CAPM, comparable earnings and other models. Developed procedures for identifying differential risk characteristics by customer class and type of service.

Presented expert testimony before such federal regulatory agencies as the FERC, FPC, NRC, DOE, FCC, NEB (Canada), and ICC. Presentations before state regulatory agencies has been made in Alaska, Arizona, California, Colorado, Delaware, District of Columbia, Florida, Hawaii, Kentucky, Maine, Maryland, Minnesota, Missouri, Nevada, New Mexico, New York, Ohio, Oklahoma, Ontario (Canada), Oregon, Pennsylvania, Rhode Island, South Carolina, Texas, Virginia and Wisconsin.

Advised various federal legislative bodies on the framing and impact of utility legislation such as the National Energy Act of 1978, especially the FUA and PURPA titles. Served as a consultant to the USDOE in interpreting and carrying out the mandates of such legislation. Also advised government and legislative bodies in Virginia, Ohio and Pennsylvania on the requirements of PURPA such as the Governor's Electricity Cost Commission (Virginia).

Clients served include state regulatory agencies in Alaska, Arizona, North Carolina, Missouri, Virginia and Ontario (Canada); consumer advocates and attorneys general in Florida, Ohio, Virginia, South Carolina, District of Columbia, Oklahoma, Texas, Kentucky, Colorado, Maryland and Pennsylvania; federal agencies including General Services Administration, Department of the Navy, Defense Communications Agency and the Department of Energy; and various private organizations such as Bath Iron Works, U.S. Steel, St. Paul Chamber of Commerce, Westermoreland Coal, Sun Oil, National Fuel Oil Jobbers Council, Pennsylvania Petroleum Association, National Association of Sheet Metal Contractors, and Virginia Hydro Power Association.

Energy Economics -- Conducted studies on the relationship between utility pricing practices and the demand and supply of oil for residential heating purposes. Analyzed the relative energy efficiencies of rail versus truck transportation. Conducted studies of the structure and performance of the petrochemical industry. Testified on the long run costs of coal vs. nuclear use for electricity generation and presented analyses on the fuel use decision in generation plant planning.

Clients have included USDOE, Detroit Edison, National Oil Jobbers Council, Virginia Electric Power Company, Kentucky Attorney General, Carolina Power & Light, Coloroado Consumer Advocate, Iowa Public Service and Ohio Consumers' Counsel.

Transportation Economics -- Conducted cost of service studies to assess service line profitability of railroads, oil pipelines, water carriers, motor carriers and taxicabs. Testified before the ICC in numerous proceedings on the cost of transporting coal by rail with specific consideration of such issues as constant cost allocation, differential pricing and inverse elasticity, long-run marginal costs, Ramsey pricing, and stand-alone costing. Served as a consultant to the ICC's Rail Services Planning Office on the reorganization of rail service in the U. S. Testified before the FMC on the cost of capital to water carriers.

Served as consultant to a number of shippers and the State of Alaska on the economics of oil pipelines. Testified on many occasions on the cost of service of moving crude and oil products by pipeline before the ICC, FERC, and the Alaska Pipeline Commission. Presented papers to various forums on the theory of cost allocation in transportation and/or communications systems.

Clients served included W. R. Grace, Minnesota Power & Light, Edison Electric Institute, Tampa Electric, Kerr-McGee Oil, Kaiser Industries, Martin Marietta, Alaska Pipeline Commission, Port of San Diego, Westinghouse, and Allied Chemical.

Financial Economics -- Conducted profitability, feasibility and expansion studies for a number of banks and savings and loan associations. Advised other financial institutions on interest rate structure and loan maturity. Presented expert testimony before the Regional Administrator of

National Banks and the Virginia State Corporation Commission with respect to certificates for need and convenience, permissible interest rates and term to maturity for loans.

Conducted analyses of the relationship between the investment income earned by insurance companies on their portfolios and the premiums charged for insurance. Doctoral dissertation (1972) consists of mathematical model of insurance company pricing decisions under different degrees of portfolio and exposure risks.

Clients have included Dominion Bankshares, Household Finance, Beneficial Finance, Virginia Bureau of Insurance, American Finance, and a number of banks and savings and loan associatons.

Franchise, Merger & Anti-trust Economics -- Conducted studies on competitive impact on market structures due to joint ventures, mergers, franchising and other business restructuring. Analyzed the costs and benefits to parties involved in mergers. Testified in federal courts and before banking and other regulatory bodies concerning the structure and performance of markets, as well as on the impact of restrictive practices.

Clients served include American Motors, General Motors, International Harvester, Kawasaki Motors, Monsanto Chemical, Dominion Bankshares, and Springfield Photo Mount.

Economic Loss Analyses -- Testified in federal courts, state courts, and other ajudicative forums regarding the economic loss sustained through personal and business injury whether due to bodily harm, non-performance, or anticompetitive practices. Testimony has been presented on behalf of private individuals and business firms such as a number of automobile dealers in Virginia.

SELECTED REPORTS AND PUBLICATIONS

"A Simple Method to Evaluate the Economic Feasibility of Streetlighting Purchase and Operation by Municipalities", prepared for Montgomery County Consortium of Communities, 1985 (with Kenneth C. Strobl and William S. Lowe)

"Towards An Understanding of the Economics of Undue Cross-Subsidization: The Case of Natural Gas Rate Structures", prepared for the Ontario Ministry of Energy, September, 1983

"Toward An Understanding of Ramsey Pricing", Expert Testimony presented before the Interstate Commerce Commission, April, 1982

"Guide For Evaluating the Community Impact of Rail Service Discontinuance", prepared for the Rail Services Planning Office, Interstate Commerce Commission, January, 1975 (with Kenneth C. Strobl)

"Evolution of the Virginia Banking Structure, 1962-1974: The Effects of the Buck-Holland Bill", (with David C. Parcell), William and Mary Law Review, Vol. 16, No. 3, 1975

"An Analysis of the Virginia Consumer Finance Industry to Determine the Need for Restructuring the Rate and Size Ceilings on Small Loans in Virginia and the Process by Which They Are Governed," prepared for the Virginia Consumer Finance Association, 1975 (with David C. Parcell)

"The Economic Objectives of Regulation: The Trend in Virginia," (with David C. Parcell), William and Mary Law Review, Vol. 14, No. 2, 1973

An Economic Analysis of The Role of Investment Income In the Insurance Supply Process, Doctorate Dissertation, Virginia Polytechnic Institute and State University, 1972

"Revision of the Property and Casualty Insurance Ratemaking Process Under Prior Approval in the Commonwealth of Virginia," prepared for the Bureau of Insurance of the Virginia State Corporation Commission, 1971 (with Charles Schotta and David C. Parcell)

Organized Medicine In Rhode Island: A Case Study of Local Medical Societies, Masters Thesis, University of Rhode Island, 1967

In addition to the above list of selected reports and publications, more than 50 special studies have been performed and more than 300 prefiled expert testimonies have been prepared.

MEMBERSHIPS

American Economic Association
Southern Economic Association
Richmond Association of Business Economists
Industrial Organization Society

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SECRETARY'S OFFICE
Public Utility Commission

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NUMBER R-850152

REBUTTAL TESTIMONY AND EXHIBITS OF

BRUCE R. OLIVER

TESTIMONY ON
COST-OF-SERVICE AND RATE STRUCTURE ISSUES

DOCKETED

MAR 18 1986

ON BEHALF OF
THE OFFICE OF CONSUMER ADVOCATE

FEBRUARY, 1986

JACKET FOLDER

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS FOR THE RECORD.

A. My name is Bruce R. Oliver. My business address is 1309 Juliana Place, Alexandria, Virginia.

Q. ARE YOU THE SAME BRUCE R. OLIVER WHO SUBMIITED DIRECT TESTIMONY FOR THE OFFICE OF CONSUMER ADVOCATE IN THIS PROCEEDING?

A. Yes, I am.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS PROCEEDING?

A. The purpose of my rebuttal testimony is to respond to portions of direct testimony submitted by witnesses Pollock and Bloom for the Philadelphia Area Industrial Energy User Group (PAIEUG).

Q. HAVE YOU REVIEWED THE RECOMMENDATIONS OF MR. POLLOCK WITH RESPECT TO THE DISTRIBUTION OF THE PROPOSED REVENUE INCREASE IN THIS PROCEEDING?

A. Yes, I have.

Q. HOW DOES MR. POLLOCK'S PROPOSED DISTRIBUTION OF THE REVENUE INCREASE DIFFER FROM THAT WHICH THE COMPANY HAS RECOMMENDED IN THIS PROCEEDING?

A. Mr. Pollock's proposed distribution of the revenue increase differs from that presented by the Company in several ways.

First, he bases his recommendation on a different set of customer class cost allocation results than does the Company. Second, he proposes to distribute the revenue increase on the basis of the non-fuel related portion of base rates. Third, he proposes to eliminate an alleged subsidization of Residential customers by HT customers.

Q. ON WHAT COST ALLOCATION RESULTS DOES MR. POLLOCK RELY IN DEVELOPING HIS PROPOSED DISTRIBUTION OF THE REVENUE INCREASE?

A. Mr. Pollock employs a set of cost allocation results developed by Dr. Bloom which employ a four summer month coincident peak methodology in combination with "weather normalized" demands for Residential and GS customers.

Q. DO YOU FIND THAT THOSE COST ALLOCATION RESULTS ON WHICH MR. POLLOCK HAS RELIED REASONABLY REFLECT THE COST OF PROVIDING SERVICE BY CUSTOMER CLASS FOR PECO?

A. No, I do not. First, as I have demonstrated in my direct testimony in this proceeding the four summer coincident peak methodology upon which Mr. Pollock relies fails to properly reflect the capacity planning decision process undertaken by PECO in its determinations of the types of capacity required by its system, and ignores the fact that substantial portions of the Company's investment in generating facilities, such as Limerick Unit 1, were clearly incurred in an attempt to obtain energy cost savings. Second, as I will demonstrate later in this testimony, Dr. Bloom's attempts to weather normalize customer class peak load data for the PECO system are incomplete and unreliable.

Q. IN SUPPORT OF HIS PROPOSAL FOR DISTRIBUTING THE RATE INCREASE USING BASE REVENUES LESS FUEL COSTS, MR. POLLOCK CITES FOUR OBJECTIVES USED BY THE COMPANY IN PREVIOUS CASES TO SUPPORT SIMILAR REVENUE INCREASE DISTRIBUTIONS. WOULD YOU PLEASE COMMENT ON THOSE OBJECTIVES?

A. At page 14 of his Direct Testimony Mr. Pollock cites four objectives used by PECO in recent cases for distributing revenue increases among customer classes. Those four objectives are as follows:

- To narrow the gap between class rates of return and the system average rate of return;

- To avoid any disruptive changes in the pattern of rates which would unduly affect any one customer class;

- To recognize the fact that energy costs do not contribute to the present need for additional revenue; and

- o To be consistent with the methodology approved by the Commission (in prior cases).

When applied in the context of the Company's revenue increase request in this proceeding, however, I find that the attainment of these objectives, assuming they are appropriate, is no longer consistent with the distribution of the revenue increase on the basis of base revenues less fuel costs.

Q. IS IT YOUR POSITION THAT THE COMMISSION SHOULD NO LONGER BE CONCERNED WITH NARROWING DIFFERENCES BETWEEN CLASS RATES OF RETURN?

A. No. What I am saying is that a distribution of the revenue increase on the basis of base revenues less fuel costs no longer produces results which consistently move class rates of return toward the system average rate of return.

In past cases the Company's cost allocations showed the Residential class providing a below system average rate of return. Since residential customers are typically relatively low load factor users of electricity, the removal of fuel costs from base rates prior to distributing a revenue increase acted to move that class' rate of return toward the system average. In this case, however, we find that the greater revenue increases applied to residential customers in past cases have brought that class' rate of return within close proximity of the system average rate of return. A distribution of the revenue increase in this case using base revenues less fuel costs may actually push the Residential class rate of return above the system average.

On the other hand, the rate of return for the HT class has now fallen seriously below the system average rate of return. Since the HT class is the primary beneficiary of any decision to exclude fuel costs from base revenue measures used to distribute the revenue increase, continued use of a non-fuel method to determine customer class revenue increases would produce little improvement in that class' rate of return. Inclusion of fuel costs in the base revenue measure used to distribute the revenue increase in this case, therefore, provides a reasonable and appropriate means of narrowing class rate of return differentials in the context of this proceeding.

Q. DOES MR. POLLOCK'S PROPOSED USE OF BASE REVENUES LESS FUEL COSTS IN THE DETERMINATION OF THE DISTRIBUTION OF THE REVENUE INCREASE IN THIS PROCEEDING REFLECT THE BENEFITS THAT EACH CUSTOMER CLASS CAN EXPECT TO DERIVE FROM THE ADDITION OF LIMERICK 1?

A. No, it does not. Mr. Pollock's exclusion of fuel costs fails to provide proper recognition of the comparative benefits that PECO expects its customer classes to receive from the operation of that plant. Large high load factor energy users receive comparatively greater benefits from the operation of Limerick 1 than small low load factor residential and commercial customers.

Q. DO ENERGY COSTS CONTRIBUTE TO THE NEED FOR THE RATE INCREASE BEING CONSIDERED IN THIS PROCEEDING?

A. Yes, they do. As I have previously testified, only a relatively small portion of the costs incurred by PECO for base load generating facilities such as Limerick 1 were necessary for the purpose of providing capacity to meet PECO's peak demand requirements. Most of the costs incurred for Limerick 1 are specifically aimed at attempts to produce lower energy costs. Thus, there exists a crucial interrelationship between the level of fuel costs to be incurred by the Company and the magnitude of the rate increase that PECO is requesting in this case. For this reason, exclusion of fuel costs from the basis used to distribute the rate increase in this case is distortive of the Company's actual cost relationships.

Q. WOULD A CHANGE IN THE METHODOLOGY USED TO DISTRIBUTE THE REVENUE INCREASE TO INCLUDE CONSIDERATION OF THE FUEL COSTS IN BASE RATES BE DISRUPTIVE OF EXISTING PATTERNS OF RATES?

A. No, to the contrary, I find that the revenue increase distribution proposed by Mr. Pollock which excludes consideration of the fuel costs in base rates is likely to be more disruptive of existing rate patterns than one which includes fuel costs. The basis for this finding is discussed below.

Q. HOW WOULD THE NET INCREASES IN BASE REVENUES FOR EACH CUSTOMER CLASS COMPARE UNDER MR. POLLOCK'S RECOMMENDATIONS?

A. The revenue increase distribution presented by PAIEUG produces several clearly inequitable and disruptive results. As illustrated by the data in Schedule BRO-9, Mr. Pollock's recommendations would result in a substantially greater percentage increase in base rate revenue for the Residential class than for any other class. Residential customers would shoulder a 35.5 percent increase compared to the system average increase of 27.2 percent. Thus, the Residential increase would be 1.3 times the system average increase and more than 1.5 times the 23.3 percent base rate increase that Mr. Pollock proposes for the HT class. In view of the magnitude of the overall rate increase, the PAIEUG proposal places an unduly large burden on Residential customers. Even with PECO's proposed phase-in of the revenue increase, Residential customers would experience electric rate increases roughly three (3) times greater than the present rate of inflation in each of the next four years. If the Company and the Commission are concerned with the well-being of low income and fixed income residential customers, the PAIEUG rate increase proposals must be rejected.

Mr. Pollock's recommendations also yield perverse results for other classes of service. For example, a greater than system average increase is proposed for the GS class, despite the fact that, under every alternative set of cost allocation results presented in this case, the GS class is shown to have a greater than system average rate of return. In addition, Rate OP customers would receive a net rate reduction of 3.6 percent. When so much of the proposed rate increase is directly associated with investments made in an attempt to gain energy cost savings, no class of customers which consumes energy should be totally exempted from responsibility for the rate increase. The PAIEUG proposal for Rate OP, however, would in fact allow those uses of energy to bear no portion of the base rate increase in this case.

Q. HOW WOULD THE PAIEUG REVENUE INCREASE DISTRIBUTION AFFECT THE CHARGES FOR SERVICE UNDER RATES R, RH, AND OP?

A. Schedule BRO-10 shows the Residential customer and energy charges that would result if the additional revenue increase proposed by Mr. Pollock is adopted. If the PAIEUG proposed revenue increase levels are to be achieved for Rates R and RH, then either significant changes in the rate differentials between energy blocks must be implemented or the existing linkages between charges for Rate R and Rate RH must be severed. Either of these alternatives would be disruptive of the existing pattern of rates for customers served under those rate schedules. Likewise, the rate decrease proposed by Mr. Pollock for Rate OP would greatly change the present relationship between the charges for that service and those under the other Residential rate schedules. Page 2 of Schedule BRO-10 shows the influence of the PAIEUG revenue increase proposal on the charges for service under Rate OP.

Q. IF MR. POLLOCK'S REVENUE INCREASE PROPOSALS ARE APPLIED IN THE CONTEXT OF THE OCA RECOMMENDED COST ALLOCATIONS, WHAT WOULD BE THE RESULTING CUSTOMER CLASS RATES OF RETURN?

A. Schedule BRO-11 presents the customer class rates of return produced by the PAIEUG increase proposals under three alternative cost allocation scenarios. The alternative cost allocation results shown in Schedule BRO-11 include:

- o PECO's recommended four summer month coincident peak allocations;

- o The OCA recommended cost allocations including the use of the Peak and Average Method for allocating production and transmission capacity costs; and

- o The OCA recommeded cost allocations modified to incorporate PAIEUG's weather normalized coincident peak demands.

These results suggest that the PAIEUG increase proposals would allow the HT class rate of return to remain substantially below the system average rate of return, while residential rates of return would rise to levels above the system average. Thus, under each of the alternative assessments presented, including one which incorporates PAIEUG's weather normalized class demands that I find to be inaccurate and unreliable, the Residential class would be providing a subsidy to the HT class.

Q. DO YOU FIND THAT MR. POLLOCK'S PROPOSALS FOR REDUCING INTER-CLASS SUBSIDIES ARE REASONABLE?

A. No, I do not. Accepting, for discussion purposes only, the accuracy of Mr. Pollock's measures of inter-class rate subsidies, his proposed distribution of the revenue increase does not move toward elimination of those subsidies in an equitable manner. Mr. Pollock's Exhibit JP-1, Schedule 6, shows that his proposals would totally eliminate any subsidy of other classes by the HT class, but would do nothing to reduce the levels of the comparatively large subsidies which his own analysis suggests the PD, GS and Street Lighting classes are presently providing. Clearly, Mr. Pollock's proposals are designed to provide the greatest benefits to the HT class without concern for equity among the non-residential classes. Accepting arguendo that the Residential class is presently being subsidized, (a finding that neither the OCA nor the Company's cost allocation results support), equity considerations would suggest that the burden of such a subsidy should be distributed as broadly as possible among other customer classes. Mr. Pollock's recommendations, however, would exempt the HT class from any responsibility for the alleged subsidy.

Q. ON WHAT BASIS DO YOU ASSERT THAT DR. BLOOM'S ATTEMPTS AT WEATHER NORMALIZATION OF CLASS COINCIDENT PEAK DEMAND ESTIMATES FOR THE TEST YEARS ARE INCOMPLETE AND UNRELIABLE?

A. I base this position on two key findings. First, no evidence has been presented which clearly establishes any of the Effective Degree Hour (EDH) measures examined by Dr. Bloom as representative of "normal" weather conditions for PECO's summer peak days. Second, Dr. Bloom's weather normalization adjustments fail to identify and adjust for the substantial weather sensitive peak load requirements of customers within the HT and PD classes.

Q. HOW SHOULD WEATHER NORMAL PEAK DAY CONDITIONS BE DETERMINED FOR PECO?

A. Weather normal conditions can only be determined for this type of analysis through the examination of weather data over many years.

Typically, measures of weather normal conditions are based on averages of weather data collected over periods of 20 years or longer. Dr. Bloom, however, presents EDH measures for only 6 years, 1980 through 1985, and the portion of Dr. Bloom's analyses on which Mr. Pollock relies is based on the use of weather data for a single alternative year, 1985. Although Dr. Bloom presents an EDH measure for a "typical hot period," no explanation of the derivation of that measure is provided. No clear indication of the number of years for which data was examined to derive that measure is offered, and no details regarding the specific mathematical formula, assumptions, or data inputs used in the development of that measure are presented.

Q. WHAT WEATHER SENSITIVE LOADS ARE FOUND WITHIN THE HT AND PD CLASSES?

A. The HT and PD classes are comprised of considerably more than just non-weather-sensitive high load factor industrial process loads. For example, the data used by PECO in its forecasts of sales to large commercial and industrial customers served under rates HT and PD indicate that large percentages of both commercial and industrial space served by the Company is air conditioned. (See the Attachment to PECO's response to IR-OCA-6-24, Electric 1984-1994 Forecast With 1994-2004 Projections, page 195.) Actual information for 1983 included with the forecast data indicates that 92 percent of the new space added by large commercial customers and 80 percent of all new large industrial customer space added in PECO's service area in that year was air conditioned space. Furthermore, the Company estimates that on average each square foot of new large commercial and industrial customer space requires about 3.5 watts of connected load for air conditioning. Thus, the addition of approximately 6.5 million square feet of new space for large commercial and industrial customers in 1983 plus the conversion to air conditioning of some existing space resulted in a total addition of over 25 megawatts of new air conditioning load for the HT and PD classes in that year alone. Over the 1984-1994 period, PECO projects the addition of over 265 megawatts of new air conditioning load for these customer classes.

The data in PECO's forecast report also indicate that the air conditioning requirements of HT and PD customers presently account for over 10 ten percent of their total annual energy requirements. Since most of that air conditioning consumption of energy occurs within the Company's four summer peak months, air conditioning probably accounts for 25 - 30 percent of HT and PD customers average summer month demands. Furthermore, the weather sensitivity of these loads combined with their high coincidence with system peak requirements suggests that their significance in the estimation of weather normalized peak demands for the HT and PD classes could be substantial. Dr. Bloom's failure to consider these loads in his attempt to normalize demands for the four summer month peaks for the test year represents a signicant oversight and a bias against the Residential and GS customers.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, it does.

