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SECRETARY'S OFFICE
Public Utility Commission

January 20, 1986

Jerry Rich, Secretary
Pennsylvania Public Utility Commission
North Office Building
Commonwealth and North Streets
Harrisburg, PA 17120

Re: Pennsylvania Public Utility Commission v.
Philadelphia Electric Company
Docket No. R-850152

Dear Secretary Rich:

Enclosed for filing with the Commission are the original and two copies of Transcript Corrections of Philadelphia Electric Company in the above-captioned proceeding for hearings on December 16-18, 1985.

As shown on the attached Certificate of Service, I have today served copies of this document on all Active Parties.

Sincerely,

Frederick H. Knight

ddq
Enclosure

cc: The Honorable Joseph Matuschak
All Active Parties

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	:	
v.	:	Docket No. R-850152
PHILADELPHIA ELECTRIC COMPANY	:	

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Public Utility Commission

TRANSCRIPT CORRECTIONS OF PHILADELPHIA ELECTRIC COMPANY FOR HEARINGS ON DECEMBER 16-18, 1985

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January 20, 1986

PECO Transcript Corrections for the hearings held on December 16, 1985

Page	Line	Correction
848	7	Change "1.766 billion to "1.744 billion"
897	11	Change "bout" to "about"

PECO Transcript Corrections for the hearings held on December 17, 1985

Page	Line	Correction
989	15	After "percent" insert "to effect"
989	17	Change "current, induce currents" to "current--induced current--"
990	10	Delete "out"
1012	15	After second "Limerick" insert "site"
1013	20	Change "1980" to "1981"
1029	21	Change "1.5" to "14.5"
1063	1	Before "treatment" insert "of a"
1063	2	Delete second "in"
1063	15	Change "use" to "used"

PECO Transcript Corrections for the hearings held on December 18, 1985

Page	Line	Correction
1171	16	Change "can't" to "can"

CERTIFICATE OF SERVICE

I hereby certify that on January 20, 1986 I served copies of the Transcript Corrections of Philadelphia Electric Company for Hearings on December 16-18, 1985, at Docket No. R-850152, upon the following by regular mail:

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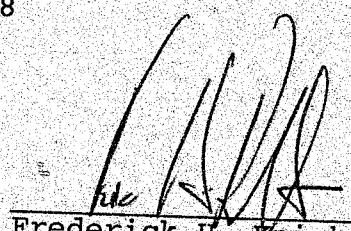

Frederick H. Knight

ORIGINAL

JAN 23 1986

SECRETARY'S OFFICE
Public Utility Commission

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	:	
v.	:	Docket No. R-850152
PHILADELPHIA ELECTRIC COMPANY	:	

FOLDER

APPLICATION FOR ORDER TO
DEPOSE OCA WITNESSES
JAMES J. O'BRIEN AND STEPHEN H. HANAUER

NOW COMES Philadelphia Electric Company (the "Company"), by its Counsel, and files this Application with the Administrative Law Judge for an Order to depose Office of Consumer Advocate ("OCA") witnesses James J. O'Brien and Stephen H. Hanauer, as follows:

1. Pursuant to Section 333(b) of the Public Utility Code (66 Pa. C.S. §333(b)), the Company requests permission to take the deposition upon oral examination of:

DOCKETED
JAN 23 1986

James J. O'Brien
O'Brien-Kreitzberg and Associates, Inc.
2 South Centre Street
Merchantville, NJ 08109

Stephen H. Hanauer
Technical Analysis Corporation
6723 Whittier Avenue
McLean, VA 22101

on January 27, 1986, at the above offices of O'Brien-Kreitzberg and Associates, commencing at 9:00 a.m., and continuing for the entire day and through January 28, 1986 if necessary.

2. The OCA has filed testimony by Mr. O'Brien in the above proceeding on the reasonableness and prudence of the Limerick 1 construction schedule duration. Specifically, Mr.

O'Brien purports to show through a computerized schedule analysis that Limerick 1 completion was unnecessarily delayed 27 months because of the Company's 1976 and 1978 construction deferral announcements and attempts to quantify the direct and indirect costs of this delay and of resolving an alleged error in the containment design at Limerick, i.e. the Mark II loads problem (OCA St. 1). The OCA has also filed testimony by Mr. Hanauer which provides support for and input into Mr. O'Brien's schedule analysis regarding the nature and effect of the Mark II loads problem and other regulatory requirements at Limerick, and a comparison of the resolution of these items at Limerick and at the La Salle and Susquehanna plants (OCA St. 2).

The matters which will be inquired into by deposition include (a) the bases and support for all analyses and conclusions contained in Mr. O'Brien's testimony, and in particular the logic, data base(s), software and all inputs and outputs used in the computerized schedule analysis, the extent to which Limerick-specific schedule information was used or modified in developing the computerized schedule analysis, the method for quantifying the effects of delay and all other relevant information needed to fully understand and evaluate the schedule analysis presented in Mr. O'Brien's testimony; and (b) the rationale and support for Mr. Hanauer's conclusions regarding the nature and effects of the Mark II loads problem and other regulatory or uncontrollable factors upon the Limerick project, and the basis for comparison of the Company's and its contractors' response to these items with similar activities at

Susquehanna and La Salle. The Company specifically requests that these witnesses be ordered to bring with them or otherwise have available at the time of deposition all documents or other materials required to provide a full and complete explanation of the matters described above.

3. Section 333(b)(5) of the Public Utlity Code (66 Pa. C.S. §333(b)(5)) and the Commission's regulations (52 Pa. Code §§ 5.324(a)(3), 5.344(b)) provide for the deposition of an expert witness where cause for such deposition exists. In view of the scope of this OCA testimony and its possible importance to PECO's future financial viability (i.e. these witnesses' analyses propose an $850 million rate base disallowance), good cause for the requested depositions is clearly present. Mr. O'Brien's analysis is derived from a computerized critical path schedule analysis and various largely undefined comparisons between Limerick and other utility construction projects. To fully evaluate this analysis, the Company must develop a complete understanding of the data bases, schedule logic and computer software that were used. In addition, there must be a complete understanding of the extent to which Mr. O'Brien's Limerick as-built schedule accurately reflects the many external factors, such as NRC regulatory changes, which impacted Limerick. Mr. Hanauer's testimony analyzes the Mark II loads problem and resolution, and its cost and schedule impact at Limerick. As with Mr. O'Brien, much data that is needed for a full understanding of the analysis does not appear to be presented in the testimony and it is unclear how the Hanauer analysis has been

employed in the O'Brien analysis.

4. This Application is being served upon the Administrative Law Judge and all participants to this proceeding, and fully satisfies the notice requirements set forth in Sections 5.343 and 5.344 of the Commission's regulations (52 Pa. Code §§5.343,5.344).

WHEREFORE, for the reasons set forth above, the Philadelphia Electric Company respectfully requests that its Application for an Order to depose OCA witnesses James J. O'Brien and Stephen H. Hanauer be granted.

Respectfully submitted,

Jack Jerrett

Walter R. Hall, II
Jack E. Jerrett
Counsel for Philadelphia
Electric Company

OF COUNSEL:

Edward G. Bauer, Jr., Esquire
Vice President and General Counsel
Philadelphia Electric Company
2301 Market Street
Philadelphia, PA 19101

MORGAN, LEWIS & BOCKIUS
2000 One Logan Square
Philadelphia, PA 19103

DATED: January 8, 1986

Application granted. So Ordered this 17th day of January, 1986.

Joseph P. Matuschak

Administrative Law Judge
Joseph P. Matuschak

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a true copy of the foregoing document upon all parties of record in this proceeding in accordance with the requirements of 52 Pa. Code §1.54.

Dated this 8th day of January, 1986.

Jack E. Jerrett

JACK E. JERRETT

Counsel for Philadelphia Electric Company

OF COUNSEL:

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(215) 963-5700

COMMONWEALTH OF PENNSYLVANIA

January 17, 1986

SUBJECT: PA. Public Utility Commission
v. Philadelphia Electric Company
R-850152

TO: William H. Smith, Chief
Administrative Law Judge

FROM: Joseph P. Matuschak
Administrative Law Judge

Enclosed please find an original and a copy of: 1) Order on Memorandum Opinion, 2) two Orders on Discussion, 3) Ruling on Petition of Philadelphia Electric Company for Stay of the December 20, 1985 Granting Motion in Limine, 4) Application for Order to Depose OCA Witnesses James J. O'Brien and Stephen J. Hanauer. A copy of each Order has been sent to the following parties of record.

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If you have any questions, please call this office.

Enclosures (10)

COMMONWEALTH OF PENNSYLVANIA
BEFORE THE PUBLIC UTILITIES COMMISSION

THE PENNSYLVANIA PUBLIC UTILITIES COMMISSION V. PHILADELPHIA ELECTRIC COMPANY

Docket No. R-850152

UP/UUC STATEMENT #3

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

DOCKETED
JAN 23 1986

January 22, 1986

RECEIVED
JAN 22 1986
SECRETARY'S OFFICE
Public Utility Commission

DOCUMENT
FOLDER

TESTIMONY OF ROBERT M WIRTSHAFTER

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

A. My name is Robert M Wirtshafter; I am employed by Delphi Energy Group, Inc., Suite 255, 3508 Market St., University City Science Center, Philadelphia, PA 19104.

Q. COULD YOU BRIEFLY DESCRIBE YOUR EXPERIENCE IN THE ENERGY FIELD?

A. I have bachelors and Ph.D. degrees from Clark University where I specialized in the analysis of electric utilities and energy conservation problems and the development of policy models to project the impact of rising energy prices upon consumers, utilities and government. In 1979, I left Clark to pursue employment with the Tennessee Valley Authority. At TVA my responsibilities were in policy planning in the Division of Conservation and Rates as an advisor overseeing more than a dozen projects in energy conservation and rate design. At the beginning of 1981, I joined Delphi Energy Group, Inc. as a principal and vice president. I have been involved in testimony for Delphi's local clients providing service to the Building Owners and Managers Association, the University of Pennsylvania, and the Utility Users Committee. I have testified before this Commission on prior Limerick cases. In addition to my responsibilities at Delphi Energy Group, Inc., I am Research Assistant Professor at the Energy Center of the University of Pennsylvania. I have co-authored one book on public utilities and have published extensively in energy journals such as Energy Policy, Energy Economics, The Journal of Energy, Public Utilities Fortnightly, etc. I teach a post-graduate course in regulatory

policy at Penn, as well as several courses in energy conservation and cogeneration.

Q. COULD YOU SUMMARIZE YOUR OBJECTIONS TO THE COMPANY'S PROPOSED COST ALLOCATION AND RATE STRUCTURE?

A. My principal objection is in the way that the Company treats the costs of generation capacity. I will show that the Company allocates all of Limerick's generation costs to the demand component of the tariff structure despite the fact that the construction of the plant is justified by the greater energy (fuel) savings it should offer over the existing capacity. As a result, rate discrimination appears at both the interclass and intraclass level of the HT class. Several rate classes that have low coincidence with the four summer peaks escape paying for their rightful share of the Limerick I costs. The lower load factor customers in the HT rate class are receiving a higher percentage increase than high load factor customers despite the greater benefits that are expected to accrue to the higher load factor customers from Limerick I fuel savings. The manner in which PECo collects those revenues is from demand charges and the associated demand ratchet.

Q. COULD YOU SUMMARIZE THE CONCLUSIONS OF YOUR TESTIMONY?

A. Yes. Lower load factor customers and those with high summer to winter demand ratios in the HT customer class are unfairly discriminated against within their class in favor of higher load factor customers. The former designation in general describes non-manufacturing (commercial, institutional and high-rise residential) customers while the latter is generally descriptive of manufacturers.

There are three components to the discrimination. **First, the demand ratchet is no longer justified since it overcollects revenues and is not an appropriate price signal. Second, the explicit demand charge increases are almost three hundred percent of the overall rate increase. Third the Company has failed to allocate an appropriate part of the rate increase to the tail energy block.**

Continuation of the demand ratchet is unjustified in view of both the Company experience and more particularly the experience of the HT class. This lack of justification occurs because of four primary reasons. First, the ratchet imposes a very large impact upon the average commercial and institutional customer. An increase of one kilowatt of demand during the summer months by a customer adds $24.00 to a non-manufacturing customer's annual bill, but as much as $120 to a non-manufacturing customer's annual bill. Second, the cost of the same kilowatt to PECo is less than $10, or less than ten percent of the revenues it receives from the non-manufacturing customer. Third, the ratchet applies only to the HT and PD customers plus AMTRAK and SEPTA. Other customer classes do not suffer its effects. Therefore, the cost of the additional kilowatt to residential customers is zero. Fourth, the ratchet is used by only two other utilities in the region, and its impact upon PECo customers is four times the impact of the next highest utility.

The proposed demand charge (assuming PECo gets 100% of its rate request) should be lowered from $9.44 /kw to $5.34 /kw and the energy block charges should be adjusted from $0.0964 /kwh to

$0.0948/kwh for the first block, $0.0668 /kwh to $0.0764 /kwh for the second block and $0.0375 /kwh to $0.0591 /kwh for the tail block for the HT class.

These changes are justified since the Company does not allocate the costs of its generation and transmission capacity correctly. The Company allocates its costs on the assumption that Limerick I is entirely needed for capacity, when in fact the plant is needed more for its fuel savings. Allocating the appropriate amount of plant costs to fuel savings results in the reallocation suggested herein.

Q. DR. WIRTSHAFTER, HOW WILL YOU DEMONSTRATE THE ABOVE POINTS?

A. First, I will compare PECo's rate structure to other utilities. Second, I will show that PECo's four peak method to allocate costs must be modified given the proposed addition of Limerick I. Third, I will demonstrate the true effects of the demand ratchet. Fourth, I will reallocate costs to compute a tariff structure that truly tracks the Company's additional costs as a result of Limerick I.

I. Comparison of Customer Bills Between Utilities

Q. DID YOU PERFORM ANY ANALYSIS OF THE RATE STRUCTURES OF OTHER ELECTRIC UTILITIES IN THE AREA?

A. Yes. In addition to PECO, the analysis was performed on Pennsylvania Power & Light, Pennsylvania Electric, Metropolitan Edison, Duquesne Light Co., Delmarva Power & Light, Potomac Electric Power Co., Baltimore Gas & Electric, Public Service Electric & Gas, Jersey Central Power & Light, Atlantic Electric Co., and Consolidated Edison.

Q. WHAT TYPE OF ANALYSIS DID YOU PERFORM TO DETERMINE THE

RELATIVE RATES LARGE NON-MANUFACTURING CUSTOMERS WOULD FACE IN THE SERVICE TERRITORIES OF OTHER UTILITIES?

A. The HT rate structure of PECO and the equivalent rate structures for other PJM and Pennsylvania utilities were input into a computer spreadsheet. The electrical use patterns of a number of Utility User Committee (UUC) customers were input to each spreadsheet in order to determine what the total electric bill would be if the customers were located in the service territories of the other utilities.

Q. HOW DID YOU TO APPLY INFORMATION FROM PECO ELECTRICITY BILLS TO THE RATE STRUCTURE OF THESE OTHER UTILITIES?

A. In most cases the PECO bill contained all the necessary data. However, in a few cases the on- and off-peak periods for the other utilities covered different hours of the day than those covered by PECO. Therefore, it was necessary to make some assumptions concerning how to convert from PECO's time-of-day schedule to those of the other utilities. We did this by adjusting proportionally by the number of on and off-peak hours within a week.

For simplicity the power factor was set equal to 95% for large load customers and equal to 90% for lower load customers. This involved adjusting PECO's billing demand such that it was equal to registered demand when the ratchet was not in effect.

In addition, the time interval over which demand is registered varies slightly between utilities. It was assumed that demands were unaffected by this interval.

Q. WHAT DID YOU USE FOR THE ENERGY COST RATE?

A. The Energy Cost Rate effective on December 1, 1985 was used for each utility.

Q. HOW WAS THE SAMPLE OF CUSTOMERS SELECTED FOR THE ANALYSIS?

A. The sample of customers was selected based on which UUC customers had supplied us with bills quickly enough for us to include an analysis of them in our testimony.

Q. DID YOU HAVE COMPLETE BILLS FOR ALL THE CUSTOMERS YOU ANALYZED?

A. No. Some customers did not supply us with complete information.

Q. WHAT DID YOU DO WHEN YOU DID NOT HAVE COMPLETE INFORMATION?

A. Very few bills were missing. The few customers which had incomplete bills had a gap of only one month. In these cases the meter readings from the prior and succeeding months were utilized to determine the total kwh used. The demand was calculated as an average of the surrounding months.

Some customers did not supply us with a cycle of bills starting in January and ending in December. For example, the University had their bills from July of one year to the June of the next year. In these cases we used the previous year's peak to set the ratchet just as was done on the bills.

Q. HOW DID YOU ESTIMATE THE USE PATTERNS FOR YOUR SAMPLE NON-MANUFACTURING CUSTOMERS?

A. Two hypothetical manufacturing customer loads were created for our analysis. These were based on the electric load patterns of typical manufacturing users. No variations in billed demand occurred due to seasonal effects, or in other words, the demand ratchet never comes into play. Kilowatt-hour use was split between on- and off-peak use with a 1:2 ratio. Manufacturing customer #1 (M1) had 5000 kw demand and 648 hours usage.

Manufacturing customer #2 had 40000 kw demand and 710 hours usage.

Q. WHAT WERE THE RESULTS OF THE INTER-UTILITY COMPARISONS?

A. Dr. Feldman's testimony deals with the results of the comparisons in a more in-depth fashion than does mine. However, I would like to point out that the analysis show that PECo's large non-manufacturing customers would now pay, on average, thirty percent more than they would if they were located in other utilities. If the proposed rate increase goes into effect these customers' bills will be more than sixty percent higher on average than they would be if they were located in the other utilities' service territories.

II. The Inappropriateness of PECo'S Cost of Service Allocation Methodology

Q. WHAT ARE THE MAJOR REASONS FOR THE HIGH NON-MANUFACTURING RATES IN PECO'S SERVICE TERRITORY?

A. I believe that the reasons are twofold. First, PECo's overall costs even without Limerick are higher than all but one area utility. Limerick costs boost those rates above all area utilities. Second, PECo's rates do not track the allocation of those costs.

Q. THE COMPANY USES THE FOUR PEAK METHOD TO ALLOCATE COSTS. IS THIS JUSTIFIED?

A. Absolutely not. The four peak method of cost allocation is no longer appropriate since it does not represent the basis of PECo costs in 1986. Mr. Sundermeir has stated that, "Production and transmission plant must be designed to meet the maximum demand requirements imposed on the system by customers; therefore, it is appropriate that these costs should be allocated

on the basis of contribution to those peak demands." (PECo statement #24, p.6, lines 19-23). While there is nothing incorrect about the first half of Mr. Sundermeir's statement (that production and transmission plant must be designed to meet the maximum demand requirements imposed on the system by customers), it is certainly incomplete. As Mr. Rush confirms production and transmission plant must be designed not only to meet maximum demand requirements, but also to provide electricity at the lowest overall cost to customers (PECo Statement #14, page 17, lines 19-33.). Mr. Sundermeir would like us to believe that all of the production and transmission costs are incurred for reliability purposes. The facts in this case are that most of the costs of the Limerick I plant are being added for energy savings rather than meeting peak demand and that those costs of Limerick I are more properly added to the energy category. With the inclusion of Limerick I, the four peak method is completely unsupportable.

Q. WHAT EVIDENCE IS THERE THAT LIMERICK I IS NOT BEING ADDED TO EXCLUSIVELY MEET PEAK REQUIREMENTS?

A. Prior to the cancellation of the combustion turbines, the Company already had sufficient capacity without including Limerick I. Concurrently with the addition of Limerick I into the Company's rate base, the Company is cancelling an almost equivalent amount of existing capacity. This is well-documented in the testimony of Mr. Paul Chernick on behalf of the Utility Users Committee in this Docket. PECo's own witness, Mr. Rush, the witness responsible for providing the justification for Limerick I, admits that a major portion of the plant is not being

built for reliability purposes. (TR 822, lines 8-11.) His justification of Limerick centers on the expected fuel savings and on the need to replace existing peaking capacity with baseload capacity (PECo Statement #14, page 20, lines 29-35).

Q. WILL A DIFFERENT COST ALLOCATION METHOD PRODUCE A DIFFERENT RESULT?

A. Yes. The Company has provided the calculations for only one other cost allocation methodology, the average and excess allocation method. The results of that methodology produce very different results. Schedule RMW__1 shows the differences between the class rates of return for the different classes under each of the two allocation methods. Under the average and excess method the RH, OP, Street Lighting, EPS and EPA rates exhibit class rates of return well below system average. The difference in the two cost methods, shown in Column 3 of RMW__1 illustrates the complete reversal in class rates of return that are realized by the RH, OP, Street Lighting, EPS and EPA rates. Under the average and excess method, the deviations from system average rate of return are exacerbated by the proposed rate increase. These deviations are shown in RMW__2 and RMW__3. Under the average and excess method, the rate classes that are significantly below system average rate of return are the very rate classes that PECo has singled out for special treatment. Column 4 of RMW__2 shows the relative increases of each class of customers as proposed by the Company. While the rate increases for the HT, PD, GS, and R customer classes are increased by 29.6 percent, the RH, OP, Street Lighting, EPS, and EPA customer classes are given smaller percentage increases.

Q. WHY DO THE RESULTS DIFFER SO MUCH BETWEEN THE TWO ALLOCATION METHODS, AND HOW SHOULD THE COMMISSION INTERPRET THESE RESULTS?

A. The four coincident peak method assigns all of the costs of Limerick based on contribution to system peak. The average and excess method recognizes that costs to PECo are both energy and demand related. In the average and excess case, a portion of the costs of capacity are assigned based on energy, and the remainder is allocated based on non-coincident peak demand. The four peak method allocates only a small portion of the cost burden of Limerick to classes with a low system peak coincidence factor. Since Limerick is a baseload plant that is in major part replacing existing peaking capacity, these classes will share in the benefits of lower fuel costs. The Commission should recognize that these rate classes must share in the cost of the Limerick plant. It should be emphasized that the present PECo request gives the greatest rate relief to the very classes that under the average and excess method should bear the greatest increases in rates.

Q. ARE YOU ADVOCATING ADOPTION OF THE AVERAGE AND EXCESS METHODOLOGY?

A. No, I am not. I offer the above example to illustrate how sensitive the class rates of return are to different allocation strategies. In this case, the issue is not so much whether one cost allocation method is superior to the next, but whether portions of the production and transmission expenses are more properly classified as energy related under any methodoology. The average and excess method recognizes that energy savings is a major factor in determining PECo capacity related expenditures.

Based on the findings of the average and excess method, it is clear that the lower percentage rate increases proposed by PECo and given to some rate classes are inappropriate. The Company presents the four peak method as though it perfectly represents the basis of all incurred costs. Yet a major portion of new costs (that incurred by the construction of Limerick) is unrelated to peak capacity requirements. 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 believe that the Commission should recognize that the four coincident peak method cannot be relied upon to accurately allocate PECo's costs. For this rate request, the Commission should raise the rates on an equal percentage basis to all classes of customers.

III. Changes in the HT Rate Structure.

Q. FOR THE HT CLASS, HOW HAS PECO ALLOCATED THE COSTS OF GENERATION?

A. In designing the intraclass rate structure PECo has assigned all capacity costs to the demand component.

Q. WHAT IS THE ULTIMATE EFFECT OF ASSIGNING ALL OF LIMERICK I COSTS ON A DEMAND BASIS?

A. The impact within the HT class under both of the allocation methods (as interpreted by PECo, which assigns the energy portion of the average and excess costs to the demand component--see IR-UUC/UP 6-1) is that the customers with low load factors are being asked to shoulder a disproportionate share of the costs of

Limerick I. RMW__4, which is a graphic depiction of PECo attachment IV-D-2, for the 1300 kW HT customer, shows the extent of the disparity of the rate increase among different customers of the HT rate class due to load factor.

For the HT customers there is the additional charge of a demand ratchet which further penalizes those customers with high summer peak loads. This demand ratchet is both unfair and obsolete. The combined result is that PECo has the highest demand related charges of any utility in PJM. PECo's proposed demand charges are so out of line that they will be 426 percent higher than Delmarva Power and Light, the next highest in the area.

Q. YOU HAVE STATED THAT YOU BELIEVE THE RATCHET IS OBSOLETE AND UNFAIR. COULD YOU PLEASE EXPLAIN WHAT THE RATCHET IS AND HOW IT WORKS?

A. The ratchet is only applied to the HT, PD, and EP rate classes. The ratchet penalizes customers with high summer demands by artificially setting a demand level of eighty percent of the highest summer demand as the minimum winter billed demand. This ratchet forces many customers to pay demand charges in the eight non-summer months above actual use. This subsequently forces customers into the higher energy blocks causing additional penalties.

Q. COULD YOU GIVE AN EXAMPLE AS TO HOW THE DEMAND RATCHET WORKS?

A. Suppose that a customer uses 1875 kW of demand in August and 1000 kW in each of the following eleven months. Also assume that monthly use is 500,000 kWh in each month of the year. The ratchet imposed on this customer in the non-summer months will be eighty

percent of his highest demand in the preceeding summer, in this case 80% of 1875 kW. A demand ratchet of 1500 kW will be imposed on this customer because of his winter demands. The customer will be billed for 1500 kW of demand instead of his actual demand of 1000 kW. Furthermore, because the energy blocks are determined by billed demand and not actual demand, more energy (75,000 kWh) is charged in each of the first two energy blocks as a direct result of the demand ratchet. RMW__5 shows a breakdown of this hypothetical customer's bills for one winter month with and without the ratchet. For this customer, the ratchet costs for this month are $11,335 or 22% more than if no ratchet were imposed.

Q. WHAT IS THE EXTENT OF THE COSTS OF THE RATCHET TO LOW AND MEDIUM LOAD FACTOR CUSTOMERS?

A. I have done the analysis for the sample of UUC members. The results are shown in RMW__6 and RMW__7. Under the proposed rates for the University of Pennsylvania (UUC Customer #1), the ratchet increases the annual bill by $650,000. This represents an addition of 3.4 percent over the charge that would be applied if there was no ratchet. For the other ten UUC members, the ratchet penalty varies from 0.8% to 5.7%. On average these members' bills are increased 3.2% percent by the inclusion of the ratchet.

Q. WHAT IS THE IMPACT OF THE RATCHET ON THE ENTIRE HT CLASS?

A. Despite PECo's insistence that the demand ratchet is a good idea, and the UUC's constant challenge to its validity, the Company cannot provide a value as to the revenue collected by the ratchet (IR-UUC/UP-4-2, Tr. 1596). I have estimated that PECo

will collect $14,442,000 in revenue from the ratchet in the test year under the proposed rates.

Q. COULD YOU EXPLAIN HOW YOU DERIVED YOUR FIGURE FOR REVENUE COLLECTED BY THE RATCHET WITHIN THE HT CLASS?

A. The three tables in RMW__8, RMW__9, RMW__10 show the process by which the ratchet revenue has been calculated. There are three steps to the process. I first calculated the number of extra kilowatts that were collected by the ratchet for 1984. Second, I adjusted this figure to conform to the test year. Third, I estimated the shifts in kilowatt-hours between the rate blocks that result from the ratchet.

RMW__8 calculates the number of kilowatts in the non-summer months that are attributable to the demand ratchet. IR-UUC/UP-4-1 gives the actual and billed demands for the HT class. I used 1984 because it contains the last complete year of data. The billed demands account for the power factor adjustment, the demand ratchet and minimum billing demand. It is assumed that billing demand adjustments are neglible. To the extent adjustments for minimum billing demand are imposed during the summer, my estimate of revenues collected from the demand ratchet is overstated. Therefore, the difference in the billed and actual demand in the summer months is largely a function of the power factor adjustment. Column 4 of RMW__8 shows the average power factor adjustment for the summer of 1.038%. I have adjusted the non-summer billed demands by assuming that they also have similar power factor adjustments as the summer months. Column 5 is the billed non-summer demand without power factor, and the difference between Columns 2 and 5 is the billed demand

due to the ratchet as shown in Column 6.

RMW__9 adjusts the figure developed in RMW__8 by adjusting for the change in the number of total kilowatts between 1984 and the test year. This raises the figure slightly from 815,295 to 816,557 kW.