Analysis of PAIEUG Rate Increase Proposal

(Thousands of Dollars)

Rate Class	Present Base Revenue 1)	PAIEUG Proposed Non-Fuel Rev Incr 2)	Roll-out of .7505 cents per KWH 3)	PAIEUG Proposed Increase in Net Base Revenues		
				Amount	Percent	Percent of Sys Avg Incr
R	739,467	310,723	(48,527)	262,196	35.46	130.1
RH	127,424	45,639	(11,582)	34,057	26.73	98.1
OP	25,989	2,007	(2,954)	(947)	-3.64	-13.4
POL	1,525	62	(62)	0	0.00	0.0
GS	344,838	121,776	(25,568)	96,208	27.90	102.4
PD	191,010	66,957	(16,818)	50,139	26.25	96.3
HT	860,983	295,796	(95,286)	200,510	23.29	85.5
EPA	31,683	8,648	(3,238)	5,410	17.08	62.7
EPS	20,100	6,681	(2,015)	4,666	23.21	85.2
SLP	14,993	3,516	(782)	2,734	18.24	66.9
SLS	18,129	4,083	(457)	3,626	20.00	73.4
TL	3,486	247	(247)	0	0.00	0.0
BLI	7	2	(1)	1	14.29	52.4
TRR	306	89	-	89	29.08	106.7
Sub Total	2,379,942	866,226	(207,537)	658,689	27.68	101.6
Other Electric Operations & Adjustments	122,051	26,745	(3,677)	23,068	18.90	69.4
Total	2,501,993	892,971	(211,214)	681,757	27.25	100.0

1) From TPH-2,A-5,Col.6

2) From Exhibit JP-1, Sch. 5,Col.2

3) From TPH-2,A-5,Col.8

PHILADELPHIA ELECTRIC COMPANY
Docket No. R-850152

PROOF OF REVENUES
FOR RATES BASED ON PAIEUG RECOMMENDED RATE INCREASE

Rates R and RH

Rate Block	Billing Determinants	Present Rates	Revenue	Proposed Rates	Revenue	Percent Increase
RATE R						
Customer Charge	6,450,456	$ 4.5000	29,027,052	$ 5.0000	32,252,280	11.1
Energy Charges						
Up to 500 KWH	2,382,086,933	0.1035	246,545,998	0.1425	339,447,388	37.7
KWH Over 500 - Winter	399,375,288	0.1035	41,335,342	0.1425	56,910,979	37.7
KWH Over 500 - Summer	380,388,453	0.1180	44,885,837	0.1521	57,857,084	28.9
Subtotal	3,161,850,674		361,794,229		486,467,730	34.5
Unaccounted			7,059		9,492	34.5
Base Revenue			361,801,288		486,477,222	34.5
12 Mos. Ended 6/30/86 Pro Forma Base Revenue			739,467,000		994,285,712	34.5
RATE RH						
Customer Charge	372,768	$ 4.5000	1,677,456	$ 5.0000	1,863,840	11.1
Energy Charges						
Up to 500 KWH	176,144,091	0.1035	18,230,913	0.1425	25,100,533	37.7
KWH Over 500 - Winter	296,275,236	0.0593	17,569,121	0.0687	20,354,109	15.9
KWH Over 500 - Summer	66,620,779	0.1180	7,861,252	0.1521	10,133,020	28.9
Subtotal	539,040,106		45,338,743		57,451,502	26.7
Unaccounted			(216)		(274)	26.7
Base Revenue			45,338,527		57,451,228	26.7
12 Mos. Ended 6/30/86 Pro Forma Base Revenue			127,424,000		161,466,767	26.7
TOTAL RATES R AND RH			866,891,000		1,155,752,479	33.3

PHILADELPHIA ELECTRIC COMPANY
Docket No. R-850152

PROOF OF REVENUES
FOR RATES BASED ON PAIEUG RECOMMENDED RATE INCREASE

Rate OP

Rate Block	Billing Determinants	Present Rates	Revenue	Proposed Rates	Revenue	Percent Increase
RATE OP						
Customer Charge	1,193,373	3.5000	4,176,806	3.3500	3,997,800	-4.3
Customer Charge	35,463	4.5000	159,584	4.3500	154,264	-3.3
Energy Charge	418,313,000	0.0551	23,049,046	0.0532	22,254,252	-3.4
Total Base Revenue			27,385,435		26,406,315	-3.6
12 Mos. Ended 6/30/86 Pro Forma Base Revenue			25,989,000		25,059,807	-3.6

PHILADELPHIA ELECTRIC COMPANY
Docket No. R-8501522

Comparison of Customer Class Rates of Return

	Total Company	Commercial and Industrial				Residential				Street Lighting	Septa & Amtrak	Other Utiliti	Inter-depart-mental
		Rate HT	Rate PD	Rate GS	Total	Rate RH	Rate R	Rate OP	Total				
PRESENT RATE LEVELS													
Rates of Return													
PECO Cost of Service Study	6.39	5.57	6.21	8.07	6.12	7.39	6.14	21.93	6.40	12.55	8.63	9.54	11.13
OCA Cost of Service Study	6.39	4.91	6.88	8.63	6.00	5.09	7.25	2.00	6.75	10.44	6.65	9.26	10.93
OCA with PAIEUG Demand Revisions	6.39	5.03	7.12	8.36	6.06	4.55	6.61	2.00	6.15	10.44	6.40	8.07	11.13
Relative Rates of Return													
PECO Cost of Service Study	1.00	0.84	0.97	1.26	0.96	1.16	0.96	3.43	1.00	1.97	1.35	1.49	1.74
OCA Cost of Service Study	1.00	0.77	1.08	1.35	0.94	0.80	1.14	0.31	1.06	1.63	1.04	1.45	1.71
OCA with PAIEUG Demand Revisions	1.00	0.79	1.11	1.31	0.95	0.71	1.03	0.31	0.96	1.63	1.00	1.26	1.74
PAIEUG PROPOSED RATE LEVELS													
Rates of Return													
PECO Cost of Service Study	12.70	11.29	11.97	14.47	12.13	15.13	13.15	28.14	13.50	17.63	15.04	9.55	11.13
OCA Cost of Service Study	12.70	10.58	13.06	15.35	11.96	11.21	14.98	3.37	14.03	14.69	12.10	9.26	10.93
OCA with PAIEUG Demand Revisions	12.70	10.77	13.44	14.94	12.07	10.30	13.89	3.38	13.02	14.69	11.72	8.07	11.13
Relative Rates of Return													
PECO Cost of Service Study	1.00	0.89	0.94	1.14	0.96	1.19	1.04	2.22	1.06	1.39	1.18	0.75	0.88
OCA Cost of Service Study	1.00	0.83	1.03	1.21	0.94	0.88	1.18	0.27	1.10	1.16	0.95	0.73	0.86
OCA with PAIEUG Demand Revisions	1.00	0.85	1.06	1.18	0.95	0.81	1.09	0.27	1.03	1.16	0.92	0.64	0.88

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MAR 1 2 1986

SECRETARY'S OFFICE
Public Utility Commission

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NUMBER R-850152

SURREBUTTAL TESTIMONY AND EXHIBITS OF

BRUCE R. OLIVER

TESTIMONY ON
COST-OF-SERVICE AND RATE STRUCTURE ISSUES

DOCKETED

MAR 1 3 1986

ON BEHALF OF
THE OFFICE OF CONSUMER ADVOCATE

MARCH, 1986

FOLDER

SURREBUTTAL TESTIMONY

OF

BRUCE R. OLIVER

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS FOR THE RECORD.

A. My name is Bruce R. Oliver. My business address is 1309 Juliana Place, Alexandria, Virginia.

Q. ARE YOU THE SAME BRUCE R. OLIVER WHO SUBMITTED DIRECT AND REBUTTAL TESTIMONY FOR THE OFFICE OF CONSUMER ADVOCATE IN THIS PROCEEDING?

A. Yes, I am.

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY IN THIS PROCEEDING?

A. The purpose of my Surrebuttal Testimony is to respond to portions of the rebuttal testimony of witnesses Williams and Sundermeir for the Philadelphia Electric Company (PECO or the Company), and Mr. Pollock for the Philadelphia Area Industrial Energy User Group (PAIEUG).

Q. MR. WILLIAMS ASSERTS IN HIS REBUTTAL THAT THE ESSENTIAL USE RATE DESIGN THAT YOU HAVE PROPOSED IS AN INEFFICIENT AND INEFFECTIVE METHOD OF TARGETING THOSE CUSTOMERS WHO REALLY NEED HELP. WOULD YOU CARE TO RESPOND TO MR. WILLIAMS' ASSERTIONS?

A. Mr. Williams' comments reflect a lack of recognition of both the concepts that underlie my essential use rate design recommendations and the effects that rate would have on customer bills. The vast majority of customers, particularly those in low income categories, would benefit from the essential use rate designs that I have presented. Furthermore, the data that Mr. Williams offers in response to my proposals fail to address the issues associated with that proposal.

Q. WHY DO YOU ASSERT THAT THE DATA PRESENTED BY PECO IN RESPONSE TO YOUR ESSENTIAL USE RATE DESIGN PROPOSALS FAIL TO ADDRESS THE ISSUES ASSOCIATED WITH THAT RATE?

A. First, Mr. Williams improperly uses data for customers already participating in PECO's Customer Assistance Program (CAP), as an indication of the characteristics of the customers who will need rate relief if PECO's proposed rate increase is granted. This data reflects only a small and potentially biased sample of customers and fails to recognize the more widespread nature of the customer payment problems that are likely to result if PECO's requested rates are implemented.

We cannot ignore the fact that the percentage increases in residential electric rates proposed by PECO are likely to far exceed the percentage increases in customers' incomes over each of the next several years. As this occurs, the proportion of customers' incomes required to pay monthly electric bills for residential customers will necessarily increase. In view of the comparatively large percentage of households in the PECO service territory already at or near the poverty level, these rate increases, even if phased-in, must be expected to significantly increase the numbers of customers who encounter payment problems. As the numbers of customers with payment problems increase, the characteristics of those customers making application for assistance under the various programs in which the Company participates will change. It appears that PECO has given little or no consideration to these factors.

Second, Mr. Williams' Rebuttal relies on the unfounded assumption that all of the customers included in his Schedule B would receive only the Basic Use allowance of 350 kWh per month. The data presented by Mr. Williams in his Schedule B, for example, fail to offer any indication of the major appliances operated by the customers included in that listing. Without knowing whether those customers have space heating or water heating equipment, it is impossible to determine their essential use allowances. My experience suggests that there is a strong likelihood that those customers who consume more than 50 percent in excess of 350 kWh per month typically have electric water heating, electric space heating, and/or electric air conditioning. The Company's rebuttal regarding essential use rate ignores the additional usage allowances provided for space heating and water heating customers under the OCA essential use proposals.

Q. HOW MUCH ELECTRICITY CAN A CUSTOMER CONSUME BEFORE HE RECEIVES A HIGHER BILL UNDER YOUR ESSENTIAL USE RATE DESIGN THAN HE WOULD UNDER THE COMPANY'S PROPOSED RATE DESIGN?

A. The answer to this question will vary with the amount of rate relief granted the Company, type of customer (in terms of the essential use categories that I have proposed) and the season of the year in which the customers' use is billed. To illustrate the breakeven points that would be experienced under the proposed essential use rate design, I have developed bill comparisons for an essential use rate and an adjusted version of the Company's proposed residential rate design. The essential use rate utilized in these comparisons is that presented in Schedule BRO-8, page 1, which was submitted as a supplemental schedule to my Direct Testimony. The adjusted version of the Company's proposed rate design used in these bill comparisons is presented in Schedule BRO-12. Both rates are designed to recover half of PECO's requested revenue increase for the Residential class. The bill comparisons for these two rate designs are provided in Schedule BRO-13.

Schedule BRO-13 demonstrates that customers whose monthly consumption does not exceed the amounts shown the breakeven levels will receive lower bills under Essential Use rates. In each case, customers will maximize their benefits under essential use rates if their consumption is at or near the level of their monthly use allowance. However, as these comparisons demonstrate, customers may consume amounts considerably in excess of those allowances and still receive lower monthly bills under the essential use rate design than they would under the Company's proposed rate design. Based on my own detailed examination of PECO's bill frequency data, I find that the vast majority of customers in each residential subgroup would benefit directly from the implementation of essential use rates.

The proposed essential use allowances and the breakeven points determined in Schedule BRO-13 are summarized below:

MONTHLY ALLOWANCES AND BREAKEVEN POINTS

FOR ESSENTIAL USE RATE DESIGN

	Essential Use Allowance	Break Even Point
Summer		
Basic Use Customer	350 kWh	532 kWh
Water Heating Customer	700 kWh	1,002 kWh
Space Heating Customer	350 kWh	532 kWh
Space Heating & Water Heating Customer	700 kWh	1,002 kWh
Winter		
Basic Use Customer	350 kWh	542 kWh
Water Heating Customer	700 kWh	1,083 kWh
Space Heating Customer	1,050 kWh	2,134 kWh
Space Heating & Water Heating Customer	1,400 kWh	2,747 kWh

Q. AT PAGE 3 OF HIS REBUTTAL MR. WILLIAMS CRITICIZES THE WATER HEATING BLOCK OF YOUR PROPOSED ESSENTIAL USE RATE DESIGN. DO YOU ACCEPT THE VALIDITY OF THOSE CRITICISMS?

A. No. Mr. Williams' assertions are not supported by the Company's own data. For example, Mr. Williams erroneously asserts that most of PECO's electric water heating is on an off-peak basis. Although approximately 102,000 Residential customers receive water heating service under Rate OP, the appliance saturation data reported by the Company in its 1984-1994 sales forecast (see the Attachment to PECO's response to IR-OCA-6-24) indicate that approximately 17 percent, or 207,000, of PECO's residential customers have electric water heaters. This data, thus, suggests that more than just "a relatively few" water heating customers are served under Rate R.

Q. DOES THE FACT THAT A CUSTOMER RECEIVES WATER HEATING SERVICE UNDER RATE R NECESSARILY IMPLY THAT THE CUSTOMER IS WILLING TO PAY A PREMIUM FOR FOR UNINTERRUPTED WATER HEATING SERVICE?

A. No. Other factors such as the size of the customer's water heater and the composition of the household may have a significant influence on the customer's ability to utilize off-peak water heating service. For example, customers having water heaters with capacities of less that 40 to 50 gallons may have inadequate hot water storage capability to meet normal household requirements during periods of service interruption.

Q. WOULD THE IDENTIFICATION OF RATE R CUSTOMERS WITH ELECTRIC WATER HEATERS SUBSTANTIALLY IMPEDE THE IMPLEMENTATION OF YOUR ESSENTIAL USE RATE DESIGN PROPOSALS?

A. No, it would not. Mr. Williams' testimony at page 3 of his Rebuttal suggests that on site inspection of each "claimed" customer water heater installation would be required. That approach represents a costly and unnecessary extreme. An alternative approach would simply require customers to certify the existence and use of electric water heaters in their residences. If the Company suspects cheating, then limited spot checking of customers premises could be undertaken. A customer found to have certified falsely would be held responsible for payment of the difference between the charges paid under the essential use rate water heating allowance and those charges which otherwise would have been applicable to the customer, plus interest and any applicable late payment charges.

Q. WOULD YOUR RESIDENTIAL RATE DESIGN PROPOSALS ENCOURAGE LOAD MANAGEMENT BY RESIDENTIAL CUSTOMERS?

A. Yes, they would. I base this position on two key findings. First, the essential use rates that I have proposed place greater percentage increases on the charges for tail block use than on charges for the initial rate blocks. Thus, those customers having the greatest opportunities to conserve are given the greatest incentives to utilize conservation measures. This concept was explicitly recognized by the Commission when it first implemented lower initial block charges for PECO's residential customers. The essential use rate design proposals that I have set forth in this proceeding are not asking for a departure from the Commission's existing residential rate design policy, but rather a refinement of that policy to recognize variances in the inelastic portions of customers' electricity requirements that are associated with customers' dependence on major electric appliances.

Second, off-peak water heating service would remain considerably less expensive than unrestricted water heating use under Rate R. Thus, substantial incentive would remain for water heating customers to elect that service. Furthermore, the identification of customers currently taking water heating service under Rate R that would result from the implementation of this rate design should help the Company improve its marketing of off-peak water heating service to those customers and expand participation under Rate OP. The improved identification of Rate R water heating customers should also be of value to the Company in its load forecasting and load research activities.

Q. AT PAGE 3 OF HIS REBUTTAL, MR. POLLOCK ASSERTS THAT YOUR RECOMMENDATION FOR USE OF THE PEAK AND AVERAGE DEMAND ALLOCATION METHODOLOGY IS NOT BASED ON COST-CAUSATION, BUT ON "COST-BENEFIT" THEORY. IS THIS ASSERTION ACCURATE?

A. No. While cost-benefit theory is clearly supportive of use of the Peak and Average allocation method, I also demonstrated in my Direct Testimony, as well as under cross-examination, that use of the Peak and Average allocation method reflects the actual system planning decision process better than the 4CP method that Mr. Pollock supports. See the discussion on pages 11-13 of my Direct Testimony, as well as my testimony under cross-examination regarding the system planning process at Tr. 3833-3838.

The system planning process that electric utilities use determines the size and type of production capacity, and thereby the costs of production capacity to be incurred, by comparing the present-valued revenue requirements of generation expansion alternatives. This approach essentially compares the expected "costs and benefits" of generation alternatives considering both the demand and energy requirements of the Company. The 4CP method supported by Mr. Pollock only addresses a portion of utilities' actual system planning considerations, and therefore, fails to reasonably portray the cost-causative factors associated with plant investment decisions. The Peak and Average Method offers explicit recognition of the duality of utilities' capacity expansion considerations, and thus, better reflects actual cost-causative relationships in this case.

Q. WOULD YOU PLEASE RESPOND TO MR. POLLOCK'S ARGUMENT THAT THE PEAK AND AVERAGE METHOD RESULTS IN A DOUBLE COUNTING OF COST RESPONSIBILITIES?

A. Mr. Pollock's position, once again, stems from his failure to recognize the duality of a utility's system planning and capacity expansion decisions. An identified need for additional generating capacity is not in itself a justification for building additional base load capacity. The type of capacity to be constructed must be justified by the frequency and duration of incremental load requirements, by the existing mix of generating capacity available to the Company, and by the present-valued capital and operating costs of generating technology alternatives.

The "peak" portion of the Peak and Average Method appropriately recognizes that the amount of capacity required by PECO is determined by the total requirements placed on the system during peak hours. The "average" portion recognizes that, a decision is made that an amount of capacity required by the Company, a second decision must be made regarding the type of capacity to be added. That second decision is primarily a function of the number of hours per year the Company expects to operate the new capacity (i.e., the amount of energy the Company expects to generate from the plant), and therefore, is closely related to the average demands placed on the system by each class of customers.

Mr. Pollock's discussion of "cause and effect" is erroneous because it presumes that any identified need for capacity is automatically a justification for building base load nuclear capacity. As demonstrated by both of the Limerick proceedings, issues relating to the determination of present-valued revenue requirements for capacity expansion alternatives, are more than just a simple identification of a need for capacity required to justify the addition of a base load nuclear plant.

Q. PLEASE COMMENT ON THE COMPARISON OF BASE LOAD AND NUCLEAR PLANT COSTS PRESENTED IN MR. POLLOCK'S EXHIBIT JP-2, SCHEDULE 2.

A. The analyses presented in JP-2, Schedule 2, as well as those presented in several subsequent schedules in the same exhibit, are erroneous. Despite Mr. Pollock's reference to the EPRI Technical Assessment Guide (TAG), the data he uses are not even close to being representative of the costs presently faced by PECO. The EPRI TAG to which Mr. Pollock refers is primarily dedicated to explanation of the use of present-valued revenue requirements techniques in the evaluation of capacity expansion alternatives, but Mr. Pollock uses the data from the EPRI TAG, while ignoring the analytic methods it prescribes. The assessment techniques outlined in the EPRI TAG require detailed examination of the costs associated with each generation alternative over an extended period of time (e.g., the book life of the plant), but Mr. Pollock's analyses examine costs for only a single year. If Mr. Pollock had followed the revenue requirements techniques described in detail in the EPRI TAG, he would recognize the importance of generation requirements (i.e., energy) in the selection of the "lowest cost system" for a utility.

Mr. Pollock's analyses are also limited by several other shortcomings. First, both the construction costs and fuel costs that he employs are out of line with current industry experience and more importantly with recent data for PECO. For example, the nuclear plant construction cost used by Mr. Pollock was design to be reflective of the costs of a nuclear plant placed in service in January 1981, and the EPRI TAG specifically notes that this cost estimate does not include additional costs resulting from the Three Mile Island experience. Second, he fails to address the differences in the operating characteristics of the two types of generators. Those two types of generators are shown in the EPRI TAG to have different availability ratings, different minimum load requirements, and different expected lives. Third, Mr. Pollock mistakenly uses the same levelized carrying charge for both the base load nuclear plant and the oil-fired peaker.

Q. DO YOU ACCEPT MR. POLLOCK'S "CORRECTED" VERSION OF THE PEAK AND AVERAGE COST ALLOCATION METHODOLOGY?

A. No, I do not. Mr. Pollock's purported corrections to the Peak and Average Demand allocation methodology that I have presented represent nothing more than an inappropriate attempt to distort the results of that methodology to yield results that more closely approximate the results of the coincident peak method.

Q. PLEASE COMMENT ON SCHEDULE 1 OF EXHIBIT JP-2 THAT IS ATTACHED TO MR. POLLOCK'S REBUTTAL TESTIMONY.

A. Mr. Pollock's Schedule 1 of Exhibit JP-2 is illustrative of the manner in which the results of the Peak and Average allocation methodology have been distorted. Mr. Pollock asserts that his Schedule 1 shows that there is a lack of symmetry in the allocations of Production Plant costs and Fuel and Purchased Power Expenses under the Peak and Average Demand method. This finding, however, is a product of improper presentation and comparison of cost allocation results under the Peak and Average Method. In Schedule 1 of Exhibit JP-2, Mr. Pollock improperly divides the dollars of net production plant allocated to each class by the Peak Demand of each class. This ignores the fact that a substantial portion of these costs were not incurred to meet peak demands and are not allocated on a peak demand basis under the Peak and Average Allocation method.

In Schedule BRO-14, I present the same dollars of allocated Net Production Plant and allocated Fuel and Purchased Power Expenses in a manner that is more consistent with the way in which those costs are allocated under the Peak and Average Methodology. This schedule demonstrates that the average demand, or energy-related portion of the Peak and Average method shows the desired symmetry with the allocation of Fuel and Purchased Power Expenses. The peak demand-related portion of the Peak and Average Method which is not allocated on an average demand, or energy, basis clearly shows a different distribution of cost responsibilities among classes, but this is appropriate since this peak portion of the Company's investment costs are incurred for different purposes than the average portion. When presented on cents per kWh basis, we find that the peak portion of the Peak and average allocation method assigns greater costs to residential and small commercial customers than to the HT class. Once again this is a reasonable result for that portion of the Company's Production Plant investment. Thus, the lack of symmetry suggested by Mr. Pollock is simply the result of an improper comparison of cost measures.