RMW__10 calculates the revenues that would be lost from removing the ratchet. In the first case it is assumed that every ratcheted customer has over 300 hours use. In this extreme case every kilowatt of billed demand due to the ratchet will also shift 150 kwh into each of the first 2 blocks from the third block. This case (line 4) measures the maximum amount of revenue that would be collected by the ratchet. For the HT class this figure is $14,922,572.

Lines 5 through 8 calculate the actual block changes for our sample of twelve UUC members, all of whom are affected by the ratchet. Several of these customers have loads that are less than 300 hours of use. For these customers the ratchet does not shift as much energy from the third block to the second block. (there is no more energy in the third block). The impact is shown in line 7, where 5,250,000 is less than 150 hours multiplied by 40,406. Having established the impact on the known group of HT customers, I extrapolate a value for the entire HT class based on the ratio of sample billed kilowatts due to ratchet over total billed kilowatts due to ratchet. This adjustment lowers the estimate of the revenue collected by the ratchet by about three percent to $14,442,424.

Q. ACCORDING TO THE COMPANY WHAT IS THE PURPOSE OF THE RATCHET?

A. Mr. Sundermeir has given the following reasons for the

ratchet in the Case R-8222912, Statement 3A, July 1983.. He states: "The purpose of the demand ratchet is to send a price signal to HT customers encouraging them to reduce their summer demand. These demand reductions benefit all customers through lower fuel costs and in decreasing the need to add new capacity. Moreover, the ratchet also ensures that the Company will at least partially recover the costs it incurs to supply an additional kW of demand during the summer." Under cross examination in this case (TR 1595-96), Mr. Sundermeir reconfirmed this statement, and stated that there were no other reasons for the ratchet (TR 1596).

Q. WHAT IS WRONG WITH THE JUSTIFICATION OF THE RATCHET GIVEN BY MR. SUNDERMEIR?

A. The justification for the ratchet, as given by the Company, has not changed in many years. However, the costs and capacity conditions of the Company have been consistently changing. Since the construction of Limerick I, the claims for the ratchet have even less validity when examined against the actual situation which the Company is now in. I will demonstrate this below. Finally, the ratchet is unfair in that it is regularly imposed on only the non-manufacturing sub-class of customers.

Q. MR SUNDERMEIR STATES THAT THE RATCHET IS A SIGNAL USED TO ALERT HT CUSTOMERS OF HIGH SUMMER USAGE. WHAT EVIDENCE DO YOU HAVE THAT THE RATCHET IS UNFAIRLY IMPOSED?

A. Mr. Sundermeir's own statement strongly demonstrates the unfairness. He justifies imposing the ratchet on HT customers because demand reductions will benefit <u>all</u> customers through lower fuel costs and in decreasing the need to add new capacity. This is blatant discrimination, for HT low and medium load factor

customers are asked to make sacrifices or pay penalties for the benefit of other customer classes.

Q. MR. SUNDERMEIR HAS STATED THAT THE RATCHET IS THE SIGNAL THAT PECO USES TO ALERT HT CUSTOMERS AS TO THE UNDESIRABILITY OF ADDING TO THE SUMMER PEAK LOAD. IS THIS THE SAME SIGNAL GIVEN TO OTHER CUSTOMERS?

A. No. The signal given to the HT low and medium load factor customers is drastically out of line with the signal given other classes of customers. I have examined the bills of the University of Pennsylvania and compared them to hypothetical bills from other PECo customer classes to determine exactly how strong a signal the ratchet is. For each class, I have measured the additional rate charges that result from the addition of one kilowatt demand during the highest summer month.

If this greater demand does impose greater costs to PECo, an assertion that I will challenge below, it must be accepted that the addition of one kilowatt of demand imposes the same costs to PECo regardless of which customer class demands the additional kilowatt. Yet, the ratchet's effect is felt only by the non-manufacturing class. RMW__11 and RMW__12 shows the discrepancy in the charges. The R and RH customers are assessed no charge for the additional demand. The manufacturing customer receives a signal of $24.00. The University of Pennsylvania's signal is $120, or $120 larger than the R and RH customer's signal and $96 larger than the signal to the industrial customer.

Q. IS THE RATCHET SIGNAL FOR HIGH SUMMER TO WINTER USERS DIFFERENT FOR OTHER REGIONAL UTILITIES?

A. I tested the impact of this proposed rate treatment against that of other PJM utilities and Con Ed. For each utility, I

added ten more kilowatts to the summer peak month demand of the University of Pennsylvania bill. (Ten kilowatts was used so that fractional kilowatts of ratcheted demand would be avoided.) I then recalculated the annual bill under each utility's appropriate rate. The results are revealed in RMW__13 and RMW__14. PECo's charge for the additional ten kilowatts is by far the highest of any utility. In fact, as graphically shown in RMW__9, the charge is over four times that of the next highest utility. Even without the ratchet, PECo's charge would be the second highest.

Q. MR. SUNDERMEIR HAS STATED THAT THE RATCHET IS NECESSARY TO ENSURE THAT THE COMPANY WILL AT LEAST PARTIALLY RECOVER THE COSTS IT INCURS TO SUPPLY AN ADDITIONAL KW OF DEMAND DURING THE SUMMER. WHAT IS WRONG WITH THIS ARGUMENT?

A. The claim that the ratchet is necessary to collect sufficient revenue from customers may at one time have been valid. The simple fact is that it does not cost PECo $120 per year to meet this type of capacity addition.

The Company's own witness, Mr. Rush, states that for economical purposes loads that occur for brief periods should be met by peaking units characterized by low capital costs (PECo Statement #14, page 18 line 30 to page 19 line 14). If the Company needed to buy new peaking capacity, it could do so by adding new peaking capacity at $52.93 per kw/year (the cost established by PJM as the cost of new peaking capacity , see IR-OCA-9-12).

The fact of the matter is that additions to peak demand would not impose large additional charges to the Company. The cost of maintaining the 458 MW of leased combustion turbines is

approximately $5,000,000 or $10.00 per kW/year. Even without the ratchet, the demand related charges (implicit and explicit) overcollect the costs of buying new peaking capacity. The imposition of the ratchet means that the Company overcollects from the ratcheted customers by an order of 10 times the proper charge for additional summer demand.

In addition, the Company has provided testimony concerning the present difficulties it experiences in trying to schedule maintenance of its baseload facilities. Mr. Rush noted in cross examination that the Company attempts to schedule baseload in the "valley period of loads." (see TR-342-345). He indicates that it is not always possible to schedule all baseload in the spring and fall. Under these conditions, the Company is forced to schedule some baseload maintenance first in the winter and if necessary in the summer. The ratchet actually encourages some customers to have higher demands in the winter than they otherwise would with no ratchet. This reduces PECo's ability to schedule demand through the winter, and forces a greater need for scheduled maintenance during the summer.

Q. ARE YOU ASKING FOR AN ELIMINATION OF THE RATCHET?

A. Yes. It should be pointed out that the demand ratchet is not generally used by other utilities. Of the eleven other utilities that I examined, only two, Metropolitan Edison and Delmarva have demand ratchets. In both cases the impact of the ratchets is significantly smaller than PECo's proposed demand ratchet. Met Ed has a ratchet that is set to only fifty percent of peak summer usage. Delmarva has a higher ratchet, but both lower total demand charges and a lower demand charge in the winter, so the

impact of the ratchet is only 23% of PECo's charge.

For PECo, two salient recommendations can be put forth: the ratchet should be eliminated and the demand charge must be radically lowered. Only if the demand charge (both explicit and implicit) were lowered to reflect the extremely low costs of providing peaking capacity would the demand ratchet be appropriate according to Mr. Sundermeir's definition.

Q. ARE YOU ASKING FOR FURTHER REDUCTIONS IN DEMAND RELATED CHARGES BEYOND THE RATCHET?

A. Yes, even with the elimination of the ratchet, PECo's demand charge is exceeded only by one utility. Our estimation of the impact of the ratchet is that it only accounts for 1.3% of the total revenues of the HT class, but it falls squarely upon the non-manufacturing customer. Even with the removal of the ratchet, the non-manufacturing HT customers will still receive rate increases significantly higher than our illustrative hypothetical manufacturers. RMW__15 shows the percent increases that will result if the ratchet is removed and the revenue is collected from all other customer classes.

IV. The Appropriate Reallocation of Rates

Q. HOW WOULD YOU REALLOCATE RATES WITHIN THE HT CLASS?

A. The process is rather straight-forward. I have reallocated Limerick I revenue requirements from the demand component to the energy component. I have also redistributed the revenues from the elimination of the demand ratchet to the energy component. I followed PECo's methodology for deriving rates within the HT class using the Bary curve to track cost components to actual

rates within the HT class. RMW__16 shows the reallocation that results from this procedure. In this particular case I assume that one hundred percent of Limerick I plus common facilities costs are included in the rate base. Line 1 indicates the total revenue requirements for Limerick I and common of $858,170,000. I have used the A1 allocator (line 2) to determine the portion of Limerick revenues which would be derived from the HT class ($355,814,000 line 3). Line 4 shows the total annual revenue requirement for the HT class as calculated by PECo. Line 5 indicates my Limerick adjustment between the four peak and energy components. I have shifted 90 percent of Limerick costs, $320,233,000, from demand to energy. Ten percent of Limerick costs assignable to the HT class, or $35,581,100, remain in the demand component. Line 6 shows the new annual revenue requirements. Lines 7 and 8 use the same procedure to redistribute demand ratchet revenues from the four peak to the energy component. Line 10 adjusts the Company cost function divisors to the appropriate function divisors without the inclusion of ratchet demand. Line 12 follows the Company procedure to calculate the Total Unit Annual Costs to Serve. The results show that the demand component is lowered from $335.18 to $200.40 and the energy component is raised from $.02603 to $0.05188.

Q. WHAT RATES RESULT FROM THE COST OF SERVICE CALCULATIONS?

A. On a spreadsheet, I have replicated in RMW__17, RMW__18, and RMW__19 the rate setting procedure used by PECo as presented in IR-PAIEUG-1-50. The resulting rates for the energy blocks are $0.0948, $0.0764, $0.0591. The demand charge is $5.34 and is set

to ensure that the Company recovers the equivalent amount of revenue as under their proposed rates.

Q. WHAT IS THE RATE INCREASE FOR THE VARIOUS HT CUSTOMERS?

A. The rate increase would fall most heavily on the high load factor customers (RMW__20). However, this is the result of treating Limerick as a facility that is primarily designed to save energy costs. This is the proper direction for the rate increase because these customers stand to gain most of the projected fuel savings. If the Commission does not believe that the fuel savings are adequate to justify placing such a heavy burden on the energy portion of the rate, then the justification for Limerick's inclusion into the rate base at all is null.

Q. DR. WIRTSHAFTER, WHAT WILL YOUR RATES BE IF THE COMMISSION ONLY ALLOWS A PORTION OF LIMERICK INTO THE RATE BASE?

A. If the Commission lowers the request made by PECo than this reduction should be reflected in the energy component. Under these circumstances, I propose that no change be made in the absolute dollars assigned to the demand component. That is I suggest that the demand component be assigned $35,814,000 regardless of the total amount assigned to the HT class. As an example, I have calculated another set of rates assuming that the Commission only allows 50 percent of Limerick into the rate base. The results are shown in RMW__21 through RMW__25.

Q. DR. WIRTSHAFTER, COULD YOU EXPLAIN YOUR REASONING BEHIND THIS ANALYSIS?

A. The $35 million represents a very generous accounting of the the value of Limerick for reliability purposes. A strict adherence to the value of reliability as determined by Mr.

Chernick would yield an even lower reliability portion. I have argued that the remainder of Limerick I belongs in the energy portion. To be consistent, any reductions in the allowed amount of Limerick should lower the amount assigned to the energy component.

Q. IF THE DEMAND COMPONENT IS NOT SUBSTANTIALLY REDUCED FROM WHAT PECO HAS REQUESTED, HOW WILL NON-MANUFACTURING CUSTOMERS LIKELY REACT TO THESE NEW HIGHER DEMAND CHARGES?

A. The non-manufacturing class is very likely to control their loads to conform to the rate signal conveyed by the proposed rate. That is, I expect that the non-manufacturing customers will lower their peak demands by a significant amount. Unfortunately, the end result will be a drastic waste of generating resources and a detriment to both PECo and the remaining customer classes.

Q. COULD YOU PLEASE EXPAND UPON YOUR EXPECTATIONS OF THE NON-MANUFACTURING CLASS AND ITS IMPACT ON PECO?

A. The key to the change in load is that most non-manufacturing customers can either install gas fired air-conditioning or their own generation equipment. Absorption cooling units are commercially available for about $350 per ton and can replace electric compression systems. These units will be quite attractive if the proposed rates are enacted. Alternatively, many customers can install generation equipment for $300 to $500 per KW. Many buildings already have some generation equipment used for backup. If the Company is going to charge $120 per kW for electricity used for to meet extreme air-conditioning loads, then these non-manufacturing establishments can generate their own electricity for a fraction of what PECo charges. In this way, whenever the air-conditioning equipment is called for, the

generator will come on and run the air-conditioner. The end result is that the customer has a flat demand and a high load factor and avoids the ratchet and other demand charges. The whole idea of individual customers buying peaking equipment to avoid demand charges makes no sense on a societal basis in the long run. The customers are forced to spend this extra money on redundant generation equipment in order to avoid the demand charges. The customers are reacting properly to an improper pricing signal. The high demand charges signal that PECo is capacity short and will be required to spend large sums of money if peak loads increase. As has been shown, the real cost of additional peak demand is $10.00 per kW. The improper pricing signal leads to the construction of three duplicate sets of generation systems: the plants installed by the customer, Limerick I, and the original peaking plants. This is an unnecessary redundancy of expenditures for which all customers will have to pay.

If the proposed allocation method which assigns all capacity expenses to the demand charge is accepted, then there will be a situation in which the revenue curve does not track the real cost curve. The improper pricing signals that result from the continued use of the four peak allocation method will be disruptive to PECo and its customers. I support the need for rates to track costs, and feel that the Commission must recognize that Limerick costs are energy related and that rates must be adjusted to reflect this.

Q. DOES THIS END YOUR TESTIMONY?

A. Yes it does.

COMPARISON OF 4CP AND AVERAGE/EXCESS COST ALLOCATIONS

RMW 1

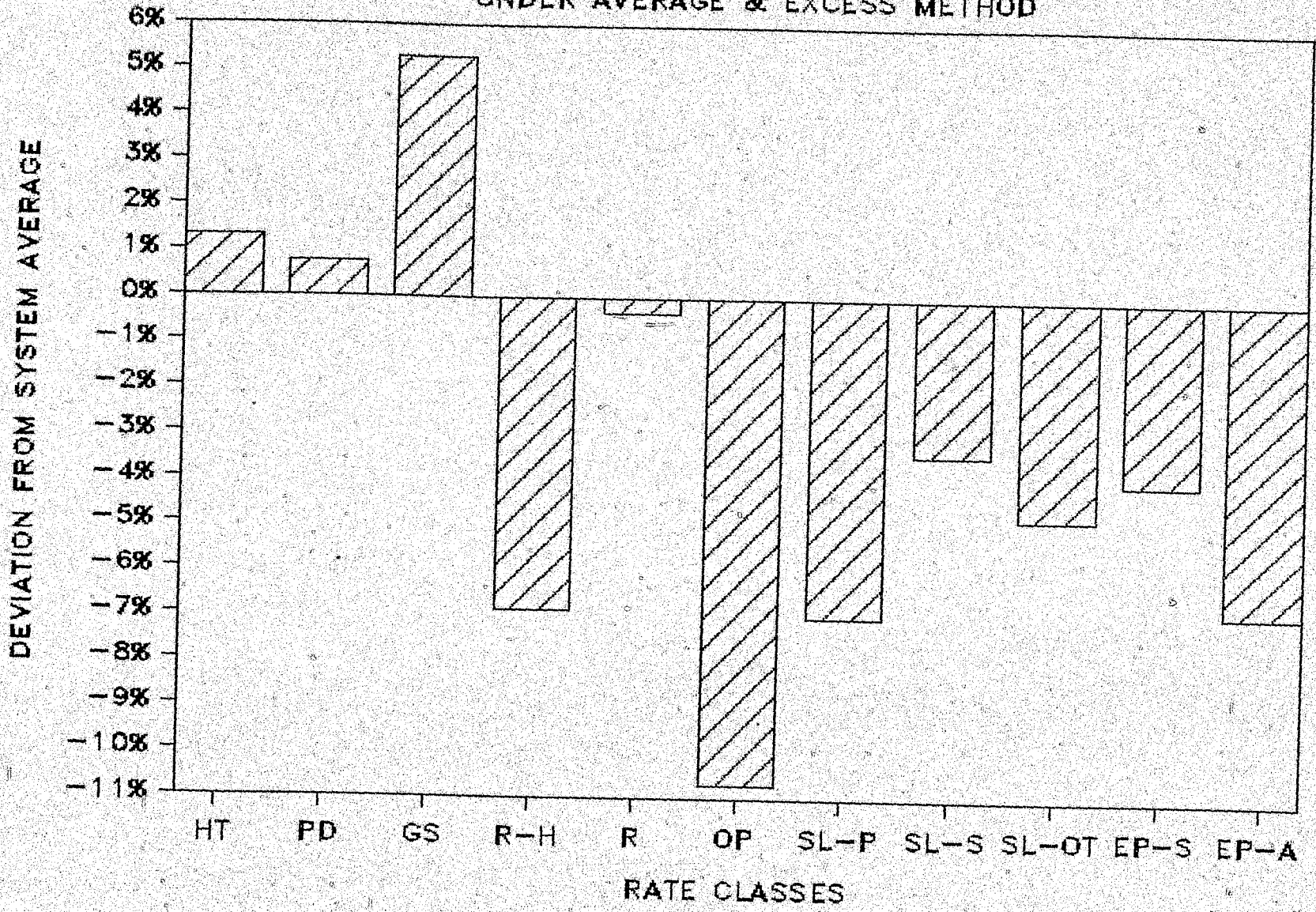
RATE CLASS	4CP CLASS RATE OF RETURN (WFS-1, p.6a,b)	AVERAGE/EXCESS CLASS RATE OF RETURN (WFS-1, p.73a,b)	DIFFERENCE BETWEEN A/E AND 4CP
HT	12.23	14.03	1.80
PD	12.40	13.46	1.06
GS	14.70	17.99	3.29
RH	14.69	5.82	-8.87
R	12.15	12.36	0.21
OP	30.98	1.99	-28.99
SLP	12.31	5.68	-6.63
SLS	13.70	9.25	-4.45
OTHER SL	20.51	7.87	-12.64
OTHER UTILITIES	9.55	10.82	1.27
INTER-DEPARTMENTAL	11.16	12.68	1.52
SEPTA	12.70	8.64	-4.06
AMTRAK	12.70	5.81	-6.89
TOTAL	12.70		

AWAY FROM CLOSURE UNDER AVERAGE AND EXCESS METHOD

RATE CLASS	(1) CURRENT CLASS RATE OF RETURN (WFS-1 p. 73a,b line 31)	(2) DEVIATION FROM SYSTEM AVERAGE (Col. 1-6.39)	(3) PROPOSED CLASS RATE OF RETURN (WFS-1 p. 73a,b line 33)	(4) DEVIATION FROM SYSTEM AVERAGE (Col. 3-12.70)	(PERC INCRE (TPH-2,A col.
T	6.39	0	14.03	1.33	29.6
D	6.87	0.48	13.46	0.76	29.6
GS	10.18	3.79	17.99	5.29	29.6
H	2.04	-4.39	5.82	-6.88	25.9
R	6.26	-0.13	12.36	-0.34	29.6
P	0.50	-5.89	1.99	-10.71	0.0
SLP	4.99	-1.40	5.68	-7.02	0.0
SLS	8.83	2.44	9.25	-3.45	0.0
THER SL	7.12	0.73	7.87	-4.83	0.0
SEPTA	5.00	-1.39	8.64	-4.02	14.9
MTRAK	3.80	-2.59	5.81	-6.89	12.7

RATE INCREASE DEVIATION FROM CLOSURE

UNDER AVERAGE & EXCESS METHOD

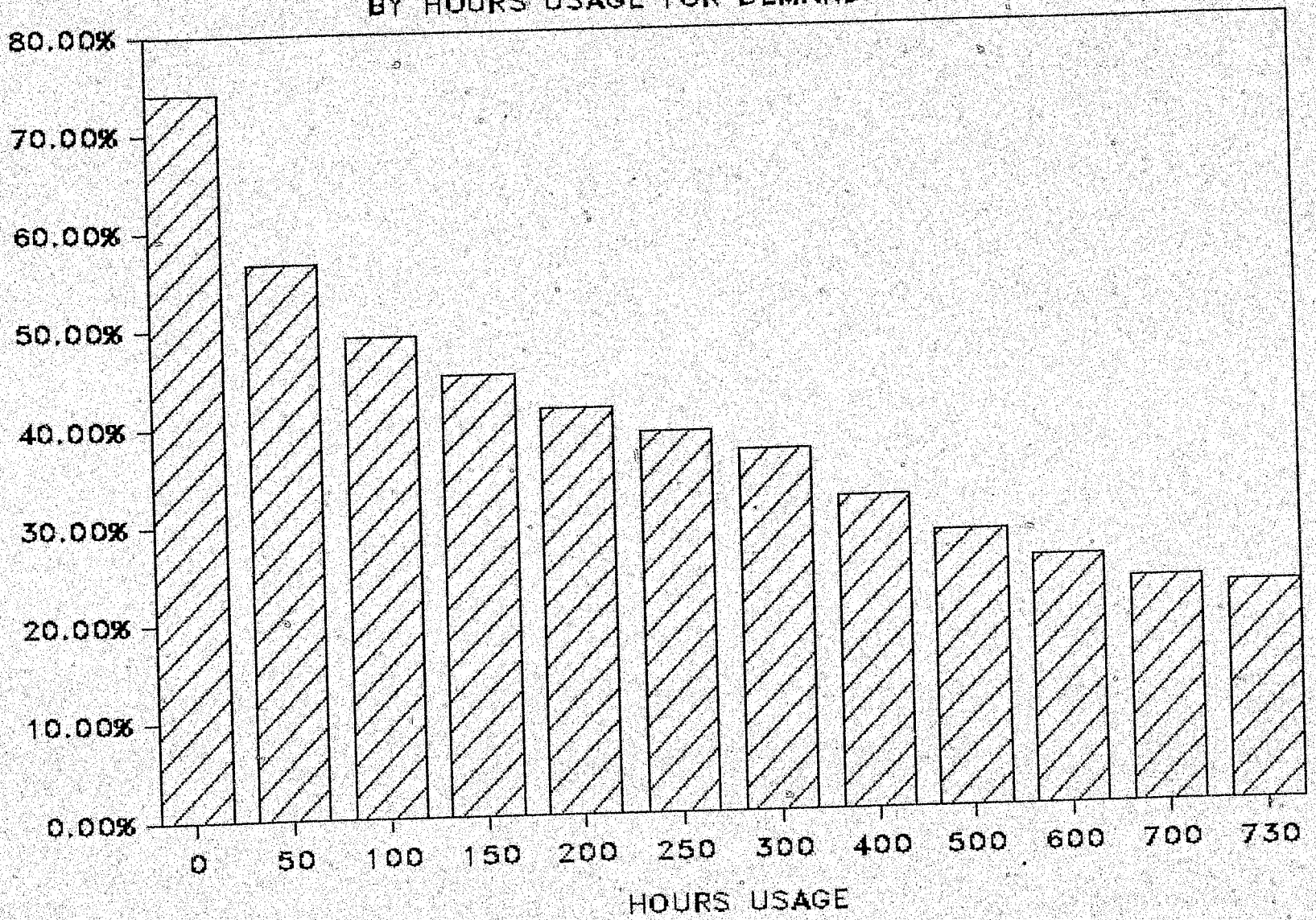


urce: RMW_2, column 4

RMW_3

PERCENTAGE HT RATE INCREASE

BY HOURS USAGE FOR DEMAND = 1300 KW



RMW_4

Source: PECo attachment IV-D-2

BREAKDOWN OF HYPOTHETICAL CUSTOMER USAGE FOR ONE WINTER MONTH
WITH & WITHOUT DEMAND RATCHET

CONSUMPTION DATA		PROPOSED RATE STRUCTURE	
actual demand	1000	customer charge	$264.15
billed demand	1500		
summer peak demand	1875	capacity charge	$9.44
billed KWH	500000	energy charges	
		first 150 hrs	$0.0964
		next 150 hrs	$0.0668
		over 300 hrs	$0.0375

CALCULATION OF BILL

	WITH RATCHET		WITHOUT RATCHET		DIFFERENCE	
customer charge		$264.15		$264.15		$0.00
billed demand	1500	$14,160.00	1000	$9,440.00	500	$4,720.00
energy blocks						
first 150 hrs (150 X 1500 kw)=	225000	$21,690.00	(150 X 1000 kw)= 150000	$14,460.00	(150 X 500 kw)= 75000	$7,230.00
next 150 hrs (150 X 1500 kw)=	225000	$15,030.00	(150 X 1000 kw)= 150000	$10,020.00	(150 X 500 kw)= 75000	$5,010.00
all additional kwh	50000	$1,875.00	200000	$7,500.00	-150000	($5,625.00)
TOTAL		$53,019.15		$41,684.15		$11,335.00

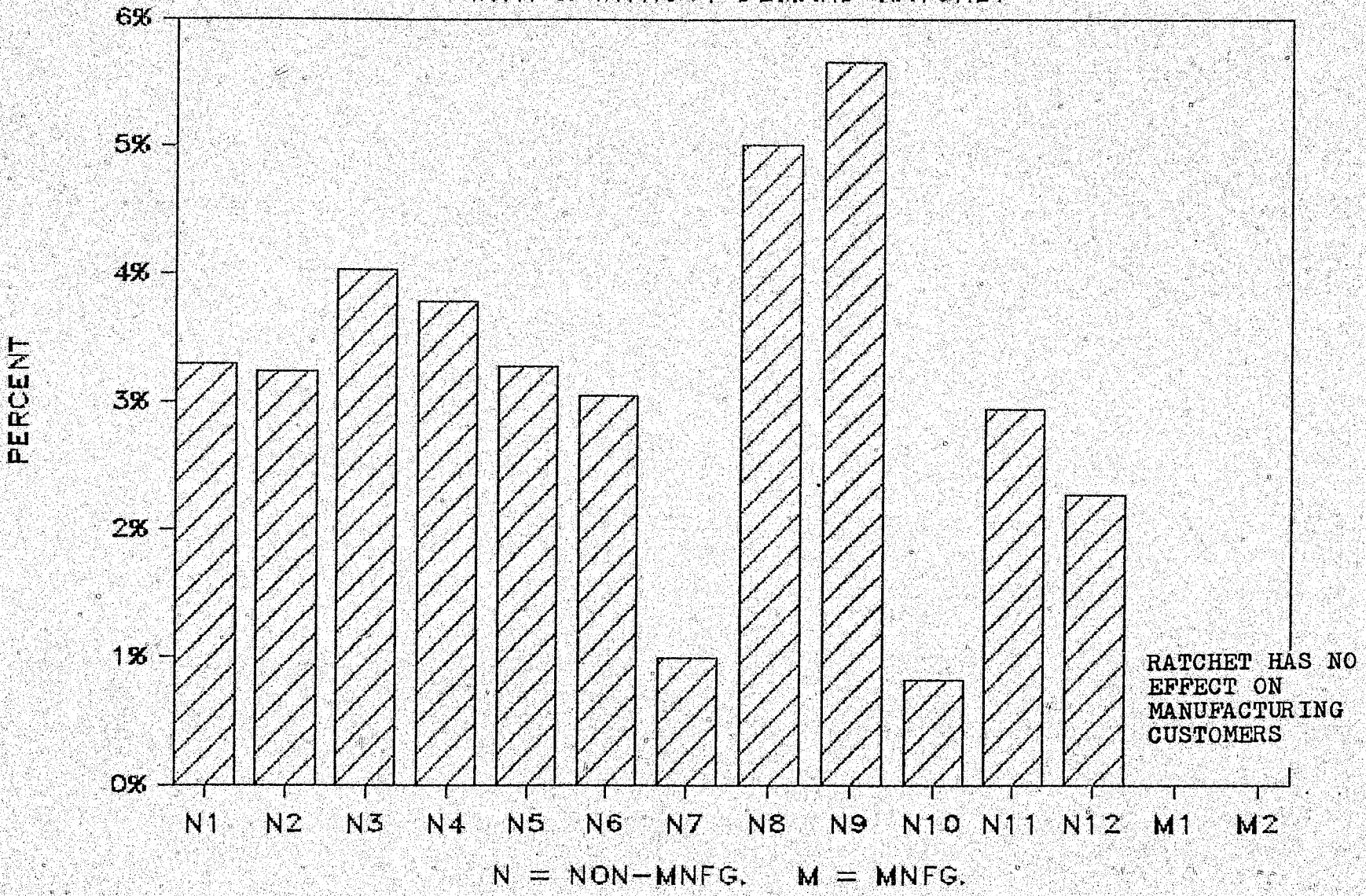
Source: PECo's proposed HT tariff schedule

PROPOSED RATE INCREASE WITH & WITHOUT RATCHET

	PECO new rates	PECO-new rates (no ratchet)	ratchet difference	percent difference due to ratchet
N1	$18,747,700.00	$18,130,820.00	$616,880.00	3.29%
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%

PERCENT DIFFERENCE IN PROPOSED RATES

WITH & WITHOUT DEMAND RATCHET



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

RMM 7

ESTIMATION OF IMPACT OF DEMAND RATCHET ON HT BILLED DEMAND

		actual demand	billed demand	difference	power factor as percent of actual	billed demand non-summer without ratchet	KW due to demand ratchet
January	1984	2185147	2358103			2207836	150267
February	1984	2153133	2333586			2175490	158096
March	1984	2052182	2223512			2073491	150021
April	1984	2147970	2313320			2170273	143047
May	1984	2114722	2230481			2136680	93801
June	1984	2352521	2376106	23585	1.0025%		
July	1984	2417812	2441117	23305	0.9639%		
August	1984	2406065	2433563	27498	1.1429%		
September	1984	2340458	2364895	24437	1.0441%		
October	1984	2280959	2344893			2304643	40250
November	1984	1794655	1942972			1813290	129682
December	1984	2303020	2277066			2326933	-49867

average power factor adjustment in summer	yearly HT demand ratcheted KW
1.0384%	815295

ADJUSTMENT OF 1984 BILLED DEMAND DUE TO RATCHET
TO BILLED DEMAND FOR TEST YEAR

1	Additional billed demand due to ratchet for 1984	815295
2	Ratio of total billed demand for 1984 to test year	99.85%
3	Total billed demand 1984 from IR-UUC/UP-4-1	27639614
4	Total billed demand 1985-86 from PECo attachment IV-10 pp. 1-2	
5	HT seven largest customers	3188205
6	Remaining customers	24494179
7	Total HT	27682384
8	Additional billed demand for test year (815295/.9985)	816557

ESTIMATION OF REVENUE COLLECTED FROM DEMAND RATCHET IN HT CLASS

Maximum impact of demand ratchet assuming no customer with less than 300 hours usage.

				pricing	revenue
1 All KW	816557			$9.44	$7,708,294.31
2 first 150 hrs use	122483490	(.0944-.0668)=		$0.0296	$3,625,511.31
3 next 150 hrs use	122483490	(.0668-.0375)=		$0.0293	$3,588,766.26
4		Maximum revenue collected from ratchet			$14,922,571.88

Impact of demand ratchet assuming load characteristics proportional to sampled UUC members.

				pricing	revenue
5 All KW	40406			$9.44	$381,432.64
6 first 150 hrs use	6060900	(.0944-.0668)=		$0.0296	$179,402.64
7 next 150 hrs use	5250000	(.0668-.0375)=		$0.0293	$153,825.00
8 reduction in 2nd block	810900	Maximum revenue collected from ratchet			$714,660.28

9 Total sampled UUC billed KW due to ratchet	40406
10 Total HT billed KW due to ratchet	816557
11 Ratio of sampled UUC billed KW to total HT billed KW due to ratchet	4.95%
12 Total demand ratchet revenue	$14,442,423.63

13 Changes in HT Blocks

All Changes added to HT exclusive of 7 largest cust.