Q. MR. SUNDERMEIR'S REBUTTAL ON THE ISSUE OF DISTRIBUTION COST ALLOCATIONS MAKES SEVERAL REFERENCES TO THE NARUC ELECTRIC UTILITY COST ALLOCATION MANUAL. WHAT IS THE POSITION OF THAT PUBLICATION WITH RESPECT TO THE USE OF THE MINIMUM-SIZE SYSTEM METHOD FOR DETERMINING THE CUSTOMER COMPONENT OF COSTS?

A. The NARUC Manual clearly states at page 56 that:

When data for its calculation can be obtained, the minimum-intercept method is recommended for use over the minimum-size method.

This statement is a strong signal that any utility of reasonable size should take steps to develop the data necessary to support the utilization of a minimum-intercept method. In the more than 12 years since the publication of the NARUC Manual, however, PECO apparently has done nothing to obtain the data necessary to apply either the minimum-intercept method defined in the NARUC Manual or other more recently developed analytic alternatives, such as the Modified Zero-Intercept Methods now used by at least three other electric utilities in Pennsylvania.

Q. MR. SUNDERMEIR TESTIFIES THAT "NOTHING SINCE 1973 INDICATES THAT THERE ARE BETTER METHODS THAN THE ONES DESCRIBED IN THE NARUC MANUAL." WOULD YOU PLEASE RESPOND?

A. First, I must reiterate that even in 1973 the minimum-size method was clearly the less preferred approach. Second, I believe that the approval by this Commission in recent years of other methods, not discussed in the now dated NARUC Manual, is strong indication that it is time for PECO to more fully consider alternatives to its present minimum-size system approach.

Q. WOULD YOU PLEASE RESPOND TO MR. SUNDERMEIR'S ASSERTION THAT THE DATA TO IMPLEMENT A MODIFIED ZERO-INTERCEPT METHOD ARE NOT REQUIRED FOR ANY OTHER PURPOSE AND WOULD BE EXPENSIVE AND TIME CONSUMING TO DEVELOP.

A. The fact that other utilities in the state, of lesser size than PECO have been able to apply alternative methods for determining the customer component of distribution plant is clear indication that Mr. Sundermeir's concerns regarding the costs and time requirements associate with the use of those alternatives are unfounded. In addition, I take issue with Mr. Sundermeir's position that the data used in computing alternatives, such as the modified zero-intercept method, are not required for any other purpose. In fact, much of the data used by PP&L in its application of the Modified Zero-Intercept Method were derived from data used in that company's distribution system construction cost estimating and budgeting activities.

Q. DO YOU AGREE WITH MR. SUNDERMEIR'S SUGGESTION AT PAGE 9 OF HIS REBUTTAL THAT THE IMPORTANCE OF THE USE OF JUDGMENT IN PECO'S DETERMINATIONS OF MINIMUM SIZES FOR DISTRIBUTION FACILITIES IS OVER EMPHASIZED?

A. No. Mr. Sundermeir attempts to support his position with an assertion that the quantity and cost of minimum-size equipment can be verified by the Company's property records and current engineering practices. The quantity and cost of minimum-size equipment are of only secondary importance, however. One cannot measure quantity and cost until the specifications of the minimum size facilities have been determined, and it is in this determination that judgment is broadly applied by the

Company. For example, PECO's minimum system cost for distribution poles is based not on a single size pole, but on the average of costs for all poles 15 Feet to 35 Feet in height. Nothing in the record or in PECO's workpapers explains why this average was used in preference to other alternatives. Likewise, the transformer costs used by PECO are not the costs of a single type of transformer, but the average of an array of transformers of varying specifications and greatly varying costs. Judgmental determinations like these play a substantial role in PECO's estimation of customer-related distribution system costs.

Q. HAS PECO JUSTIFIED ITS ALLOCATION OF REVENUES IN ACCOUNT 454 - RENT FROM ELECTRIC PROPERTY?

A. No. To the contrary, the information provided by the Company leaves no question that PECO's allocation of the revenues in Account 454, solely on the basis of coincident peak demand contributions (i.e., the Company's A-1 allocation factors), is incorrect. While Mr. Sundermeir avoids mention of any distribution-related element of these revenues in his Rebuttal, PECO's response to DR-WFS9-CEPA (1/6/86) shows that nearly half ($5,049,000) of the revenues in Account 454 are derived from rentals of distribution poles. Since costs for distribution poles are not allocated on the basis of coincident peak demands, the revenues from those rentals should not be allocated on that basis.

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY IN THIS PROCEEDING?

A. Yes, it does.

PHILADELPHIA ELECTRIC COMPANY

Docket No. R-850152

PROOF OF REVENUES
FOR ADJUSTED PECO RATE DESIGNS

Rates R and RH

Rate Block	Billing Determinants	Present Rates	Revenue	Proposed Rates	Revenue	Percent Increase
RATE R						
Number of Bills	6,450,456	$ 4.5000	29,027,052	$ 4.7500	30,639,666	5.6
Up to 500 KWH	2,382,086,933	0.1035	246,545,998	0.1188	282,991,928	14.8
KWH Over 500 - Winter	399,375,288	0.1035	41,335,342	0.1188	47,445,784	14.8
KWH Over 500 - Summer	380,388,453	0.1180	44,885,837	0.1356	51,580,674	14.9
Subtotal	3,161,850,674		361,794,229		412,658,052	14.1
Unaccounted			7,059		8,051	14.1
Base Revenue			361,801,288		412,666,103	14.1
12 Mos. Ended 6/30/86 Pro Forma Base Revenue			739,467,000		843,426,973 844,159,924	14.1
RATE RH						
Number of Bills	372,768	$ 4.5000	1,677,456	$ 4.7500	1,770,648	5.6
Up to 500 KWH	176,144,091	0.1035	18,230,913	0.1188	20,925,918	14.8
KWH Over 500 - Winter	296,275,236	0.0593	17,569,121	0.0681	20,176,344	14.8
KWH Over 500 - Summer	66,620,779	0.1180	7,861,252	0.1356	9,033,778	14.9
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Unaccounted			(216)		(247)	14.5
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12 Mos. Ended 6/30/86 Pro Forma Base Revenue			127,424,000		145,883,130 145,154,706	14.5
TOTAL RATES R AND RH			866,891,000		989,310,103	14.1

MONTHLY BILL COMPARISONS FOR
EXAMPLE ESSENTIAL USE RATE DESIGN

Scenario 1: Half of Full Increase for Rates R and RH*

	Winter Months				Summer Months			
Monthly kWh Use	Company Rates***	Essential Use Rate	Dollar Increase	Percent Increase	Company Rates***	Essential Use Rate	Dollar Increase	Percent Increase
				(Basic Use Customer)				
0	5.03	5.03	0.00	0.0				
50	11.19	10.74	-0.46	-4.1	5.03	5.03	.00	.0
100	17.35	16.44	-0.91	-5.2	11.19	10.74	-0.46	-4.1
150	23.51	22.15	-1.37	-5.8	17.35	16.44	-0.91	-5.3
200	29.68	27.86	-1.82	-6.1	23.52	22.15	-1.37	-5.8
250	35.84	33.56	-2.28	-6.4	29.68	27.86	-1.82	-6.1
300	42.00	39.27	-2.73	-6.5	35.84	33.56	-2.28	-6.4
350	48.16	44.98	-3.19	-6.6	42.00	39.27	-2.73	-6.5
400	54.33	51.97	-2.36	-4.3	48.17	44.98	-3.19	-6.6
450	60.49	58.96	-1.52	-2.5	54.33	51.97	-2.36	-4.3
500	66.65	65.96	-0.69	-1.0	60.49	58.96	-1.53	-2.5
532	70.59	70.43	-0.16	-0.2	66.65	65.96	-0.70	-1.0
542	71.83 **	71.83 **	.00 **	.0 **	71.17 **	71.17 **	0.01 **	.0 **
600	78.97	79.94	0.97	1.2	72.58	72.81	0.23	0.3
700	91.30	93.93	2.63	2.9	80.76	82.26	1.51	1.9
800	103.62	107.92	4.29	4.1	94.86	98.57	3.71	3.9
900	115.95	121.90	5.95	5.1	108.96	114.87	5.91	5.4
1,000	128.27	135.89	7.62	5.9	123.06	131.18	8.11	6.6
1,050	134.43	142.88	8.45	6.3	137.17	147.48	10.31	7.5
1,100	140.60	149.88	9.28	6.6	144.22	155.63	11.42	7.9
1,200	152.92	163.86	10.94	7.2	151.27	163.79	12.52	8.3
1,300	165.25	177.85	12.60	7.6	165.37	180.09	14.72	8.9
1,400	177.57	191.84	14.26	8.0	179.48	196.40	16.92	9.4
1,500	189.89	205.82	15.93	8.4	193.58	212.70	19.12	9.9
1,750	220.71	240.79	20.08	9.1	207.68	229.00	21.32	10.3
2,000	251.52	275.75	24.24	9.6	242.94	269.77	26.83	11.0
2,500	313.14	345.69	32.55	10.4	278.20	310.53	32.33	11.6
3,000	374.76	415.62	40.86	10.9	348.71	392.05	43.34	12.4
4,000	498.01	555.48	57.48	11.5	419.22	473.58	54.35	13.0
5,000	621.25	695.35	74.10	11.9	560.25	636.62	76.37	13.6
					701.28	799.67	98.39	14.0

* Assumes no phase-in. Increase granted is implemented immediately.

** Break Point -- Use up to this level by a customer without electric water heating or electric space heating would receive a lesser increase under the proposed Essential Use Rate.

*** Company's proposed rates adjusted to collect half of the requested rate increase; assumes customer charge remains at PECO's proposed level and energy charges are increased by equal percentages.

PHILADELPHIA ELECTRIC COMPANY
Docket No. R-850152

MONTHLY BILL COMPARISONS FOR
EXAMPLE ESSENTIAL USE RATE DESIGN

Scenario I: Half of Full Increase for Rates R and RH*

	Winter Months				Summer Months			
Monthly kWh Use	Company Rates***	Essential Use Rate	Dollar Increase	Percent Increase	Company Rates***	Essential Use Rate	Dollar Increase	Percent Increase
	(Water Heating Customer)							
0	5.03	5.03	0.00	0.0	5.03	5.03	0.00	0.0
50	11.19	10.74	-0.46	-4.1	11.19	10.74	-0.46	-4.1
100	17.35	16.44	-0.91	-5.2	17.35	16.44	-0.91	-5.3
150	23.51	22.15	-1.37	-5.8	23.52	22.15	-1.37	-5.8
200	29.68	27.86	-1.82	-6.1	29.68	27.86	-1.82	-6.1
250	35.84	33.56	-2.28	-6.4	35.84	33.56	-2.28	-6.4
300	42.00	39.27	-2.73	-6.5	42.00	39.27	-2.73	-6.5
350	48.16	44.98	-3.19	-6.6	48.17	44.98	-3.19	-6.6
400	54.33	50.68	-3.64	-6.7	54.33	50.68	-3.64	-6.7
450	60.49	56.39	-4.10	-6.8	60.49	56.39	-4.10	-6.8
500	66.65	62.10	-4.55	-6.8	66.65	62.10	-4.55	-6.8
600	78.97	73.51	-5.46	-6.9	80.76	75.15	-5.60	-6.9
700	91.30	84.93	-6.37	-7.0	94.86	88.21	-6.65	-7.0
800	103.62	98.91	-4.71	-4.5	108.96	104.51	-4.45	-4.1
900	115.95	112.90	-3.05	-2.6	123.06	120.82	-2.25	-1.8
1,000	128.27	126.89	-1.39	-1.1	137.17	137.12	-0.04	.0
1,002	128.52	127.17	-1.35	-1.1	137.45 **	137.45 **	.00 **	.0 **
1,050	134.43	133.88	-0.56	-0.4	144.22	145.27	1.06	0.7
1,083	138.50 **	138.49 **	-0.01 **	.0 **	148.87	150.66	1.78	1.2
1,100	140.60	140.87	0.28	0.2	151.27	153.43	2.16	1.4
1,200	152.92	154.86	1.94	1.3	165.37	169.73	4.36	2.6
1,300	165.25	168.85	3.60	2.2	179.48	186.04	6.56	3.7
1,400	177.57	182.83	5.26	3.0	193.58	202.34	8.76	4.5
1,500	189.89	196.82	6.92	3.6	207.68	218.65	10.97	5.3
1,750	220.71	231.78	11.08	5.0	242.94	259.41	16.47	6.8
2,000	251.52	266.75	15.23	6.1	278.20	300.17	21.97	7.9
2,500	313.14	336.68	23.54	7.5	348.71	381.69	32.98	9.5
3,000	374.76	406.61	31.85	8.5	419.22	463.22	43.99	10.5
4,000	498.01	546.48	48.47	9.7	560.25	626.27	66.01	11.8
5,000	621.25	686.34	65.09	10.5	701.28	789.31	88.03	12.6

* Assumes no phase-in. Increase granted is implemented immediately.

** Break Point -- Use up to this level by a customer without electric water heating or electric space heating would receive a lesser increase under the proposed Essential Use Rate.

*** Company's proposed rates adjusted to collect half of the requested rate increase; assumes customer charge remains at PECO's proposed level and energy charges are increased by equal percentages.

PHILADELPHIA ELECTRIC COMPANY
Docket No. R-850152

MONTHLY BILL COMPARISONS FOR
EXAMPLE ESSENTIAL USE RATE DESIGN

Scenario 1: Half of Full Increase for Rates R and RH*

	Winter Months				Summer Months			
Monthly kWh Use	Company Rates*	Essential Use Rate	Dollar Increase	Percent Increase	Company Rates*	Essential Use Rate	Dollar Increase	Percent Increase
	(Space Heating Customer)							
0	5.03	5.03	0.00	0.0	5.03	5.03	0.00	0.0
50	11.19	10.74	-0.46	-4.1	11.19	10.74	-0.46	-4.1
100	17.35	16.44	-0.91	-5.2	17.35	16.44	-0.91	-5.3
150	23.51	22.15	-1.37	-5.8	23.52	22.15	-1.37	-5.8
200	29.68	27.86	-1.82	-6.1	29.68	27.86	-1.82	-6.1
250	35.84	33.56	-2.28	-6.4	35.84	33.56	-2.28	-6.4
300	42.00	39.27	-2.73	-6.5	42.00	39.27	-2.73	-6.5
350	48.16	44.98	-3.19	-6.6	48.17	44.98	-3.19	-6.6
400	54.33	50.68	-3.64	-6.7	54.33	50.68	-3.64	-6.7
450	60.49	56.39	-4.10	-6.8	60.49	56.39	-4.10	-6.8
500	66.65	62.10	-4.55	-6.8	66.65	62.10	-4.55	-6.8
600	73.61	68.55	-5.06	-6.9	80.76	75.15	-5.60	-6.9
700	80.57	75.00	-5.57	-6.9	94.86	88.21	-6.65	-7.0
800	87.52	81.45	-6.08	-6.9	108.96	104.51	-4.45	-4.1
900	94.48	87.90	-6.58	-7.0	123.06	120.82	-2.25	-1.8
1,000	101.44	94.34	-7.09	-7.0	137.17	137.12	-0.04	.0
1,002	101.58	94.47	-7.10	-7.0	137.45 **	137.45 **	.00 **	.0 **
1,050	104.92	97.57	-7.35	-7.0	144.22	145.27	1.06	0.7
1,100	108.39	101.39	-7.01	-6.5	151.27	153.43	2.16	1.4
1,200	115.35	109.02	-6.33	-5.5	165.37	169.73	4.36	2.6
1,300	122.31	116.66	-5.65	-4.6	179.48	186.04	6.56	3.7
1,400	129.27	124.29	-4.98	-3.8	193.58	202.34	8.76	4.5
1,500	136.22	131.93	-4.30	-3.2	207.68	218.65	10.97	5.3
1,750	153.62	151.01	-2.60	-1.7	242.94	259.41	16.47	6.8
2,000	171.01	170.10	-0.91	-0.5	278.20	300.17	21.97	7.9
2,134	180.33 **	180.33 **	.00 **	.0 **	297.09	322.02	24.93	8.4
2,500	205.80	208.27	2.48	1.2	348.71	381.69	32.98	9.5
3,000	240.58	246.45	5.86	2.4	419.22	463.22	43.99	10.5
4,000	310.16	322.80	12.64	4.1	560.25	626.27	66.01	11.8
5,000	379.73	399.15	19.41	5.1	701.28	789.31	88.03	12.6

* Assumes no phase-in. Increase granted is implemented immediately.

** Break Point -- Use up to this level by a customer without electric water heating or electric space heating would receive a lesser increase under the proposed Essential Use Rate.

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PHILADELPHIA ELECTRIC COMPANY
Docket No. R-850152

MONTHLY BILL COMPARISONS FOR
EXAMPLE ESSENTIAL USE RATE DESIGN

Scenario 1: Half of Full Increase for Rates R and RH*

Monthly kWh Use	Winter Months: Company Rates*	Winter Months: Essential Use Rate	Winter Months: Dollar Increase	Winter Months: Percent Increase	Summer Months: Company Rates*	Summer Months: Essential Use Rate	Summer Months: Dollar Increase	Summer Months: Percent Increase
(Space Heating and Water Heating Customer)								
0	5.03	5.03	0.00	0.0	5.03	5.03	0.00	0.0
50	11.19	10.74	-0.46	-4.1	11.19	10.74	-0.46	-4.1
100	17.35	16.44	-0.91	-5.2	17.35	16.44	-0.91	-5.3
150	23.51	22.15	-1.37	-5.8	23.52	22.15	-1.37	-5.8
200	29.68	27.86	-1.82	-6.1	29.68	27.86	-1.82	-6.1
250	35.84	33.56	-2.28	-6.4	35.84	33.56	-2.28	-6.4
300	42.00	39.27	-2.73	-6.5	42.00	39.27	-2.73	-6.5
350	48.16	44.98	-3.19	-6.6	48.17	44.98	-3.19	-6.6
400	54.33	50.68	-3.64	-6.7	54.33	50.68	-3.64	-6.7
450	60.49	56.39	-4.10	-6.8	60.49	56.39	-4.10	-6.8
500	66.65	62.10	-4.55	-6.8	66.65	62.10	-4.55	-6.8
600	73.61	68.55	-5.06	-6.9	80.76	75.15	-5.60	-6.9
700	80.57	75.00	-5.57	-6.9	94.86	88.21	-6.65	-7.0
800	87.52	81.45	-6.08	-6.9	108.96	104.51	-4.45	-4.1
900	94.48	87.90	-6.58	-7.0	123.06	120.82	-2.25	-1.8
1,000	101.44	94.34	-7.09	-7.0	137.17	137.12	-0.04	.0
1,002	101.58	94.47	-7.10	-7.0	137.45 **	137.45 **	.00 **	.0 **
1,050	104.92	97.57	-7.35	-7.0	144.22	145.27	1.06	0.7
1,100	108.39	100.79	-7.60	-7.0	151.27	153.43	2.16	1.4
1,200	115.35	107.24	-8.11	-7.0	165.37	169.73	4.36	2.6
1,300	122.31	113.69	-8.62	-7.0	179.48	186.04	6.56	3.7
1,400	129.27	120.14	-9.13	-7.1	193.58	202.34	8.76	4.5
1,500	136.22	127.78	-8.45	-6.2	207.68	218.65	10.97	5.3
1,750	153.62	146.86	-6.75	-4.4	242.94	259.41	16.47	6.8
2,000	171.01	165.95	-5.06	-3.0	278.20	300.17	21.97	7.9
2,500	205.80	204.12	-1.67	-0.8	348.71	381.69	32.98	9.5
2,747	222.98 **	222.98 **	.00 **	.0 **	383.54	421.97	38.42	10.0
3,000	240.58	242.30	1.71	0.7	419.22	463.22	43.99	10.5
4,000	310.16	318.65	8.49	2.7	560.25	626.27	66.01	11.8
5,000	379.73	395.00	15.27	4.0	701.28	789.31	88.03	12.6

* Assumes no phase-in. Increase granted is implemented immediately.

** Break Point -- Use up to this level by a customer without electric water heating or electric space heating would receive a lesser increase under the proposed Essential Use Rate.

*** Company's proposed rates adjusted to collect half of the requested rate increase; assumes customer charge remains at PECO's proposed level and energy charges are increased by equal percentages.

PHILADELPHIA ELECTRIC COMPANY
12 Months Ended June 30, 1986

PEAK AND AVERAGE ALLOCATION OF NET PRODUCTION PLANT
COMPARED TO ALLOCATION OF FUEL AND PURCHASED POWER EXPENSES

		Commercial and Industrial			Residential						
	Total	High Tension	Primary	Secondary	Rate RH	Rate R	Rate OP	Street Lighting	Septa & Amtrak	Other Utilities	Inter-depart-mental
NET PRODUCTION PLANT											
Average Portion											
Dollars ($1,000's)	3,643,443	1,603,214	295,960	455,903	211,115	852,663	51,659	22,609	86,677	55,704	7,938
Average Demand	3,455,651	1,520,580	280,706	432,405	200,234	808,715	48,996	21,443	82,210	52,833	7,529
($/kW of Average Demand)	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054
Peak Portion											
Dollars ($1,000's)	2,041,457	846,429	189,573	289,308	80,006	564,054	53	112	37,032	30,456	4,435
Peak Demand	5,391,886	2,235,585	500,698	764,118	211,311	1,489,776	140	296	97,808	80,440	11,714
($/kW of Peak Demand)	379	379	379	379	379	379	379	379	379	379	379
($/kW of Average Demand)	591	557	675	669	400	697	1	5	450	576	589
Total Net Production Plant											
Dollars ($1,000's)	5,684,900	2,449,643	485,533	745,211	291,121	1,416,717	51,712	22,721	123,709	86,160	12,373
($/kW of Average Demand)	1,645	1,611	1,730	1,723	1,454	1,752	1,055	1,060	1,505	1,631	1,643
TOTAL FUEL AND PURCHASED POWER EXPENSE											
Dollars ($1,000's)	392,968	172,917	31,921	49,172	22,770	91,965	5,572	2,438	9,349	6,008	856
($/kW of Average Demand)	114	114	114	114	114	114	114	114	114	114	114

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SECRETARY'S OF[illegible]
Public Utility Comm[illegible]

COMMONWEALTH OF PENNSYLVANIA
BEFORE THE PUBLIC UTILITIES COMMISSION

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MAR 12 1986

SECRETARY'S OFFI[illegible]
Public Utility Commis[illegible]

THE PENNSYLVANIA PUBLIC UTILITIES COMMISSION V. PHILADELPHIA ELECTRIC COMPANY

Docket No. R-850152

UP/UUC STATEMENT #3A

REBUTTAL TESTIMONY OF DR. ROBERT M WIRTSHAFTER
ON BEHALF OF THE
UTILITY USERS COMMITTEE/
UNIVERSITY OF PENNSYLVANIA

February 25, 1986

DOCKETED

MAR 13 1986

DOCUMENT
FOLDER

REBUTTAL TESTIMONY
OF
ROBERT M WIRTSHAFTER

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. I strongly disagree with portions of the testimony of Mr. Larson and Mr. Pollock regarding treatment of the third energy block. Both have testified that they believe that the third block of the energy charges should be lowered. I also wish to clarify several typographical errors that appeared in my testimony regarding my proposed rates.

Q. WHAT ARE YOUR OBJECTIONS TO THE TESTIMONY OF MR. POLLOCK AND MR. LARSON?

A. It is inconceivable that the third block should receive a rate reduction at the time of the largest rate increase in Pennsylvania history. What makes the request even more absurd is that the tail block stands to receive the greatest benefits from the inclusion of Limerick I costs.

Q. WHY DO MESSRS. POLLOCK AND LARSON ERR IN DESIRING TO REDUCE THE THIRD (TAIL) ENERGY BLOCK?

A. Messrs. Pollock and Larson do not include the appropriate demand and energy related costs that result from the use of the Bary curve, nor do they allocate a portion of Limerick's cost to energy.

The Bary curve is the tool derived by PECo to measure the probability of the coincidence of an individual customer's peak with the class peak. It assigns a portion of the demand costs to each of the energy rate blocks. This is a necessary function for any rate-setting process that uses effective use hours. The Bary curve is an appropriate tool for the rate-setting process, yet it be dismissed by these two parties.

Q. MR. POLLOCK OF PAIEUG STATES THAT ALL OF LIMERICK'S CAPITAL COSTS SHOULD BE ALLOCATED TO THE DEMAND COMPONENT OF HIS REVISED 4CP CALCULATIONS. WHY DO YOU FEEL HE HAS ERRED?

A. Mr. Pollock's argument that a demand cost allocation should apply to 100 percent of Limerick costs does not recognize the trade-off between high production capital costs and high running costs. Implicit in his rationale and stated by him in prior cases is that the criterion for system planning is always and entirely a need to meet new demand. He does not recognize that some capacity additions are made for reasons other than reliability. He consistently equates all capital costs with fixed charges and fixed charges with demand related costs.

Q. WHY IS IT WRONG TO EQUATE DEMAND CHARGES WITH FIXED CHARGES?

A. Fixed charges are not always demand related. An example is a contract with another utility for energy purchase on a "take or pay" basis; these are fixed charges, in that the expense is incurred regardless of load; however, they are by no means demand related.

Q. WHY SHOULD THE COSTS OF LIMERICK BE ALLOCATED PRIMARILY TO THE ENERGY COMPONENT RATHER THAN THE DEMAND COMPONENT?

A. The important point to remember is not why Limerick was originally proposed but rather what the reason was for its ultimate completion. In 1967, when the Limerick plants were begun, they were intended to meet demand forecasts which were never realized. In 1980-81, when the first Limerick hearings were held to justify the continued construction of the power plants, the Company consistently argued that the plants should not be cancelled. They based their arguments solely on the gy savings of Limerick.

Mr. Pollock's colleague, Mr. Falkenberg, PAIEUG's own witness, states on pp. 23-24 of his testimony that Limerick Unit I "will reduce PECo's operational reliability from previous levels though reliability will remain more than adequate for the system. Secondly, Limerick Unit I will not produce economic benefits to consumers over the life of the plant based on PECO's own economic study, as would be interpreted by the majority of executives in the electric utility industry in the United States..."

PAIEUG's two claims, 1) that Limerick lessens PECo's reliability, and 2) that Limerick is to be placed solely in the demand component of the cost allocation, are inconsistent with each other. PAIEUG recognizes that Limerick provides no capacity benefits beyond what already exist, therefore Limerick's costs must be assigned to the energy related component.

Q. WHAT IS THE IMPACT OF MR. POLLOCK'S PROPOSED RATE REQUEST ON THE DIFFERENT HT CUSTOMERS?

A. According to Mr. Pollock's own analysis his rate request will lower the rate increase to the PAIEUG members. He did not provide as promised the actual impact of his rate request. The same rate request would be even more harmful to UUC members than the PECo proposed rates. RMW_26 and RMW_27 show the impact of Mr. Pollock's rate request on the twelve UUC customers and the two hypothetical manufacturing customers.

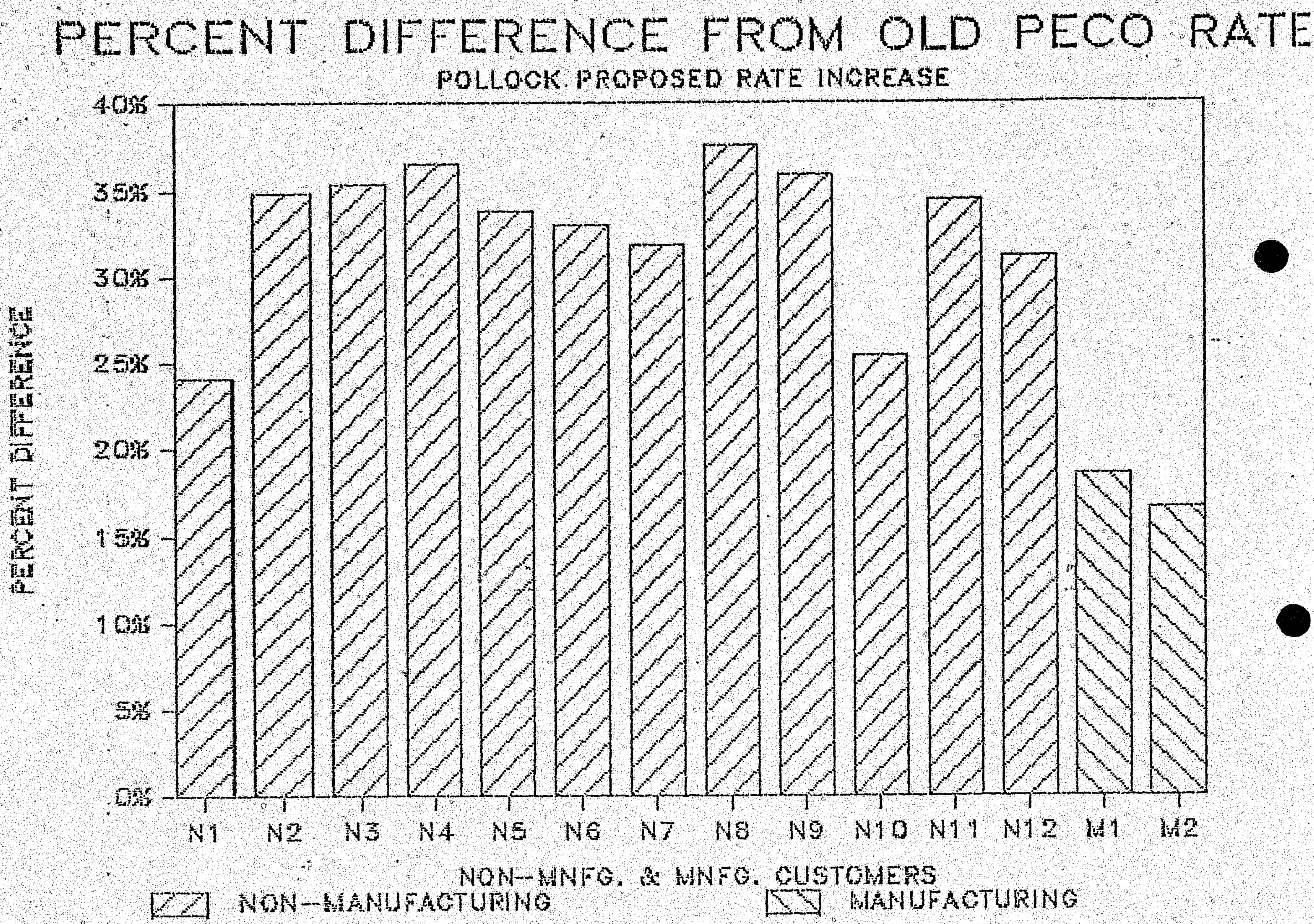
Q. THERE WAS SOME QUESTION DURING YOUR CROSS-EXAMINATION AS TO WHAT YOUR RATE PROPOSAL WAS. WHAT ARE THE RATES THAT YOU ARE PROPOSING?

A. The correct rates are those that appeared on pages 3 and 4 and again on page 21 of my testimony, with one exception. The first energy block is corrected below. The demand charge is $5.34 and the three energy blocks are .0940 $/kwh, .0764 $/kwh, and .0591 $/kwh. I have included a revised RMW_18 and RMW_19 that show the correct revenue requirements for the HT class. For the example in which only 50 percent of the costs of Limerick is allowed, I inadvertently left out the rate for the demand charge in calculating the seven largest HT customers. I have included RMW_23 (revised 2/25) and RMW_24 (revised 2/25) as the corrected tables. Again there are no changes in the rates; the tables merely reflect the corrected demonstration of revenue requirements.

EFFECT OF POLLOCK RATE INCREASE PROPOSAL ON UUC CUSTOMER SAMPLE
AND HYPOTHETICAL MANUFACTURING CUSTOMERS

	Total Electric Bill	Percent difference from old PECO rate
N1	$18,350,237.20	24.15%
N2	$2,222,181.20	34.84%
N3	$423,116.70	35.41%
N4	$283,740.00	36.52%
N5	$296,125.20	33.83%
N6	$440,861.40	33.03%
N7	$2,287,727.20	31.79%
N8	$534,631.30	37.63%
N9	$945,537.20	35.94%
N10	$2,535,752.20	25.41%
N11	$2,258,364.20	34.46%
N12	$1,538,838.20	31.14%
M1	$3,148,886.20	18.60%
M2	$26,301,872.20	16.63%
TOTAL COMMERCIAL	$32,117,112.00	27.47%
TOTAL INDUSTRIAL	$29,450,758.40	16.83%

Source: Testimony of J. Pollock,
PECo HT rate schedule &
UUC customer bills.



urce: Testimony of J. Pollock,
PECo HT rate schedule &
UUC customer bills.

OF REVENUE INCREASE UUC METHOD

12 MONTHS ENDED
JUNE 30, 1985 & 1986

12 MONTHS SAMPLE	BILLS, KW AND KWH FROM SAMPLE	SUPPLEMENT NO. 11 PRICING	SUPPLEMENT NO. 11 REVENUE	BILLS, KW AND KWH FROM SAMPLE	UUC SUPPLEMENT PRICING	UUC SUPPLEMENT REVENUE
	(1)	(2)	(3)=(1)*(2)	(4)	(5)	(6)=(4)*(5
1 CUSTOMER CHARGE	84 BILLS	$220.45	$18,518	84 BILLS	$264.15	$2
2 ALL KW	3,188,205 KW	5.37	$17,120,661	3,188,205 KW	5.34	$17,02
3 FIRST 150 HRS USE	478,230,000 KWH	0.0739	$35,341,197	478,230,000 KWH	0.0940	$44,95
4 NEXT 150 HRS USE	448,837,000 KWH	0.0556	$24,955,337	448,837,000 KWH	0.0764	$34,23
5 ADDITIONAL USE	1,411,512,000 KWH	0.0376	$53,072,851	1,411,512,000 KWH	0.0591	$83,42
6 HIGH VOLTAGE DISCOUNT	2,527,620 KWH	0.3	($758,286)	2,527,620 KWH	0.3	($75
7 BASE REVENUE			$129,750,278			$178,95

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS

RATE HT

CALCULATION OF REVENUE INCREASE UUC METHOD

12 MONTHS ENDED
JUNE 30, 1985 & 1986

12 MONTHS SAMPLE	SUPPLEMENT NO. 11 BILLS, KW AND KWH FROM SAMPLE	SUPPLEMENT NO. 11 PRICING	SUPPLEMENT NO. 11 REVENUE	UUC SUPPLEMENT BILLS, KW AND KWH FROM SAMPLE	UUC SUPPLEMENT PRICING	UUC SUPPLEMENT REVENUE
	(1)	(2)	(3)=(1)*(2)	(4)	(5)	(6)=(4)*(5)
1 CUSTOMER CHARGE	27,512 BILLS	$220.45	$6,065,020	27,512 BILLS	$264.15	$7,267,295
2 ALL KW	24,494,179 KW	5.37	$131,533,741	23,677,622 KW (A)	5.34	$126,438,501
3 FIRST 150 HRS USE	3,654,963,716 KWH	0.0739	$270,101,819	3,532,480,166 KWH (B)	0.0940	$332,053,136
4 NEXT 150 HRS USE	3,366,781,298 KWH	0.0556	$187,193,040	3,356,134,112 KWH (C)	0.0764	$256,408,646
5 ADDITIONAL USE	3,019,493,022 KWH	0.0376	$113,532,938	3,152,623,758 KWH (D)	0.0591	$186,320,064
Total kwh	10,041,238,036 KWH			10,041,238,036		
6 HIGH VOLTAGE DISCOUNT) 66KV			($22,128)			($22,128)
7 HIGH VOLTAGE DISCOUNT - 66KV			($81,385)			($81,385)
8 HIGH VOLTAGE DISCOUNT - 33KV			($606,481)			($606,481)
9 SUB-TOTAL			$707,716,564			$907,777,648
10 UNACCOUNTED FOR			$99,292			$127,360
11 BASE REVENUE			$707,815,856			$907,905,009
TOTAL RATE HT------------12 MOS. ENDED 6/30/85						
12 PROFORMA BASE REVENUE-EXCL NSR & 7 LARGE CUSTS			$714,950,596			$917,056,635
13 NIGHT SERVICE RIDER			$3,520,126			$3,520,126
14 BASE REVENUE OF 7 LARGE CUSTS			$129,750,278			$178,954,043
15 TOTAL PROFORMA BASE REVENUE			$848,221,000			$1,099,530,804
16 CURTAILMENT RIDER			($113,000)			($113,000)
17 ADJUSTED BASE REVENUE			$848,108,000			$1,099,417,804
TOTAL RATE HT------------12 MOS. ENDED 6/30/86						
18 BASE REVENUE			$860,983,000			$1,116,073,913
19 CURTAILMENT RIDER			$0			($113,000)
20 ADJUSTED BASE REVENUE			$860,983,000			$1,115,960,913

(A) (LN.2,COL.1 - BILLED DEMAND FROM RATCHET, RMW #,LN. 8)
(B) (LN.3,COL.1 - RMW # ,LN.13)
(C) (LN.4,COL.1 - RMW # ,LN. 14)
(D) (LN.5, COL.1 - RMW # , LN.15)

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS

RMW_23

(Revised

RATE HT--7 LARGE CUSTOMERS

CALCULATION OF REVENUE INCREASE UUC METHOD

Only 50% of Limerick allowed in rate base

12 MONTHS ENDED
JUNE 30, 1985 & 1986

12 MONTHS SAMPLE	BILLS, KW AND KWH FROM SAMPLE	SUPPLEMENT NO. 11 PRICING	SUPPLEMENT NO. 11 REVENUE	BILLS, KW AND KWH FROM SAMPLE	UUC SUPPLEMENT PRICING	UUC SUPPLEMENT REVENUE
	(1)	(2)	(3)=(1)*(2)	(4)	(5)	(6)=(4)*(5)
1 CUSTOMER CHARGE	84 BILLS	$220.45	$18,518	84 BILLS	$264.15	$22,1
2 ALL KW	3,188,205 KW	5.37	$17,120,661	3,188,205 KW	5.14	$16,387,3
3 FIRST 150 HRS USE	478,230,000 KWH	0.0739	$35,341,197	478,230,000 KWH	0.0802	$38,354,0
4 NEXT 150 HRS USE	448,837,000 KWH	0.0556	$24,955,337	448,837,000 KWH	0.0626	$28,097,1
5 ADDITIONAL USE	1,411,512,000 KWH	0.0376	$53,072,851	1,411,512,000 KWH	0.0453	$63,941,4
6 HIGH VOLTAGE DISCOUNT	2,527,620 KWH	0.3	($758,286)	2,527,620 KWH	0.3	($758,2
7 BASE REVENUE			$129,750,278			$146,044,0

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS

RATE HT

CALCULATION OF REVENUE INCREASE UUC METHOD

Only 50% of Limerick allowed in rate base   12 MONTHS ENDED
JUNE 30, 1985 &1986

12 MONTHS SAMPLE	BILLS, KW AND KWH FROM SAMPLE	SUPPLEMENT NO. 11 PRICING	SUPPLEMENT NO. 11 REVENUE	BILLS, KW AND KWH FROM SAMPLE	UUC SUPPLEMENT PRICING	UUC SUPPLEMENT REVENUE
	(1)	(2)	(3)=(1)*(2)	(4)	(5)	(6)=(4)*(5)
1 CUSTOMER CHARGE	27,512 BILLS	$220.45	$6,065,020	27,512 BILLS	$264.15	$7,267,295
2 ALL KW	24,494,179 KW	5.37	$131,533,741	23,677,622 KW (A)	5.14	$121,702,977
3 FIRST 150 HRS USE	3,654,963,716 KWH	0.0739	$270,101,819	3,532,480,166 KWH (B)	0.0802	$283,304,909
4 NEXT 150 HRS USE	3,366,781,298 KWH	0.0556	$187,193,040	3,356,134,112 KWH (C)	0.0626	$210,093,995
5 ADDITIONAL USE	3,019,493,022 KWH	0.0376	$113,532,938	3,152,623,758 KWH (D)	0.0453	$142,813,856
Total kwh	10,041,238,036 KWH			10,041,238,036		
6 HIGH VOLTAGE DISCOUNT) 66KV			($22,128)			($22,128)
7 HIGH VOLTAGE DISCOUNT - 66KV			($81,385)			($81,385)
8 HIGH VOLTAGE DISCOUNT - 33KV			($606,481)			($606,481)
9 SUB-TOTAL			$707,716,554			$764,473,039
10 UNACCOUNTED FOR			$99,292			$107,255
11 BASE REVENUE			$707,815,856			$764,580,294
TOTAL RATE HT————12 MOS. ENDED 6/30/85						
12 PROFORMA BASE REVENUE-EXCL NSR & 7 LARGE CUSTS			$714,950,596			$772,287,216
13 NIGHT SERVICE RIDER			$3,520,126			$3,520,126
14 BASE REVENUE OF 7 LARGE CUSTS			$129,750,278			$146,044,012
15 TOTAL PROFORMA BASE REVENUE			$848,221,000			$921,851,354
16 CURTAILMENT RIDER			($113,000)			($113,000)
17 ADJUSTED BASE REVENUE			$848,108,000			$921,738,354
TOTAL RATE HT————12 MOS. ENDED 6/30/86						
18 BASE REVENUE			$860,983,000			$935,721,167
19 CURTAILMENT RIDER			$0			($113,000)
20 ADJUSTED BASE REVENUE			$860,983,000			$935,608,167

(A) (LN.2,COL.1 - BILLED DEMAND FROM RATCHET, RMW #,LN. 8)
(B) (LN.3,COL.1 - RMW # ,LN.13)
(C) (LN.4,COL.1 - RMW # ,LN. 14)
(D) (LN.5, COL.1 - RMW # , LN.15)

UP/UUC Statement No. 3[illegible]
[illegible] 3-26-86 [illegible]

COMMONWEALTH OF PENNSYLVANIA
BEFORE THE PUBLIC UTILITIES COMMISSION

THE PENNSYLVANIA PUBLIC UTILITIES COMMISSION V. PHILADELPHIA ELECTRIC COMPANY	Docket No. R-850152

UP/UUC STATEMENT #3B

SURREBUTTAL TESTIMONY OF DR. ROBERT M WIRTSHAFTER
ON BEHALF OF THE
UTILITY USERS COMMITTEE/
UNIVERSITY OF PENNSYLVANIA

March 5, 1986

SURREBUTAL TESTIMONY OF
DR. ROBERT M WIRTSHAFTER

Q. ARE YOU THE SAME DR. WIRTSHAFTER WHO SUPPLIED DIRECT AND REBUTTAL TESTIMONY IN THIS CASE?

A. Yes, I am.

Q. FOR WHICH WITNESSES ARE YOU PROVIDING SURREBUTTAL TESTIMONY?

A. I am rebutting major portions of the rebuttal testimonies of Mr. Sundermeir of PECo, Mr. Pollock of PAIEUG, and Dr. Michael J. Ileo of the City of Philadelphia. I am also replying to a characterization of my testimony made by Mr. Rudden of SEPTA/AMTRAK.

Q. COULD YOU SUMMARIZE YOUR OBJECTIONS TO MR. POLLOCK'S REBUTTAL TESTIMONY?

A. Mr. Pollock argues that all production costs should be classified and allocated relative to the instantaneous demand. He develops his justification of this on two points: first, that generating facilities are rated in terms of maximum amount of demand and not average annual demand; and second, that generation facilities, when first authorized, are normally constructed in response to a demand forecast showing the need for additional capacity. On page 6, he states as a general proposition that "...the factor that caused the utility to construct the base load plant was the need to meet projected demands reliably." While he has presented a very logical argument that might describe most utilities in this country, he has failed to recognize the particularly unique conditions involved in the Commission's 1981 decision allowing the completion of Limerick I and the current request to include the costs of Limerick I in the rate base.

LIMERICK COSTS ARE ENERGY RELATED

Q. WHAT IS YOUR MAJOR OBJECTION TO THE COMMENTS OF MR. POLLOCK AND DR. ILEO?

A. Mr. Pollock claims that his approach alone, not mine, nor the supporting testimonies of Messrs. King, Sterzinger and Oliver, considers cost-causation based upon the theory of utility system planning. Dr. Ileo makes the similar statement that I have ignored cost incidence. I strongly disagree with Mr. Pollock's and Dr. Ileo's contention that my proposal is not based on cost-causation. My recommendations are based on the actual planning process that led to the completion of Limerick I.

Q. WHAT ARE THE CONDITIONS REGARDING THE COMPLETION OF LIMERICK I THAT YOU REFER TO?

A. Mr. Pollock argues that because Limerick I was originally conceived to have a demand related function it must now be classified as demand related. However, in 1981, the Commission held hearings to determine whether the Limerick units should be cancelled. The Company conceded that Limerick was not needed for demand purposes, but that the continuation of the construction was justified solely on the energy savings that the plant would provide. The head of system planning for PECo, Mr. Kasum, stated during the hearings the following: " ...the reason for building Limerick is not a reliability reason because it is being put in to reduce the cost of operating the system and reduce the cost to Philadelphia Electric's customers, not to improve reliability." (see Docket No. I-80100341, Tr. 3847-8).