Block	present KWH	change	kwh after ratchet removal
first	3,654,963,716 kwh	(122,483,490)kwh	3,532,480,226
2nd	3,366,781,298 kwh	(122,483,490)kwh	
		16,381,818 kwh	3,260,679,626
3rd	3,019,493,022	244,966,980 kwh	
		(16,381,818)kwh	3,248,078,184

THE PRICE SIGNAL GIVEN TO VARIOUS PECO RATE CLASSES
For adding 1 kw of additional summer peak demand

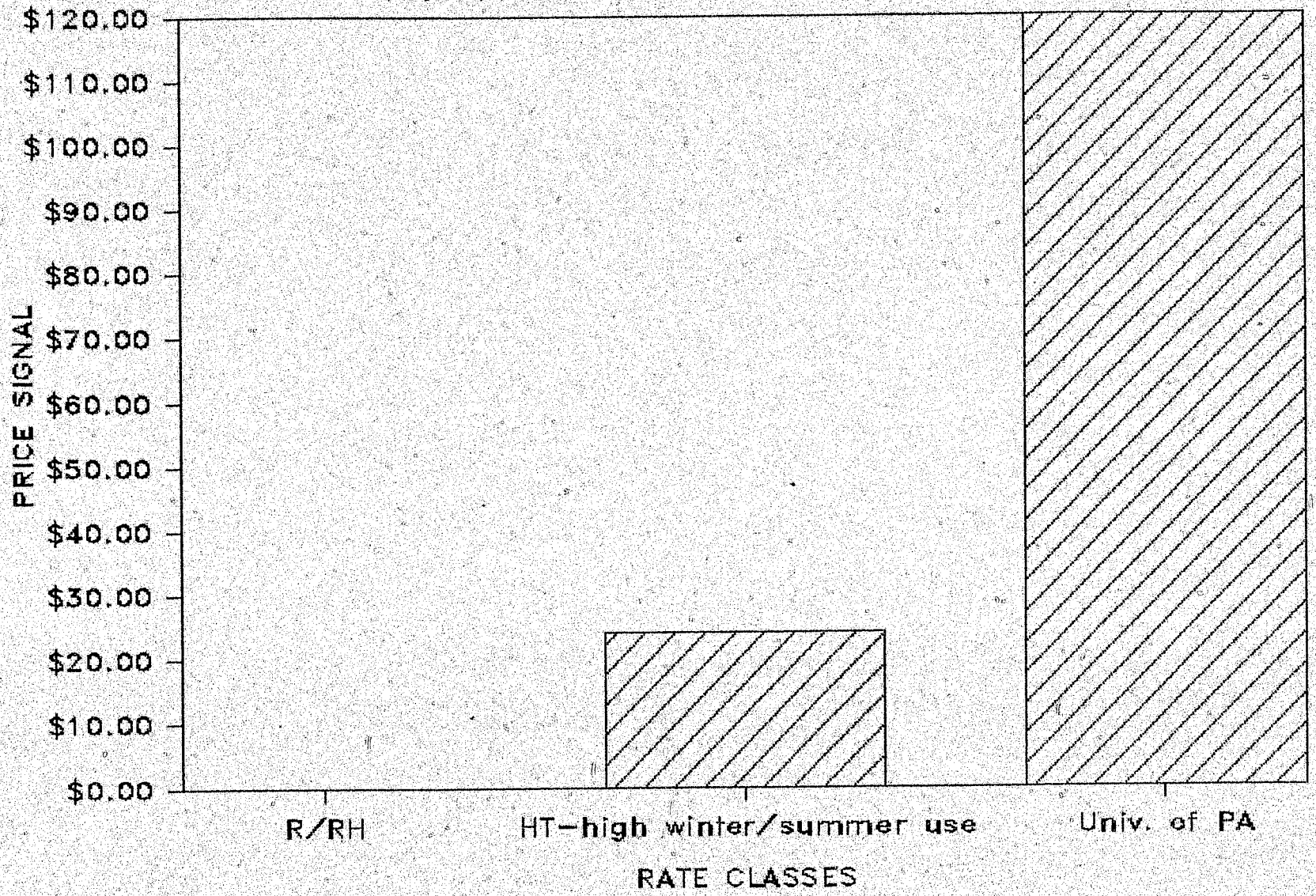
Class	price signal/kw
R, RH	$0.00
HT high winter and summer user	$24.00 (1)
Univ. of PA	$120.00
Cost of adding additional peaking capacity (per kw)	$5.00 (2)

(1) $9.44 demand charge + 150 ($0.0964-0.0375) + 150 ($0.0668-0.0375) multiplied by 1.0586 STAC

(2) From IR-oca-15-5 Cost of maintaining peaking plants

PECO PRICE SIGNAL

FOR ADDITIONAL 1 KW SUMMER PEAK DEMAND



Source: RMW__11

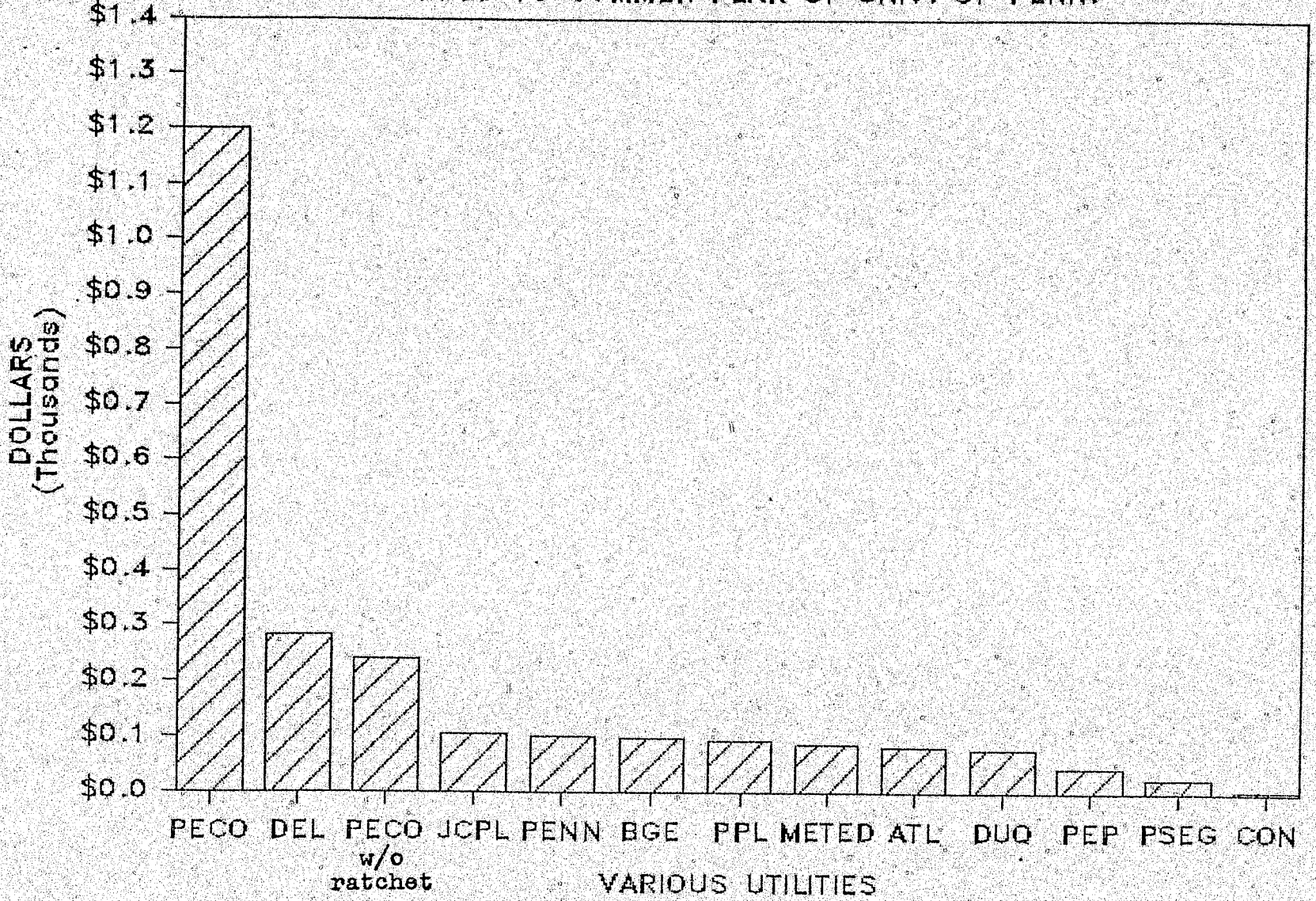
IMPACT OF 10 KW INCREASE IN DEMAND IN PEAK SUMMER MONTH
FOR UNIVERSITY OF PENNSYLVANIA

impact of 10 kw demand increase	utility	without demand increase	with 10 kw demand increase
$1,200	PECO	$18,747,700	$18,748,900
$282	DEL	$11,133,222	$11,133,504
$240	PECO**	$18,130,820	$18,131,060
$103	JCPL	$17,206,368	$17,206,471
$101	PENN	$10,810,643	$10,810,744
$98	BGE	$10,048,478	$10,048,576
$92	PPL	$11,771,491	$11,771,583
$87	METED	$11,016,106	$11,016,193
$82	ATL	$14,013,511	$14,013,593
$76	DUQ	$10,576,070	$10,576,146
$44	PEP	$11,450,754	$11,450,798
$24	PSEG	$12,228,310	$12,228,334
$2	CON	$13,587,501	$13,587,503

**without ratchet

IMPACT OF ADDITIONAL 10 KW DEMAND

ADDED TO SUMMER PEAK OF UNIV. OF PENN.

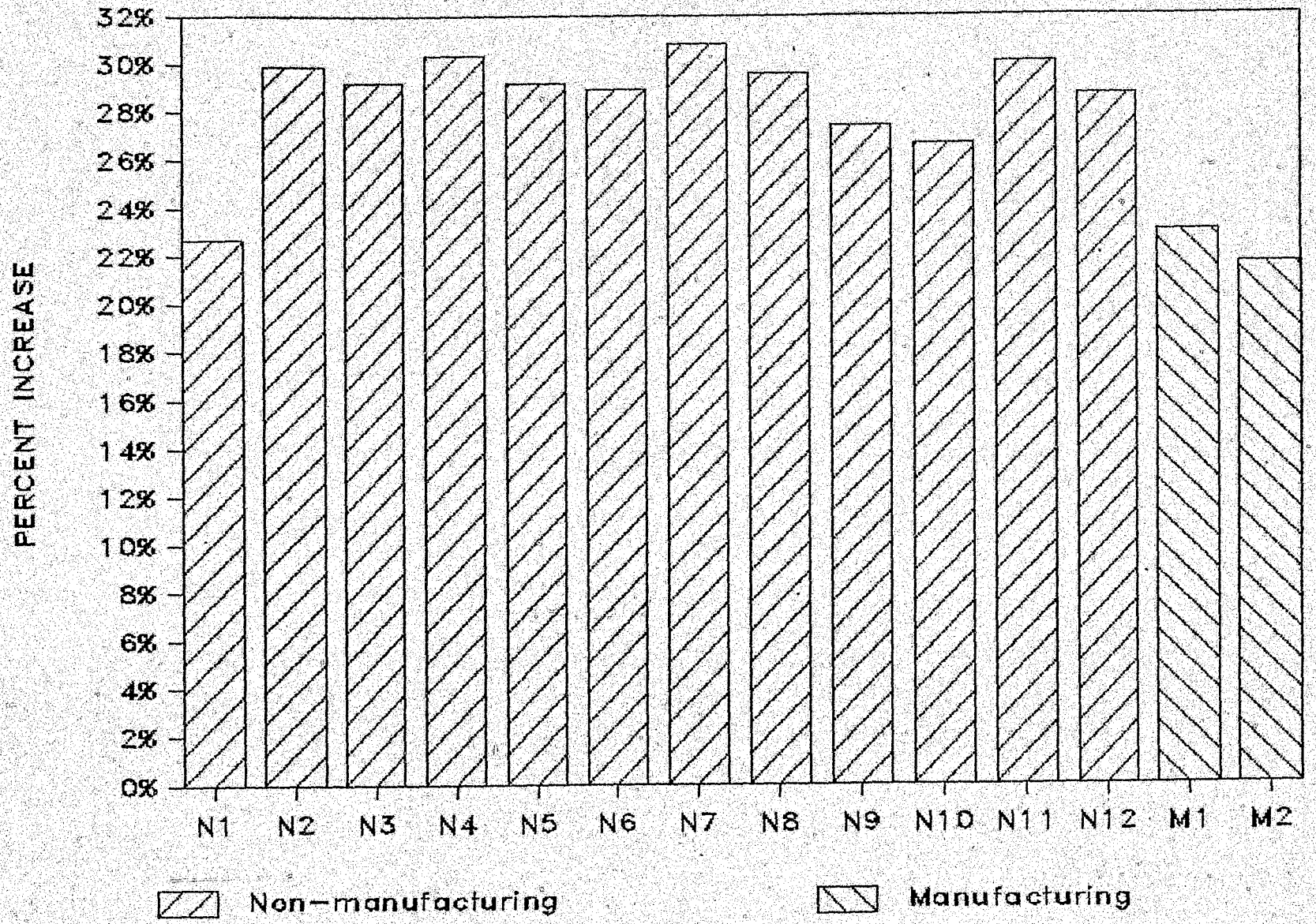


rce: Utility rate schedule analysis & Univ. of PA electric bills.

RMW 14

PERCENT RATE INCREASE W/O RATCHET

FOR NON-MNFG. & MNFG. CUSTOMERS



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

RMW 15

CHANGES IN TOTAL ANNUAL UNIT COST-TO-SERVE RMW_16
IF LIMERICK IS TREATED AS ENERGY RELATED COST
90% allocated to energy
HIGH TENSION CLASS--TWELVE MONTHS ENDED 6/30/86
(in thousand dollars)

1 Revenue Requirement for Limerick and Common- (PECo ST. # 18, Table $858,170 Portion Allowed 100.00%
Portion transfered
2 Percentage of Limerick assigned to HT to energy component 90.00%
(WFS-1, p.29 A1 Allocation) 41.462%

3 Limerick Revenue Requirement HT Class
(line 1 multiplied by line 2) $355,814 TRANSFERRED PORTION $320,233

	Total Class (1)	4 Peak (2)	Class Peak (3)	Energy (4)	Customer (5)
4 Total Annual Revenue Requirement PECo Method (IR-PAIEUG-1-50)	$1,142,725	$772,779	$25,602	$336,975	$7,369
5 Limerick Adjustment (line 3)	$0	($320,233)		$320,233	
6 Total Annual Revenue Requirement UUC Method Before Ratchet Removal	$1,142,725	$452,546	$25,602	$657,208	$7,369
7 Total Demand Ratchet Revenue (RMW_10, line 12)		($14,442)		$14,442	
8 Total Annual Revenue Requirement UUC Method After Ratchet Removal	$1,142,725	$438,104	$25,602	$671,650	$7,369
9 Cost Function Divisor (Ir-PAIEUG 1-50)		2135188	2381938	12947425	2316
10 Minus Billed Demand due to Ratchet (RMW_9, line 8/12months)			68046		
11 Cost Function Divisor without ratchet		2135188	2313892	12947425	2316
12 Total Unit Annual Cost to Serve ($/KW,$/KWH,$/CUST) (line 8 divided by line 12)		205.18287	11.06448	0.05188	3181.78

13 Demand Component For HT Rate
(ln. 8 cols. (2 + 3)/ln. 11, col. 3) 200.40

DERIVATION OF HT RATES USING UUC ADJUSTMENT FOR LIMERICK AS ENERGY COMPONENT RMN_17

RECALCULATED WORKSHEET FOR DERIVING HT RATES

(as calculated in IR-PAIEUG-1-50)

Year 1985-tariff 26, #3, systems return

H.T. CLASS

HOURS F(M) USE	ENERGY CMPNT	DEMAND CMPNT	CUSTOMER COMPONENT 100	500	1300	50000	0	0	TOTAL COST TO SERVE 100	500	1300	50000	0	0
	5.19	200.40			3181.78									
0	0.0	0.00	0.00	2.65	0.53	0.20	0.01	0.0	0.0	2.65	0.53	0.20	0.01	0.0	0.0
50	0.266	2.59	4.44	2.65	0.53	0.20	0.01	0.0	0.0	9.69	7.57	7.24	7.04	0.0	0.0
100	0.432	5.19	7.21	2.65	0.53	0.20	0.01	0.0	0.0	15.05	12.93	12.61	12.41	0.0	0.0
150	0.558	7.78	9.32	2.65	0.53	0.20	0.01	0.0	0.0	19.75	17.63	17.30	17.11	0.0	0.0
200	0.66	10.38	11.02	2.65	0.53	0.20	0.01	0.0	0.0	24.85	21.93	21.60	21.40	0.0	0.0
250	0.73	12.97	12.19	2.65	0.53	0.20	0.01	0.0	0.0	27.81	25.69	25.36	25.17	0.0	0.0
300	0.778	15.56	12.99	2.65	0.53	0.20	0.01	0.0	0.0	31.21	29.09	28.76	28.56	0.0	0.0
400	0.829	20.75	13.84	2.65	0.53	0.20	0.01	0.0	0.0	37.25	35.12	34.80	34.60	0.0	0.0
500	0.854	25.94	14.26	2.65	0.53	0.20	0.01	0.0	0.0	42.85	40.73	40.40	40.20	0.0	0.0
600	0.907	31.13	15.15	2.65	0.53	0.20	0.01	0.0	0.0	48.92	46.80	46.48	46.28	0.0	0.0
700	0.969	36.31	16.18	2.65	0.53	0.20	0.01	0.0	0.0	55.15	53.03	52.70	52.50	0.0	0.0
730	1.000	37.87	16.70	2.65	0.53	0.20	0.01	0.0	0.0	57.22	55.10	54.77	54.57	0.0	0.0

SLOPE OF COST TO SERVE VS. HOURS USE CURVE

HOURS USE	TOTAL COST TO SERVE 100	500	1300	50000	0	0	AVERAGE SLOPE
100-150	.093959	0.093959	0.093959	0.093959	0	0	0.093959
150-300	.076368	0.076368	0.076368	0.076368	0	0	0.076368
300-600	.059056	0.059056	0.059056	0.059056	0	0	0.059056

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS

RMW_18

RATE HT--7 LARGE CUSTOMERS

CALCULATION 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	$22,189
2 ALL KW	3,188,205 KW	5.37	$17,120,661	3,188,205 KW	5.77	$18,395,943
3 FIRST 150 HRS USE	478,230,000 KWH	0.0739	$35,341,197	478,230,000 KWH	0.0940	$44,953,620
4 NEXT 150 HRS USE	448,837,000 KWH	0.0556	$24,955,337	448,837,000 KWH	0.0764	$34,291,147
5 ADDITIONAL USE	1,411,512,000 KWH	0.0376	$53,072,851	1,411,512,000 KWH	0.0591	$83,420,359
6 HIGH VOLTAGE DISCOUNT	2,527,620 KWH	0.3	($758,286)	2,527,620 KWH	0.3	($758,286)
7 BASE REVENUE			$129,750,278			$180,324,971

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS

RATE HT

CALCULATION 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	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)	5.77	$136,619,879
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	$256,409,646
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			$917,959,026
10	UNACCOUNTED FOR			$99,292			$128,789
11	BASE REVENUE			$707,815,856			$918,087,814
	TOTAL RATE HT----------12 MOS. ENDED 6/30/85						
12	PROFORMA BASE REVENUE-EXCL NSR & 7 LARGE CUSTS			$714,950,596			$927,342,083
13	NIGHT SERVICE RIDER			$3,520,126			$3,520,126
14	BASE REVENUE OF 7 LARGE CUSTS			$129,750,278			$180,324,971
15	TOTAL PROFORMA BASE REVENUE			$848,221,000			$1,111,187,180
16	CURTAILMENT RIDER			($113,000)			($113,000)
17	ADJUSTED BASE REVENUE			$848,108,000			$1,111,074,180
	TOTAL RATE HT----------12 MOS. ENDED 6/30/86						
18	BASE REVENUE			$860,983,000			$1,127,905,666
19	CURTAILMENT RIDER			$0			($113,000)
20	ADJUSTED BASE REVENUE			$860,983,000			$1,127,792,666

(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

COMPARISON OF MONTHLY BILLS

RATE: HT USING UUC ADJUSTMENTS DEMAND = 500

HRS USAGE	BASE RATE BILL EXISTING RATE	BASE RATE BILL PROPOSED RATE	BASE RATE BILL $ CHANGE	BASE RATE BILL % CHANGE	TOTAL BILL EXISTING RATE	TOTAL BILL PROPOSED RATE	TOTAL BILL $ CHANGE	TOTAL BILL % CHANGE
0	2905	3149	244	8.4%	3079	3334	255	8.3%
10	3275	3619	344	10.5%	3484	3845	361	10.4%
20	3644	4089	445	12.2%	3889	4356	467	12.0%
30	4014	4559	545	13.6%	4294	4867	573	13.3%
40	4383	5029	646	14.7%	4699	5378	679	14.4%
50	4753	5499	746	15.7%	5104	5889	785	15.4%
60	5122	5969	847	16.5%	5509	6400	891	16.2%
70	5492	6439	947	17.2%	5914	6911	997	16.9%
80	5861	6909	1048	17.9%	6319	7422	1103	17.4%
90	6231	7379	1148	18.4%	6724	7933	1209	18.0%
100	6600	7849	1249	18.9%	7129	8444	1315	18.4%
150	8448	10199	1751	20.7%	9155	10999	1845	20.1%
200	9838	12109	2271	23.1%	10695	13089	2393	22.4%
250	11228	14019	2791	24.9%	12236	15178	2942	24.0%
300	12618	15929	3311	26.2%	13776	17268	3491	25.3%
400	14498	18884	4386	30.3%	15903	20531	4627	29.1%
500	16378	21839	5461	33.3%	18031	23794	5763	32.0%
600	18258	24794	6536	35.8%	20158	27057	6899	34.2%
700	20138	27749	7611	37.8%	22285	30320	8035	36.1%
730	20702	28636	7934	38.3%	22923	31299	8376	36.5%

CHANGES IN TOTAL ANNUAL UNIT COST-TO-SERVE RMW_21
IF LIMERICK IS TREATED AS ENERGY RELATED COST
$35,581,400 allocated to DEMAND, remainder to ENERGY, 50% allowed in rate base energy
HIGH TENSION CLASS--TWELVE MONTHS ENDED 6/30/86
(in thousand dollars)

1 Revenue Requirement for Limerick and Common- (PECo ST. # 18, Table $858,170 Portion Allowed 50.00%

2 Percentage of Limerick assigned to HT (WFS-1, p.29 A1 Allocation) 41.462%

3 Limerick Revenue Requirement HT Class (line 1 multiplied by line 2) $177,907 TRANSFERRED PORTION

	Total Class (1)	4 Peak (2)	Class Peak (3)	Energy (4)	Customer (5)
4 Total Annual Revenue Requirement PECo Method (IR-PAIEUG-1-50)	$1,142,725	$772,779	$25,602	$336,975	$7,369
5 Limerick Adjustment (line 3)	($177,907)	($320,233)		$142,326	
6 Total Annual Revenue Requirement UUC Method Before Ratchet Removal	$964,818	$452,546	$25,602	$479,301	$7,369
7 Total Demand Ratchet Revenue (RMW_10, line 12)		($14,442)		$14,442	
8 Total Annual Revenue Requirement UUC Method After Ratchet Removal	$964,818	$438,104	$25,602	$493,743	$7,369
9 Cost Function Divisor (Ir-PAIEUG 1-50)		2135188	2381938	12947425	2316
10 Minus Billed Demand due to Ratchet (RMW_9, line 8/12months)			68046		
11 Cost Function Divisor without ratchet		2135188	2313892	12947425	2316
12 Total Unit Annual Cost to Serve ($/KW,$/KWH,$/CUST) (line 8 divided by line 12)		205.18287	11.06448	0.03813	3181.78
13 Demand Component For HT Rate (ln. 8 cols. (2 + 3)/ln. 11, col. 3)	200.40				

DERIVATION OF HT RATES USING UUC ADJUSTMENT FOR LIMERICK AS ENERGY COMPONENT

RMW_22

RECALCULATED WORKSHEET FOR DERIVING HT RATES
(as calculated in IR-PAIEUG-1-50)
Only 50% of Limerick allowed in rate base