Mr. Pollock attempts to label Limerick as demand related despite the fact that Limerick provides no additional reliability to the PECo system. In fact, PAIEUG's other witness, Mr. Falkenburg, clearly argues that the inclusion of Limerick lowers the reliability of the system.

The facts in this case are contrary to Mr. Pollock's assertions. Limerick's continued construction was based solely on its energy saving virtues. The inclusion of Limerick provides no additional demand related functions. Mr. Pollock's entire argument must therefore be rejected. In this admittedly unique case, the relevant decisions were based on energy considerations exclusively. To assign costs on any other basis would be inconsistent with Mr. Pollock's own logic.

Dr. Ileo makes a similar mistake in ignoring the special characteristics of the decision to complete Limerick I, and assumes, as would ordinarily be the case, that Limerick I was completed to meet new demand. Therefore, his arguments must also be rejected.

Q. MR. POLLOCK CLAIMS THAT YOUR METHOD AND THE METHOD ADVOCATED BY MESSRS. KING AND OLIVER ARE WRONG BECAUSE THEY DO NOT ALLOCATE BELOW AVERAGE FUEL COSTS TO THE CLASSES THAT ARE HIGHER LOAD FACTOR. WOULD YOU CARE TO COMMENT?

A. I must assume that Mr. Pollock was refering to treatment between classes when he raised that objection. I strongly agree with him in that regard. My rate suggestions, however, only address treatment within the HT class. The majority of the energy units sold within the HT class are already assigned as Mr. Pollock has suggested, by the on-peak/off-peak surcharge and credit. In other words, the HT class already differentiates between high and low cost energy, but not between high and low cost generation. My suggested changes only complete the equally true corollary to the logic that Mr. Pollock has offered. If below average fuel costs are to be assigned to those subclasses which are more economical to serve, then it follows that those same subclasses should pay a greater portion of the capital costs of the energy saving equipment.

In addition, It should be noted that I have not shifted all of the capacity related costs for all baseload units to the energy side and that the amount of Limerick that I have transferred to energy is less than would be indicated if I had strictly adhered to Mr. Pollock's LCS method and Mr. Falkenberg's reliability assessment.

Q. MR. POLLOCK RATIONALIZES THE CASE FOR HIGH LOAD FACTOR CUSTOMERS BEING ALLOCATED BELOW-AVERAGE VARIABLE COSTS. DO YOU AGREE?

A. No. Mr. Pollock incorrectly uses a lowest cost system (LCS) model that accounts for the trade-offs between capital costs and costs of different technologies in order to minimize the total fixed and variable costs of serving a given load.

The LCS model is the perfect tool to illuminate the errors in Mr. Pollock's analysis. He constructs a hypothetical high load factor class and determines the threshold point at which baseload capacity becomes more economical than peaking capacity. His data are not applicable to Philadelphia and the Limerick case; they apply to a generalized case using data from the <u>EPRI Technology Assessment Guide</u>.

Exhibit JP-2, Schedule 2, of Mr. Pollock's rebuttal testimony, shows the costs assumed in Mr. Pollock's analysis. The assumed base load plant cost is $1150/kW which is in fact only 32 percent of Limerick's cost. If Limerick or any baseload unit cost $1150/kW or less, then one could justify its installation using the LCS model. However, exhibits RMW__28, 29, and 30 show that there is no threshold point for the base plant using the Company's numbers. Mr. Falkenberg's statement that Limerick is uneconomical should be made emphatic to his colleague, Mr. Pollock.

Q. ALTHOUGH HE DOES NOT USE THE FIGURES FOR PECO, MR. POLLOCK CLAIMS THE RESULTS OF THE LCS ANALYSIS WOULD BE THE SAME. DO YOU AGREE?

A. No, I do not. Had he used the proper PECo numbers he would have found that there is no break-even point or threshold point for Limerick in the LCS analysis.

Q. HAVE YOU PERFORMED A SIMILAR ANALYSIS USING DATA WHICH IS REPRESENTATIVE OF PECO?

A. Yes. The results are contained in Exhibits RMW__28, 29, and 30. As can be seen, our results indicate that Limerick will never be cheaper than peaking capacity based on the costs of both Limerick and peaking capacity to PECo. Rather than a cross-over point of 1386 hours, as Mr. Pollock obtained, our analysis obtained the figures of 13,184 and 13,622 hours respectively for analysis of purchasing all new Combustion Turbines (CTs) and purchasing 637 MW of new CTs plus retaining the 458 MW being retired early by PECo. Since these figures represent more hours than there are in a year (8760), it is apparent that even if the peaking units are operated at 100% capacity factor, they will still be less expensive than operating Limerick I at 100% cpacity factor in their place. At 100 percent capacity factor, the total cost of construction and operation of Limerick I is $100.89/kW per year and the cost of purchasing and operating the same capacity of new CTs is $74.68/kW per year.

DEMAND RATCHET

Q. IN COMMENT TWO, ON PAGES 15 AND 16 OF HIS REBUTTAL, MR. SUNDERMEIR USES THE WORD PENALTY TO CHARACTERIZE YOUR POSITION ON THE RATCHET. IS THE RATCHET A PENALTY?

A. If the rate structure as proposed by PECo is allowed, then the characterization of the ratchet as a penalty is appropriate. The ratchet presently collects more money than is justified.

Q. IN POINT FIVE AND ON AGAIN ON PAGE 21, MR. SUNDERMEIR HAS STATED THAT PENNSYLVANIA ELECTRIC HAS A DEMAND RATCHET. IS THIS CORRECT?

A. No. According to Jack Shugres of the rate department of Pennsylvania Electric, Pennsylvania Electric has no demand ratchet. Pennsylvania Electric does have a minimum billing provision equal to 50 percent of the maximum demand. The same is true of the Potomac Electric Power Co.; it has no demand ratchet but merely a miminum billing provision. The Company and Mr. Pollock attempt to misrepresent our objections to the demand ratchet by assuming that it is the same as the mimimum contract demand provision. My objections expressed in this case are to the demand ratchet and not to PECo's mimimum demand billing provision. Most utilities in the country have a minimum billing provision. Atlantic Electric does have a demand ratchet therefore only four of the eleven PJM utilities employ a demand ratchet.

Again the major issue is not the definition of the demand ratchet, but what the impact of the ratchet is. Mr. Sundermeir has not in any way disputed the fact that the impact of the ratchet is significantly higher in PECo then in any other utility. Mr. Pollock admits on p. 32, lines 21-23 in his rebuttal testimony that the impact of the ratchets in other utilities is lower than PECo's. He attempts to refute my assessment by stating that other factors such as seasonal demand charge differentials, time of use differentials, etc., may make other utilities' demand signals closer to PECo's. My assessment accounts for these provisions. He fails to provide any analysis which disputes my findings.

Q. DR. WIRTSHAFTER, DO ANY OF THE OTHER UTILITIES YOU EXAMINED HAVE A DEMAND SIGNAL CLOSE TO THAT OF PECO'S?

A. No. I have recalculated the impact of increases in summer peak demand including the Atlantic Electric ratchet. My analysis includes seasonal demand and time of use charges. The numbers are presented in RMW__31 and graphically represented in RMW__32. PECo still demonstrates a ratchet impact far in excess of any utility. The impact is 2.9 times that of Atlantic Electric and 4 times that of the next utility, Delmarva Power and Light. I have demonstrated irrefutably that PECo's demand ratchet is way out of line with other area utilities.

Q. MR. POLLOCK STATES THAT THERE APPEAR TO BE SOME INCONSISTENCIES IN THE POSITIONS TAKEN BY YOU AND BY MR. FIGLEY ON THE DEMAND RATCHET. COULD YOU COMMENT?

A. Mr. Pollock does not specifically state in his testimony exactly which inconsistencies he addresses to me. He and Mr. Sundermeir both disagree with Mr. Figley's assessment that the ratchet discourages conservation. Mr. Figley should have noted, as I have noted, that the ratchet does encourage additional demand in the winter.

Q. MR. POLLOCK THINKS IT IS INCONCEIVABLE THAT ANY BUSINESSMAN WOULD DELIBERATELY INCREASE HIS NON-SUMMER DEMAND BECAUSE OF THE RATCHET. IS HE CORRECT?

A. No. His statement demonstrates that he knows little about demand management and the equipment used to control demand. Most demand saving devices cause additional energy to be consumed. Demand controllers anticipate potential peaks and cause equipment to be used prior to instantaneous needs. Sometimes the expected demand does not occur. Under these circumstances, energy is wasted to ensure that demand is controlled. If a customer's winter demand is artificially set by the ratchet, he will save energy and suffer no demand penalty if he disconnects his demand limiting equipment.

Q. MR. SUNDERMEIR SAYS THAT IT IS IMPORTANT TO SEND PRICE SIGNALS TO LIMIT SUMMER DEMAND AND IMPROVE SYSTEM LOAD FACTOR. WOULD YOU COMMENT ON THIS CLAIM?

A. He bases this claim on the fact that it is an increase in summer demand that creates the need to construct additional high cost production and transmission facilities. His claim is ludicrous. The Company had access to 458 MW of combustion turbines with an annual leasing cost of $494,000 (see IR-OCA-15-5). That translates into a figure of $1.08/kW per year. This hardly represents high costs. Furthermore the Company has decided to cancel these contracts and incur penalties for doing so. I must assume that the Company has acted responsibly and has cancelled these leases because it has so much capacity available at even cheaper costs to preclude the need for building more capacity. Mr. Sundermeir clearly states on page 5, lines 3 and 4, of his rebuttal testimony that "it is important to send cost based price signals to the customers." Based on the abovementioned contract cancellations, the cost of additional capacity to PECo can be no more than \$1.08/KW per year, and that is the signal that should be conveyed to the customer. Even if we include the entire costs of fuel, operation and maintenance, the figure is only \$10/kW per year, a figure less than the \$13/kW per year my proposed rates will collect in demand related costs. The signal proposed by PECo will be \$120/ kW per year for summer peak demand. I agree with Mr. Sundermeir that cost based pricing is in order, and that is why I have argued for the removal of the ratchet and the lowering of the demand charges.

Q. MR. POLLOCK PRESENTS A JUSTIFICATION FOR THE RATCHET ON PAGES 30 TO 32 OF HIS TESTIMONY. AT FIRST APPEARANCE HIS LOGIC SEEMS TO BE CORRECT. WHAT IS WRONG WITH HIS JUSTIFICATION?

A. Mr. Pollock's logic is very sound in the example that he has provided. Unfortunately, the example does not reflect the PECo situation and therefore does not justify the ratchet in PECo's case. In his example, shown in JP-2, Schedule 16, the cost of a kW is \$1.00. If PECo's allocated demand costs were \$1.00 per kW, then the ratchet would indeed be justified. In PECo's case, however, the entire cost of Limerick is allocated in the demand charge. Under Mr. Pollock's example, customer B would have the same cost allocation as customer A despite the fact that a large portion of customer B's demand is best served by peaking units. For PECo Class HT, customer A is already benefiting from the existence of a on-peak/off-peak surcharge/credit and is receiving benefits for the use of baseload units. Customer B is both penalized for using on-peak energy and expected by the Company and Mr. Pollock to pay for an equal portion of Limerick

I's costs.

Q. DR WIRTSHAFTER, YOU HAVE CALCULATED THE TOTAL REVENUE COLLECTED BY THE RATCHET FOR THE HT CLASS. WHAT COMMENTS HAS MR. SUNDERMEIR OFFERED IN REBUTTAL OF YOUR CALCULATION?

A. Beginning on page 16, line 27, Mr. Sundermeir makes a brief exception to my calculation of revenues collected by the ratchet. His only objections to my calculation are that I have assumed that the power factor adjustment in the summer is the same in the winter and that I have attributed one hundred percent of the difference between actual and billed demand to the ratchet thus ignoring any minimum billing demands that might have been in effect.

As noted in my original testimony, it is impossible to separate the minimum billing adjustments from the effect of the demand ratchet. I have assumed that there were no minimum billing adjustments so as to determine the highest possible estimate of the impact of the ratchet. If there were any minimum billing adjustments then my estimate of the impact of the ratchet is too high. Similarly, if I have overestimated the power factor adjustment in the winter months as Mr. Sundermeir implies, though he offers no specific data, then I again have slightly overestimated the revenue collected by the ratchet.

My calculation represents the maximum effect that the ratchet can have. The Company has all of the data on each of the customers. PECo could have done a more accurate calculation; however, as noted above, any calculation that the Company could have done would have lowered the estimate. Under my suggestion, the Company benefits from this slight overestimate. I have increased the revenue collected in the energy component by the entire amount. If less money than I have calculated is really lost due to the elimination of the ratchet, then the Company will receive slightly more revenue under my proposal than under its proposal.

EFFECT ON INCOME STABILITY, LOAD FACTOR AND TAIL BLOCK

Q. MR. POLLOCK STATES (P. 25) THAT YOUR PROPOSAL SETS ASIDE THE NOTION OF GRADUALISM--A GENERALLY ACCEPTED RATE DESIGN PRACTICE--BECAUSE THE NON-FUEL ENERGY CHARGES WOULD INCREASE BY NEARLY 300 PERCENT. DO YOU AGREE WITH HIS STATEMENT?

A. No. Mr. Pollock dramatizes my proposed rate increases to the energy component by stating that non-fuel portions increase by 300 percent and says that that is not gradualistic. This statement by him is misleading and erroneous. The notion of gradualism applies to the percentage increase in the overall rates and bills to a customer. For high load factor customers, those that Mr. Pollock represents, the Company's proposed rate increase is 24.1 percent, as compared to an average rate increase of 32.8 percent for the twelve UUC members.

Q. MR. POLLOCK SUGGESTS THAT YOUR PROPOSAL WILL WORSEN SYSTEM LOAD FACTOR, AFFECT INCOME STABILITY AND REDUCE THE INCENTIVE TO SHIFT OR INCREASE POWER AND ENERGY REQUIREMENTS TO OFF-PEAK. IS HE CORRECT?

A. No, he is not. My proposal and those of Messrs. Figley and Oliver reduce the demand requirements from what PECo has proposed. My proposal only lowers the explicit demand charge by \$0.03 /kW or one half of one percent from the existing level. At the same time the first two energy blocks will increase by \$0.0201/kWh (27 percent) and \$0.0208/kWh (37 percent), respectively. The rate designs of PBUUG which I would also support as a more gradualistic approach increases the explicit demand by $0.81/kW or 15 percent. The customer will have more incentive under either the PBUUG or my proposal to lower peak demands than he does under existing PECo rates.

Q. BOTH MR SUNDERMEIR AND MR. POLLOCK ARGUE THAT RAISING THE ENERGY BLOCK WILL INCREASE THE INCOME INSTABILITY OF PECO. WOULD YOU COMMENT ON THIS CLAIM?

A. One of the surest results of a large rate increase is that it will produce income instability. On this point a number of witnesses agree. However, I take strong exception to the claims made by Mr. Pollock, Mr. Sundermeir and Mr. Larson that only by lowering the tail energy block can income instability be minimized. If demand charges are raised to the levels that are suggested by either Mr. Pollock or Mr. Sundermeir then it will no longer be economical for UUC members to use PECo as the source of supply for peak loads such as air-conditioning. Customers will pursue options that drastically reduce their peak loads. Based on my knowledge of the energy conservation opportunities available locally, the proposed rise in demand charges will result in a significant loss of income to PECo.

Q. MR. SUNDERMEIR CLAIMS THAT YOUR PROPOSAL (ALONG WITH THOSE OF OCA AND PBUUG) IS TO INCREASE THE THIRD BLOCK ENERGY CHARGE AT TOO HIGH A LEVEL. IS THAT THE CASE?

A. Under the Company's proposal, the tail block drops from $0.0376/kWh to $0.0375/kWh within a request for the largest rate increase in the history of Pennsylvania. My proposed rates are based on costs; the increase of the third tail block is in line with other increases.

Q. MR. SUNDERMEIR CLAIMS THAT YOUR PROPOSAL ALONG WITH MR. FIGLEY'S AND MR. OLIVER'S "...RESULTS IN LARGER INCREASE TO HIGH LOAD FACTOR CUSTOMERS THAT GENERALLY EMPLOY LARGE NUMBERS OF

PEOPLE, BUT ALSO CREATES REVENUE INSTABILITY." WHAT IS WRONG WITH HIS CLAIM?

A. Mr. Sundermeir ignores the claims of the Company's own witness in the Limerick II case, Professor Anita Summers. Professor Summers states that the non-manufacturing sector of the economy has five employees for every one that exists in the manufacturing sector (p. 15, Economic Report on the Philadelphia Metropolitan Area 1985) and that the ratio will be growing with time. Therefore a greater revenue instability emerges from the imposition of higher rates upon the service sector.

The requested rates are more than twenty-five percent higher in this rate request for the non-manufacturing sector than for the manufacturing sector as denoted by Dr. Feldman in page 4 of his direct testimony. This results in a greater impact upon the service sector which makes up the bulk of the region's employment, thus creating a larger effect upon revenue stability from the Company's proposed rates than from my proposed rates.

In addition, as I have testified previously, the much higher demand charges proposed by the Company will also create large revenue instability as a result of consumers now having a powerful incentive to install their own generation equipment for use during peak periods. At $120 per kW, an institution or commercial office building can easily justify the installation of its own peaking diesels. I view this type of incentive as wasteful: ratepayers will be required to pay for Limerick as well as peaking capacity--a double cost to society which directly results from the incorrect price signal.

Q. BOTH MR. SUNDERMEIR AND MR. POLLOCK ARGUE THAT HIGH DEMAND CHARGES AND LOW TAIL BLOCK ENERGY CHARGES ENCOURAGE A HIGHER LOAD

FACTOR WHICH IS BENEFICIAL TO PECO AND ITS CUSTOMERS? IS THIS TRUE?

A. No, it is not. There is no evidence in this case that PECo or its customers would benefit from having higher load factors. The only statement regarding the optimum load factor is Mr. Sundermeir's statement made on page 5 lines 18-25:

> "Furthermore, until such time that the system load factor is so high that additional capacity is required solely for maintenance purposes, it is beneficial to continue to encourage the improvement of system load factor. With PECo's current system load factor of less than 60%, there is ample room for improvement in system load factor before additional capacity would be required for maintenance purposes."

This piece of testimony is in direct conflict with the statement made by Mr. Rush in his direct testimony on page 14 to 16. He develops on these pages a rationale for why PECo needs a reserve margin greater than twenty-five percent. The basis of his argument is that the higher reserve margin allows PECo to schedule summer maintenance:

> "The next area showed outages. Note that because of the high reserve, some maintenance could be scheduled during the summer periods, thus spreading the work load and minimizing costs. Where available generation was less than the load, reliance had to be made on companies outside PJM. Had the reserve been only 25%, maintenance costs would have been greater due to shifting this work to the spring and fall periods, and there would have been greater reliance on more expensive high cost peaking power from outside PJM." (Direct Testimony of Cary H. Rush, page 16, lines 15-29.)

As Mr. Rush clearly states above, additional capacity is already needed for maintenance purposes.

COMMENTS TO MR. SUNDERMEIR

Q. MR. SUNDERMEIR HAS MANY CRITICISMS OF YOUR TESTIMONY. HOW WOULD YOU CHARACTERIZE HIS COMMENTS?

A. Before I address each of Mr. Sundermeir's comments individually, I would like to point out that he does not refute the basic themes of my testimony: that the combination of the eighty percent demand ratchet and the placement of all Limerick related costs into the demand component has created a situation that is completely out of line with other area utilities and places significantly different burdens on lower load factor customers and lower winter to summer demand ratio customers in the HT rate class. Mr. Sundermeir does not refute the fact that the present demand related signal is twelve times the cost to PECo of supplying additional generation capacity. Rather his comments attempt to cloud this indisputable fact by attempting to pick apart minute details of our analysis.

Most of Mr. Sundermeir's comments apparently reflect a miscomprehension of my analysis. In response to my comparisons he offers no analysis of his own nor does he attempt to quantify the impact of his comments on my analysis. In addition, many of the comments that he makes are in error, and none changes the obvious conclusions that the demand ratchet must be drastically lowered or eliminated, and that the energy charges must be increased.

Q. ON PAGES 14 THROUGH 19 OF HIS REBUTTAL TESTIMONY, MR. SUNDERMEIR OFFERS ELEVEN COMMENTS ON THE TESTIMONIES OF DR. FELDMAN AND YOURSELF. WOULD YOU ADDRESS EACH OF THESE COMMENTS BEGINNING WITH HIS OBJECTIONS TO YOUR CLASSIFICATION OF MANUFACTURING AND NON-MANUFACTURING?

A. Mr. Sundermeir attempts to obscure the fact that UUC members in general receive much higher percent rate increases than large manufacturing customers. A major portion of his rebuttal addresses the use by Dr. Feldman and myself of the terms manufacturing and non-manufacturing. He objects to my characterization in points one, three, four and seven. In my testimony, I developed two characterizations for comparative purposes. As I note on page 2 of my original testimony, I have characterized customers with low and medium load factors and high summer to winter peak demand ratios as non-manufacturing customers. To the extent that some manufacturing customers have these characteristics, I am happy to represent their interests.

Furthermore, Mr. Sundermeir's evidence is not very convincing. He would like us to believe from his evidence that manufacturing customers do not have different load factors from non-manufacturing customers. Yet, his numbers clearly demonstrate for the HT class that non-manufacturing customers have, on average, lower load factors than do manufacturing customers. A more meaningful comparison should take into account the sizes of the different customers. The largest manufacturing customers are responsible for a large portion of HT load and they do have high load factors.

Q. MR. SUNDERMEIR CLAIMS THAT YOUR PROPOSED RATES WILL RESULT IN A CHARGE TO THE UNIVERSITY WHICH WOULD BE HIGHER THAN UNDER THE RATES PROPOSED BY PECO. IS THIS CORRECT?

It is true that the University of Pennsylvania will have a higher annual electric bill under my proposal. This is a fair rate based on the fact that the University is a high load factor customer.

Q. MR. SUNDERMEIR DISAGREES WITH YOUR ASSUMPTION THAT THE FIFTEEN MINUTE DEMANDS OF OTHER UTILITIES WOULD BE THE SAME AS THE THIRTY MINUTE DEMANDS OF PECO. WHAT IS WRONG WITH THE EVIDENCE THAT HE HAS PROVIDED AGAINST THIS ASSUMPTION?

A. To counter my assumption, Mr. Sundermeir offers the observation of one single customer. This hardly represents a convincing argument. More importantly, the conclusion reached by Mr. Sundermeir is unsupportable. I am not surprised that a customer in PECo would have higher fifteen minute demands than thirty minute demands. The customer has no reason to control his demands on a fifteen minute basis. For the PECo service territory, all energy management equipment is designed to minimize the thirty minute demand. If this same operation were located in another service territory where demand is measured on a fifteen minute basis, the rational customer would monitor and control his demand based on those conditions. There is no evidence to suggest otherwise.