Year 1985-tariff 26, #3, systems return
H.T. CLASS

HOURS USE	F(M)	ENERGY CMPNT	DEMAND CMPNT	CUSTOMER COMPONENT 100	500	1300	50000	0	0	TOTAL COST TO SERVE 100	500	1300	50000	0	0
		3.81	200.40			3181.78									
0	0.0	0.00	0.00	2.65	0.53	0.20	0.01	0.0	0.0	2.65	0.53	0.20	0.01	0.0	0.0
50	0.266	1.91	4.44	2.65	0.53	0.20	0.01	0.0	0.0	9.00	6.88	6.55	6.35	0.0	0.0
100	0.432	3.81	7.21	2.65	0.53	0.20	0.01	0.0	0.0	13.68	11.56	11.23	11.03	0.0	0.0
150	0.558	5.72	9.32	2.65	0.53	0.20	0.01	0.0	0.0	17.69	15.57	15.24	15.04	0.0	0.0
200	0.66	7.63	11.02	2.65	0.53	0.20	0.01	0.0	0.0	21.30	19.18	18.85	18.65	0.0	0.0
250	0.73	9.53	12.19	2.65	0.53	0.20	0.01	0.0	0.0	24.38	22.25	21.93	21.73	0.0	0.0
300	0.778	11.44	12.99	2.65	0.53	0.20	0.01	0.0	0.0	27.08	24.96	24.64	24.44	0.0	0.0
400	0.829	15.25	13.84	2.65	0.53	0.20	0.01	0.0	0.0	31.75	29.63	29.30	29.10	0.0	0.0
500	0.854	19.07	14.26	2.65	0.53	0.20	0.01	0.0	0.0	35.98	33.86	33.53	33.33	0.0	0.0
600	0.907	22.88	15.15	2.65	0.53	0.20	0.01	0.0	0.0	40.68	38.56	38.23	38.03	0.0	0.0
700	0.969	26.69	16.18	2.65	0.53	0.20	0.01	0.0	0.0	45.53	43.41	43.08	42.88	0.0	0.0
730	1.000	27.84	16.70	2.65	0.53	0.20	0.01	0.0	0.0	47.19	45.07	44.74	44.54	0.0	0.0

SLOPE OF COST TO SERVE VS. HOURS USE CURVE

HOURS USE	TOTAL COST TO SERVE 100	500	1300	50000	0	AVERAGE 0 SLOPE
100-150.	0.080218	0.080218	0.080218	0.080218	0	0 0.080218
150-300.	0.062627	0.062627	0.062627	0.062627	0	0 0.062627
300-600.	0.045315	0.045315	0.045315	0.045315	0	0 0.045315

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS

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	$22,189
2 ALL KW	3,188,205 KW	5.37	$17,120,661	3,188,205 KW	*	$0
3 FIRST 150 HRS USE	478,230,000 KWH	0.0739	$35,341,197	478,230,000 KWH	0.0802	$38,354,046
4 NEXT 150 HRS USE	448,837,000 KWH	0.0556	$24,955,337	448,837,000 KWH	0.0626	$28,097,196
5 ADDITIONAL USE	1,411,512,000 KWH	0.0376	$53,072,851	1,411,512,000 KWH	0.0453	$63,941,494
6 HIGH VOLTAGE DISCOUNT	2,527,620 KWH	0.3	($758,286)	2,527,620 KWH	0.3	($758,286)
7 BASE REVENUE			$129,750,278			$129,656,638

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

	SUPPLEMENT NO. 11			UUC SUPPLEMENT		
12 MONTHS SAMPLE	BILLS, KW AND KWH FROM SAMPLE	PRICING	REVENUE	BILLS, KW AND KWH FROM SAMPLE	PRICING	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			$707,716,564			$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			$129,656,638
15 TOTAL PROFORMA BASE REVENUE			$848,221,000			$905,463,980
16 CURTAILMENT RIDER			($113,000)			($113,000)
17 ADJUSTED BASE REVENUE			$848,108,000			$905,350,980
TOTAL RATE HT----------12 MOS. ENDED 6/30/86						
18 BASE REVENUE			$860,983,000			$919,087,235
19 CURTAILMENT RIDER			$0			($113,000)
20 ADJUSTED BASE REVENUE			$860,983,000			$918,974,235

(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

COMPARISON OF MONTHLY BILLS

RATE: HT USING UUC ADJUSTMENTS DEMAND = 500
Only 50% of Limerick allowed in rate base

HRS USAGE	BASE RATE BILL EXISTING RATE	BASE RATE BILL PROPOSED RATE	BASE RATE BILL $ CHANGE	BASE RATE BILL % CHANGE	TOTAL BILL EXISTING RATE	TOTAL BILL PROPOSED RATE	TOTAL BILL $ CHANGE	TOTAL BILL % CHANGE
0	2905	2834	-71	-2.5%	3079	3000	-79	-2.6%
10	3275	3235	-40	-1.2%	3484	3438	-46	-1.3%
20	3644	3636	-8	-0.2%	3889	3876	-13	-0.3%
30	4014	4037	23	0.6%	4294	4314	20	0.5%
40	4383	4438	55	1.2%	4699	4752	53	1.1%
50	4753	4839	86	1.8%	5104	5190	86	1.7%
60	5122	5240	118	2.3%	5509	5628	119	2.2%
70	5492	5641	149	2.7%	5914	6066	152	2.6%
80	5861	6042	181	3.1%	6319	6504	185	2.9%
90	6231	6443	212	3.4%	6724	6942	218	3.2%
100	6600	6844	244	3.7%	7129	7380	251	3.5%
150	8448	8849	401	4.7%	9155	9570	415	4.5%
200	9838	10414	576	5.9%	10695	11294	599	5.6%
250	11228	11979	751	6.7%	12236	13019	783	6.4%
300	12618	13544	926	7.3%	13776	14743	967	7.0%
400	14498	15809	1311	9.0%	15903	17276	1372	8.6%
500	16378	18074	1696	10.4%	18031	19808	1778	9.9%
600	18258	20339	2081	11.4%	20158	22341	2183	10.8%
700	20138	22604	2466	12.2%	22285	24874	2589	11.6%
730	20702	23284	2582	12.5%	22923	25634	2710	11.8%

	jan	feb	march	april	may	june	july	aug	sept	oct	nov	dec
ill days	30	30	30	30	30	30	30	30	30	30	30	30
illed kwh	14760200	14090600	15617900	15495800	16730800	19324700	20749900	20451800	19257700	19474600	17030400	15319200
ctual demand	25776	25992	26064	28944	33696	33912	36720	36504	40176	37584	33768	28224
illed demand	32141	32141	32141	32141	33696	33912	36720	36504	40176	37584	33768	32141
ower factor	95	95	95	95	95	95	95	95	95	95	95	95
n-peak kwh	5203404	5637456	5247612	6023988	6584868	6770268	7416174	8148823	7224277	7133414	6508044	5742432
ff-peak kwh	9556796	8453144	10370288	9471812	10145932	12554432	13333726	12302977	12033423	12341186	10522356	9576768
oltage	13200											
revious demand	26568	25200	25992	26712	29592	35208	34992	35856	36792	37584	34488	27360

2

	jan	feb	march	april	may	june	july	aug	sept	oct	nov	dec
ill days	30	30	30	30	30	30	30	30	30	30	30	30
illed kwh	1115000	1203000	1184000	1378000	1594000	1522000	1641000	1637000	1859000	1505000	1411000	1434000
ctual demand	2951	3002	4242	4533	4547	4670	5233	5106	5090	4759	4453	3959
illed demand	4347	4347	4347	4533	4547	4670	5233	5106	5090	4759	4453	4347
ower factor	95	95	95	95	95	95	95	95	95	95	95	95
n-peak kwh	590471	556153	641377	702571	824903	875598	953238	933920	971870	799383	710089	694988
ff-peak kwh	524259	646847	542623	675429	769097	646402	687762	703060	887130	705697	700191	739012
oltage	13200											
revious demand	3023	3052	3832	4336	4739	5222	5198	5102	4900	4643	4444	4339

3

	jan	feb	march	april	may	june	july	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	30	30
lled kwh	254600	235000	217100	250500	295000	295700	315700	351700	318700	240400	278300	256500
tual demand	615	574	594	844	967	908	1004	1040	1053	857	834	626
lled demand	774	774	774	844	967	908	1004	1040	1053	857	834	774
wer factor	90	90	90	90	90	90	90	90	90	90	90	90
-peak kwh	117879.8	104575	104859.3	125751	156940	154355.4	177739.1	185697.6	159350	114199	133027.4	120555
f-peak kwh	136720.2	130425	112240.7	124749	138060	141344.6	137960.9	166002.4	159350	126210	145272.6	135945
ltage	13200											
evious demand	624	603	522	740	996	967	912	927	879	867	800	632

	jan	feb	march	april	may*	june	july	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	30	30
lled kwh	196100	184300	150300	157100	186800	182500	220700	205900	204200	139500	151700	154300
tual demand	648	504	441	576	606	603	657	648	666	486	477	459
lled demand	648	605	605	605	606	603	657	648	666	526	526	605
wer factor	90	90	90	90	90	90	90	90	90	90	90	90
-peak kwh	90794.3	82013.5	72594.9	78864.2	99377.6	95265	124254.1	108715.2	102100	66262.5	72512.6	72521
f-peak kwh	105305.7	102286.5	77705.1	78235.8	87422.4	87235	96445.9	97184.8	102100	73237.5	79187.4	81779
ltage	13200											
evious demand	567	504	477	432	594	756	720	693	621	567	450	585

	jan	feb	march*	april*	may	june	july	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	30	30
lled kwh	188800	175700	177100	177100	199900	223700	240100	242900	232600	179600	184100	191100
tual demand	549	468	500	500	612	639	666	693	684	585	495	441
lled demand	552	552	552	552	612	639	666	693	684	611	552	552
wer factor	90	90	90	90	90	90	90	90	90	90	90	90
-peak kwh	87414.4	78186.5	85539.3	88904.2	106346.8	116771.4	135176.3	128251.2	116300	85310	87999.8	89817
f-peak kwh	101385.6	97513.5	91560.7	88195.8	93553.2	106928.6	104923.7	114648.8	116300	94290	96100.2	101283
ltage	13200											
evious demand	459	441	500	500	612	675	639	648	610	548	513	504

	jan	feb	march*	april	may	june	july	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	30	30
lled kwh	264900	278500	280200	288100	328300	331400	361200	360900	352700	295900	286400	264900
tual demand	711	684	765	846	918	936	981	972	981	891	738	711
lled demand	838	838	838	846	918	936	981	972	981	891	785	838
wer factor	90	90	90	90	90	90	90	90	90	90	90	90
-peak kwh	122648.7	123932.5	135336.6	144626.2	174655.6	172990.8	203355.6	190555.2	176350	140552.5	136899.2	124583
f-peak kwh	142251.3	154567.5	144863.4	143473.8	153644.4	158409.2	157844.4	170344.8	176350	155347.5	149500.8	140397
ltage	13200											
evious demand	675	621	644	666	918	972	999	1008	900	855	693	675

	jan	feb	march	april	may	june	july	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	30	30
lled kwh	1770000	1814000	2078000	1431000	1309000	1655000	1707000	1687000	1651000	1344000	1415000	1857000
tual demand	4056	3957	4674	4641	4530	4713	4875	4890	4893	4356	4023	4152
lled demand	4351	4357	4674	4641	4530	4713	4875	4890	4893	4356	4023	4351
wer factor	95	95	95	95	95	95	95	95	95	95	95	95
-peak kwh	818147	792189	846473	783849	829496	847403	932727	897488	873120	716966	692571	817656
f-peak kwh	951853	1021811	1231527	647151	479504	807597	774273	789512	777880	627034	722429	1039344
ltage	13200											
evious demand	4071	4122	4242	4287	5217	5250	5439	5187	5277	4872	4467	3699

	jan	feb	march	april	may	june	july	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	30	30
lled kwh	280000	265000	259000	292000	317000	363000	407000	437000	401000	364000	263000	269000
tual demand	751	756	800	907	1195	1212	1432	1418	1444	1171	986	823
lled demand	1023	1023	1023	1023	1195	1212	1432	1418	1444	1171	1156	1156
wer factor	90	90	90	90	90	90	90	90	90	90	90	90
-peak kwh	129640	117925	125097	146584	168644	189486	229141	230736	200500	172900	125714	126430
f-peak kwh	150360	147075	133903	145416	148356	173514	177859	206264	200500	191100	137286	142570
ltage	13200											
evious demand	696	669	646	624	784	1279	1231	1252	1252	1228	1008	700

	jan	feb	march*	april	may	june	july	aug	sept	oct	nov*	dec
ll days	30	30	30	30	31	29	30	30	30	30	30	30
lled kwh	542000	524000	506000	525000	608000	578000	735000	749000	699000	637000	561000	485000
tual demand	1346	1403	1401	1399	2198	2193	2308	2263	2248	2039	1701	1363
lled demand	1804	1804	1804	1804	2198	2193	2308	2263	2248	2039	1846	1804
wer factor	95	95	95	95	95	95	95	95	95	95	95	95
-peak kwh	250946	233180	244398	263550	404591	372714	440963	459331	431231	383185	268158	227950
f-peak kwh	291054	290820	261602	261450	203409	205286	294037	289669	267769	253815	292842	257050
ltage	13200											
evious demand	1408	1391	1414	1420	2106	2255	2152	2121	2107	2099	1763	1427

0

	jan	feb	march	april	may	june	july*	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	30	30
lled kwh	1766000	1983000	1897000	2101000	2397000	2278000	2511000	2385000	2690000	2220000	1915000	2003000
tual demand	3774	3633	4242	4677	4842	4938	5113	5289	5232	4599	4080	3663
lled demand	3968	3968	4242	4677	4842	4938	5113	5289	5232	4599	4080	3968
wer factor	95	95	95	95	95	95	95	95	95	95	95	95
-peak kwh	751589	724842	797295	871508	942971	971796	1079730	1015589	1066374	885596	770061	795779
f-peak kwh	1014411	1258158	1099705	1229492	1454029	1306204	1431270	1369411	1623626	1334404	1144939	1207221
ltage	13200											
evious demand	3480	3387	3423	3897	4566	4833	4884	4908	4716	4677	3360	3339

1

	jan	feb	march	april	may	june	july	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	29	32
lled kwh	1645000	1316000	1376000	1534000	1534000	1593000	1770000	1625000	1492000	1342000	1356000	1382000
tual demand	3684	3684	3576	4740	4776	5232	5244	5136	4500	4400	4776	3588
lled demand	4282	4282	4282	4740	4776	5232	5244	5136	4500	4400	4776	4282
wer factor	95	95	95	95	95	95	95	95	95	95	95	95
-peak kwh	727986	700542	737460	843354	895704	920646	993162	949050	825090	662736	747000	684300
f-peak kwh	917014	615458	638540	690646	638296	672354	776838	675950	666910	679264	609000	697700
ltage	13200											
evious demand	3458	3504	3552	3444	4416	5352	5196	5160	4740	4764	3492	3492

2

	jan	feb	march	april	may	june	july	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	30	30
lled kwh	1128700	1009200	997900	1110300	1161500	1130100	1406300	1321400	1258400	1100600	923700	937500
tual demand	2314	2333	2504	3299	3155	3310	3461	3404	3423	2935	2697	2137
lled demand	2649	2649	2649	3299	3155	3310	3461	3404	3423	2935	2769	2649
wer factor	95	95	95	95	95	95	95	95	95	95	95	95
-peak kwh	515891	431429	507943	542663	617760	585126	705061	718777	588394	556674	431088	421789
f-peak kwh	612809	577771	489957	567637	543750	544974	701239	602623	670006	543926	492612	515711
ltage	13200											
evious demand	2198	2127	2187	2551	2551	3310	3265	2952	3136	2783	2508	2227

	jan	feb	march	april	may	june	july	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	30	30
lled kwh	3240000	3240000	3240000	3240000	3240000	3240000	3240000	3240000	3240000	3240000	3240000	3240000
tual demand	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
lled demand	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
wer factor	95	95	95	95	95	95	95	95	95	95	95	95
-peak kwh	1080000	1080000	1080000	1080000	1080000	1080000	1080000	1080000	1080000	1080000	1080000	1080000
f-peak kwh	2160000	2160000	2160000	2160000	2160000	2160000	2160000	2160000	2160000	2160000	2160000	2160000
ltage	13200											
evious demand	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000

	jan	feb	march	april	may	june	july	aug	sept	oct	nov	dec
ll days	30	30	30	30	30	30	30	30	30	30	30	30
lled kwh	28400000	28400000	28400000	28400000	28400000	28400000	28400000	28400000	28400000	28400000	28400000	28400000
tual demand	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000
lled demand	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000
wer factor	95	95	95	95	95	95	95	95	95	95	95	95
-peak kwh	9457200	9457200	9457200	9457200	9457200	9457200	9457200	9457200	9457200	9457200	9457200	9457200
f-peak kwh	18942800	18942800	18942800	18942800	18942800	18942800	18942800	18942800	18942800	18942800	18942800	18942800
ltage	13200											
evious demand	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000

TOTAL ANNUAL ELECTRIC BILL RMW__WORKSHEET

	BALTIMORE GAS & ELECTRIC	METROPOLITAN EDISON	DELMARVA POWER & LIGHT	PUBLIC SERVICE ELECTRIC & GAS	JERSEY CENTRAL POWER & LIGHT	POTOMAC ELECTRIC POWER CO.	ATLANTIC ELECTRIC
N1	$10,048,478.00	$11,016,106.00	$11,133,222.00	$12,228,310.00	$17,206,368.00	$11,450,754.00	$14,013,511.00
N2	$1,095,037.00	$1,195,441.00	$1,277,008.00	$1,143,043.00	$1,681,626.00	$1,171,652.00	$1,405,951.00
N3	$242,863.10	$227,151.70	$243,396.10	$217,829.30	$317,981.90	$281,375.10	$276,636.60
N4	$159,298.80	$150,856.00	$161,788.30	$142,896.80	$209,031.20	$142,322.00	$186,733.40
N5	$173,704.70	$162,653.90	$171,151.00	$159,203.00	$228,284.10	$170,499.30	$196,767.40
N6	$227,333.20	$244,596.60	$256,484.80	$240,423.50	$345,402.30	$303,111.10	$291,799.20
N7	$1,171,449.00	$1,291,104.00	$1,344,534.00	$1,261,458.00	$1,832,848.00	$1,217,652.00	$1,519,253.00
N8	$300,049.00	$279,113.20	$310,854.80	$259,691.70	$387,744.00	$332,967.70	$347,459.60
N9	$533,301.20	$495,868.30	$541,772.50	$476,092.00	$695,785.30	$535,570.80	$593,377.30
N10	$1,417,079.00	$1,527,912.00	$1,540,720.00	$1,574,193.00	$2,228,110.00	$1,607,615.00	$1,832,205.00
N11	$1,115,676.00	$1,224,075.00	$1,297,767.00	$1,177,302.00	$1,723,950.00	$1,194,448.00	$1,437,754.00
N12	$799,357.30	$864,122.80	$902,366.30	$857,736.00	$1,235,884.00	$901,762.10	$1,012,611.00
TOTAL NON-MANUFACTURING	$17,283,626.30	$18,681,000.40	$19,181,064.80	$19,738,178.30	$28,093,014.80	$19,309,729.10	$23,114,058.50
M1	$1,891,579.00	$2,052,453.00	$1,939,491.00	$2,220,415.00	$3,067,329.00	$2,250,170.00	$2,541,859.00
M2	$16,208,492.00	$17,545,050.00	$16,468,438.00	$19,321,766.00	$26,429,014.00	$18,835,468.00	$21,625,803.00
TOTAL MANUFACTURING	$18,100,071.00	$19,597,503.00	$18,407,929.00	$21,542,181.00	$29,496,343.00	$21,085,638.00	$24,167,662.00
RATIO NON-MNFG./MNFG.	0.9549	0.9532	1.0420	0.9163	0.9524	0.9158	0.9564
TOTAL NON-MANUFACTURING W/O UNIVERSITY OF PENNSYLVANIA (N1)	7235148.3	7664894.4	8047842.8	7509868.3	10886846.8	7858975.1	9100547.5
RATIO NON-MNFG./MNFG. W/O UNIVERSITY OF PENNSYLVANIA (N1)	0.9509	0.9532	1.0419	0.9163	0.9524	0.9158	0.9564

AVERAGE NON-MNFG. BILL FOR OTHER UTILITIES	$20,238,621.55	W/O UNIVERSITY $8,213,126.25
PERCENT THAT PECO IS HIGHER	160.77%	167.91%

PENNSYLVANIA ELECTRIC	DUQUESNE LIGHT	PENNSYLVANIA POWER & LIGHT	PECO new rates	PECO-new rates (no ratchet)	PECO old rates	ratchet difference	rate increase
$10,810,643.00	$10,576,070.00	$11,771,491.00	$18,747,700.00	$18,130,820.00	$14,780,743.00	$616,880.00	$3,966,957.00
$1,198,995.00	$1,321,918.00	$1,230,077.00	$2,212,831.00	$2,141,140.00	$1,648,049.00	$71,691.00	$564,782.00
$228,164.10	$241,995.70	$237,194.10	$420,865.50	$403,885.80	$312,476.00	$16,979.70	$108,389.50
$152,117.10	$163,718.20	$157,966.40	$281,610.30	$270,954.60	$207,837.20	$10,655.70	$73,773.10
$162,847.80	$174,988.80	$171,424.90	$295,453.90	$285,781.80	$221,265.60	$9,672.10	$74,188.30
$244,343.60	$258,930.60	$256,922.90	$440,767.10	$427,335.70	$331,395.70	$13,431.40	$109,371.40
$1,288,677.00	$1,333,901.00	$1,340,080.00	$2,293,373.00	$2,270,632.00	$1,735,916.00	$22,741.00	$557,457.00
$281,973.00	$296,905.00	$288,778.60	$529,924.60	$503,355.60	$388,456.70	$26,569.00	$141,467.90
$497,405.30	$515,510.00	$509,309.80	$939,146.30	$885,936.80	$695,575.50	$53,209.50	$243,570.80
$1,506,105.00	$1,652,963.00	$1,624,471.00	$2,581,688.00	$2,560,472.00	$2,021,904.00	$21,216.00	$559,784.00
$1,226,262.00	$1,341,731.00	$1,257,892.00	$2,250,113.00	$2,184,075.00	$1,679,617.00	$66,038.00	$570,496.00
$862,189.40	$896,381.40	$905,200.60	$1,544,731.00	$1,509,626.00	$1,173,390.00	$35,105.00	$371,341.00
$18,459,722.30	$18,775,012.70	$19,750,808.30	$32,538,203.70	$31,574,015.30	$25,196,625.70	$964,188.40	$7,341,578.00
$1,998,168.00	$2,131,976.00	$2,213,828.00	$3,265,059.00	$3,265,059.00	$2,655,096.00	$0.00	$609,963.00
$17,001,109.00	$16,990,782.00	$18,912,691.00	$27,423,062.00	$27,423,062.00	$22,552,086.00	$0.00	$4,870,976.00
$18,999,277.00	$19,122,758.00	$21,126,519.00	$30,688,121.00	$30,688,121.00	$25,207,182.00	$0.00	$5,480,939.00
0.9716	0.9818	0.9349	1.0603	1.0289	0.9996		
7649879.3	8198942.7	7979317.3	13790503.7	13443195.3			
0.9716	0.9818	0.9349	1.0602	1.0287			

PERCENT DIFFERENCE FROM
NEW PECO RATE

RMW__WORKSHEET

	BGE	METED	DEL	PSEG	JCPL	PEPCO	ATL	PENN	DUQ	PPL	PECO-old
N1	-46.40%	-41.24%	-40.62%	-34.77%	-8.22%	-38.92%	-25.25%	-42.34%	-43.59%	-37.21%	-21.16%
N2	-50.51%	-45.98%	-42.29%	-48.34%	-24.01%	-47.05%	-36.46%	-45.82%	-40.26%	-44.41%	-25.52%
N3	-42.29%	-46.03%	-42.17%	-48.24%	-24.45%	-33.14%	-34.27%	-45.79%	-42.50%	-43.64%	-25.75%
N4	-43.43%	-46.43%	-42.55%	-49.26%	-25.77%	-49.46%	-33.69%	-45.98%	-41.86%	-43.91%	-26.20%
N5	-41.21%	-44.95%	-42.07%	-46.12%	-22.73%	-42.29%	-33.40%	-44.88%	-40.77%	-41.98%	-25.11%
N6	-48.42%	-44.51%	-41.81%	-45.45%	-21.64%	-31.23%	-33.80%	-44.56%	-41.25%	-41.71%	-24.81%
N7	-48.92%	-43.70%	-41.37%	-45.00%	-20.08%	-46.91%	-33.75%	-43.81%	-41.84%	-41.57%	-24.31%
N8	-43.38%	-47.33%	-41.34%	-50.99%	-26.83%	-37.17%	-34.43%	-46.79%	-43.97%	-45.51%	-26.70%
N9	-43.21%	-47.20%	-42.31%	-49.31%	-25.91%	-42.97%	-36.82%	-47.04%	-45.11%	-45.77%	-25.94%
N10	-45.11%	-40.82%	-40.32%	-39.02%	-13.70%	-37.73%	-29.03%	-41.66%	-35.97%	-37.88%	-21.68%
N11	-50.42%	-45.60%	-42.32%	-47.68%	-23.38%	-46.92%	-36.10%	-45.50%	-40.32%	-44.10%	-25.35%
N12	-48.25%	-43.93%	-41.58%	-44.47%	-19.99%	-41.62%	-34.45%	-44.19%	-41.97%	-41.40%	-24.04%
TOTAL NON-MANUFACTURING	-46.88%	-42.59%	-41.05%	-39.34%	-13.66%	-40.66%	-28.96%	-43.27%	-42.30%	-39.30%	-22.56%
M1	-42.07%	-37.14%	-40.60%	-31.99%	-6.06%	-31.08%	-22.15%	-38.80%	-34.70%	-32.20%	-18.68%
M2	-40.89%	-36.02%	-39.95%	-29.54%	-3.62%	-31.32%	-21.14%	-38.00%	-38.04%	-31.03%	-17.76%
TOTAL MANUFACTURING	-41.02%	-36.14%	-40.02%	-29.80%	-3.88%	-31.29%	-21.25%	-38.09%	-37.69%	-31.16%	-17.86%

PERCENT DIFFERENCE FROM OLD PECO RATE

RMW__WORKSHEET

	BGE	METED	DEL	PSEG	JCPL	PEPCO	ATL	PENN	DUQ	PPL	PECO-new	PECO-new no ratchet	rate increase due to ratchet
N1	-32.02%	-25.47%	-24.68%	-17.27%	16.41%	-22.53%	-5.19%	-26.86%	-28.45%	-20.36%	26.84%	22.67%	3.29%
N2	-33.56%	-27.46%	-22.51%	-30.64%	2.04%	-28.91%	-14.69%	-27.25%	-19.79%	-25.36%	34.27%	29.92%	3.24%
N3	-22.28%	-27.31%	-22.11%	-30.29%	1.76%	-9.95%	-11.47%	-26.98%	-22.56%	-24.09%	34.69%	29.25%	4.03%
N4	-23.35%	-27.42%	-22.16%	-31.25%	0.57%	-31.52%	-10.15%	-26.81%	-21.23%	-24.00%	35.50%	30.37%	3.78%
N5	-21.49%	-26.49%	-22.65%	-28.05%	3.17%	-22.94%	-11.07%	-26.40%	-20.91%	-22.53%	33.53%	29.16%	3.27%
N6	-31.40%	-26.19%	-22.60%	-27.45%	4.23%	-8.53%	-11.95%	-26.27%	-21.87%	-22.47%	33.00%	28.95%	3.85%
N7	-32.52%	-25.62%	-22.55%	-27.33%	5.58%	-29.86%	-12.48%	-25.76%	-23.16%	-22.80%	32.11%	30.80%	0.99%
N8	-22.76%	-28.15%	-19.98%	-33.15%	-0.18%	-14.28%	-10.55%	-27.41%	-23.57%	-25.66%	36.42%	29.58%	5.01%
N9	-23.33%	-28.71%	-22.11%	-31.55%	0.03%	-23.00%	-14.69%	-28.49%	-25.89%	-26.78%	35.02%	27.37%	5.67%
N10	-29.91%	-24.43%	-23.80%	-22.14%	10.20%	-20.49%	-9.38%	-25.51%	-18.25%	-19.66%	27.69%	26.64%	0.82%
N11	-33.58%	-27.12%	-22.73%	-29.91%	2.64%	-28.89%	-14.40%	-26.99%	-20.12%	-25.11%	33.97%	30.03%	2.93%
N12	-31.88%	-26.19%	-23.10%	-26.90%	5.33%	-23.15%	-13.70%	-26.52%	-23.61%	-22.86%	31.65%	28.66%	2.27%
TOTAL NON-MANUFACTURING	-31.40%	-25.86%	-23.87%	-21.66%	11.50%	-23.36%	-8.27%	-26.74%	-25.49%	-21.61%	29.14%	25.31%	2.96%
M1	-28.76%	-22.70%	-26.95%	-16.37%	15.53%	-15.25%	-4.26%	-24.74%	-19.70%	-16.62%	22.97%	22.97%	0.00%
M2	-28.13%	-22.20%	-26.98%	-14.32%	17.19%	-16.48%	-4.11%	-24.61%	-24.66%	-16.14%	21.60%	21.60%	0.00%
TOTAL MANUFACTURING	-28.19%	-22.25%	-26.97%	-14.54%	17.02%	-16.35%	-4.12%	-24.63%	-24.14%	-16.19%	21.74%	21.74%	0.00%

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January 24, 1986

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SECRETARY'S OFFICE
Public Utility Commission

Jerry Rich, Secretary
Pennsylvania Public Utility Commission
P. O. Box 3265
Harrisburg, Pennsylvania 17120

Re: Pennsylvania Public Utility Commission
v.
Philadelphia Electric Company
Docket No. R-850152

Dear Secretary Rich:

Enclosed for filing with the Commission are the original and three (3) copies of the Motion in Limine/Motion to Strike of Philadelphia Electric Company in the above-referenced proceeding.