Similarly, I did not apply the maximum demand at each meter used by Duquesne, in calculating the University of Pennsylvania bill. Were the University of Pennsylvania located in Pittsburgh and subject to the idiosyncrasies of Duquesne's billing procedures, it would have adjusted the configuration of its connection to conform to those idiosyncrasies. The same applies to the present contract in effect between the University and PECo. The University has not altered the contract between the University and PECo despite a large reduction in demand over the last few years. The major reason for not changing the contract is that the old contract has not had any influence on the bills paid by the University. If it had, the University would have changed the contract. Had the University been subject to a billing idiosyncrasy that collected 70 percent of the contract demand as is in effect in Duquesne, I am sure it would have adjusted its contract.

Q. MR. SUNDERMEIR HAS NOTED THAT HE HAS FOUND SEVERAL ERRORS IN

THE WORKPAPERS SUPPLIED BY YOU TO HIM. WOULD YOU COMMENT ON THIS?

A. First let me point out that Mr. Sundermeir acknowledges that he has only performed a "preliminary examination" of my workpapers. This is evident by the number of incorrect statements he has made about them. Second, he misses the point of the entire analysis. The analysis was performed to allow a comparison of customers in PECo with similar customers across different utilities.

Q. MR. SUNDERMEIR STATES THAT YOUR CALCULATIONS USING THE ELECTRIC BILLS FOR THE UNIVERSITY OF PENNSYLVANIA CONTAINED "SERIOUS ERRORS". IS HE CORRECT IN MAKING THIS STATEMENT?

A. No. This statement is not correct. One <u>minor</u> error was made in the bill for the University of Pennsylvania. The demand for September 1985 was inadvertently used in our analysis and matched with the September 1984 energy usage, rather than the demand for September 1984. This causes approximately a 2% error in the calculation of the PECo bill for the University of Pennsylvania and smaller errors in the calculation of the bill using other utility rate schedules.

It should be emphasized that these bills were used to compare across different utilities and that this error was applied to all the other utilities with approximately the same margin of error. The point of the analysis was to compare the annual rates of similar usage patterns between different utilities. It should also be made clear that the bills used were not characterized as being exact bills of our clients but merely representative of our clients with approximations made where omissions in data occurred.

Q. MR. SUNDERMEIR CRITICIZED THE WAY IN WHICH YOU CALCULATED THE RATCHET DEMAND FOR DELMARVA POWER & LIGHT. HE CLAIMS THAT THE WRONG YEARS WERE USED IN YOUR CALCULATION. CAN YOU PLEASE EXPLAIN WHAT HE MEANS?

A. Certainly. Delmarva Power & Light bases its demand ratchet on the average monthly peak demand incurred in the previous summer months (June-September). The effect of averaging over four months, rather than taking the summer maximum, as PECo does, results in less variation from year to year. For this reason, and also for simplicity in programming our spreadsheets, the University's ratchet for Delmarva was calculated as if the billing data represented a yearly cycle from January to December rather than the July to June cycle actually used for the University. Almost all the other UUC bills were based on a January to December cycle and therefore it was easier to program based on that assumption.

Q. MR. SUNDERMEIER ALSO FEELS THAT YOU MISREPRESENTED THE EFFECT OF A 10 KW INCREASE IN SUMMER DEMAND FOR DELMARVA BY NOT INCLUDING ANY RATCHET FOR THE MONTHS OF JANUARY TO MAY. IS HE CORRECT IN HIS STATEMENT?

A. No, he is not. However, I do know how he came to this conclusion based on his cursory analysis of our results. In response to PECo interrogatory IV-7 we generated a computer printout (see Interrogatory Attachments IV-6, IV-7) of Delmarva's rates with a 10 kW increase for the University. In preparing the worksheet for the Interrogatory, we neglected to make the manual adjustments to the spreadsheet necessary for Delmarva to reflect the demand ratchet for January to May. All our graphs and tables in the testimony do reflect the correct calculation, as Mr. Sundermeir would have been aware on closer inspection.

Q. HOW DO YOUR ERRORS IN CALCULATING THE BILLS FOR ATLANTIC ELECTRIC EFFECT YOUR RESULTS?

A. The omission of Atlantic Electric's 80% demand ratchet and exclusion of 82,500 kwh from the third energy block have a negligible effect on the total bills. For the University of Pennsylvania the difference due to our error is less than 2%.

Q. WHAT ABOUT YOUR EXCLUSION OF ATLANTIC ELECTRIC'S KVAR CHARGE?

A. As was explained in my direct testimony, standard power factors were assumed in our bills to avoid the complications involved in estimating these numbers. An assumption of a standard power factor results in no KVAR charge for Atlantic Electric Co.

I also neglected to include a credit of 1.3% for high voltage service in Atlantic Electric's rate schedule. I am surprised that Mr. Sundermeir, in his zealousness for pointing out minor corrections, neglected this detail.

Q. MR. SUNDERMEIR ACCUSES YOU OF ADJUSTING FOR POWER FACTOR WHEN CALCULATING PECO'S BILLS BUT NOT DOING SO WHEN CALCULATING THOSE OF THE OTHER UTILITIES IN YOUR ANALYSIS. IS HE CORRECT IN HIS ACCUSATION?

Absolutely not. The nature of our computer spreadsheets precludes this from occurring. One file contains the usage data while each utilities' rates are contained in individual files. On running the program the usage patterns are consecutively fed into the spreadsheet of each utility. If Mr. Sundermeir had peformed more than a "preliminary examination" of our results, he would not have made this grossly unfair accusation.

Q. HAVE YOU REDONE YOUR ANALYSES OF THE RATES CHARGED BY OTHER UTILITIES, TAKING INTO ACCOUNT THE ERRORS POINTED OUT BY MR. SUNDERMEIR IN HIS REBUTTAL TESTIMONY?

A. Yes, I have. There were a few errors which I did make.

These involved incorrectly specifying the demand blocks for Public Service Electric & Gas Co., and neglecting Atlantic Electric's demand ratchet as well as excluding 82,500 kwh from Atlantic Electric's third energy block. In addition there was an error in our billing data for the University of Pennsylvania, as pointed out above, and we did not add the Public Utilities Tax charged by Delmarva Power & Light to the bill for the University. We recalculated our results taking the above corrections into account.

Q. WERE THERE ANY SIGNIFICANT CHANGES IN YOUR CONCLUSIONS BASED ON THE ABOVE RECALCULATIONS?

A. No. As I originally testified, the rate increase proposed by PECo will result in the highest electricity rates for non-manufacturing HT customers in PJM (see RMW__35 and RMW__36). Currently PECo is exceeded by only one utility, Jersey Central Power & Light. The conclusions still hold true. The impact of an additional 10 kW demand increase in the summer peak, as added to the bill of the University of Pennsylvania, is also unchanged (see RMW__31 and RMW__32). There were some minor changes in the ordering of the other utilities. PECo without a demand ratchet is not as bad as Delmarva and Atlantic, which are the only other utilities in which demand ratchets have an impact on the rates of our clients.

The only minor difference in our results was the relative treatment of non-manufacturing and manufacturing customers by our sample of utilities (see RMW_43). Delmarva treats non-manufacturing customers slightly worse in our corrected results. It should be pointed out that this change is due only to the inclusion in our analysis of the Public Utilities Tax of 5% charged to the University of Pennsylvania. Delmarva's rates are significantly lower than those of PECo, and therefore this difference in treatment has less of an impact on non-manufacturing customers in Delmarva's service territory. Consequently our analysis is basically unchanged; PECo still treats non-manufacturing customers significantly worse than nearly all other utilities.

Exhibits RMW__31 through RMW__43 contain revisions to the relevant tables and graphs from the direct testimonies of myself and Dr. Feldman. As I noted, these exhibits are very similar to those contained in the original testimonies.

Q. WHAT IS THE MAGNITUDE OF THE CHANGES MADE, AS A RESULT OF ERRORS, TO YOUR DIRECT TESTIMONY?

For the errors on the University's bill the total magnitude of the error was approximately 2%. The analysis of Atlantic Electric resulted in a less than 2% error. The analysis of Public Service Electric and Gas Company resulted in an average 18% error. It should be emphasized that even with the large error made on Public Service's bills, <u>PECo will still have the highest rates if PECo's proposed rate increase is enacted. Therefore my original conclusions remain valid.</u>

<u>COMMENTS TO MR. RUDDEN</u>

Q. MR. RUDDEN HAS CHARACTERIZED YOUR TESTIMONY ON RATE ALLOCATION AS AN ABANDONMENT OF COST BASED PRICING. IS THIS A FAIR ASSESSMENT?

A. Absolutely not. I have suggested no such thing. I have demonstrated that two different rate allocation methods, the 4CP method and the average and excess method, have radically different results. The very rate classes that should be given the greatest rate relief under one method warrant the larger rate increases under the other. As I stated in my testimony: "Given the sensitivity of certain classes' rates of return to different allocation methodologies, the partial validity of arguments for each of the divergent allocation methodologies, and the magnitude of the present rate request, complete adherence to the four peak method as defined by the Company is imprudent." I therefore suggest that the Company's method of increasing rates to each major class be extended to all rate classes. In my view strict adherence to the 4CP method is wrong and represents a major movement away from real cost based pricing.

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?

A. Yes, it does.

COMPARISON OF TOTAL COST BETWEEN BASE LOAD AND PEAKING UNITS

	POLLOCK'S CALCULATIONS		CALCULATIONS BASED ON PECO Using Pollock optimization procedure to determine "threshold" or cross-over point at which base load capacity becomes more economical than peaking capacity. Optimized at 150.5% Capacity Factor (13184 hours use)		
Description	Base Load	Peaker	Limerick	PECo Peaker (all new CT's)	PECo Peaker (458 mw CT's retaine 637 mw new CT's)
1 Fuel Type	Nuclear	Residual	Nuclear	Residual	Residual
2 Construction Cost ($/kW)	$1,150.00	$235.00	$3,621.00	$265.00	see (1) below
3 Levelized Carrying Charge	20.00%	20.00%	20.00%	20.00%	20.00%
Annual Fixed Cost ($/kW)					
4 Construction	$230.00	$47.00	$724.20	$53.00	$31.24
5 O&M	$13.38	$0.60	$13.38	$0.60	$0.60
6 Total	$243.38	$47.60	$737.58	$53.60	$31.84
Levelized Variable Costs:					
7 Fuel ($/MWh)	$14.13	$152.43	$14.13	$63.00 (2)	$63.00
8 Other O&M ($/MWh)	$2.56	$5.56	$2.56	$5.56	$5.56
9 Total	$16.69	$157.99	$16.69	$68.56	$68.56
10 Average Capacity Factor	15.82%	15.82%	100.00%	100.00%	100.00%
11 Hours' Use	1,386	1,386	8,760	8,760	8,760
12 Capacity	1,055	75	1,095	1,095	1,095
13 Energy Generated (MWh)	1,462,053	103,937	9,592,200	9,592,200	9,592,200
14 Capital Cost	$256,765,900.00	$3,570,000.00	$807,650,100.00	$58,692,000.00	$34,864,800.00
15 Variable Cost	$24,401,660.56	$16,421,069.83	$160,093,818.00	$657,641,232.00	$657,641,232.00
16 Total Cost	$281,167,560.56	$19,991,069.83	$967,743,918.00	$716,333,232.00	$692,506,032.00
17 Total Per Unit Cost	$192.31	$192.34	$100.89	$74.68	$72.19

(1) calculation based on:
((637 mw X $52.93/kw) + $494000) / 1095 mw = $31.24/kw
annual least cost of 458 mw CT's = $494,000.00

(2) calculation of fuel costs based on:
$25.2/bbl / 6300000 btus/bbl x 15760 btu/kwh = $0.063/kwh

COMPARISON OF TOTAL COST BETWEEN BASE LOAD AND PEAKING UNITS

	POLLOCK'S CALCULATIONS		CALCULATIONS BASED ON PECO Using Pollock optimization procedure to determine "threshold" or cross-over point at which base load capacity becomes more economical than peaking capacity. Optimized at 150.5% Capacity Factor (13184 hours use)	
Description	Base Load	Peaker	Limerick	PECo Peaker (all new CT's)
1 Fuel Type	Nuclear	Residual	Nuclear	Residual
2 Construction Cost ($/kW)	$1,150.00	$235.00	$3,621.00	$265.00
3 Levelized Carrying Charge	20.00%	20.00%	20.00%	20.00%
Annual Fixed Cost ($/kW)				
4 Construction	$230.00	$47.00	$724.20	$53.00
5 O&M	$13.38	$0.60	$13.38	$0.60
6 Total	$243.38	$47.60	$737.58	$53.60
Levelized Variable Costs:				
7 Fuel ($/MWh)	$14.13	$152.43	$14.13	$63.00 (2)
8 Other O&M ($/MWh)	$2.56	$5.56	$2.56	$5.56
9 Total	$16.69	$157.99	$16.69	$68.56
10 Average Capacity Factor	15.82%	15.82%	150.50%	150.50%
11 Hours' Use	1,386	1,386	13,184	13,184
12 Capacity	1,055	75	1,095	1,095
13 Energy Generated (MWh)	1,462,053	103,937	14,436,261	14,436,261
14 Capital Cost	$256,765,900.00	$3,570,000.00	$807,650,100.00	$58,692,000.00
15 Variable Cost	$24,401,660.56	$16,421,069.83	$240,941,196.09	$989,750,054.16
16 Total Cost	$281,167,560.56	$19,991,069.83	$1,048,591,296.09	$1,048,442,054.16
17 Total Per Unit Cost	$192.31	$192.34	$72.64	$72.63

(1) calculation based on:
((637 mw X $52.93/kw) + $494000) / 1095 mw = $31.24/kw
annual least cost of 458 mw CT's = $494,000.00

(2) calculation of fuel costs based on:
$25.2/bbl / 6300000 btus/bbl x 15760 btu/kwh = $0.063/kwh

COMPARISON OF TOTAL COST BETWEEN BASE LOAD AND PEAKING UNITS

	POLLOCK'S CALCULATIONS		CALCULATIONS BASED ON PECO Using Pollock optimization procedure to determine "threshold" or cross-over point at which base load capacity becomes more economical than peaking capacity. Optimized at 150.5% Capacity Factor (13184 hours use)	
Description	Base Load	Peaker	Limerick	PECo Peaker (458 mw CT's retained, 637 mw new CT's)
1 Fuel Type	Nuclear	Residual	Nuclear	Residual
2 Construction Cost ($/kW)	$1,150.00	$235.00	$3,621.00	see (1) below
3 Levelized Carrying Charge	20.00%	20.00%	20.00%	20.00%
Annual Fixed Cost ($/kW)				
4 Construction	$230.00	$47.00	$724.20	$31.24 (1)
5 O&M	$13.38	$0.60	$13.38	$0.60
6 Total	$243.38	$47.60	$737.58	$31.84
Levelized Variable Costs:				
7 Fuel ($/MWh)	$14.13	$152.43	$14.13	$63.00 (2)
8 Other O&M ($/MWh)	$2.56	$5.56	$2.56	$5.56
9 Total	$16.69	$157.99	$16.69	$68.56
10 Average Capacity Factor	15.82%	15.82%	155.50%	155.50%
11 Hours' Use	1,386	1,386	13,622	13,622
12 Capacity	1,055	75	1,095	1,095
13 Energy Generated (MWh)	1,462,053	103,937	14,915,871	14,915,871
14 Capital Cost	$256,765,900.00	$3,570,000.00	$807,650,100.00	$34,864,800.00
15 Variable Cost	$24,401,660.56	$16,421,069.83	$248,945,886.99	$1,022,632,115.76
16 Total Cost	$281,167,560.56	$19,991,069.83	$1,056,595,986.99	$1,057,496,915.76
17 Total Per Unit Cost	$192.31	$192.34	$70.84	$70.90

(1) calculation based on:
((637 mw X $52.93/kw) + $494000) / 1095 mw = $31.24/kw
annual least cost of 458 mw CT's = $494,000.00

(2) calculation of fuel costs based on:
$25.2/bbl / 6300000 btus/bbl x 15760 btu/kwh = $0.063/kwh

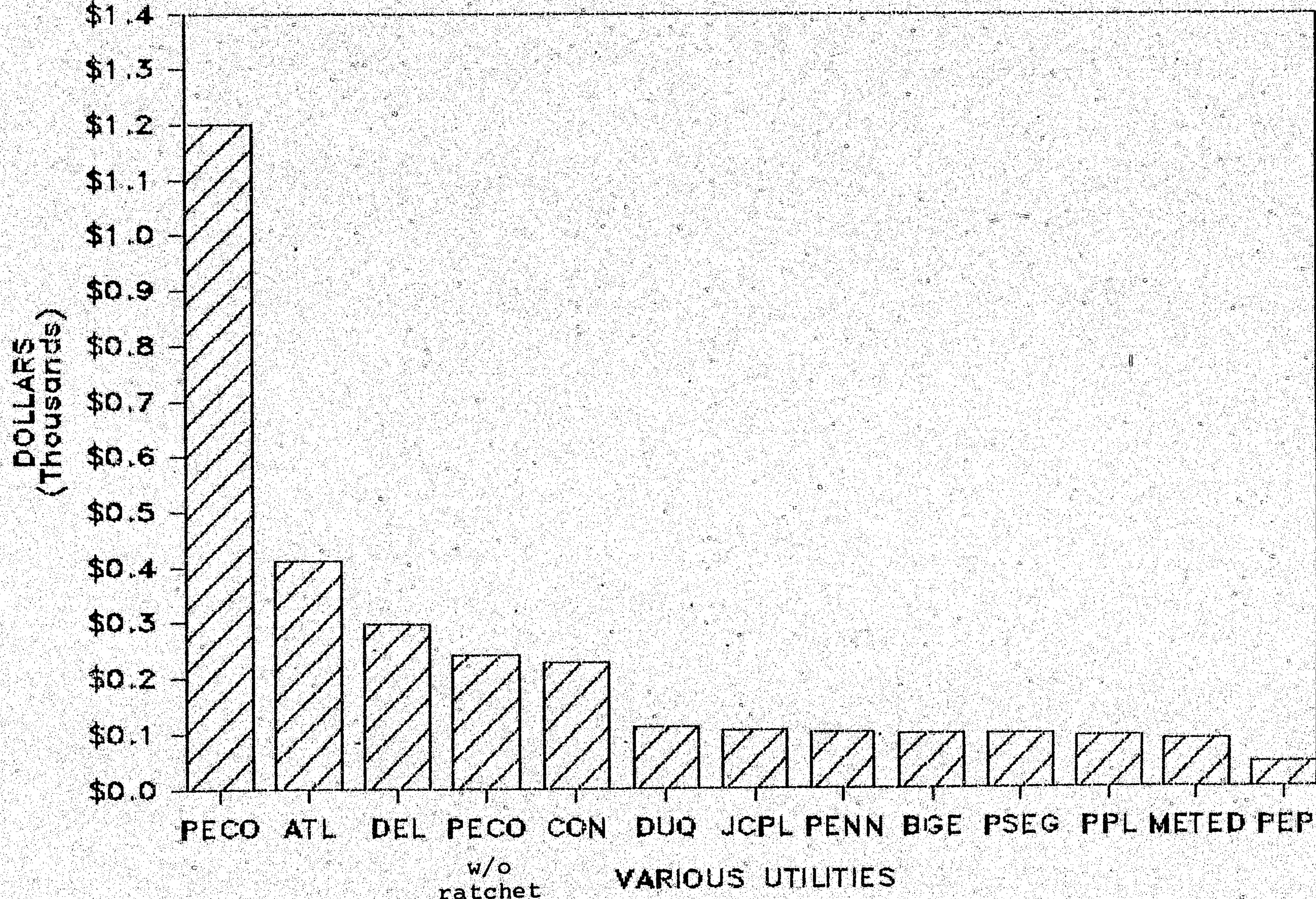
IMPACT OF 10 KW INCREASE IN DEMAND IN PEAK SUMMER MONTH FOR UNIVERSITY OF PENNSYLVANIA (corrected values)

impact of 10 kw demand increase	utility	without demand increase	with 10 kw demand increase
$1,200	PECO	$18,317,432	$18,318,632
$410	ATL	$14,138,101	$14,138,511
$297	DEL	$11,611,661	$11,611,958
$240	PECO**	$18,032,330	$18,032,570
$228	CON	$19,477,464	$19,477,692
$111	DUQ	$10,141,839	$10,141,950
$104	JCPL	$17,163,947	$17,164,051
$101	PENN	$10,769,229	$10,769,330
$98	BGE	$10,008,218	$10,008,316
$98	PSEG	$14,824,273	$14,824,371
$92	PPL	$11,733,763	$11,733,855
$87	METED	$10,980,370	$10,980,457
$43	PEP	$11,432,820	$11,432,863

**PECO without ratchet

IMPACT OF ADDITIONAL 10 KW DEMAND

ADDED TO SUMMER PEAK OF UNIV. OF PENN.