As the attached Certificate of Service indicates, copies of the Company's Motion have been served on all participants in the proceeding.

Sincerely,

David B. MacGregor

DBM:jr
Enclosures
cc: The Honorable Joseph P. Matuschak
All Parties

DOCUMENT FOLDER

CERTIFICATE OF SERVICE

I hereby certify that I have on this day served a true copy of the foregoing Motion upon the following parties in the proceeding at Docket No. R-580152.

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Counsel for Philadelphia Electric Company

Dated: January 24, 1986

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JAN 24 1986
SECRETARY'S OFFICE
Public Utility Commission

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION, et al.	:	
v.	:	Docket No. R-850152
PHILADELPHIA ELECTRIC COMPANY	:	

APPENDICES TO
THE MOTION IN LIMINE/MOTION TO STRIKE OF
PHILADELPHIA ELECTRIC COMPANY

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DATED: January 22, 1986

DOCUMENT FOLDER

DOCKETED
JAN 27 1986

APPENDIX A

Testimony and Exhibits of
Stephen H. Hanauer

(OCA Statement No. 2; R-850152)

PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA ELECTRIC COMPANY

DOCKET No. R-850152

Testimony and Exhibits of

Stephen H. Hanauer

Limerick I and Common

Delay and Cost Increase

Caused by

Errors in Mark II Containment Design

December 1985

Technical Analysis Corporation
6723 Whittier Avenue Suite 202
McLean, VA 22101

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EXHIBITS

SHH-1	Qualifications and Experience of Stephen H. Hanauer
SHH-2	Typical Mark II Pressure Suppression Containment
SHH-3	Milestone Dates for Individual Mark II Plants
SHH-4	Chronology of Mark II Load Definition Program in Response to Identification of Design Errors
SHH-5	PECO Statement on Delay Caused by Mark II-IR-OCA-4-47
SHH-6	PECO Statement on Regulatory Requirements -IR-OCA-4-18.
SHH-7	PECO Statement on Mark II Cost Breakdown - First 2 pages of OCA-4-45.

1. INTRODUCTION AND SUMMARY

1.1 Introduction

Q. Please state your name and business address.

A. My name is Stephen H. Hanauer. My business address is Technical Analysis Corporation, 6723 Whittier Avenue, McLean, Virginia.

Q. On whose behalf are you testifying?

A. I am testifying at the request of the Pennsylvania Office of Consumer Advocate.

Q. What is the purpose of your testimony?

A. My testimony deals with a major error that occurred in the design of the Limerick plant. I explain the nature of the error, estimate its effect on the Limerick plant, and evaluate the responsibility for causing the resulting cost increase.

Q. What are your qualifications to testify as an expert?

A. I testified previously before the Pennsylvania Public Utility Commission In Docket No. P-830453, in Philadelphia Electric Company's Case ECR-8. I have testified before the electrical ratemaking commissions of the States of California, Delaware, Indiana, Maryland, Missouri, and New Jersey. I also performed consulting services for the Public Utilities Commission of Ohio.

Commission, I held several senior technical and managerial positions in that Federal agency and its predecessor, the U.S. Atomic Energy Commission, including Director of Safety Technology. I have also been Professor of Nuclear Engineering at the University of Tennessee and a group leader in the Instrumentation and Controls Division of Oak Ridge National Laboratory. A personal resume is given in Exhibit SHH-1 attached to my testimony.

Q. What experience have you had in evaluating regulatory effects in nuclear power plant construction projects?

A. In my work for State regulatory agencies, I have reviewed regulatory effects in the cost and schedule of the following plants:

Callaway (Missouri)
Diablo Canyon (California)
Marble Hill (Indiana)
River Bend (Texas)
San Onofre (California)
Vogtle (Georgia)
Wolf Creek (Missouri)
Zimmer (Ohio)

Some of these reviews are still underway.

In my earlier work at the AEC and the NRC, the utilities licensed by these agencies often discussed with us the effect of our regulation on the costs and schedules of their projects.

As an engineer at Oak Ridge National Laboratory, I was associated with the design and construction of several

nuclear facilities. These were research and test reactors, smaller and simpler than a nuclear power plant. Because of their experimental nature, however, some of these plants presented severe challenges and commanded the attention of some of the best technologists of their time.

Q. What is the basis of your knowledge and understanding of Mark II containments?

A. The AEC Advisory Committee on Reactor Safeguards reviewed all aspects of proposed nuclear power plants, including containment. The Mark II containment was first proposed to and reviewed by the Committee during my tenure as a member and Chairman of the committee. As Technical Advisor to the AEC Director of Regulation (later, the NRC Executive Director for Operations), I followed the evolution of such major technical problems as the GE containment design inadequacy. Later, as manager of NRC Unresolved Safety Issues and then, Director of Safety Technology, I supervised the project managers responsible for resolving the Mark I and Mark II containment problems.

1.2 Summary

Q. Dr. Hanauer, please summarize your testimony.

A. After explaining the design and function of the Limerick containment, a GE Mark II, I explain how the errors made in its design were identified, the substance of the errors, and the responsibilities of GE and PECO as I see them.

errors to public safety is given in Section 4. Section 5 describes the NRC requirements for Mark II containments and the nuclear power industry programs that were carried out to bring the Mark II plants into conformance with the requirements. The effect of these programs, and their implementation at Limerick, on the plant cost and schedule are described in Section 6. These are compared with two other Mark II plants in Section 7. My findings and conclusions are given in Section 8.

Q. Please state your findings and conclusions.

A. My findings and conclusions are the following:

1. All nuclear power plants are required to provide a containment system. For Limerick, the Company chose a Mark II Pressure Suppression Containment as recommended by General Electric.

2. General Electric, in developing the pressure suppression containment concepts and basic designs, imprudently failed to adequately measure, predict, or specify the loads and forces which this type of containment would develop in the quenching process, both from loss-of-coolant accidents and from safety/relief valve operation during normal operation and anticipated transients. The technology was available in the 1960's to make such measurements and specifications.

3. The errors were not detected by General Electric, the plant owners or the regulatory authorities until actual plant damage occurred during transients, and additional tests disclosed that the problem would exist for both safety/relief valve discharge and accident circumstances.

4. If the errors had not been identified and corrected, and an accident had occurred, the containment may well have failed to perform its safety function.

5. The NRC required the errors to be corrected.

6. The inadequate GE load specification was not an act of God or a force majeure; it was a technical error. The error in load specifications was eventually corrected. Several Mark II plants have been successfully constructed and licensed by the NRC on the basis of the corrected load specifications. The technical problem was--is--solvable.

7. The utilities owning Mark II plants undertook a long and expensive program of theoretical and experimental work to develop acceptable load definitions. These were finally accepted by the NRC in 1981 and 1982, although some load specifications were provisionally approved as early as 1978. Each Mark II owner had to apply the revised load definitions to re-analyze its plant and make the necessary modifications. These expenditures were necessary under the circumstances,

but the circumstances should never have been allowed to arise.

8. For Limerick, the Mark II program is estimated by the Company to have cost $136.1 million in direct costs. This was not an externally imposed regulatory cost, as stated by PECO, but was made necessary by failure of the Limerick design to conform to the NRC requirements already in existence.

9. The Mark II cost, that would not have had to be spent if the plant had been designed correctly to start with, was unreasonably and imprudently spent and should be disallowed.

10. The Mark II problem is stated by the Company not to have significantly delayed completion of Limerick Unit 1 and Common.

11. The Mark II problem could have been resolved at Limerick by early- to mid-1982. It should not have constrained any later completion date, provided that the Company had earlier taken the appropriate actions to achieve such early resolution.

12. The non-Mark II regulatory requirements cited by PECO could also have been resolved at Limerick by early- to mid-1982.

2. CONTAINMENT FUNCTION

Q. What is the purpose of a containment?

A. Like all nuclear power reactors, the Limerick reactor* is enclosed within a containment system. The purpose of the containment is to isolate the radioactivity within the core and the primary reactor fluids from the outside world in the event of any kind of incident or accident.

Q. How does the Limerick containment work?

A. All containments provide an enclosure around the reactor and the primary system to "contain" radioactive fluids. The Limerick plant uses a containment concept developed at General Electric called "pressure suppression," which includes, inside the containment enclosure, a large pool of water to absorb the heat and steam released from any leaks in the primary reactor system. The Limerick plant uses the Mark II configuration of the GE pressure suppression containment. The containment system includes the large pool of water, called the suppression pool, and a separate large enclosed space, called the drywell, in which the reactor and the primary system are located. The drywell is connected to the suppression pool by large pipes called downcomers, which have open ends located far below the surface of the water in the suppression pool.

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* For brevity, I will describe a single Limerick unit; the two units are essentially identical in containment design.

Steam or hot water coming out of a leak or break in the primary system is directed by the downcomers into the suppression pool, where the relatively cool water absorbs the heat and turns the steam back into additional water. This process is called "quenching".

In a boiling water reactor, such as Limerick, there are valves on the main steam pipes which open automatically if the pressure gets too high, and let out some of the steam to lower the pressure and protect the primary system against overpressure. These valves open not only during accidents, but during certain plant maneuvers which are expected typically a few times a year in a power plant. The steam coming out of these safety/relief valves is another source of high temperature fluid. Pipes from these valves are used to carry this steam below the surface of the suppression pool so the water can absorb the energy in this steam just as it would in an accident. The suppression pool thus serves to quench hot water and steam from two sources: (1) from the safety/ relief valves during plant maneuvers and certain accidents, via the safety/relief valve discharge pipes; and (2) from leaks or breaks in the primary system (and other classes of accidents) via the downcomers.

Q. What does the Limerick containment look like?

A. Over the past three decades, GE has developed three different configurations for its pressure suppression containment system, called Mark I, Mark II, and Mark III. Limerick uses

SHH-2. The suppression pool is in a cylindrical tank called the suppression chamber at the bottom of the containment building. The water of the suppression pool fills about half of the suppression chamber. The drywell is cone-shaped and sits on top of the suppression chamber so that the floor of the drywell is the ceiling of the suppression chamber. You can see the downcomers and the safety/relief valve discharge pipes leading into the suppression pool in Exhibit SHH-2.

3. ERRORS MADE IN MARK II CONTAINMENT DESIGN

Q. What is the purpose of this section of your testimony?

A. I explain the nature of the errors in the Mark II design and how they were discovered.

Q. When was the Mark II containment concept developed?

A. The basic design of the Mark II containment system was done in the 1960's, and was based principally on tests run in the late 1950's and early 1960's to supply information for the Mark I pressure suppression design.

Q. How were the errors discovered?

A. Three events in the early and mid 1970's showed that the design of the Mark II containment system - and the Mark I system as well--was in error. The designs did not

adequately account for the forces developed during the quenching process.

3.1 Wuergassen Reactor Containment Failure

Q. What happened in this event?

A. In April 1972, the Wuergassen plant in Germany was substantially damaged in an unanticipated transient event. This plant has a boiling water reactor and a pressure suppression containment somewhat different in configuration from the one in Limerick, but operating according to the same principles. The Wuergassen accident involved a prolonged opening of one of the safety/relief valves. The resulting steam discharge was successfully quenched in the suppression pool. However, because the safety/relief valve failed to reclose, the quenching process continued much longer than is usual in such events. This heated up the suppression pool water as time went by, and it was observed that the quenching process involved progressively louder noises from the suppression pool. These noises were evidence of peaks in local pressure inside the pool. As the suppression pool water got hotter, the pressure pulses got larger, until finally the pool wall was seriously damaged by the large forces from the pressure pulses.

3.2 Browns Ferry Tests

Q. Why were these tests undertaken?

A. As a result of the Wuergassen incident, and some less damaging experiences in U.S. plants, a series of tests began in 1973 at Browns Ferry. This is a U.S. boiling water reactor with a General Electric Mark I pressure suppression containment. The purpose of the tests was to measure the quenching forces from safety/relief valve openings. For these tests, a safety/relief valve was deliberately opened and measurements were made at various plant conditions.

Q. What were the results of these tests?

A. The Browns Ferry results were consistent with the Wuergassen experience. Higher suppression pool water temperatures produced larger local pressure pulses and larger forces on the suppression chamber wall. As the pool temperatures increased in later tests, the forces became so large that the tests were stopped for fear of damaging the facility if the pool temperature was raised still more, as had originally been planned.

Q. What conclusions were drawn from these data?

A. It was clear from the Wuergassen accident and Browns Ferry tests that the quenching of steam from the safety/relief valve openings could, under some conditions, produce very large forces which were potentially destructive to the

basis of the pressure suppression containment system.

3.3 General Electric Mark III Tests

Q. Why were these tests performed?

A. In the period 1972-74, General Electric performed a series of experiments on pressure suppression as part of their development of the Mark III system. General Electric was designing this new configuration to have both safety and economy advantages over the Mark I and II designs. Additional tests were needed to determine the forces and loads for design. These tests were directed toward postulated loss-of-coolant accidents, involving leaks or breaks in the primary system in the drywell. Such an event involves quenching of steam from the downcomers, rather than the safety/relief valve discharge pipes as in the Wuergassen accident and the Browns Ferry tests discussed above.

Q. What results were obtained?

A. The GE Mark III tests also showed that under some circumstances, very large local pressure pulses could occur. These could produce very large loads on the suppression chamber walls, and also on other parts of the pressure suppression system. Additionally, the resulting shaking of the containment structure could impose additional loads on equipment located in the drywell or supported by any part of

some testing programs in other countries.

Thus, by 1974 or 1975, it was clear that the design of the GE pressure suppression system was seriously deficient.

3.4 The Substance of the Error

Q. What was the nature of the error?

A. The original design considered the mechanical loads associated with accidents in the drywell, including pressure and temperature increases, earthquake loads, the load from the jet of water coming out of the downcomer, and the usual dead loads, hydrostatic loads and test loads required for the design of any structure. However, the design did not include any allowance for the large dynamic loads from the quenching process which had now been shown to occur for both safety/relief valve events and accidents in the drywell. Therefore, there was no assurance that the containment structures would hold together and perform their safety function on the occurrence of a safety/relief valve discharge or a loss-of-coolant accident.

The basic problem with the Mark II containment was the inadequate load specification provided in its original design. Had the containment and the equipment in it been built as originally specified, there is a substantial probability that safety/relief valve actuations would have

safety/relief valve quenchers, the suppression chamber, and the equipment in the drywell were inadequately designed to withstand the shaking caused by the quenching process. This could likely have occurred during normal operation and anticipated transients over the lifetime of the plant, which routinely involve multiple actuations of the safety/relief valves. The plants where damage has actually been experienced are earlier pressure suppression containment designs, where the drywell is supported separately from, and relatively independently of, the suppression chamber. How much more severe this might have been in the Mark II plants such as Limerick, where much of the equipment in the reactor building is essentially built using the suppression chamber as a foundation, is not known.

Q. What new technical facts were discovered? What wasn't known when the original designs were developed?

A. No new laws of nature were discovered that showed the need for new design loads. The forces generated during quenching have been known for a long time. During some of the GE pressure suppression tests in the early 1960's, noises were heard indicating large pressure pulses, which would lead to large potential forces. The technology for measuring pressures and forces was available then, and could and should have been employed in the tests.

power industry?

A. No. Only plants using GE pressure suppression containments were affected by the design errors. The Mark II plants are listed in Exhibit SHH-3. Six of these plants are in operation: LaSalle 1 and 2, Limerick 1, Susquehanna 1 and 2, and Washington Nuclear 2.

3.5 Responsibility for Errors

Q. Who made the errors?

A. General Electric, in developing the pressure suppression containment concepts and basic designs, did not adequately measure, predict, or specify the loads and forces which this type of containment would develop in the quenching process. This includes both loss-of-coolant accidents and safety/relief valve operation during normal operation and anticipated transients. The inadequacy was present in all three configurations of the General Electric pressure suppression containment design. It was not identified by General Electric, the plant owners or the regulatory authorities until actual plant damage occurred during transients, and additional tests disclosed that the problem would exist for both safety/relief valve discharge and accident circumstances.

Q. What are the provisions of the contract between PECO and GE, as they relate to the Limerick Mark II containment?

for Limerick Generating Station" (August 15, 1969) provides that GE furnish PECO with design and operating requirements for the balance of plant, including the containment structures, systems and components furnished by PECO and its contractors.

Appendix A to the contract contains a table giving "Division of Responsibility" between GE and PECO. (Contract Appendix A, pages A.3-1 through A.3-9) The containment is not listed explicitly. It is presumably included under "Other plant systems and equipment, Item XX." (page A.3-9) For this item, the contract gives the following responsibilities:

Scope Design - This denotes responsibility for the design analysis and calculations to establish the essential parameters and requirements for the basic equipment and plant design. This includes the preparation of outline and arrangement drawings, specifications, piping and instrumentation diagrams, process flow diagrams, functional diagrams, and heat balances.

The principal responsibility lies with the Purchaser, but certain requirements which affect the safety or performance of the nuclear system will be furnished by General Electric. Design specifications and procedures prepared by the Purchaser will be made available to General Electric for review and comment.

the equipment and plant design by performing the necessary analysis and calculations and by preparing the necessary drawings, specifications and instructions, such as detail, final arrangement and assembly drawings; purchasing, installation and testing specifications, and operating instructions. The Purchaser has sole responsibility.

The contract states, "Seller's sole liability with respect to the Plant Requirements shall be limited to correcting, at Seller's expense, substantial error or omissions therein." (Contract, page I-1).

Q. How much information is included in the contract documents?

A. The containment system requirements are given in three pages in Appendix B to the contract (pages 1-1 through 1-3) which reference four drawings in Appendix A. Appendix B includes the statement:

> Design methods that include design features and practices applied to previous General Electric reactor containments are available for information. These features and practices are compatible with the equipment and auxiliary systems that make up the General Electric scope of supply.

(Contract, Appendix B, page 1-2)

This presumably is the way GE transmitted the containment load specification to PECO.

A. The errors were omissions of essential loads in the GE information furnished to PECO, that was used by PECO and Bechtel as a basis for the design of the containment. The errors were made by General Electric. These errors then resulted in incorrect design of the containment structures, systems and components, and also other equipment subject to shaking because it is attached to, or supported by the containment.

Q. Who was held responsible by NRC for the errors?

A. The NRC regulates the owners of nuclear power plants. For each approved plant, a single utility is issued the various required NRC licenses. The utility has the obligation of showing that operation of the plant will not be inimical to the health and safety of the public. (Code of Federal Regulations, Title 10, Chapter 1, Part 50, Section 50.40c) When the Mark II design errors were discovered and the NRC (earlier, AEC) was notified, the agency sent letters to the utility licensees and applicants for all the plants with GE pressure suppression containments. Each such utility was required to provide information demonstrating the adequacy of its containment design in the light of the new information.

Q. What was the NRC's role in the development and approval of the Mark II concept and load definition?

A. The NRC's sole role in the Mark II was its safety regulatory responsibility. This means that a utility proposing to build and operate a nuclear power plant that has a Mark II containment must convince the NRC of its safety acceptability. As part of its licensing review, NRC evaluates the conformance of the Mark II containment to the NRC regulatory requirements.

NRC played no role in the development by GE of the Mark II concept and load definitions. The first proposed Mark II was reviewed extensively by the NRC in connection with the application for a Construction Permit for Shoreham. Years later, the NRC Operating License reviews for all the Mark II plants included reviews of containment design in the light of the problems identified in the interim.

Q. Were these errors detected in the various owner and regulatory reviews?

A. No. Neither the Quality Assurance program of the owner and his contractors nor the regulatory review by the AEC and its Advisory Committee on Reactor Safeguards identified the errors.

A. Were the costs of the Mark II redesign and modifications prudently incurred, in your opinion?

A. No. It is true that the costs had to be paid once the Mark II errors were identified; in this sense, performing (and paying for) the Mark II program was necessary. But it

should not have been necessary. Adequate experimental work should have been done to enable developing an acceptable Mark II design in the first place. GE's failure to do so was unreasonable and imprudent.

Q. What, in your opinion, is PECO's responsibility?

A. As the owner of Limerick, PECO is responsible to the NRC for conformance with the regulations of that agency. PECO is responsible to its ratepayers and Limerick's neighbors for the safety, reliability and economy of Limerick's operation. Allocation between PECO and its contractor GE of the responsibility owed the ratepayers for the cost of errors in Mark II design is irrelevant, in my opinion. It should be settled between PECO and GE, with or without legal action. I understand that another Mark II plant, Zimmer, is the subject of a lawsuit between the utility owners and GE. I recommend that PECO not be allowed to collect the cost of these unreasonable Mark II errors from the ratepayers; my recommendation is independent of how much of the disallowance PECO can collect from GE.

4. SAFETY SIGNIFICANCE

Q. What is the safety significance of the Mark II containment design errors?

A. In the unlikely event of a loss-of-coolant accident at Limerick, the pressure suppression containment may well have failed to perform its necessary safety function. We now

withstood the forces which are now calculated to occur in the event of such an accident. This type of accident is a much less likely occurrence than the safety/relief valve discharge which would also cause excessive loads, because of the low probability of the severe postulated initiating leak or accident. However, it should be noted that the water in the suppression pool serves as the primary source for the emergency core cooling system. It is just this emergency core cooling system which must function to prevent core melting if an accident were to occur. Therefore, failure of the suppression pool that let the water run out would probably lead to failure of the emergency core cooling system, which is needed and provided to cool the core in the event of just the loss-of-coolant accident that caused the pool failure.

The NRC has required all plants with pressure suppression containments to make extensive engineering analyses and hardware changes. For the operating plants, this has meant long outages; for the plants under construction, this has meant redesign, rework, and delays in completion.

5.1 NRC Requirements

Q. When did the NRC first act on the design errors in GE pressure suppression containments?

A. In April 1975, the NRC sent letters to all the utilities having pressure suppression containment systems, requesting that they provide information demonstrating the adequacy of their containment designs. These letters reflect NRC concerns about the need to evaluate the containment response to the recently identified dynamic loads.

Q. What are the NRC requirements for Mark II containments?

A. The NRC has many requirements for containments, including Mark II. The general requirements are that the structures, systems and components necessary to effect the containment function must withstand, with sufficient strength margin and acceptably low leakage, the conditions of normal operations, plant transients and all accidents within the plant's safety design basis. (Code of Federal Regulations, Title 10, Chapter 1, Part 50, Appendix A, Criteria 50-57; NRC Standard Review Plan, Section 6.2)

When the Mark II containment was first proposed in the Shoreham application in the late 1960's, the utility and General Electric presented calculations and experimental results to show compliance with all AEC requirements. After

design (in its then conceptual state) and the criteria proposed were accepted by the AEC and the Advisory Committee on Reactor Safeguards.

Q. How did the NRC requirements change after the errors were discovered?

A. The basic requirements didn't change at all. When it was discovered that the Mark II containments didn't meet the existing requirements, the NRC issued letters to all Mark II utilities. (NRC letters to Mark II licensees, April 17, 1975 (Safety/Relief valve discharges); April 18, 1975 (Accidents)). These letters requested the utilities to provide information demonstrating the adequacy of their containment designs, in the light of the recently identified errors.

The following sections of my testimony describe briefly the programs used by the utilities in responding to this problem.

5.2 Industry Program

Q. What was the situation of the Mark II plants in April 1975?

A. No Mark II plants were in operation in 1975. Eleven units at eight U.S. sites had been approved and were under construction. Since 1976, seven of these units have been completed (including Limerick Unit 1) one is under-construction, two have been cancelled, and one has been

are listed in Exhibit SHH-3.

Q. How did the utilities respond to the NRC letters?

A. The owners of the Mark II plants under construction realized that a long and expensive effort would be required. They formed the Mark II Owners Group to coordinate, direct, and finance the necessary analytical and experimental programs for developing corrected specified loads for redesign of these containment systems. This did prove to be a long and expensive process. The NRC-approved load specification and acceptance criteria for drywell accident forces were eventually published in NUREG-0808, issued in August 1981, over six years after the April 1975 letters to the utilities. For safety/relief valve forces, NUREG-0802 was issued in October 1982. A recent bibliography lists 163 technical references as part of the Mark II program.

Q. Why did the resolution take so long?

A. The Mark II program included actions by GE, plant owners, consultants to the plant owners, and the NRC in several planned steps.

1) GE developed an analytical model of pool swelling.

2) GE and others ran tests of the effect of pool swelling, condensation oscillation, and chugging. These tests required building large thermohydraulic test facilities, and conducting many experimental runs.

proposing formulas for defining the loads that would occur on structures, systems and components as a result of the various phenomena. There was some iteration between testing and theoretical development.

4) Kraftwerk Union, a consultant to Pennsylvania Power and Light Company, performed additional, independent tests to determine load definitions resulting from safety/relief valve discharge. Pennsylvania Power and Light Company published the load definitions in the revised Design Assessment Report of Susquehanna.

5) The NRC staff reviewed the technical results. After further testing required by the NRC had been completed and the results incorporated into the load specifications, the NRC approved, with some modifications, the proposed load definition formulas.

6) Plant designers applied the approved formulas to the design or redesign of plant components.

5.2.1 Mark II Lead Plant Program

Q. Why was a "Lead Plant Program" developed?

A. The Mark II program was logical, but the owners recognized from the start that it would take too long. The Mark II plants were licensed for construction during the 1972-74 period and scheduled for completion (at the time they were

(Susquehanna 2, Limerick 2).

The owners of the Zimmer, Shoreham, and LaSalle plants foresaw that the technical resolution of this problem was likely to take too long compared to the schedules for these plants. The suppression chamber structure forms the bottom of the reactor building. Any substantial change in this prestressed concrete structure would have to come early in the construction process, or would be difficult, time-consuming, expensive, and perhaps even impossible to accomplish later in the project. Changes in downcomers or safety/relief valve discharge piping would, in principle, be easier to accomplish later during construction, although one could also foresee potential problems in finding adequate foundations to install bracing that might later be found to be needed.

To accommodate the licensing needs of the early Mark II plants, the program was divided into a Lead Plant Program and a Long Term Program. The three lead plants were LaSalle, Shoreham, and Zimmer.

Q. Was Limerick a part of the lead plant program?

A. No. PECO decided not to implement the lead plant loads, but to wait for the results of the long term program. The later results were expected to justify lower loads. Other delays in the Limerick schedule allowed PECO to delay designing much of the containment system until the later results were

available. (PECO Statement 8, pages 149-153.) However, some modifications were still required at Limerick during 1981-83 as a result of recent new data and resulting changes in the load definitions. (See Exhibit SHH-4; reference PECO response to Data Requests OCA-4-5 and 4-46.)