ource: Univ. of PA electric bills & Utility Rate Schedules

CORRECTED VALUES

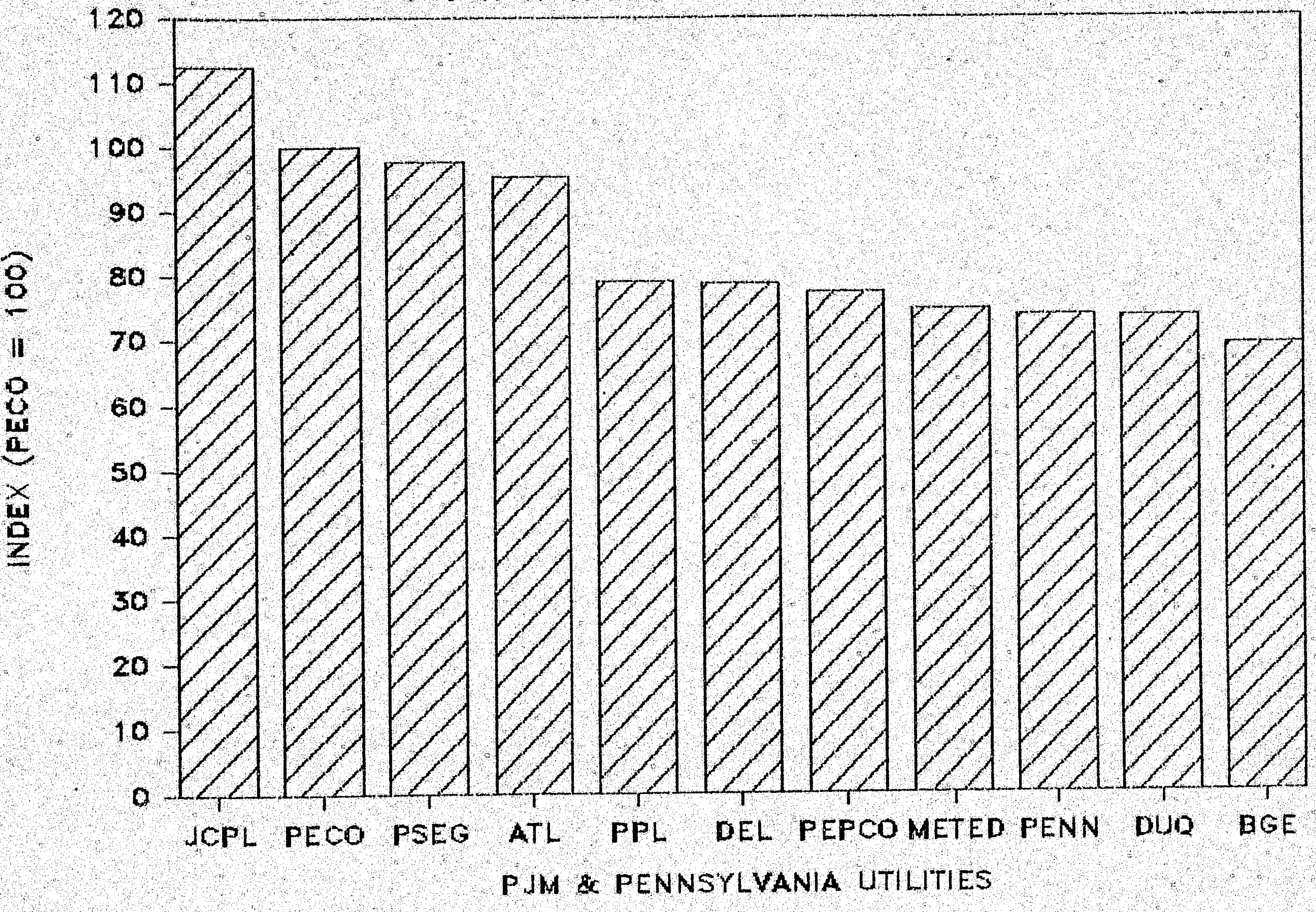
COMPARISON OF PRESENT RATES
For non-manufacturing HT customers
in different utility service territories
(corrected values)

INDEX (PECO=100)

	present rates	
1	Jersey Central Power & Light	112.47
2	Philadelphia Electric Co.	100.00
3	Public Service Electric & Gas	97.78
4	Atlantic Electric	95.32
5	Pennsylvania Power & Light	79.04
6	Delamarva Power & Light	78.83
7	Potomac Electric Power Co.	77.35
8	Metropolitan Edison	74.76
9	Pennsylvania Electric	73.85
10	Duquesne Light Co.	73.54
11	Baltimore Gas & Electric	69.14

COMPARISON OF PRESENT RATES

FOR NON-MANUFACTURING HT CUSTOMERS



urce: Utility Rate Schedules

CORRECTED VALUES

RMW 35

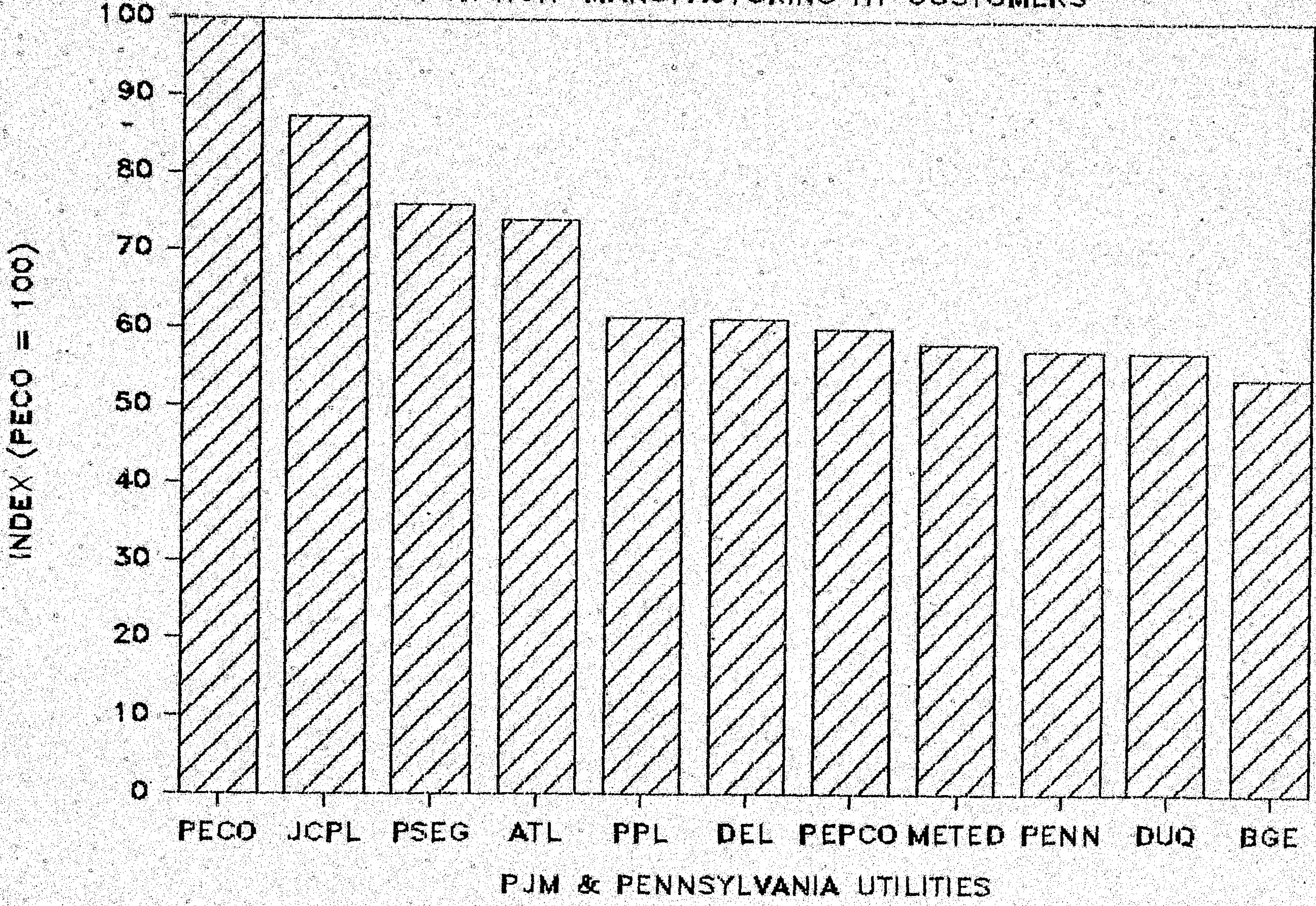
COMPARISON OF PROPOSED RATES
For non-manufacturing HT customers
in different utility service territories
(corrected values)

INDEX (PECO=100)

		proposed rates
1	Philadelphia Electric Co.	100.00
2	Jersey Central Power & Light	87.36
3	Public Service Electric & Gas	75.95
4	Atlantic Electric	74.04
5	Pennsylvania Power & Light	61.40
6	Delamarva Power & Light	61.23
7	Potomac Electric Power Co.	60.08
8	Metropolitan Edison	58.07
9	Pennsylvania Electric	57.36
10	Duquesne Light Co.	57.12
11	Baltimore Gas & Electric	53.70

COMPARISON OF PROPOSED RATES

FOR NON-MANUFACTURING HT CUSTOMERS



urce: Utility Rate Schedules

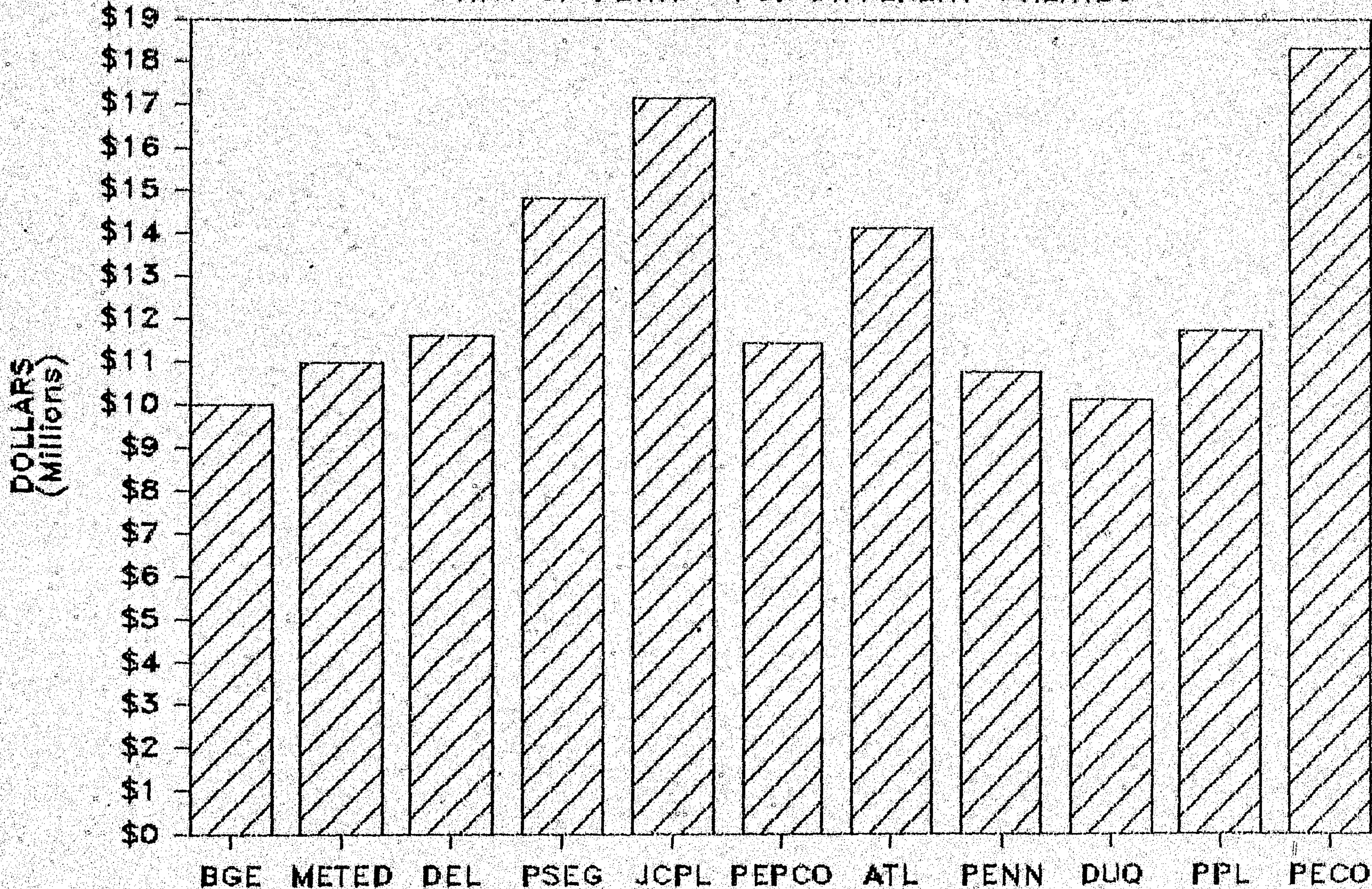
CORRECTED VALUES

TOTAL YEARLY ELECTRIC BILLS FOR UNIVERSITY OF PENNSYLVANIA
For different utility service territories
(PECo after requested rate increase, corrected values)

Baltimore Gas & Electric	$10,008,218.00
Metropolitan Edison	$10,980,370.00
Delmarva Power & Light	$11,611,661.00
Public Service Electric & Gas	$14,824,273.00
Jersey Central Power & Light	$17,163,947.00
Potomac Electric Power Co.	$11,432,820.00
Atlantic Electric	$14,138,101.00
Pennsylvania Electric	$10,769,229.00
Duquesne Light Co.	$10,141,839.00
Pennsylvania Power & Light	$11,733,763.00
Philadelphia Electric Co.	$18,317,432.00

ANNUAL ELECTRICITY BILLS

UNIV. OF PENN.— FOR DIFFERENT UTILITIES

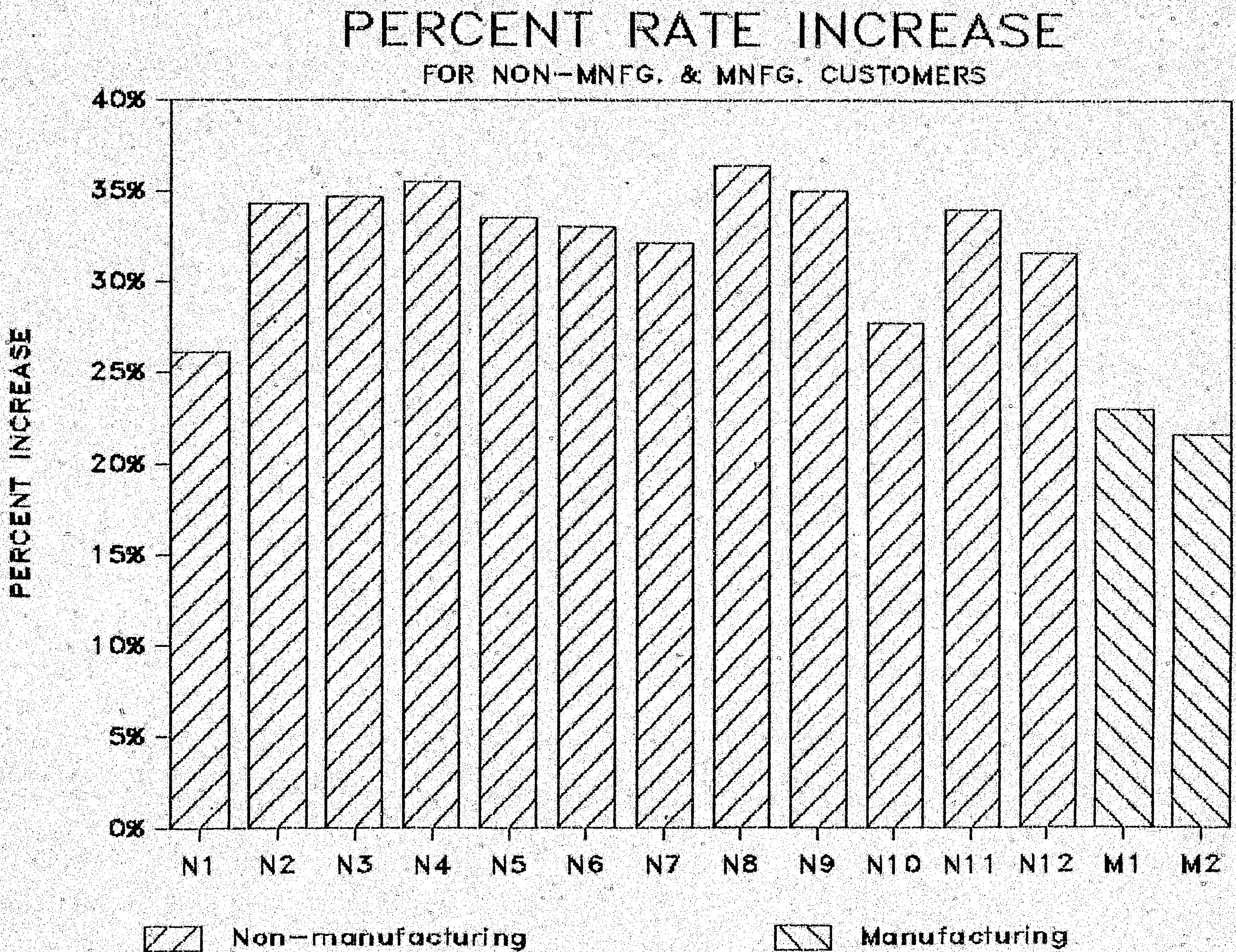


urce: Univ. of PA electric bills &
Utility Rate Schedules

CORRECTED VALUES

PERCENT RATE INCREASE
For non-manufacturing & manufacturing customers
(corrected values)
(code: N=non-mnfg., M=mnfg.)

N1	26.12%
N2	34.27%
N3	34.69%
N4	35.50%
N5	33.53%
N6	33.00%
N7	32.11%
N8	36.42%
N9	35.02%
N10	27.69%
N11	33.97%
N12	31.65%
M1	22.97%
M2	21.60%



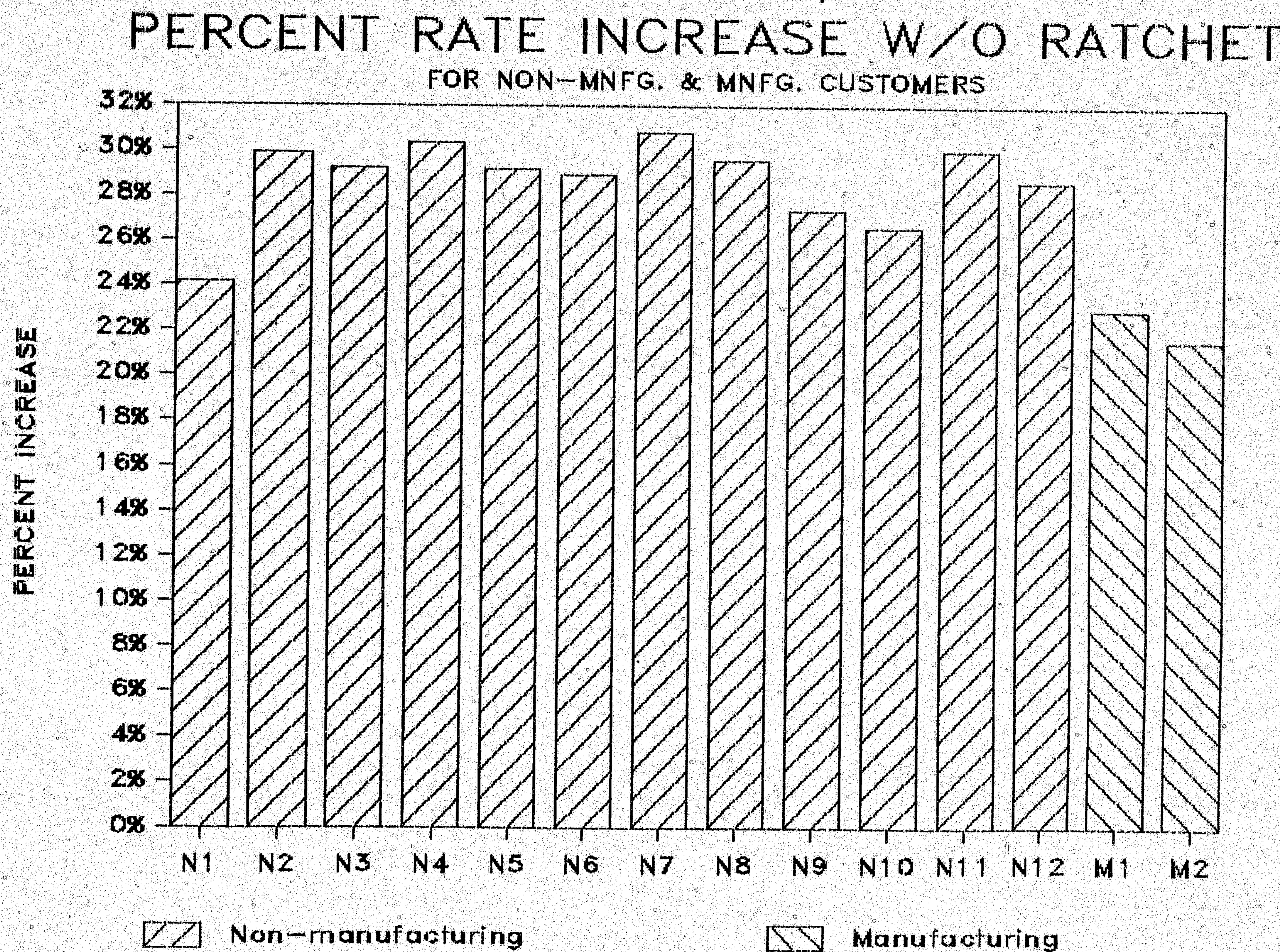
rce: UUC member electric bills
& hypothetical mnfg. bills/
Analysis of PECo rate

CORRECTED VALUES

RMW 40

PROPOSED RATE INCREASE WITH & WITHOUT RATCHET
(corrected values)

	PECO new rates	PECO-new rates (no ratchet)	ratchet difference	percent difference due to ratchet
N1	$18,317,432.00	$18,032,330.00	$285,102.00	1.56%
N2	$2,212,831.00	$2,141,140.00	$71,691.00	3.24%
N3	$420,865.50	$403,885.80	$16,979.70	4.03%
N4	$281,610.30	$270,954.60	$10,655.70	3.78%
N5	$295,453.90	$285,781.80	$9,672.10	3.27%
N6	$440,767.10	$427,335.70	$13,431.40	3.05%
N7	$2,293,373.00	$2,270,632.00	$22,741.00	0.99%
N8	$529,924.60	$503,355.60	$26,569.00	5.01%
N9	$939,146.30	$885,936.80	$53,209.50	5.67%
N10	$2,581,688.00	$2,560,472.00	$21,216.00	0.82%
N11	$2,250,113.00	$2,184,075.00	$66,038.00	2.93%
N12	$1,544,731.00	$1,509,626.00	$35,105.00	2.27%
M1	$3,265,059.00	$3,265,059.00	$0.00	0.00%
M2	$27,423,062.00	$27,423,062.00	$0.00	0.00%



ce: UUC member electric bills
& hypothetical mnfg. bills/
Analysis of PECo rate

CORRECTED VALUES

RELATIVE TREATMENT OF NON-MANUFACTURING & MANUFACTURING CUSTOMERS BY PJM & PENNSYLVANIA UTILITIES
(corrected values)

Higher values indicate large discrepancy between non-manufacturing & manufacturing rates

UTILITIES	RATIO NON-MANUFACTURING/MANUFACTURING
Delmarva Power & Light	1.068
Philadelphia Electric Co.	1.046
Duquesne Light Co.	1.035
Atlantic Electric	0.979
Public Service Electric & Gas	0.975
Pennsylvania Electric	0.969
Baltimore Gas & Electric	0.953
Metropolitan Edison	0.951
Jersey Central Power & Light	0.951
Pennsylvania Power & Light	0.933
Potomac Electric Power Co.	0.915

PBUUG Statement 8
BI 3-10-86
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COMMONWEALTH OF PENNSYLVANIA

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION, ET AL.

VS.