Q. What was the scope of the lead plant program?

A. Preliminary load definition formulas developed for the three lead plants were intended to be acceptable more quickly, since they were believed to be more conservative from the safety standpoint than load definition formulas that would be developed later for the other plants. This meant that the available test data would be more limited for the lead plant load definitions, and that a bounding or conservative interpretation of these data would be required. Furthermore, this meant that the lead plant results would be subject to later modification if experimental or theoretical results later showed this to be necessary. Thus, the lead plant program involved a certain risk that, in spite of the caution and conservatism used, some further modifications might be required later. This would involve the expense and delay of modifications late in the construction process.

In addition, the lead plant program involved another kind of risk: the conservative load specification could turn out to be more conservative than necessary.

Q. Why were these risks incurred?

A. The Mark II lead-plant owners concluded that it was necessary for them to take these risks, once the design errors had been identified, because they foresaw that their plants would be unacceptably delayed if they had to wait for the completion of the long term program.

Q. Did the lead plant program succeed in its objectives?

A. The lead plant program did not fully succeed. The NRC did not issue its "approval" report, NUREG-0487, until October 1978. This was already late in the design and construction of the lead plants. (See Exhibits SHH-3 and 4) Moreover, the NRC "approval" was hedged in three ways:

1. The NRC increased the conservatism of some of the load definition formulas proposed by the industry; and

2. More future testing was stated by the NRC to be required; and

3. Definitions for some known loads were left out of the Lead Plant program reports, yet had to be resolved for design and construction of these plants to be completed.

In this connection, the NRC staff stated:

> "Several pool dynamic related loads were not included in the Mark II owners' generic program. These will be reviewed on a plant unique basis as a part of the staff's review of the individual design assessment reports."
>
> (NRC, NUREG-0487, page IV-10)

NUREG-0487.

Q. Was that the end of the Lead Plant Program?

A. No. Even the NRC's meagre "approval" of NUREG-0487 was partly rescinded in September 1980 when Supplement 1 to NUREG-0487 stated that recent test results required reassessment of certain load definitions.

Supplement 1 had two parts:

(a) The Mark II owners had proposed some alternative pool dynamic load specifications different from, and less conservative than, those approved in the original NUREG-0487. In Supplement 1, the staff reviewed these proposals, accepted some, accepted some others with modifications and constraints, and found still others not acceptable.

(b) The NRC staff also pointed out that one of the risks had, in fact, turned into a reality. They stated:

> "The results of recent large scale tests have led the Mark II owners to reassess the original lead plant condensation oscillation, and chugging pool boundary load specifications."
>
> (NRC, NUREG-0487, Supplement 1, page IV-1)

This meant that some of the design basis loads were called into question by the recent test results.

Q. Did that complete the Lead Plant Program?

A. No. The results of later tests were discussed by the NRC staff in Supplement 2 to NUREG-0487, issued in February 1981. The staff concluded that the recent large scale tests pointed out deficiencies in the lead plant load specifications because these specifications did not bound the data at all the frequencies and amplitudes that were observed in the new tests. The Owners Group was obliged yet again to develop revised "interim" load specifications which the NRC staff judged were reasonable and acceptable for use in evaluating the lead plants. However, Supplement 2 discussed the application of these load specifications only to the LaSalle plant, with application to other plants left for later evaluation in plant specific documents.

5.3 Completion of the Mark II Program

Q. What was done by the utilities to solve the Mark II problem for non-lead plants?

A. Concurrent with the Lead Plant Program, the Mark II Long Term Program was being pursued by the Mark II Owners Group and their contractors. In fact, the distinction between the programs became blurred after a while. The NRC reports resolving the two programs (Lead Plant and Long Term) cite many of the same technical documents, and were issued less than one year apart.

A. The Long Term Program was concluded with the issuance by the NRC of NUREG-0808 for accident loads in August 1981, and NUREG-0802 for safety/relief valve loads in October 1982. In their evaluation, the NRC concluded that the condensation oscillation "interim load specification" used for the lead plants is satisfactory but that the lead plant "interim" chugging load specification was not. Therefore, each of the lead plant utilities was required to reassess its containment still another time, using the NUREG-0808 loads.

Q. Is that where the Mark II stands now?

A. Yes. The two NRC reports concluded that the load definitions, as refined and revised, are adequate in the light of both the theoretical and experimental work of the Owners Group and its contractors and the confirmatory work performed by the NRC staff and its contractors. Work by others was also considered by the NRC, including German tests and calculations performed for U.S. and German utilities, and a Japanese technical program.

Q. Then what had to be done?

A. Following the NRC approval of the load definitions, each Mark II utility had to apply the definitions to its particular configuration, design details and dimensions. It was necessary to calculate the specific loads that would be imposed by the quenching process on the containment and all

forces that go with them.

Q. What effect did this have on the plants?

A. If there ever are any new Mark II plants, these quenching loads will be factored into their design basis. The actual Mark II plants (those that haven't been cancelled) were all in the late stages of construction in 1981-2 when the load definitions were approved. It was therefore required that the results of the quenching load calculations for each Mark II plant, corrected in accordance with the approved loads, be applied to the plant structures, systems and components that would be affected by them. Any item that could not adequately withstand the newly defined or redefined loads, in combination with other required loads, had to be redesigned and, if necessary, reworked in the field.

the direct cost, including engineering, analysis, Owners Group support, and plant modifications. (Pages 8, 33-4) These included approximately 750 new hangers and over 1400 modifications to existing hangers, replacement of the safety/relief valve discharge quenchers, modified bracing for the downcomers and discharge pipes, and modified supports for the snubbers used to dampen shaking forces on equipment and piping. (Page 34; Forecasts)

Q. What cost breakdown has been furnished?

A. In response to a data request, PECO supplemented the information in PECO Exhibit 2 with a detailed breakdown into 15 subheads, supplemented by about 50 pages from Forecasts, Trends, and other cost reconciliation documents. (PECO response to Data Request OCA-4-45.) Exhibit SHH-7 gives the overall cost breakdown portion of this PECO document.

With each of the 15 categories is associated an attachment, the front page of which lists the components of cost increase for the category. The following pages in the attachment are copies of the referenced documents for each component.

Q. Was the cost of the Mark II program a regulatory cost, externally imposed?

A. Not in my opinion. PECO classifies the Mark II costs under "Regulatory and other Externally Imposed Changes". (PECO

Exhibit 2, pages 2a, 8.) The Company states that "new NRC requirements were issued during the period 1978 to 1982." (PECO Exhibit 2, page 8.) But the expensive new Mark II programs and plant modifications were made necessary by the failure of the Limerick design to conform to the NRC requirements that existed before the original design. The "new requirements" cited by PECO are NRC's response to these errors. NRC approved, with some modifications, the acceptance criteria proposed by the Mark II Owners Group to correct the errors.

7. COMPARISON OF MARK II SCHEDULES FOR LIMERICK AND OTHER PLANTS

7.1 Purpose of the Comparison

Q. Why do you compare schedules?

A. The purpose of this comparison is to contribute to answering the question, when could Limerick Unit 1 and Common have been completed? The bulk of this analysis is given in the Direct Testimony of Mr. J. J. O'Brien. However, one of the constraints on such an analysis is the completion of the Mark II program in a faster Limerick construction schedule. To gain insight into this question, I studied the LaSalle and Susquehanna plants. Additionally, possible, non-Mark II regulatory requirements constraints are reviewed, also, in Section 7.4.

8. FINDINGS AND CONCLUSIONS

Q. Dr. Hanauer, please state your findings and conclusions.

A. My findings and conclusions are the following:

1. All nuclear power plants are required to provide a containment system. For Limerick, the Company chose a Mark II Pressure Suppression Containment as recommended by General Electric.

2. General Electric, in developing the pressure suppression containment concepts and basic designs, imprudently failed to adequately measure, predict, or specify the loads and forces which this type of containment would develop in the quenching process, both from loss-of-coolant accidents and from safety/relief valve operation during normal operation and anticipated transients. The technology was available in the 1960's to make such measurements and specifications.

3. The errors were not detected by General Electric, the plant owners or the regulatory authorities until actual plant damage occurred during transients, and additional tests disclosed that the problem would exist for both safety/relief valve discharge and accident circumstances.

4. If the errors had not been identified and corrected, and an accident had occurred, the containment may well have failed to perform its safety function.

5. The NRC required the errors to be corrected.

6. The inadequate GE load specification was not an act of God or a force majeure; it was a technical error. The error in load specifications was eventually corrected. Several Mark II plants have been successfully constructed and licensed by the NRC on the basis of the corrected load specifications. The technical problem was--is--solvable.

7. The utilities owning Mark II plants undertook a long and expensive program of theoretical and experimental work to develop acceptable load definitions. These were finally accepted by the NRC in 1981 and 1982, although some load specifications were provisionally approved as early as 1978. Each Mark II owner had to apply the revised load definitions to re-analyze its plant and make the necessary modifications. These expenditures were necessary under the circumstances, but the circumstances should never have been allowed to arise.

8. For Limerick, the Mark II program is estimated by the Company to have cost $136.1 million in direct costs. This was not an externally imposed regulatory cost, as stated by PECO, but was made necessary by failure of the Limerick design to conform to the NRC requirements already in existence.

9. The Mark II cost, that would not have had to be spent if the plant had been designed correctly to start with, was unreasonably and imprudently spent and should be disallowed.

10. The Mark II problem is stated by the Company not to have significantly delayed completion of Limerick Unit 1 and Common.

11. The Mark II problem could have been resolved at Limerick by early- to mid-1982. It should not have constrained any later completion date, provided that the Company had earlier taken the appropriate actions to achieve such early resolution.

12. The non-Mark II regulatory requirements cited by PECO could also have been resolved at Limerick by early- to mid-1982.

Q. Does that complete your testimony?

A. Yes, it does, for the present.

APPENDIX B

Testimony and Exhibits of James J. O'Brien

(OCA Statement No. 1; R-850152)

CONFIDENTIAL

OCA STATEMENT No. 1

CONFIDENTIAL

PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

Testimony and Exhibits of

James J. O'Brien

Limerick I and Common

Construction Delay and Consequent Cost Increases

December 1985

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CONFIDENTIAL

A. Yes.

Q. Are you also aware of the fact that the Commission found (Ibid at Page 17), ". . . that PECO management did not exercise judgment sufficient to meet our reasonable man standard in delaying construction at Limerick in 1976 and 1978."

A. Yes.

Q. Please describe your testimony.

A. My testimony will attempt to demonstrate when Limerick Unit 1 could have been completed if the company had not delayed construction. I will do this by presenting a Critical Path Method Construction Schedule, which, I believe could have been followed by the company in accordance with prudent construction management practices.

In the last portion of my testimony, I will attempt to quantify the additional costs incurred at Limerick - including escalation, increased AFUDC, Overheads and other Indirect costs - which resulted from the delayed completion date. I will also attempt to quantify the impact on Limerick 1 costs of ~~the~~ error ~~in~~ the plant's containment

design that has been identified in the direct testimony of OCA witness, Dr. Stephen Hanauer.

Q. What is your primary conclusion in this case?

A. I have concluded, based upon OKA's critical path analysis of Limerick 1 and a comparison with other plants, that if prudent construction management practices had been followed, Limerick 1 could have been completed and ready to load fuel by July, 1982 or 27 months earlier than it was actually achieved on October 26, 1984.

Q. Would you please tell us the scope of your investigation.

A. Yes, I'll start by reviewing some of the pertinent background. Because of changes in the AEC's requirements which were prerequisite to gaining a Construction Permit (CP), many plants were delayed in starting construction. Limerick's CP was delayed until June 19, 1974. By that time, added regulations had increased the scope of the plant, and inflation had raised its cost, and according to the company, PECO's financial condition had begun to deteriorate. This condition was further exacerbated by a

Except for Taxes and Overheads which were given annually, I calculated that approximately 44.5%, or $77.7 million, of the indirect expenditures identified above were spent between July 1982 and October 1984 and thus could have been avoided. The basis for this calculation was my assumption that these expenditures were made at the same annual rate as the Direct Costs, i.e., 7.5% for the later half of 1982, 18% during 1983, and 19% in 1984. Thus, a total of $81 million ($77.7 million in indirects and $3.4 million in taxes and overheads) were expended between July '82 and October '84. With AFUDC added, the identified avoidable expenditure for Indirects/Overheads was $90 million (complete Derivation of AFUDC Accruals on Miscellaneous Overheads appended as Exhibit 18). This is but a fraction of the real figure however because of the absence of the BPC portion.

I would, however, request the right to supplement my testimony should it become possible to reconcile the appropriate BPC costs.

Q. Have you evaluated the cost of any other items which you believe to have been avoidable?

A. Yes, Dr. Hanauer has testified that the Mark II redesign and modification costs were not prudently incurred (at P. 19; OCA Statement No. 2). I have thus analyzed the impact of this error on the cost of the plant.

Q. How was that done, sir?

A. PECO's response to OCA-4-29 (Exhibit 7) gave the cost of Mark II changes as $136.1 million. I have taken that as a final net figure for the additional costs occasioned by the error. As I previously testified regarding the Mark II schedule impacts, the overwhelming majority of work was accomplished between 1980 and the end of the project. Accordingly, the $136.1 million was removed from actual expenditures in those years. Finally, I recalculated and added the AFUDC accrual on the revised directs. The result was a total of $160.7 million dollars (including AFUDC) attributable to Mark II. My complete analysis is appended as Exhibit 19.

Q. Other than those documents you have already cited, did you use any other references in your investigation for this assignment?

A. Yes, a comprehensive listing is appended as Exhibit 15.

APPENDIX C

Testimony of
Gregory C. Minor and Dale G. Bridenbaugh

(OCA Statement No. 3; R-822169)

OCA St No

Testimony of Gregory C. Minor and Dale G. Bridenbaugh

Regarding the Cost of Constructing the Susquehanna Steam Electric Station, Unit I

Re: Pennsylvania Power and Light, R-822169

March 18, 1983

Q: Which portions of this testimony did each of you prepare?

A: The testimony was co-authored and edited, so we both subscribe to all portions and conclusions. However, to aid in cross-examination, the following guidance is provided as to principal authorship:

(1) Minor: Description of scope of study and discovery and document review process (pages 6 to 14).

(2) Bridenbaugh: Detailed review and discussion of the Containment and IGSCC issues (pages 14 to 29).

(3) Minor: Detailed review and discussion of expansion anchor, electrical, and ACR issues (page 30 to 41).

(4) Minor and Bridenbaugh: Jointly developed the sections on project delay, quantification, conservatism, and conclusions (page 42 to end).

Q: What was the scope of your study?

A: Our study of the Susquehanna Project began in 1982, when our contract with OCA was approved. During the period of the last six months, we have had numerous meetings with Pennsylvania Power and Light (PP&L) personnel, have received and reviewed responoses to approximately 225 formal and several informal interrogatories.

(4) Expansion Anchor Replacement $ 2.7 million

(5) Advanced Control Room $ 0.52 million

(6) Schedule Delay $125.0 million

The basis for certain of these cost elements are provided in Attachment C and the derivation of the totals are discussed in more detail in subsequent paragraphs of this testimony. We additionally recommend a deduction of approximately $4.72 million to correct for an allocation error discovered during Mr. Curtis' cross-examination.

Q: Would you please describe the makeup of these "disallowed" costs and provide the basis for their removal from rate base?

A: Yes, we will. They will be discussed in turn as follows:

(1) Containment Cost Adjustment

The cost of constructing an adequate (licensable) primary reactor containment was substantially increased due to errors made by PP&L and/or those working for or under contract to PP&L. Additionally, the time required for plant completion was drastically affected by containment problems. We recommend, therefore, that an adjustment exclusive of delay costs be made to the allowable cost of plant in-service as proposed by PP&L in the form of a capital cost reduction of $40.7 million. Appropriate reduction in the associated AFUDC costs should also be made. We have not

calculated such AFUDC costs but have provided the cost and date of estimated cost incurrance as specified in Attachment C for use by OCA witness Cotton for appropriate inclusion. A reduction to plant costs should also be made to compensate for delay of the completion schedule. This reduction is further described and quantified in the portion of this testimony on Project Delay.

Background and Reason for Containment Adjustment

An effective containment system is provided to assure containment of potential leakages of radioactive materials that may occur during normal or postulated accident operating conditions. PP&L, having delegated the fulfillment of these containment design requirements to its agents, Bechtel and General Electric, became aware apparently in 1975 that a serious design deficiency had been incorporated into the SSES containment.

To fully understand the implications of this deficiency and the extent of the associated corrective actions required, it is necessary to review the design requirements and the evolution of reactor containment structures. All U.S. nuclear power reactors are enclosed in a leak-tight structure called the primary containment which is designed to contain and control the leakage of the reactor coolant and radioactive materials that might be released by leaks or

ruptures of the reactor primary system. Early reactors and most pressurized water reactors are housed in dry containments similar in structure to the large petroleum gas storage tanks. The boiling water reactor built by GEhowever, has by nature of its design a larger primary system, making it more difficult (or costly) to use dry containment. Starting with the series of plants placed in service in the late 1960's, GE utilized a so-called "pressure suppression" containment system.

In the pressure suppression containment, the reactor system is housed in a chamber called the dry well. The dry well communicates with a second chamber, the wet well, by a series of large vents which terminate several feet beneath the surface of the large volume of water contained in the wet well. In the event of a system rupture, the dry well fills with steam from the reactor coolant and then vents the releasing vapor through the pool of water. The water condenses the released steam being forced through it and suppresses the pressure built up in the containment, hence the name pressure suppression.

Water pressure suppression is a containment concept used exclusively in the U.S. by GE's BWR plants. This concept

was first used in the PG&E Humboldt Bay-3 nuclear unit in Eureka, California, placed in service in 1963. GE, with PG&E, did a series of pressure suppression verification tests in the period between 1958 and 1962. The first series of tests performed were to support the licensing of the Humboldt Bay-3 unit and the later series of tests were for design verification for the proposed Bodega Bay plant which was never built. These tests, in 1958 through 1962, provided the design basis for both the Mark I and Mark II containment designs, initially developed by GE and utilized in 36 BWR plants in operation or planned for the U.S. (25 Mark I and 11 Mark II).

In the early and mid-70's, after approximately 15 of the Mark I's were in service, and before any of the Mark II's were completed, it was discovered that neither the Mark I's or II's had properly taken into account the dynamic loading conditions that were to be experienced during transient operation and postulated for the design-basis loss of coolant accident (LOCA). These discoveries were made separately, through operating experience at several Mark I (and similar European) plants and at the GE San Jose Mark III Pool Swell Test Facility (PSTF), a one-third scale, segmental facility, built by GE to verify its new concept,

the Mark III containment. The events experienced at the operating plants had to do with severe hydrodynamic loads experienced with the blowdown of steam into the suppression pools through safety relief valves (SRV's). The SRV's are piped to the suppression pool and open to vent steam from the reactor to the pool in the event of a turbine trip or other transient events requiring shutdown of the plant. Such operation was found to cause heavy vibration of the pool structure and mechanical damage was experienced.

The first SRV discharge load problem occurred at the German Wuergassen plant (not built by GE) in about 1971 or 72. SRV openings were also experienced at the KKM plant (Muhleberg, Switzerland) during startup testing about 1972-73, at Quad Cities about 1972-73, and at Browns Ferry about 1974. At each of these plants, heavy vibration was noted and piping supports were damaged requiring subsequent repair. Because of this experience, GE and the NRC became concerned and GE and Commonwealth Edison instrumented one of the Quad Cities units and performed tests (about 1974) but these were inconclusive. Meanwhile, the Mark III PSTF was placed in operation about 1973 and tests there ultimately demonstrated that a series of loads associated with LOCA events had been

overlooked or underassessed at all pressure suppression plants.

The imposition of these previously under-assessed loads necessitated the reanalysis, redesign, and, in most cases, extensive rework and modification at all Mark I and Mark II plants. Because the LOCA and SRV loading phenomena are imposed on the very base mat supporting the containment, the reactor, and many critical piping systms making up the heart of the plant, almost every safety-related system required redesign and strengthening. Due to the problem of continuing construction while the loads were being finalized, PP&L had three different sets of loads used during the project life. Phase O were those initially used and Phases I & II were interim loads used from approximately 1977 through 1981. In March 1981, PP&L decided to go with loads supplied by KWU because the Mark II generic program was delayed. These loads, designated as Phase III, were used for the final design of hangers and supports.

In resolving the Mark II problems at SSES, literally thousands of piping and conduit support modifications were required, relocation of wetwell equipment was necessary, and strengthening of the containment diaphragm floor was

required. These actions were required as a result of inadequate definition by GE of the Mark II containment design loads and by the associated design deficiencies committed by Bechtel in the original structure and component design. PP&L has claimed that the regulations governing the design and analysis of the containment and associated structures were changed by the NRC during the course of the SSES project. This is not technically correct. The basic regulations require that the containment be designed to withstand the effects of natural phenomena such as earthquakes appropriately combined with the effect of normal operating and accident conditions (10 CFR 50, Appendix A, Criterion 50). This Criterion has been in effect since 1971 and has not changed since then. What has changed is the analytical practices utilized by industry to assure that the requirements are met. Some of these practices have required more effort (generally analysis) such as those described in the Regulatory Guides mentioned by Mr. Curtis in cross examination (Reg. Guides 1.46, 1.48, 1.61 and 1.92, See Tr. 926). It should be noted that Regulatory Guides (Guides) are not considered by the NRC to be requirements and in fact a notice appears on the front page of each Guide that:

US NRC REGULATORY GUIDES

> Regulatory Guides are issued to describe and make available to the public methods acceptable to the NRC staff of implementing specific parts of the Commission's regulations, to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants. Reglatory Guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

It should also be noted that some Guides have resulted in less stringent requirements. The NRC has made some other changes which lessened the demands. For example, the Mark II Owners Group effort resulted in the NRC accepting Square-Root-of-the-Sum-of-the-Squares (SRSS) load combination for the Mark II analysis (Methodology for Combining Dynamic Responses, USNRC Report, NUREG-0484, Rev. 1, May 1980). This resulted in a substantial reduction in conservatism for some plants.

Mr. Curtis has also made mention of NRC Bulletins, specifically 79-02 and 79-14 imposing new requirements. These Bulletins, issued in 1979, advised all plant owners of problems identified at several plants. Bulletin 79-02 advised that expansion anchor installation defects appeared to be generic to the industry and required inspections to verify their quality. Bulletin 79-14 advised of generic

discrepancies consisting of differences between the piping system design and the actual construction of such systems in the plants. Technically, Bulletin 79-02 only required that the utility verify the design and installation adequacy of expansion anchors to meet required loading conditions although it imposed much additional work for those plants when problems were found. Bulletin 79-14 required a physical walkdown of the piping systems to assure that the installed hardware in fact conformed with the assumptions made by the seismic analysts. Deviations thus identified had to be corrected, just as corrections are required to correct defective workmanship.

To add further to the background for understanding this complex containment issue, a copy of a portion of an NRC document summarizing the final load definitions for the Mark II generic program is appended as Attachment C.

PP&L initiated the corrective program in 1975, but it was not until late 1981 and early 1982 that the problem was fully overcome. An operating license was issued in July, 1982 when all required corrective action to make Unit 1 licensable was completed. During this corrective action period, large costs were incurred in re-analysis, modifications, and rework of already installed systems and compo-

nents that could have been avoided had the design been properly developed to fully meet the requirements of the 1971 regulatory requirements.

Cost Basis for Containment Adjustment

In reviewing the Cost Trends and Forecast changes associated with the SSES containment, we have identified three cost categories that seem appropriate for adjustment. These categories are:

- Modifications in suppression pool area (sometimes called wetwell) due to underassessed pool-swell loads. This occurred in the 1976 to 1980 time frame.
- Repair and rework of (primarily) in-containment pipe hangers. This was the critical path work for construction completion and occurred primarily in 1981 and 1982.
- Hanger quantity cost adjustments for piecemeal design approach used in Unit 1. The pipe hanger design on Unit 1 was far from optimum and excessive quantities of pipe hangers were utilized. Most of these were installed in 1981 and 1982.

APPENDIX D

Recommended Decision of
Administrative Law Judge
Joseph J. Klovekorn

(R-822169)

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Pennsylvania Public Utility Commission, et al.	:	
	:	Docket Number
v.	:	
	:	R-822169, et al.
Pennsylvania Power & Light Company	:	

RECOMMENDED DECISION
of
ADMINISTRATIVE LAW JUDGE
JOSEPH J. KLOVEKORN

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This is similar to delaying Susquehanna, which would significantly increase the cost of the plant and would clearly be detrimental to ratepayers. In addition, Mr. King's proposal would violate the FERC Uniform System of Accounts and Statement No. 71 of the Financial Accounting Standards Board.

Under Dr. Rosen's proposal, some 945 mw of capacity, representing PP&L's share of Susquehanna, would be termed excess. Although he identified three different approaches that could be taken to quantify this excess capacity so that revenue adjustment could be made, the approach which is most reasonable, identifies 945 mw of PP&L's complete capacity mix in equal proportions as the excess capacity. This approach was similar to the one undertaken in Philadelphia Electric Co., 54 Pa. P.U.C. 220 (1980). It permits PP&L to recover depreciation and other operating costs associated with the excess megawatts, but does not allow PP&L to earn a return on the net plant investment.

This approach is reasonable and should be adopted by the Commission.

2. Cost of Susquehanna's Construction

A highly controversial issue in this proceeding has been whether PP&L's management of the construction of the $1.7 billion Susquehanna Unit No. 1 was reasonable and prudent.

a. PP&L's Position

Mr. Norman W. Curtis, PP&L's Vice-President - Engineering and Construction - Nuclear Project Director, testified as to the management philosophies used during the design and construction of the Susquehanna project. He also presented testimony as to some of the key factors that have affected the project during its construction stages (PP&L St. 8).

Mr. Curtis stated that the Susquehanna Steam Electric Station is located on the west bank of the Susquehanna River in Salem Township, Luzerne

County, Pennsylvania. The main site within the security fence is approximately 100 acres.

The plant consists of two boiling water reactor (BWR) nuclear generating units, each with a net 1050 MW rating. The reactors and directly related equipment, which together constitute the Nuclear Steam Supply System (NSSS), were designed and supplied by General Electric Company (General Electric or G.E.). The total plant design, engineering, procurement, construction, and related services were provided by Bechtel Power Corporation (Bechtel) under contract to PP&L.

Mr. Curtis further stated that before 1970, PP&L forecast that it would need a substantial amount of new generating capacity to meet customer demand in the 1970's and beyond. To help fill that need, the company decided in 1970 to proceed with plans and preliminary engineering to build a large nuclear power plant. Design work started in September, 1970, and by December 1971, conceptual design was essentially complete. At that time, construction of Unit 1 was expected to begin in the fall of 1972, with commercial operation scheduled for October, 1978. Because of a delay in the receipt of a construction permit from the Atomic Energy Commission (AEC), construction did not actually begin until November, 1973. Construction of Unit 1 was completed and the plant loaded fuel on July 27, 1982. As noted earlier, commercial operation for Susquehanna Unit 1 began on June 8, 1983.

Bechtel was responsible for total plant design, with the exception of the NSSS, Turbine Generator, and the Advanced Control Room. These three major components were designed by General Electric. Although G.E. and Bechtel provided extensive design services for the project, PP&L had overall responsibility to ensure that Susquehanna would be a safe, reliable, and economical plant. PP&L established a staff of personnel to take an active role in

reviewing design specifications and drawings. Also, PP&L evaluated and approved all major engineering changes in order to maintain control of the design process as it evolved.

During the 1970's, Mr. Curtis testified, the number of nuclear safety and environmental regulations increased dramatically. These new standards imposed stricter design, manufacturing and construction requirements on Susquehanna and the remainder of the nuclear industry. When the various regulatory agencies ordered incorporation of new regulatory requirements, changes in design, fabrication, construction and testing were necessary. In many instances, extensive retrofitting was required which contributed to delays in the construction schedule. The new regulations required more and more new analysis, studies and tests. All phases of the design process required accumulation of substantial records to document engineering calculations. Mr. Curtis testified that regulatory changes and design evolution had a considerable effect on Susquehanna, particularly upon the cost of the project.

In addition, the series of events that occurred at Three Mile Island (TMI) on March 28, 1979, had a considerable effect on the Susquehanna project. As a result of the accident, many new safety regulations requiring hardware, procedural and documentation changes were initiated.

In addition to the hardware changes, various studies were required to analyze critical plant systems. Also, many new procedures, training programs and additional plant personnel were required to ensure plant safety. The direct cost of these improvements was considerable. Mr. Curtis also stated that the indirect costs associated with TMI, namely, effect on project schedule, were difficult to ascertain.

In summary, he testified, the TMI incident served to increase Susquehanna's scope, schedule and cost significantly. Mr. Curtis stated that not all

design changes on Susquehanna were a result of new regulations; some changes were incorporated to improve the operational capabilities of the plant.

The company's philosophy behind non-regulatory changes undertaken to improve operational capabilities was to minimize non-regulatory design changes. Only those changes that would provide cost-effective operability and maintainability enhancements were incorporated into the plant design. PP&L made Bechtel responsible for essentially all procurement. Bechtel also acted as PP&L's agent in administering the NSSS contract.

The general procedures used for procuring material and equipment, he stated, were similar to those used on most other nuclear construction projects. The respective engineering groups defined material and equipment requirements in the form of specifications. Agents or buyers then transmitted the approved specifications as bid requests to selected vendors. Upon receipt of bids, the Purchasing Department coordinated their evaluation and the recommendation of an award.

In order to effectively monitor Bechtel's performance in this area, PP&L, he stated, played an active role in the entire procurement process. Prior to bid solicitation, PP&L was responsible for reviewing and approving specifications and lists of approved bidders. After receipt of bids, PP&L reviewed Bechtel contract award recommendations and had the final approval authority. Mr. Curtis stated that throughout the course of the project, PP&L maintained an engineering staff which has been involved in establishing and maintaining standards of design quality.

He testified that PP&L also maintained an active role in design development. It directly managed many technical programs, defined requirements, established technical and schedule objectives and managed consultants with specialized experience in the investigation and resolutions of special work tasks.

It jointly developed the conceptual design of the project in conjunction with Bechtel and General Electric. It directed the preparation of the Preliminary Safety Analysis Report (PSAR) and participated with Bechtel, General Electric and other consultants in construction permit hearings and Nuclear Regulatory Commission (NRC) meetings. Its previous corporate experience in the design and construction of fossil plants was factored into the preliminary design. It prepared the Final Safety Analysis Report (FSAR) with input from Bechtel, G.E. and many consultants.

Mr. Curtis testified that the key decisions on the project have been made or reviewed for adequacy by PP&L. These decisions have been based upon corporate studies or recommendations of Bechtel, G.E. or consultants.

Mr. Curtis also stated that a high quality design control program has been in effect throughout the project. This program has been based upon formal procedures, work instructions, a change control program, formal transmittals of design data, design inputs and outputs, a strong architect engineer/nuclear steam system supplier/PP&L cooperation, special design reviews, and a substantial quality assurance program.

PP&L's construction management approach on Susquehanna was to utilize Bechtel to manage, apply cost control methods, schedule and be responsible for all construction of the project.

Mr. Curtis stated that PP&L's role was to provide project direction and to monitor contractors' performance against that direction. This definition of each group's responsibilities, he stated, minimized duplication of effort and fostered an efficient approach to managing the complex construction effort of Susquehanna.

Labor performance was closely monitored by utilizing both computerized and manual control systems. He stated, for example, that throughout the

construction process, production data was distributed to the executive management levels of both Bechtel and PP&L. When these documents indicated less than anticipated productivity, steps to uncover the causes were initiated, and corrective action was implemented. On the working level, productivity was monitored in great detail by Bechtel Cost Engineers who advised project supervision of individual crew performance. He testified that by using this data, construction superintendents were able to investigate problem areas and initiate corrective measures that had a beneficial effect on productivity.

Mr. Curtis testified that PP&L's management role has changed over the years in order to be more responsive to the project's needs. Since the beginning of the project, it has become more involved by increasing its personnel and performing more work itself and has implemented numerous management programs so as to improve project performance. PP&L established a site project manager in order to achieve better visibility and to provide more effective communications with the Bechtel project manager. It also initiated monthly project team review meetings between Bechtel and PP&L, which included executive management levels from both groups. It established and implemented an integrated scheduling group to provide a more cohesive measurement of project performance for use in management decision-making process.

Overall, as the project progressed and became more complex, Mr. Curtis testified, PP&L recognized the need for increased involvement. Mr. Curtis stated that PP&L assembled a sizeable staff to control and monitor costs on the Susquehanna project. It also used many control programs. For example, he testified, throughout the project various types of reports which tracked key cost factors were generated. Over the years, he stated, the contents and formats of the reports were modified in order to be more relevant and to focus on current issues.

These many tracking devices, he testified, enable project management to stay abreast of major cost developments as they occurred. In addition, PP&L frequently evaluated management effectiveness by initiating internal and third party audits. These audits evaluated performance in various areas including procurement practices, subcontractor administration, site security, Bechtel Engineering, etc.

Over the years, he stated, it has been a project policy to follow up on any deficiencies uncovered in the audits and take the necessary steps to correct the reported problems. In general, the many audits performed on Susquehanna have had a beneficial effect by identifying ways of improving management practices and thus improving project performance.

Mr. Curtis stated that PP&L utilized an aggressive scheduling technique for Susquehanna. Target dates were established and maintained as long as practical in order to foster a competitive environment on the Project. When it was felt that additional resources or overtime could promote schedule gains, PP&L actively pursued this course. Its effort in this area was sucessful, he stated, in that Susquehanna's construction duration was less than average for other similar plants constructed during the same time frame.

Mr. Curtis listed the most important factors that affected project costs as:

(a) New regulatory requirements

(b) Natural evolution and improvement of design

(c) Schedule delay

(d) Inflation

(e) Labor productivity

These factors, on an individual basis, were significant, he stated, but a greater impact was felt when collectively these factors interacted with each other to increase costs even further.

Susquehanna was similar to other nuclear plants constructed during this time frame, he stated, and was greatly affected by all of the above factors. While PP&L minimized cost increases where possible, the key factors that escalated costs were difficult or impossible to control.

Mr. Curtis believed that the basic fixed fee-cost reimbursable contract with Bechtel enabled PP&L to have a direct voice in the management of Susquehanna. The utility's active involvement in the design and licensing processes allowed it to stay abreast of regulatory developments. This awareness, he believed, was instrumental in preventing additional licensing and construction delays and was successful in making Susquehanna's construction duration one of the shortest when compared to similar facilities constructed in the same time frame. This shorter schedule minimized costs and enabled its customers to benefit much earlier from the energy produced by Susquehanna. It was his opinion that a total cost of $1.7 billion is reasonable and fair for such a project.

PP&L also presented Mr. Robert C. Traylor, Senior Vice-President of Management Analysis Company, who supervised a comprehensive evaluation of PP&L's management of the Susquehanna project. This audit, presented in the record as PP&L Exhibit RCI-1, concludes that the utility's management was effective and prudent. The audit specifically finds that (pp. 211-213):

> PP&L management decisions and actions relative to Susquehanna, evaluated during the conduct of this study, demonstrated that its management consistently understood its basic mission - to provide an adequate and reliable supply of electricity to its customers at a reasonable cost. The projected cost of Susquehanna as of December 1980, adjusted to dollars per kilowatt, was near average for plants compared in this study.

* * *

Our historical review of Susquehanna identified some areas in which PP&L's performance was considered superior to the nuclear utility industry. PP&L demonstrated a technical competence and awareness which we considered unusual and exceptional for a utility undertaking its first nuclear project. PP&L is currently recognized in the utility industry as a technical leader primarily due to the significant contributions and aggressiveness of the company in the analysis and resolution of the Boiling Water Reactor hydrodynamic load problems. We consider PP&L's emphasis on safety and reliability in the design and construction of the plant to be prudent and responsive to its obligations. The importance of safety to PP&L was paramount. Plant reliability was a major factor in all of PP&L's decisions, considering that the overall cost of generating electricity includes operations and maintenance.

* * *

The first objective of this study was to determine the propriety and accuracy of Susquehanna's cost estimates. The estimating process throughout the project fulfilled the criteria by which we evaluated it. The cost estimates were consistently prepared in sufficient detail to assure accuracy. Given the assumptions on which they were based, Susquehanna's cost estimates were proper and accurate. We do believe that optimistic schedule assumptions between 1977 and 1979 resulted in predictions of plant costs much lower than now realized.

* * *

The second objective of this study was to identify the major factors which influenced the cost and progress of Susquehanna. Our overall conclusion is that forces outside of PP&L's management control had the greatest impact on Susquehanna's cost and progress.

* * *

The third objective of this study was to determine whether management decisions and methods were prudent under the circumstances, recognizing that conditions have changed over time.

PP&L's initial decisions on Susquehanna consistently fulfilled our criteria for being proper. The decisions which we evaluated were prudent and the resultant action was reasonably taken.

> In managing the project, PP&L was aware of its responsibilities and was aggressive in fulfilling them. Notwithstanding those areas where the need for improvement was identified, PP&L's performance in managing the project was better than we expected of a utility building its first and only nuclear plant. In general, we find that in the circumstances of a highly turbulent environment, PP&L demonstrated prudent management by continual reassessment of project performance and formulation of strategies to deal with the potential changes of the future.
>
> The final objective ot this study was to determine whether Susquehanna's costs were proper and reasonable. . . . As a company, PP&L examined itself, was examined by others and changed when necessary to improve its effectiveness and efficiency in managing Susquehanna. Overall, we believe that PP&L's management of Susquehanna was both proper and reasonable.

b. OCA Position

The OCA, on the basis of testimony presented by its witnesses Minor and Bidenbaugh (OCA St. No. 3), proposes that some $182.5 million of Unit No. 1 costs be disallowed. This equates to a rate base adjustment of some $146,970,000. These disallowances fall within six cost groups and will be considered individually.

(1) Containment Problems

The Susquehanna containment structure is a concrete structure surrounding the nuclear reactor. Its purpose is to contain radioactivity in the event of failure of the reactor vessel or associated components. The containment concept at Susquehanna was developed by GE and is identified as a Mark II containment (PP&L St. R-5, p. 2). It consists of a drywell and a wetwell, which are separated by a concrete diaphragm slab.

The drywell surrounds the reactor and associated equipment. The wetwell is located directly underneath the drywell and contains 23 feet of water (Tr. 880). The wetwell serves as a suppression chamber to condense steam released from the drywell and thereby reduce the pressure exerted on the containment structure.

As explained on the record, a steam release could occur in two ways - from the opening of the safety relief valves (SRVs), or from a loss of coolant accident (LOCA). In the SRV system, 16 SRV lines are attached to the four primary steam lines which run from the reactor to the turbine. The steam released when the SRVs open travels down these four pipes, through the diaphragm slab and into the pressure suppression pool in the wetwell. This venting occurs as a part of normal reactor operations (PP&L St. R-5, p. 4).

The other source of a steam release is a loss of coolant accident, which could result from a major pipe break in the reactor cooling system. In the event of such an accident, large amounts of steam would be released into the drywell and would be vented into the wetwell through large downcomer vent pipes. In accordance with NRC requirements, Susquehanna is designed to withstand such an event (PP&L St. R-5, p. 5).

Steam released into the wetwell during SRV openings or LOCA creates forces or loads in the wetwell which may be transferred to the rest of the reactor building. The Mark II containment, such as that used at Susquehanna, was designed to withstand these conditions as they were understood at the time the Mark II containment was developed (PP&L St. R-5, pp. 2-3). It should be noted that the Atomic Energy Commission (AEC) approved the Mark II design and issued a number of construction licenses for plants with this design during the 1960's and 1970's, including Susquehanna in 1973 (PP&L St. R-5, pp. 2-3).

In the early 1970's, two independent problems began to be seen. At certain operating Mark I units (the predecessor to Mark II) it was discovered that SRV discharges into the wetwell caused vibration of the pool structure. This problem was first identified as potentially significant in late 1974 and early 1975. During the same period (1973-74), testing by GE on its then-new Mark III containment revealed that the hydrodynamic loads produced during a

hypothetical LOCA were greater than previously anticipated (PP&L St. R-5, pp. 4-5).

The NRC first notified BWR owners of these newly identified hydrodynamic loads in 1975, and required owners to evaluate and analyze these loads, and prove that their containments would meet the simultaneous occurrence of these loads and a 0.1g earthquake (PP&L St. R-5, p. 6).

After receiving notice from the NRC, PP&L formed a task force with Bechtel and GE to evaluate Susquehanna's design in light of the newly identified SRV and LOCA loads. A preliminary study completed by Bechtel in May 1975 recommended additional reinforcing steel and relocation of certain equipment. This recommendation was adopted, and the work was performed (PP&L St. R-5, p. 8).

At the same time, PP&L undertook the formation of BWR Owners' Group to study the newly identified SRV and LOCA loads in more detail (PP&L St. R-5, p. 7). PP&L subsequently discovered that the Owners' Group was not on a timetable which would satisfy Susquehanna's schedule requirements and looked elsewhere for a solution to these problems (PP&L St. R-5, p. 8). With respect to the SRV issue, PP&L believed that the SRV loads could be modified by the attachment of a "quencher" to the end of the SRV discharge pipes in the wetwell. PP&L contracted with Kraftwerk Union (KWU), a German company actively engaged in quencher design at that time, to design a special quencher for Susquehanna. This design was available by 1979 and was ultimately used in all but one Mark II plant in the nation as a solution to the new SRV loads (PP&L St. R-5, pp. 8-9).

With respect to the newly identified LOCA loads, while the problem was first identified in 1975, many years of further testing were required to determine the exact nature of these LOCA loads and what impact they would have in combination with SRV and earthquake loads. As with the SRV loads, PP&L

worked with the BWR Owners' Group and KWU to solve the problem. In 1980, KWU produced final design loads for Susquehanna which incorporated the effects of SRV, LOCA and a 0.1g earthquake. These loads were identified as Phase III loads (PP&L St. R-5, p. 9; OCA St. 3, p. 19).

The tests leading to the development of the Phase III loads demonstrated that the original containment design was sound and met all NRC requirements. However, implementation of the Phase III loads did require the installation of a large number of new pipe hangers and some rework to move or replace hangers and other equipment installed on the basis of earlier loads (PP&L St. R-5, p. 9).

Because the LOCA and SRV loading phenomena are imposed on the base mat which supports the containment, the reactor, and many critical piping systems making up the heart of the plant, almost every safety-related system required redesign and strengthening. Due to the problem of continuing construction while the loads were being finalized, PP&L had three different sets of loads used during the project life. Phase 0 loads were those initially used and Phases I and II were interim loads used from approximately 1977 through 1981. In March 1981, PP&L decided to go with loads supplied by KWU because the Mark II generic program was delayed. These loads, designated as Phase III, were used for the final design of hangers and supports. In resolving the Mark II problems at Susquehanna, thousands of piping and conduit support modifications were required, relocation of wetwell equipment was necessary, and strengthening of the containment diaphragm floor was required.

OCA argues that until 1974-1975, the SRV and LOCA load impacts upon the containment were overlooked in designing the plant. When these loads were first recognized, Unit No. 1 construction was well underway. Had PP&L acted sooner and been more diligent in the supervision of GE, these design deficiencies

could have been avoided. The OCA argues that the ratepayers should not be required to bear the costs of these oversights.

There is no support for this adjustment.

First, it is undisputed that PP&L's expenditures to solve the containment problem were necessary to build a safe and licensable plant. Failure to expend these dollars would have resulted in a completed plant without a license. PP&L's effort to evaluate and incorporate the new loads in the design of Susquehanna was prudent and essential to commercial operation of the plant and the investment to solve this problem should be recognized in rate base. Secondly, there is no showing 7/ that GE was imprudent in the design of the Mark II containment.

The record shows that GE analyzed both Mark I and Mark II containments and the Mark II design was repeatedly approved by the AEC and was purchased by many utilities. Additionally, OCA has failed to demonstrate that the containment problem was reasonably discoverable by GE at any earlier point in time. The SRV loads were first identified at operating Mark I plants (PP&L St. R-5, p. 4). The additional LOCA loads were discovered during testing at GE's Mark III test facility, which was not even constructed until 1973.

Finally, the problem here was not identifying the loads, but determining the impact of these loads on the plant and how to design for these impacts. As explained by Mr. Curtis (Tr. 2737):

> Q. Mr. Curtis, on page 2 of Mr. Bridenbaugh's surrebuttal at lines 19 to 22, he indicates that the test facilities and instrumentation design capabilities were such that they could have easily detected the load problems if the decision had been made to perform representative tests to confirm the Mark I and II designs.

7/ Assuming that the issue of GE's responsibility for any design deficiencies should be addressed here - an assumption the ALJ is not prepared to make.

Was detection of the loads the principal aspect of the containment problem?

A. The containment problem as experienced by both the Mark I and Mark II plants required approximately six or seven years to resolve. Identification of the major effects of those loads was identified quite early in the game and quite easily.

The major challenge was one of probing the causes of those effects, understanding the physical principles involved and the theory behind those principles then translating that into a significant determination of the loadings to be applied for design of structures and plant facilities.

It was in that latter area that the industry, including PP&L, experienced a great deal of difficulty in using existing technology to probe those areas. A good part of the program was developed to fundamental physics, understanding the phenomena relating to bubbles and water and a great deal of innovation was required for both analytical purposes and testing purposes to get to the end result.

Resolution of the new loads problem required years of study and analysis and was substantially aided by the development of new state of the art techniques in this field and by the use of more sophisticated testing facilities and instrumentation which were not available when the problem first arose.

In addition, there are serious deficiencies in the calculation of the $38.6 million adjustment sought by the OCA. This adjustment is divided into three parts: (1) $2.7 million for wetwell modification; (2) $32 million for pipe hanger rework; and (3) $3.8 million for an alleged excessive number of pipe hangers in Unit 1 (OCA St. 5B, Sched. 7, p. 3).

With respect to the $2.7 million in wetwell modifications, the evidence supports the conclusion that these modifications were not rework, but would have been incurred even if the containment problem had been solved originally.

Similarly, a substantial portion of the costs identified by the OCA for pipe hanger rework would have been incurred even without the new loads problem since, due to new NRC requirements and general design evolution, a hanger design based on the original hydrodynamic loads would not have been sufficient to obtain a license from the NRC (Tr. 961-62). Since PP&L's cost tracking system did not segregate hanger rework caused by new loads and hanger rework caused by other developments (PP&L St. R-3, p. 13), a substantial portion of the OCA adjustment is for work that would have occurred even without the new loads.

In addition, when the new loads were first identified in 1975, PP&L was faced with a choice of stopping work on the plant while the problem was resolved, or using a set of assumed loads and continuing construction in parallel with the containment technical program. PP&L chose the latter course. The record shows that at the time of these decisions, PP&L recognized that some rework might be required. The cost of this rework, most of which resulted from modification of pipe hangers, was small when compared to the cost penalty of not continuing and completing the plant with its attendant increase in AFUDC costs. Its decisions to proceed with those design and construction activities were made knowing that final test results and design loads being built into the plant would ultimately have to be reconciled. The fact that Susquehanna's Phase III loads were higher than earlier loads could not have been known at that time. Had it waited for Phase III loads, it would have risked project delays for potentially no reason, if the earlier load definition had been shown to be adequate. This was a prudent management decision.

The remainder of the OCA's containment direct cost adjustment is a $3.8 million deduction based on the current difference in number of hangers

between Unit 1 and Common, and Unit 2 (OCA St. 3B, Sch. 7, p. 3). This amounts to some 631 hangers. The record shows, however, that some 500 of the hangers included in this adjustment are located in the turbine building, which was not affected by the new loads problem (PP&L St. R-5, p. 14). Second, because Unit 2 is not complete and more hangers are currently being added, the number of so-called excess hangers is overstated.

(2) Schedule Delays

The OCA argues that the record here indicates that plant construction was delayed by one year as a result of the failure to calculate correctly the hydrodynamic loads for the plant. Considering, however, all activities which occurred in the final stages of the project, the OCA recommends that the six month delay immediately preceding fuel load and Unit 1 (from February 27, 1982 to July 27, 1982) be considered as related to the containment loads modifications and that rate base be reduced by $125 million ($100.7 million on a jurisdictional basis).

There is no evidence to support a finding that the new loads problem was by itself responsible for a delay in fuel load for six or twelve months. While there is no doubt that this containment problem increased the work at this project, so did several other critical activities. The existence of all these factors prevented fuel load from occurring prior to July 1982. These factors, shown in Attachment 1 to PP&L Statement R-5 and attached to this decision as Appendix A, demonstrate that many activities impacted the loading of fuel.

In addition, the six-month figure has no record support. Indeed, the only support is contained in OCA Statement No. 3, pp. 42-43, where the OCA witnesses state:

Forecast II reflected a delayed fuel load of approximately one year, primarily to permit such changes. Because of concern expressed by PP&L that the NRC might have delayed fuel load through a delay in licensing even if containment were not an issue, we have decided to reduce the project delay adjustment to less than the full year. Monthly reports (e.g. January 1982) indicated that licensing was no longer considered critical as of year-end 1981 and Mr. Curtis confirmed that fact upon cross-examination (Tr. 1048). We therefore recommended a cost reduction equivalent to the extra project management and AFUDC costs related to a six months delay period (January-June 1982).

Even if licensing were not on the critical path to completion in December 1981 as asserted by MHB, this hardly supports an adjustment of $100 million. All this means is that some other area or areas were then projected to take at least one day longer than licensing, and that areas other than licensing prevented fuel load prior to July 1982.

The OCA's six-month schedule adjustment is not supported by any meaningful record evidence and should therefore be rejected.

Furthermore, as stated earlier, I find no evidence to substantiate the claim that PP&L was imprudent with respect to the problems arising out of the containment structure.

(3) Intergranular Stress Corrosion Cracking

OCA proposes a $2.1 million ($1.7 million on a PUC jurisdictional basis) adjustment for improvements to certain piping designed to reduce the possibility of intergranular stress corrosion cracking (IGSCC) (OCA St. No. 3, pp. 27-28).

The OCA adjustment is based on PP&L's contention that GE is responsible for the costs associated with IGSCC. According to PP&L, GE argues that the work associated with IGSCC produced an improved product which will require less maintenance, and that no contract adjustment is appropriate (PP&L

APPENDIX E

Opinion and Order of
Pa. P.U.C.

(August 22, 1983; R-822169)

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P.O. BOX 3265, HARRISBURG, Pa. 17120

8/22/83

August 22, 1983

IN REPLY PLEASE
REFER TO OUR FILE
R-822169, etc.

TO WHOM IT MAY CONCERN

Pennsylvania Public Utility Commission, et al.
v.
Pennsylvania Power & Light Company

To Whom It May Concern:

This is to advise you that an Opinion and Order has been adopted by the Commission in Public Meeting on August 19, 1983, in the above entitled proceeding.

A copy of this Opinion and Order has been enclosed for your records.

Very truly yours,

Jerry Rich, Secretary

jr/fao/tw
Encls.
Cert. Mail

The Company's final Exception asserts that if some sharing of the risk is deemed appropriate, the Commission should adopt the proposal of Trial Staff witness Giordano, who proposed that we adopt a method recently employed by the Iowa Public Service Commission. (Trial Staff Stmt. No. 17). We agree with the ALJ's determination that the record simply does not support the adoption of this adjustment, and we concur with the conclusion of the ALJ.

In the final analysis, the ALJ's recommendation is clearly supported by the record, and is in accordance with Commission precedent. We therefore adopt the same for our ratemaking determinations herein and the Company's exceptions are denied.

2. Cost of Susquehanna Construction

The OCA and Trial Staff proposed certain adjustments to the claimed cost of Susquehanna construction. The OCA proposed the disallowance of $182.5 million of Unit 1 costs, which would reduce the jurisdictional rate base by $146,970,000. The disallowances fall into the following categories: containment problems, schedule delays, inter granular stress corrosion cracking (IGSCC), electrical equipment, expansion anchors, Advanced Control Room, and hydrodynamic load studies.

The ALJ rejected every adjustment proposed by the OCA relative to the costs of the Susquehanna Unit 1 contruction project. The OCA has taken strong exception.[17]

In light of ALJ Klovekorn's concise and cogent summary of the testimony and description of the alleged design and construction deficiencies, we shall make every effort not to be unduly repetitious.

a. Containment Problem and Schedule Delays

During the course of constructing Unit 1, certain hydrodynamic loads produced during a hypothetical loss of coolant accident (LOCA) were greater than previously anticipated. When the extent of the design deficiency was subsequently recognized, extensive rework and redesign became necessary. OCA seeks the disallowance of some $38.57 million[18] which is its estimate of the cost of redesigning and reworking the nuclear equipment as a result of the disparity in hydrodynamic load. Additionally, OCA asserts that the delay caused by the efforts to correct this design deficiency resulted in additional costs of approximately $125 million. (OCA, Main Brief, pp. 91-92; OCA, Stmt. 3, p. 43; R.D., p. 64).

17/ The City of Harrisburg supports the arguments contained in the OCA's Exceptions. (City of Harrisburg Exceptions, pp. 8-9).

18/ The OCA adjustment has three components: (1) $2.7 million for wet well modification; (2) $32 million for pipe hanger rework and (3) $3.8 million for an alleged excessive number of pipe hangers in Unit 1. (OCA Stmt. 5B, Sched. 7, p. 3; R.D., p. 62).

Based upon a thorough consideration of PP&L's management philosophies during the design and construction of the Susquehanna project, and a detailed analysis of OCA's arguments relative to its proposed adjustments, the ALJ concluded that there is no support for the $38.6 million adjustment because (1) it is undisputed that PP&L's expenditures to solve the containment problem were necessary to build a safe and licensable plant; (2) PP&L's efforts to evaluate and incorporate the new loads in the design of Susquehanna were prudent and essential to commercial operation of the plant; (3) the record does not demonstrate that the containment problem was reasonably discoverable at an earlier point in time; (4) the problem was not in identifying the loads, but determining the impact of the loads on the plant and how to design for the impact; (5) there is no showing that General Electric was imprudent in the design of the containment; (6) there are serious deficiencies in the components of the $38.6 million adjustment. Likewise, the ALJ rejects the $125 million proposed adjustment because (1) there is no evidence to support a finding that the "new load" problem was solely responsible for the specified delay in fuel load; (2) the six-month period incorporated into the $125 million adjustment has no evidentiary support; (3) PP&L was not imprudent. (See generally, R.D. pp. 60-65).

By way of its exceptions, OCA merely reiterates arguments previously advanced and contends that if Unit 1 had been properly designed and constructed initially, the additional costs would have been avoided. (OCA Exceptions, p. 13)

As recognized by the ALJ and further noted in PP&L's Reply Exceptions (PP&L Reply Exceptions, p. 11), it is undisputed that PP&L's expenditures to solve the containment problem were necessary to ensure the safety and licensability of the plant. Moreover, there is absolutely no evidentiary support for the proposition that the level of control which PP&L exercised over General Electric was such as to impute imprudence to PP&L or to result in a direct act of imprudence on the part of PP&L.

In the final analysis, the ALJ's disposition of these adjustments is consistent with the standards heretofore developed by the Commission. The OCA raises no new issues in its exceptions which are sufficient to rebut the factual and legal conclusions reached by the ALJ.

Accordingly, we adopt the ALJ's rejection of both the $38.5 million and $125 million adjustments.

b. Inter Granular Stress Corrosion Cracking

The OCA has proposed an adjustment in the amount of $2.1 million ($1.7 million on a Pa. jurisdictional basis) for improvements to certain piping designed to reduce the possibility of inter granular stress corrosion cracking (IGSCC). The ALJ has recommended rejection of this adjustment and the OCA has excepted.

APPENDIX F

Petition for Reconsideration of the Office of Consumer Advocate

(September 14, 1983; R-822169)

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	:	
v.	:	R-822169
PENNSYLVANIA POWER & LIGHT COMPANY	:	

PETITION OF THE OFFICE OF CONSUMER ADVOCATE
FOR RECONSIDERATION

I. INTRODUCTION

1. The Office of Consumer Advocate (OCA), a party to the above-captioned rate proceeding, hereby petitions the Pennsylvania Public Utility Commission (Commission or PUC), pursuant to 66 Pa. C.S. §703(g), to reconsider its Order entered August 22, 1983 in this proceeding.