PHILADELPHIA ELECTRIC COMPANY
PA P.U.C. DOCKET NO. R-850152

SURREBUTTAL TESTIMONY OF THE

PENNSYLVANIA BUSINESS UTILITY USERS GROUP

WITNESS: ROBERT L. FIGLEY

FILED: MARCH 5, 1986

SURREBUTTAL TESTIMONY OF ROBERT L. FIGLEY

Q. Please state your name and business address for the record.

A. My name is Robert L. Figley. My business address is 1220 L Street, N.W., Washington, D.C. 20005.

Q. Are you the same Robert L. Figley who submitted direct testimony for the Pennsylvania Business Utility Users Group in this proceeding?

A. Yes.

Q. What is the purpose of your surrebuttal testimony?

A. The purpose of this testimony is to respond to portions of the rebuttal testimony submitted by witnesses Ileo, Rudden and Pollock.

Q. What criticisms has Dr. Michael Ileo, witness on behalf of the City of Philadelphia, leveled at your testimony?

A. Dr. Ileo strongly objects to my proposal to allocate the capital cost of the Limerick 1 nuclear plant between 4-CP peak demand and energy with the former representing the cost of a combustion turbine generator. He has three specific problems with this approach. The first is his belief that my allocation of a large portion of Limerick 1 capital costs on an energy basis is inconsistent with the way utility systems are planned and operated. Second, he objects to what he believes to be special treatment of the Limerick 1 costs independently of other generation facilities. Finally, he objects to the allocation of Limerick 1 costs to energy without regard to time of use.

Q. Would you please respond to Dr. Ileo's accusation that your method fails to reflect the way utility systems are planned and operated?

A. On page 17, Dr. Ileo presents a concise and I believe largely accurate description of the manner in which the utility electric generating systems are planned and operated:

> In the planning and operation of utility systems, a major objective is to minimize total demand (kw) and energy (kwh) costs in meeting total system load requirements. In the planning phase, this goal is achieved by determining the least-cost mix of peak, intermediate, and base load generation facilities which, on a combined basis, consists of sufficient capacity (and attendant reliability) to meet system kw demands in peak hours. This least-cost mix will depend on plant specific capital costs/kw and energy costs/kwh, as well as the shape of the annual load duration curve.
>
> If this curve, for example, is fairly flat, the least-cost mix will consist entirely of base load plants, since the relatively high capital costs/kw can be spread over many hours of load duration. On the other hand, when the load duration curve is steep, peaking units will play an important role in meeting capacity requirements. This is true because combined capital and energy costs are minimized when peaking units are operated for short periods of time, i.e., the comparatively high energy costs/kwh are offset by the comparatively low capital costs/kw.

It would appear from this description that Dr. Ileo is in fact supporting my proposed treatment of Limerick 1 costs because he acknowledges throughout that the decision to construct new plant is based on requirements for energy throughout the entire load curve, not just at the peak period. Yet, in the paragraph immediately following this discussion, he makes this quite surprising assertion:

> An additional important aspect of system planning is that need to meet kw demands in the peak period drives selection of the least cost generation mix. In fact, off-peak loads play virtually no role in this process.

It is difficult to understand how Dr. Ileo could reconcile this "additional important aspect" with his description of the planning process. In that description he specifically recognizes that if the load curve is flat, that is, if there is a fairly large amount of off-peak and intermediate peak power consumption, the least cost mix will consist of baseload plants. In other words, off-peak and intermediate peak loads drive the decision to select baseload as opposed to peaker generating units. If such is the case, then it is appropriate to charge the incremental capital costs associated with constructing baseload rather than peaker plants to the off-peak and intermediate peak loads that stimulated that added cost. In the specific case of Limerick, it is only because of the presence of large amounts of relatively high load factor demand that PECO justified the construction of a nuclear plant as opposed to a cycling or a peaking plant which would have incurred far lower capital costs. To imply, as Dr. Ileo does, that Limerick 1 was constructed solely to meet peak load demand is flatly false. It is Dr. Ileo, not I, who has ignored the way in which utility systems are planned and operated.

Q. Would you please respond to Dr. Ileo's accusation that you have carved out Limerick 1 for special treatment independently of other generation facilities?

A. Yes. It is true, as Dr. Ileo asserts, that I have treated Limerick in a special manner, and this is for the simple reason that Limerick is special. The capital cost of Limerick is $3,620 per kw. This number exceeds, by a factor of almost ten, the $396 per kw cost of a new combustion turbine, which is the minimum capital cost addition that PECO would have to incur in order to meet added demands solely at the time of the system peak. In contrast, the remaining generating plant of PECO has a capital cost of only $338 per kilowatt, which is less that the cost of the peaker unit. It is therefore appropriate that this remaining plant should be allocated entirely to demand, as should $396/per kw of Limerick 1 cost.

Arguably, PECO's other two nuclear plants, the Salem and Peach Bottom units, might be treated in the same manner as Limerick. The cost of these plants, however, is only $659 per kw, or 68 percent more than the cost of a peaking unit. Furthermore, these plants have by now accrued some depreciation, so that their net investment cost is somewhat lower yet. Since their cost in the rate base does not significantly exceed the cost that PECO would have to incur to meet an increment in its peak load, it is appropriate to treat them as demand related. It is not, however, appropriate to treat Limerick 1 in that manner.

Q. Would you please respond to Dr. Ileo's accusation that you have failed to allocate the energy component on the basis of time of use?

A. I find this objection curious, since implementation of Dr. Ileo's proposed time-of-use allocation would result in a significantly higher cost assignment to his client. It is possibly appropriate that the energy-related costs of Limerick should be assigned according to the proportionate use of the Limerick plant during the peak, intermediate peak and off-peak periods. If so, then the off-peak customers would receive proportionately a much higher allocation of Limerick plant costs because Limerick is responsible for a relatively greater proportion of off-peak generation. During the on-peak period, when all of the Company's cycling and peaking units are in service, Limerick represents a relatively small proportion of total generation and thus its costs contributions to the average kwh during that period would be correspondingly small.

I have allocated Limerick's cost on a flat per kwh basis in order to be symmetrical with the treatment of Limerick's fuel savings. The fuel savings generated by Limerick are incorporated into the fuel adjustment charge and passed through to all kilowatt-hours of energy consumed, whether on-peak or off-peak. This treatment, which is intrinsic to the present fuel clause, unduly rewards consumers during the peak and intermediate peak period. Accordingly, I have allocated Limerick's energy-related costs in the same manner, so that those peak and intermediate peak users will correspondingly be assigned a relatively higher proportion of the cost than would be appropriate on a pure time-of-use allocation basis.

Q. Would you please respond to the criticisms of Mr. Rudden on behalf of SEPTA and Mr. Pollock on behalf of the Industrial Intervenors that your method is asymmetrical in that it does not assign energy costs on a time-of-use basis?

A. This criticism is similar to that of Dr. Ileo, and the answer is much the same. The cost allocation method used by the Company assigns variable energy costs, including fuel, on a flat per kilowatt-hour basis, presumably because that is how they are treated in the fuel adjustment rate. Messrs. Rudden and Pollock complain that this procedure unduly burdens high load factor customers who consume relatively large proportions of their energy during the intermediate and off-peak periods when fuel costs are lowest. This criticism should appropriately be directed to the Company which follows this allocation practice or at the Commission, which has approved the fuel adjustment. It has nothing to do with my allocation of capital costs on an energy-related basis.

Nonetheless, if fuel costs were reassigned on a time-of-use basis to recognize their relatively low level during the off-peak periods, then it would be necessary, in order to maintain symmetry, to allocate the Limerick energy-related costs on a time-of-use basis as well. Such an allocation would recognize that Limerick is a relatively larger contributor to the generation of off-peak power than on-peak power. While such time-of-use allocations might be appropriate, I doubt that they would benefit

Messrs. Pollock and Rudden's clients. It appears that Limerick's capital costs, at least in its initial years of operations, are substantially greater than its fuel savings. For this reason it is probable that the increased capital cost allocation to high load factor customers would more than offset the reduced fuel and variable energy cost assignments from a time-of-use costing procedure.

Q. Does this conclude your surrebuttal testimony?

A. Yes.

CEPA ET. AL. STATEMENT 1A
R-850152

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PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA ELECTRIC CO.

SURREBUTTAL TESTIMONY

OF

GEORGE GRIER

CONCERNING IMPACT OF RATE STRUCTURE

ON LOW-INCOME HOUSEHOLDS

ON BEHALF OF: CONSUMERS EDUCATION AND PROTECTIVE ASSOC.
ACTION ALLIANCE OF SENIOR CITIZENS
PHILADELPHIA CITIZENS IN ACTION
ASSOCIATION OF COMMUNITY ORGANIZATIONS
FOR REFORM NOW
MR. BRADSHAW

March 5, 1986

SURREBUTTAL TESTIMONY OF GEORGE GRIER

Q. ARE YOU THE SAME GEORGE GRIER WHO HAS PREVIOUSLY FILED DIRECT TESTIMONY IN THIS PROCEEDING?

A. Yes. I have previously submitted direct testimony identified as CEPA et. al. Statement 1.

Q. WHAT IS THE PURPOSE OF THIS SURREBUTTAL TESTIMONY?

A. My surrebuttal testimony addresses the rebuttal of my direct testimony made by PECO witness Williams. In partial support of my surrebutttal, and as promised at my cross-examination on February 20, I am attaching an exhibit, Exhibit GG-12, showing the electricity consumption in KWH by households under 150 percent of the federal poverty level residing in metropolitan areas within the Mid-Atlantic Census Division, consisting of the States of New York, New Jersey, and Pennsylvania.

A. The data come from a survey of a representative sample of U.S. households, undertaken by the U.S. Department of Energy in 1982 and 1983. One important attribute of this survey is that the data on utility consumption and expenditures for the households in the sample were supplied by the utilities serving these households themselves, directly from their billing records. By going directly to the data tape of the survey, I was able to obtain KWH consumption data for customers in the Mid-Atlantic Region who do not use electricity either as their main space heating fuel, or for heating hot water. Thus they are as comparable as possible to PECO's customers in Rate Class R.

Q. WHAT DO THESE DATA SHOW?

A. They indicate that the majority of low-income metropolitan customers in the Mid-Atlantic states who use electricity neither for home heating nor for water heating consume less than 300 KWH per month. To be exact, 55.4 percent are below this level. Furthermore, 83.1 percent of these customers use less than 500 KWH of electricity per month. Only 3.2 percent us 800 KWH per month or more.

Q. MR. WILLIAMS PRESENTS EVIDENCE THAT 48 PERCENT OF THE PARTICIPANTS IN PECO'S CUSTOMERS ASSISTANCE PROGRAM USE MORE THAN 500 KWH PER MONTH. DOES THIS TESTIMONY REFUTE THE EVIDENCE YOU HAVE GIVEN?

A. No, not in the least. PECO's Customer Assistance Program does not serve a representative cross-section of low-income customers. Moreover, it serves only a very small segment of those customers—by the latest figures, 704 households out of over 220,000 low-income households residing in the Company's service area.

As Mr. Williams has indicated under cross-examination, the program serves a highly selected subset of PECO's customer population. These are, in his words, "customers who have demonstrated extreme difficulty in being able to make their bill payments." Moreover, many of these customers clearly are having payment problems because their low incomes are accompanied by a high level of electricity consumption. As Mr. Williams has put it, the program is "designed to maintain an adequate but reasonable <u>limit</u> (emphasis mine) on the use of electricity while at the same time accepting payment from the customer as much as they are truly able to pay."

I would note, furthermore, that the payment-troubled customers in PECO's CAP program come from all rate classes. In PECO's Year-End Report on the program for 1985, there is a table indicating that 31 percent are in some other rate class than Rate R, and that a number use electricity for heating their homes, or for water heating, or both. I attach the table as Exhibit GG-13.

Thus, when Mr. Williams states that a high precentage of the participants in the CAP program use more than 500 KWH, he is including customers who heat space and water with electricity. Despite this fact, I would not that a 52 percent majority of these customers use less than 500 KWH per month.

Q. MR. WILLIAMS ALSO DISAGREES WITH YOUR STATEMENTS THAT MOST LOW-INCOME HOUSEHOLDS ARE SMALL, CONTAIN FEW CHILDREN, AND ARE OFTEN ELDERLY. HAS HE PRESENTED VALID EVIDENCE IN SUPPORT OF THIS CONTENTION?

A. No. Again Mr. Williams has drawn his evidence from the highly-selected group of payment-troubled clients in the Company's CAP Program. Even in this group, however, I note that only 16 percent are listed in his Schedule C as having three or more children. I attach this table as my Exhibit GG-14.

My data on this point, on the other hand, come from the U.S. Census, a source that is not only highly reliable but completely objective, and produced by an agency that is independent of any party in this case. The Census makes every reasonable effort to count everyone—whereas the PECO CAP program deals only with customers in payment trouble, and does not even accept all such customers.

I would point out, furthermore, that I have analyzed Census data for the U.S. as a whole and for many individual states and localities. I have found that in every case low-income populations had quite similar characteristics to those in PECO's territory.

There is a widespread myth that most low-income households consist of large families with numerous children. The U.S. Census data do not support this myth. Such families do tend to show up quite often on the rolls of welfare and service programs like the CAP program, while the elderly and disable people who are more typical are often under-represented.

There are several explanations for this. One is that many do not have the physical or emotional stamina to go through the often rigorous and embarrassing process of applying for benefits, answering the many personal questions often required to qualify, and supplying various kinds of documentation on their deprived status. Another is that many have too much pride; they would rather suffer than admit they need the help.

In any event, I stand behind the Census data I have presented as being the best available, and presenting an accurate picture of the low-income customers whom PECO serves.

Q. MR. WILLIAMS ALSO CITES A 1976 STUDY BY NATIONAL ANALYSTS, WHICH HE SAYS FOUND THAT THE RELATIONSHIP BETWEEN ELECTRICITY CONSUMPTION AND INCOME IS LOW, AND THAT FAMILY SIZE HAS A FAR GREATER INFLUENCE ON ELECTRICITY USAGE. WOULD YOU PLEASE COMMENT ON THAT STUDY.

A. The 1976 study broke down Rate Class R customers into three broad consumption categories. The middle one of these categories was especially broad. The first or "low" consumption category was under 3000 KWH per year, which is only 250 KWH per month. The second or "medium" category extended all the way from 3000 to 8499 KWH per year, or from 250 to over 700 KWH per month. This range is so broad that it covers 51 percent of all low-income customers in Rate Class R by the DOE data I have presented. I do not know why it was set so broadly, but I do know that it obscures many if not most differences in electric usage. The third category extended from 8500 KWH per year or 708 KWH per month up, a range that contains only about 4 percent of all customers in the 1982-1983 study.

These three broad consumption ranges are so gross that they serve very poorly as a basis for determining the statistical relationship of KWH consumption to income levels. Despite the fact, Table 1 of the study report (which I have appended to my testimony as Exhibit GG-15) does show a clear relationship. It is true that the percentage of customers in the very broad "medium" category does not vary much with income level. That is hardly surprising. But in both the "low" and "high" categories, the percentages vary greatly and directly with income.

In the income group under $3,000, 57 percent of households are in the "low" consumption category, while at all income levels over $15,000 only 5 percent or less are in this category. By the same token, only 3 percent of households with incomes under $3,000 are in the "high" consumption category, while 47 percent or more of those with incomes of $20,000 or more have usage levels in this range. Thus, for more than one reason, it is difficult to understand how this study could be considered as providing valid statistical proof that the relationship between income and usage is low.

Q. WHEN MR. WILLIAMS STATES THAT "IF ANY OF THE BENEFIT TO THE FIRST 500 KWH BLOCK IS ACHIEVED BY INCREASING THE RATE FOR USE OVER 500 KWH IT WILL FURTHER DISADVANTAGE 48% OF THE LOW INCOME CUSTOMERS," IS HE CORRECT?

A. No, his statement is incorrect, and for two reasons. First, he bases his contention on the fact that 48 percent of PECO's Customer Assistance Program customers use over 500 KWH. However, as I have indicated, this program is highly selective and unrepresentative of low-income consumers as a class. The DOE figures indicating that only 17 percent of low-income metropolitan customers under Rate R in the Mid-Atlantic states use over 500 KWH is, in my view, a much more correct representation of the facts regarding this customer class.

The second problem with Mr. Williams' statement is that he does not seem to understand that the benefits of an inverted rate block such as proposed by OCA Witness Oliver extend will beyond the upper limites of the block to which the rate applies. In the case of Mr. Oliver's proposed 350 KWH lower block for basic uses, under the conditions presented in his testimony, the "crossover point" in consumption beyond which a customer no longer derives any benefit from that rate is not 350 KWH, but 542 KWH in winter and 532 KWH in summer. (Figures obtained from Mr. Oliver.) For other uses the crossover points are considerably higher, as show in Mr. Oliver's surrebuttal.

Q. APART FROM THE ERRORS YOU HAVE CITED, DO YOU HAVE ANY OTHER PROBLEMS WITH MR. WILLIAMS' STATEMENT THAT MR. OLIVER'S RATE PROPOSAL WOULD "PENALIZE LOW INCOME CUSTOMERS WITH HIGH USAGE?"

A. Yes. Mr. Williams ignores the purpose and function of his Company's own CAP program. For example, the 13% of PECO's low-income customers in rate class R with usage above 532 KWH per month (the cross-over point for Mr. Oliver's 350 KWH rate block) could be placed in CAP. To repeat, the <u>vast majority</u> of PECO's rate R low-income customers are below the 532 KWH cross-over point. For those low-income customers with usage above 532 KWH level, CAP would protect these customers by determining through an examination of household income and expenses a monthly electric payment that the household could afford. Moreover, CAP participation for these low-income, high-use customers would make possible the targeting of all available conservation and weatherization materials such as the TLC Program (tighten-up-low-cost), to those households most in need of ways to reduce usage.

Unless rate relief is targeted in a way that protects as many of the 226,100 low-income ratepayer households as possible (containing nearly 600,000 persons) living in PECO's service territory, it is painfully obvious, given the magnitude of the rate increase, that more and more low-income customers will become delinquent in the coming years. Unfortunately, it is also very likely that the number of low-income families suffering termination of service will increase unless a major rate structure initiative like Mr. Oliver's proposal is adopted. The choice is clear and stark.

Q. CANNOT THESE LOW-INCOME CUSTOMERS OBTAIN HELP FROM THE GOVERNMENT?

A. Governemental assistance programs are far too little, and their benefits are getting smaller even as the need is growing. Between 1979 and 1985, the price of household fuels in the Philadelphia area went up 73 percent. (Exhibit GG-16). Yet the size of Low-Income Energy Assistance grants decreased by 9.3 persent. Between 1985 and 1986, the size of the grants paid to each household was reduced by an additional 35 percent, from $289 to $185. Further cuts are in store under Gramm-Rudman-Hollings. These programs are an increasingly inadequate source of protection for low-income consumers against terminations and other problems resulting from high home energy costs.

Q. HOW DOES PECO'S TERMINATION EXPERIENCE COMPARE WITH THAT OF OTHER PENNSYLVANIA UTILITIES?

A. PECO is one of only two utilities in the state whose terminations increased form 1984 to 1985. The increase, furthermore, was a hefty 26 percent. PECO's 32,239 terminations in January-September period of 1985 were two-thirds of all residential terminations by electric utilities in the entire state. These striking termination figures indicate the particular, unique vulnerability of PECO's low-income customers.

Q. DOES THIS COMPLETE YOUR SURREBUTTAL TESTIMONY AT THIS TIME?

A. Yes, it does.

KWH CONSUMPTION BY CONSUMERS UNDER 150 PERCENT OF POVERTY

METROPOLITAN AREAS IN MID-ATLANTIC STATES 1982 - 1983

(Customers Using Electricity Neither As the Main Heating Fuel Nor for Water Heating—Comparable to PECO's Rate Class R)

KWH Range	Percent of Households
Under 200	40.0
200-249	4.8
250-299	10.6
300-249	7.1
350-399	4.6
400-449	14.1
450-499	1.9
500-599	10.7
600-699	2.1
700-799	1.0
800 or more	3.2
Total	100.0

Source: U.S. Department of Energy, Residential Energy Consumption Survey, 1982-1983, Machine-Readable Data Tape.

SERVICE SUPPLIED

Rate R Only (Residential Electric)	430 (69%)
Rate RH (Electric Heat)	44 (7%)
Rates R and H Only (Electric and Gas Heat)	94 (15%)
Rates R and G Only (Electric and Gas)	26 (4%)
Rates R and OP Only (Electric and Off-Peak Electric)	25 (4%)
Rates R, H, and OP (Electric, Gas Heat, and Off-Peak Electric)	4 (1%)
Rates R, G, and OP (Electric, Gas, and Off-Peak Electric)	0 (0%)
Total Customers Accepted	623

Exhibit GG-14

Schedule C

CUSTOMER ASSISTANCT PROGRAM

CUSTOMER DEMOGRAPHICS

	Customers Contacted	Customers Accepted
Single Male - Sr.	29	11
Single Male	227	31
Single Male/1 Child	55	5
Single Male/2 or More Children	57	4
Single Female - Sr.	167	38
Single Female	464	114
Single Female/1 Child	762	135
Single Female/2 Children	789	132
Single Female/3 or More Children	673	80
Couple - Sr.	74	12
Couple	242	20
Couple/1 Child	312	42
Couple/2 Children	396	37
Couple/3 of More Children	469	33
3 or More Adults	150	5
3 Adults/with Children	194	5
TOTALS	5064	704

RESULTS

Household Income and Electrical Usage

The major objective of this study is to examine the relationship between household income and electrical usage. Based on the survey data, households are distributed across usage categories by income as shown in Table 1. There is some tendency for households with higher incomes to be "high" users, and households with lower incomes to be "low" users. It is clear by examining Table 1 that this relationship is not perfect. A small percentage of low income households are "high" users, and some of the high income households are "low" users.

Table 1

Income and Electrical Usage Categories

Yearly kWh Usage	Less than $3,000	$3,000 to $4,999	$5,000 to $7,999	$8,000 to $11,999	$12,000 to $14,999	$15,000 to $19,999	$20,000 to $24,999	$25,000 and Over
	%	%	%	%	%	%	%	%
Low (less than 3,000)	57	41	26	14	12	5	4	4
Medium (3,000 to 8,499)	40	54	67	76	64	60	49	49
High (8,500 and more)	3	5	7	10	24	35	47	48
n =	(96)	(122)	(111)	(146)	(155)	(128)	(67)	(77)

It is possible to examine the same relationship by looking at the income of the households within each usage category (Table 2). It can be observed that households in the "low usage category tend to have relatively low income, while the "high" usage households more frequently have higher income. Nevertheless, there is some "overlap." Some "low" users have high incomes, and some "high" users have low incomes.