2. The PUC set forth the standards for reconsideration of a Commission Order in Philip Duick v. Pennsylvania Gas and Water Company, C-R0597001, Order Entered Jan. 4, 1983, as follows:

> A petition for reconsideration, under the provisions of 66 Pa. C.S. §703(g), may properly raise any matters designed to convince the Commission that it should exercise its discretion under this code section to rescind or amend a prior order in whole or in part. In this regard we agree with the Court in the Pennsylvania Railroad Company case, wherein it was said that "[p]arties..., cannot be permitted by a second motion to review and reconsider, to raise the same questions which were specifically considered and decided against them...." What we expect to see raised in petitions . . .

are new and novel arguments, not previously heard, or considerations which appear to have been overlooked or not addressed by the Commission.

Order at 6 (Emphasis added).

3. In the present proceeding, the OCA respectfully avers that the Commission Order either overlooked or failed to address certain legal and/or factual arguments raised by parties below which, if accepted, would require the Commission to rescind or amend its August 22, 1983, Order in several respects. As more fully set forth below, the specific aspects of the Commission Order on which the OCA seeks reconsideration are: 1) the cost of constructing Susquehanna Steam Electric Station, Unit 1 (Order at 22-27); 2) the disposition of Susquehanna "energy savings" in light of the Commission's inclusion of the great majority of Susquehanna's capital costs in rate base (Order at 74-76); 3) the reversal of the Commission's prior rate case decision with regard to the amortization of consolidated tax savings generated by the Oneida Mining Company (Order at 67-68); and 4) the failure of the Commission to apply the provisions of 66 Pa. C.S. §1315 and §102, to the Company's claims for plant held for future use and the amortization of abandonment losses on the Stony Creek project (Order at 8-9, 50-51). The grounds for the present Petition are as follows:

II. THE COMMISSION ORDER WITH RESPECT TO THE COST OF CONSTRUCTING SUSQUEHANNA UNIT 1 DISREGARDS AN ESTABLISHED LINE OF COMMISSION PRECEDENT, IMPOSES AN INAPPROPRIATE LEGAL STANDARD IN DETERMINING THE INCLUSION OF CONSTRUCTION COSTS IN RATES, AND REPRESENTS A DEPARTURE FROM PROPER RATEMAKING PRINCIPLES WITH RESPECT TO CONSTRUCTION COST CLAIMS.

A. Introduction.

1. The PUC in its Order in the above case made various decisions concerning the cost of constructing the Susquehanna Steam

Electric Station, Unit 1 (hereinafter Unit 1). Order at 22-27. The Commission denied each construction cost adjustment proposed by the OCA and the Trial Staff, except for a minor reallocation of certain hydrodynamic load studies between Units 1 and 2. Order at 26. The OCA avers that in making these determinations the Commission erred as follows:

B. The PUC's Disposition Of The Construction Cost Adjustments Proposed By OCA And Staff Is Inconsistent With The Standards Previously Developed By The Commission.

1. The PUC states with respect to the OCA's proposed adjustments concerning hydrodynamic loads: "In the final analysis, the ALJ's disposition of these adjustments is consistent with the standards heretofore developed by the Commission." Order at 23.

2. The OCA submits that, to the extent the PUC concluded that any rate base adjustment caused by construction deficiencies must await some determination of responsibility among PP&L and its contractors, such policy clearly conflicts with the decisions of this Commission in the prior cases in which this issue was addressed.

In prior cases, the Commission has never held that an adjustment to rate base must be predicated on a finding of direct fault by the utility itself or that such an adjustment must await the outcome of litigation between a utility and its contractors. Rather, as the Commission stated in ordering a rate base adjustment as a result of faulty construction at TMI Unit 1:

> Regardless of subsequent litigation which may determine responsibility for the faulty concrete pour at TMI we are of the opinion that respondents' ratepayers should not be made to bear this burden.

Pa. PUC v. Metropolitan Edison, R.I.D. 170, 50 Pa. PUC 82, 102 (June 22, 1976). Similarly, in a later case with respect to TMI Unit 2, the Commission held:

> [W]hile Respondent asserts that it should not bear any costs that are not recovered in its pending suit against Lonergan & Company, we believe that this situation is analogous to that of the TMI-I girder ring, (R.I.D. 170-171, 50 Pa. PUC 77, 102) and as there, we are of the opinion that Respondent's ratepayers should not be made to bear the burden of the costs of replacing the malfunctioning steam valves, for it was the Respondent not its ratepayers which selected the contractor to provide the valves and Respondent and its stockholders should bear the risk of performance failure.

Pa. PUC v. Metropolitan Edison Co., R.I.D. 626, at 14, 28 PUC 4th 555, 563 (March 22, 1979).

3. The OCA submits that by proposing that all resolution of these construction cost adjustments must await a determination of fault among PP&L and its contractors, the PUC has apparently overlooked or disregarded the standards set forth above, and its Order thus runs directly contrary to an established line of precedent.

4. As in the case of TMI, the OCA submits that ratepayers should not bear the cost of construction deficiencies whether they are caused by the utility or its contractors. By this Petition for Reconsideration, the OCA respectfully requests that the Commission reconfirm the standard set forth in the TMI cases quoted above and reject any intimations that ratepayers must bear the cost of faulty construction work unless and until the specific party at fault can be identified.

C. The PUC Must Not Defer Any Ratemaking Adjustment To The Cost Of Constructing Unit 1 Until All Contractual Litigation Is Resolved.

1. During the course of constructing Unit 1, as in any large utility construction project, PP&L, the architect/engineer (Bechtel), and the other contractors involved in the project (e.g. General Electric), entered into various agreements which control and limit the

rights and obligations of these parties during the course of the project and afterwards. In this case, the terms and conditions of these contracts control and limit to some extent the rights of the parties to recover from each other through subsequent litigation and related negotiation the costs of correcting certain construction deficiencies.

2. In rejecting the OCA adjustment concerning intergranular stress corrosion cracking, the Commission quoted the Recommended Decision as follows:

> These claims will someday be litigated. In that forum it might be shown that PP&L is right. On the other hand, GE might be right that it has no responsibility for this problem. When this is litigated, after completion of Susquehanna Unit 2 in 1984, the appropriate rate base treatment can be determined.

(R.D., p. 66). We agree. As further noted by the ALJ, any adjustment at this time could act as a disincentive to a utility to contest what it considers to be improper charges.

The ALJ's recommendation is adopted, and PP&L is directed to report in its next rate case as to the status of its claim against GE.

Order at 24. In the discussion of various other construction cost adjustments, the Commission similarly directs PP&L to report back as to the progress which it has made in litigating or negotiating further claims.

3. By this Order the PUC has implied that just as a utility is restricted in the damages it may collect against its contractors by the terms of its agreements with its contractors, so shall the PUC be restricted from reducing the rate base of the utility by these same terms of agreement. The OCA submits that whether "PP&L is right" or "GE is right" concerning various contractual claims, ratepayers should not be held responsible for excessive construction costs.

4. Currently, PP&L has under construction the Susquehanna Steam Electric Station, Unit No. 2. Other nuclear units currently planned or under construction, which are at least partially owned by Pennsylvania utilities, include Limerick Units 1 & 2, Perry Units 1 & 2, and Beaver Valley Unit 2. The various contractual terms and conditions entered into by the parties to these contruction projects are not filed as a matter of record with this Commission and have certainly not been approved as a matter of ratemaking policy.

5. The OCA submits that it would be inappropriate to establish a policy of allowing the private contracts of the parties to a large utility construction project to control the decisions of this Commission in this, as well as future cases. This Commission does not control these contractual terms and conditions, and, in the present case, these contractual terms and conditions were not even made a part of the record.

6. Such a policy effectively places the ratemaking duty of valuing the used and useful property of a utility under 66 Pa. C.S. §1311 on the contracting parties. Such deference to the "unsupervised contracts of unregulated third parties" is inconsistent with the PUC's duty to establish reasonable rates. National Fuel Gas Distribution Corporation v. Pa. PUC, No. 11 C.D. 1982, issued August 4, 1983, n.8.

7. "Such a policy also effectively removes from the utility any financial incentive to actively pursue the contractors responsibile for these identified deficiencies and aggressively bring to completion the ensuing litigation or negotiation." As long as ratepayers are to be charged for every dollar spent unless and until the utility and its contractors come to some resolution of the dispute through litigation or

some other process, the utility has no incentive to seek prompt or complete satisfaction of its claims. Such a process is nothing short of a surrender of the Commission's power to assess the proper level of construction costs to be included within rates.

8. By this Petition, the OCA therefore respectfully requests that the Commission reject any intimation that its power to make ratemaking adjustments with regard to construction costs can or should be limited by the contractual rights of the parties. Rather, the Commission should make it clear that it will disallow any construction costs that are unnecessarily or imprudently incurred and that it will disallow costs for faulty construction work which does not prove to be used and useful to ratepayers. Applying that standard to the evidence in this case, the OCA submits that the Commission's Order with regard to Susquehanna Unit 1 construction costs must be rescinded, and that the OCA's proposed adjustments must be adopted.

D. PP&L May Not Escape Liability For Its Contractors' Actions Simply By Delegating Its Duties To Those Contractors.

1. In the PUC's discussion of the OCA proposed adjustment related to hydrodynamic loads, the Commission states as follows:

> Moreover, there is absolutely no evidentiary support for the proposition that the level of control which PP&L exercised over General Electric was such as to impute imprudence to PP&L or to result in a direct act of imprudence on the part of PP&L.

Order at 23.

2. OCA submits that PP&L, or any other utility engaged in a major construction project, cannot avoid responsibility for any errors occurring in the construction project by simply avoiding a close level of control over the contractor which has committed these construction errors.

3. The OCA submits that PP&L, or any other utility which constructs a major generating facility, has a special obligation to closely supervise those parties actually constructing the project whose costs the ratepayers will later be asked to bear.

4. Moreover, the result of the Commission's standard as proposed here would be to charge ratepayers for the faulty work of PP&L's contractors simply because their imprudence could not be directly attributed to PP&L. As noted above, such a standard is contrary to Commission precedent and constitutes inappropriate ratemaking policy for this and future cases.

E. Construction Cost Adjustments May Not Be Denied Merely Because Construction Deficiencies Are Safety Related Or Are Common In The Nuclear Industry.

1. In discussing the OCA adjustments related to expansion anchors and the advanced control room, the PUC notes that the errors related to this equipment were not unique to PP&L but were industry-wide in nature. Order at 25.

2. The OCA submits that the mere fact that many other utilities and their contractors made the same errors as PP&L in installing nuclear equipment does not justify imposing upon PP&L ratepayers the full costs of these errors. Such a policy would only insulate the nuclear industry from the costs of its most frequent mistakes and allow the failures of the nuclear industry to control PUC ratemaking.

3. In discussing the adjustments proposed by the OCA related to the reconstruction of the containment caused by a reassessment of hydrodynamic loads and the rework of certain expansion anchors, the PUC concluded that any adjustments in these areas would be improper, as the

costs related to the construction rework in these areas were necessary to ensure the safety and licensability of the plant. Order at 23, 25.

4. OCA submits that merely because the correction of a deficiency in the construction of a nuclear plant is necessary to ensure its safe operation does not necessarily preclude any ratemaking adjustment which is associated with these various safety related deficiencies. Moreover, the fact that the error is so significant that the safety and licensability of the plant is called into question should not mean that the cost of correcting these errors must necessarily be borne by the ratepayer.

5. The OCA submits that in considering a rate base adjustment for construction of a nuclear unit, the inquiry should not be confined to whether or not the identified error was common to all similar facilities or whether it concerned the safety and licensability of the plant. Rather, the Commission must consider whether construction expenditures were prudent and reasonable and whether the expenditures produced facilities which are used and useful to the ratepayers. Just as Met-Ed ratepayers were not required to pay for the original faulty concrete pour at TMI-1, PP&L ratepayers should not have to pay for the original faulty containment design at Susquehanna 1.

F. PP&L's Failure To Quantify The Cost Of Construction Deficiencies May Not Be Permitted To Form The Basis For A Denial Of Any Related Ratemaking Adjustments.

1. In the discussion of the OCA contruction cost adjustments related to hydrodynamic loads and electrical equipment, and the comparable Trial Staff adjustments, the PUC cites as a justification for its rejection of these ratemaking adjustments the contention that the amount of the adjustment has not been properly quantified. Order at 23, 25, 26.

2. In each of these instances the adjustment proposed was based upon a deficiency in the contruction of Unit 1 which PP&L itself had identified.

3. Despite the efforts of OCA and Trial Staff, PP&L refused to quantify the cost of correcting these deficiencies.

4. OCA submits that it is unfair to allow PP&L to avoid such ratemaking adjustments merely by refusing to provide a quantification of the costs related to these deficiencies. By accepting the utility's unwillingness to produce a quantification of the costs of errors in its own construction project, the PUC allows the utility to avoid any ratemaking adjustment even when the errors are admitted. The PUC thus improperly shifts the burden of proof with regard to the reasonableness of construction costs from the utility to its ratepayers.

G. Conclusion.

1. As demonstrated by the above arguments, the OCA is concerned that the Commission in this Order not only has rejected any construction adjustments in this case, but has set forth a series of standards under which it may be virtually impossible to establish the propriety of such adjustments in the future. If this Order is permitted to stand as is, it may be construed to stand for the proposition that a construction adjustment will only be permitted if the party proposing the adjustment can perfectly quantify any cost overruns, and prove that these excessive costs were caused by an imprudent act of the utility (as opposed to its contractor); that responsibility for the cost had been established in any pending or proposed civil litigation; and that the construction deficiency was not safety-related or common to other similar plants.

2. The OCA respectfully asks the Commission to reconsider and modify the standards which were apparently applied in this case. Rather, the Commission should make it clear that it will disallow any construction costs that are unnecessary or imprudently incurred, and that it will disallow costs for any faulty construction work which does not prove to be used and useful to the ratepayers.

Applying that standard to the evidence in this case, the Commission must therefore modify its order with respect to Susquehanna Unit 1 construction costs and grant the specific adjustments proposed by the OCA.

III. THE COMMISSION ORDER WITH RESPECT TO SUSQUEHANNA ENERGY SAVINGS IS INCONSISTENT WITH ITS EXCESS CAPACITY ADJUSTMENT AND IS CONTRARY TO SOUND RATEMAKING POLICY.

A. The Commission Order Fails To Recognize The Explicit Link Between The OCA Excess Capacity Adjustment And The OCA Recommendation That Ratepayers Actually Receive The Pro Forma Energy Savings Used By The Company To Justify The Inclusion Of Any Part Of Susquehanna In Rate Base.

1. At page 20-21 of its Order, the Commission correctly noted that:

> In the instant proceeding, the OCA advanced three alternative methods of quantifying the excess capacity to be removed from rate base.... After a thorough analysis of the methods advanced for making the excess capacity adjustment (R.D., pp. 45-48), ALJ Klovekorn found most reasonable one of the methods advanced by the OCA. We agree that the method recommended by the ALJ, which utilizes a cross section of the net depreciated value of all of PP&L's plant, is clearly supported by the record.

2. As shown on Table III of the Commission's Order, the effect of this adjustment was to reduce the Company's net plant in service by $287,189,000. The bulk of the Company's $1.5 billion

APPENDIX G

Opinion and Order Upon Reconsideration of
Pa. P.U.C.

(December, 1983; R-822169)

PENNSYLVANIA
PUBLIC UTILITY COMMISSION
Harrisburg, PA 17120

Public Meeting held November 22, 1983

Commissioners Present:

Linda C. Taliaferro, Chairman
Michael Johnson, dissenting
James H. Cawley

Pennsylvania Public Utility Commission
v. R-822169
Pennsylvania Power & Light Company

OPINION AND ORDER UPON RECONSIDERATION

BY THE COMMISSION:

Before us for review are the Petitions for Reconsideration, separately filed by the Lehigh Valley Power Committee ("LVPC"), the Office of Consumer Advocate ("OCA"), and Branch 39 of the Utility Consumers Union of CEPA ("CEPA"), on September 6, 1983, September 14, 1983, and September 20, 1983, respectively, to our Opinion and Order, entered August 22, 1983, in the above-captioned proceeding. For the reasons more fully enunciated hereinbelow, we are of the opinion that the Petitions for Reconsideration filed by the above-named parties shall be denied.

BACKGROUND

By Opinion and Order entered August 22, 1983, the Commission granted Pennsylvania Power & Light Company ("PP&L" or the "Company") permission to file tariffs or tariff supplements, effective for service rendered on and after August 22, 1983, designed to produce total annual operating revenues, excluding tax surcharge revenue, of $1,389,625,000 (an increase of $203,346,000). On August 24, 1983, the Company filed Supplement No. 6 to its Tariff Electric-Pa. P.U.C. No. 199.

On September 6, 1983, the LVPC, pursuant to the provisions of 1 Pa. Code §35.241 and 52 Pa. Code §3.291,[1/] filed a Petition for Reconsideration of our Opinion and Order, entered August 22, 1983. In its petition, the LVPC contends, inter alia, that the Commission erred in not adopting the Administrative Law Judge's cost of service, revenue allocation and rate design recommendations. On September 14, 1983, PP&L filed a motion to dismiss the petition filed by LVPC, averring that the petition fails to state a legally sufficient ground upon which reconsideration could be granted. On September 26, 1983, LVPC filed a Supplementary

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1/ 52 Pa. Code §3.291 superceded the provisions of 1 Pa. Code §35.241 relating to application for rehearing or reconsideration.

Analysis of the Commission's August 22, 1983 Opinion and Order. PP&L, on October 14, 1983, filed a motion to strike the Supplementary Analysis of LVPC.

On September 14, 1983, the OCA, pursuant to 66 Pa. C.S. §703(b),[2] filed a Petition for Reconsideration of our Opinion and Order, entered August 22, 1983. In its petition, the OCA argues that the Commission "overlooked or failed to address certain legal and/or factual arguments . . ." and requests that the Commission reconsider its decision. On September 26, 1983, the Company filed a motion to dismiss the OCA's Petition for Reconsideration.

On September 20, 1983, CEPA petitioned the Commission to reconsider its Opinion and Order, entered August 22, 1983. In its Petition for Reconsideration, CEPA argues that the Commission "failed to address and substantively overlooked" CEPA's proposal to totally exclude Susquehanna Unit I from rate base. On September 30, 1983, PP&L filed a motion to dismiss CEPA's Petition for Reconsideration.

At its Public Meeting of September 16, 1983, the Commission, by separate Opinion and Orders, entered on September 19, 1983, granted reconsideration pending a review of the merits of LVPC's Petition and the OCA's Petition.[3]

DISCUSSION

PP&L's motion to dismiss the petitions for reconsideration, in large part, is devoted to argument of the proposition that the petitions fail to meet the standard for reconsideration because the parties (LVPC, the OCA, and CEPA) provided no newly discovered evidence and demonstrated no significant change of circumstances since the Commission's August 22, 1983 Opinion and Order. While it may be, as the Court said in Paradise v. Pa. P.U.C., 184 Pa. Superior Ct. 8, 15-6, 132 A.2d 754 (1957), that "the line of demarcation between a rehearing under Section 1006 and an independent inquiry by the Commission under Section 1007 may frequently

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2/ 66 Pa. C.S. §703(g) states, in pertinent part, that, "the Commission may, at any time, after notice and after opportunity to be heard ..., rescind or amend any order made by it."

3/ The Commission must act upon a Petition for Reconsideration within thirty (30) days from entry of its order or lose its power to act on that item if an appeal to the Commonwealth Court is timely filed. Pa. R.A.P. 1701(b)(3)(c) and 1512(a)(1). The Commission granted a review of its August 22, 1983 Opinion and Order pending a review of the merits of the petitions of LVPC and the OCA. The Commission's Opinion and Order specifically stated that matters raised, in LVPC's petition, related to PP&L's compliance filings would not be considered in its review. CEPA's Petition for Reconsideration was filed after our Public Meeting of September 16, 1983, which was the last public meeting within thirty days from entry of our August 22, 1983 Opinion and Order.

be very faint . . .",[4] we believe the line can be drawn and that recent case decisions, by the courts, have clarified the historic confusion.

In support of its proposition, the Company states that "the proper function of a Section 1007 (recodified as Section 703(g)) petition is to allow the P.U.C. to reconsider a previous [Opinion and] Order in light of newly discovered evidence or a change in circumstances",[5] citing Brinks, Inc. v. Pa. P.U.C., 16 Pa. Commonwealth Ct. 319, 328 A.2d 582 (1974), as being supportive of its proposition. While it is true, that the Court in Brinks stated that "the proper function of a Section 1007 petition is to allow the P.U.C. to reconsider a previous order in light of newly discovered evidence or a change in circumstances" (328 A.2d at 584), citing Crooks v. Pa. P.U.C., 1 Pa. Commonwealth 583, 276 A.2d 364 (1971), the Court inaccurately characterized the Court's holding in Crooks and many prior cases. The thrust of the Court's holding in Crooks, was that a Section 1007 petition seeking reopening of the record was proper even though the statutory 15 days period for filing a petition for rehearing had run, when it is based upon evidence discovered thereafter.[6] The Court's inaccuracy in Brinks was when it said "the purpose" rather than "a purpose". All of the decisions cited in our footnote, below, which address the subject of whether matters normally thought proper only for a petition for rehearing may be considered as a petition for reconsideration, contemplate that a petition seeking reopening because of newly discovered evidence, discovered or which came into being after the statutory period for filing a petition for reconsideration had run, is merely one matter which may be considered upon reconsideration, rather than the exclusive matter to be entertained.

The language frequently seen in Commission decisions regarding reconsideration, that is "new matters and new or changed conditions", seems to have had its genesis in the Pennsylvania Railroad case, or cases following it. In those cases, there was a petition to reopen after the period for a petition for rehearing had run, and the court found the pleadings deficient as petitions under Section 1007, because of the failure to allege "new matters or changed conditions," arising after the period for filing a petition for rehearing and/or appeal had run. Their language then has been repeated by both the courts and the Commission as if "new matters or changed conditions" are the sole and

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4/ Now 66 Pa. C.S. §§703(f) and (g), respectively.

5/ PP&L's Motion to Dismiss LVPC's Petition for Reconsideration, p. 4; PP&L's Motion to Dismiss OCA's Petition for Reconsideration, p. 3; PP&L's Motion to Dismiss CEPA's Petition for Reconsideration, p. 3-4.

6/ Accord, Pennsylvania Railroad Company v. Public Service Commission, 118 Pa. Superior Ct. 380, 179 A. 850 (1935); Beaver Valley Water Company v. Pa. P.U.C., 140 Pa. Superior Ct. 297, 14 A.2d 205 (1940); Department of Highways v. Pa. P.U.C., 197 Pa. Superior Ct. 350, 178 A.2d 820 (1962).

exclusive basis for a petition for reconsideration. Such is clearly not the case.

We view the situation as follows:

1. A petition for rehearing, under the provisions of 66 Pa. C.S. §703(f), properly must seek the reopening of the record for the introduction of additional evidence of some sort. As grounds therefore it must allege newly discovered evidence, not discoverable through the exercise of due diligence prior to the close of the record. P.U.C. v. Reading Company, 21 Pa. Commonwealth Ct. 334, 338, 345 A.2d 311 (1975); Mobilfone v. Pa. P.U.C., 24 Pa. Commonwealth Ct. 243, 355 A.2d 611 (1975); Abramson v. Pa. P.U.C., 489 Pa. 267, 414 A.2d 60 (1980).

2. A petition seeking reopening of the record (more properly one for rehearing) may be entertained as a petition for reconsideration, under the provisions of 66 Pa. C.S. §703(g), if the newly discovered evidence, was not in existence, or was not discoverable through the exercise of due diligence, prior to the expiration of the time within which to file a petition for rehearing, under the provisions of 66 Pa. C.S. §703(f). Pennsylvania Railroad Company v. Public Service Comm., 118 Pa. Superior Ct. 380, 179 A 850 (1935); Beaver Valley Water Co. v. Pa. P.U.C., 140 Pa. Superior Ct. 297, 14 A.2d 205 (1940); Dept. of Highways v. Pa. P.U.C., 197 Pa. Superior Ct. 350, 178 A.2d 820 (1962); Crooks v. Pa. P.U.C., 1 Pa. Commonwealth Ct. 583, 276 A.2d 364 (1971).

3. A petition for reconsideration, under the provisions of 66 Pa. C.S. §703(g), may properly raise any matters designed to convince the Commission that it should exercise its discretion under this code section to rescind or amend a prior order in whole or in part. In this regard, we agree with the Court in the Pennsylvania Railroad Company case, wherein it was said that "[p]arties..., cannot be permitted by a second motion to review and reconsider, to raise the same questions which were specifically considered and decided against them..." What we expect to see raised in such petitions are new and novel arguments, not previously heard, or considerations which appear to have been overlooked or not addressed by the Commission. Absent such matters being presented, we consider it unlikely that a party will succeed in persuading us that our initial decision on a matter or issue was either unwise or in error.

Based upon the foregoing discussion, we conclude that the first proposition urged by the Company, that is, that the instant petitions fail to meet the requirements of a petition for reconsideration because the parties had no newly discovered evidence and demonstrated no significant change of circumstance since the Commission's Opinion and Order, is not well founded, in that a petition for reconsideration under the provisions of 66 Pa. C.S. §703(g), need not plead such matters.

We will now consider the merits of the petitions for reconsideration.

PETITION FOR RECONSIDERATION OF LVPC

The gravamen of the arguments raised, in LVPC's Petition for Reconsideration, is that the Commission's Opinion and Order has cavalierly rejected the respective positions of the various parties in favor of the Company's position. It is LVPC's contention that the Commission has failed to recognize the substantial evidence of record which rebuts the Company's position. Without reconsideration and explanation, avers LVPC, the existing Opinion and Order in this proceeding violates the standards for appellate review by not basing its reasoning on substantial evidence. We disagree with the arguments raised by LVPC.

In our Opinion and Order, entered August 22, 1983, we stated, "the Company's cost-of-service study is acceptable in the context of this proceeding" (Opinion and Order at p. 92). While it is true that we did not specifically state our reasoning for rejecting the cost-of-service studies presented by the other parties, this does not indicate that we "effectively ignored the substantial evidence presented in this case," as averred by LVPC. Having carefully considered the cost of service studies presented by all of the parties, we found the Company's cost-of-service study appropriate in this proceeding. Thus, we find no merit in the argument raised by LVPC.

LVPC similarly takes issue with our acceptance of the Company's proposal to distribute the increase on a fairly uniform across-the-board basis and our acceptance of the Company's design of its commercial and industrial rate schedules. The essence of LVPC's argument is that the Commission has not based its findings and conclusions on substantial evidence of record. We find LVPC's arguments to be a bald allegation, unsupported by the petitioner.

The petitioner has not persuaded us that our disposition with regard to the cost-of-service, revenue allocation, and rate design was unwise or in error. Consequently, we deny the petition of LVPC.

PETITION FOR RECONSIDERATION OF THE OCA

The specific aspects of the Commission's Opinion and Order on which the OCA seeks reconsideration are: (1) the cost of constructing Susquehanna Unit 1 (Opinion and Order at 22-27); (2) the disposition of Susquehanna Unit 1 "energy savings" (Opinion and Order at 74-76); (3) the reversal of the Commission's prior rate case decision with regard to the amortization of consolidated tax savings generated by the Oneida Mining Company (Opinion and Order at 67-68); and (4) the failure of the Commission to apply the provisions of 66 Pa. C.S. §1315 and §102, to the Company's claims for plant held for future use and the amortization of abandonment losses on the Stony Creek project (Opinion and Order at 8-9, 50-51). We will consider them seriatim.

1. Construction Cost of Susquehanna Unit 1

The OCA's Petition for Reconsideration advances several arguments in support of its allegation that certain construction costs were excessive

or imprudently incurred. Each of the arguments presented, however, were expressly rejected by both the ALJ and the Commission. As recognized by the Company at p. 7 of its Motion to Dismiss, the fundamental flaw in each argument is that it is premised upon the express assumption that the cost of constructing Susquehanna Unit 1 was excessive or imprudent. The evidence provided by the OCA, in its petition, does not support such an assumption.

The OCA has selectively ignored the ALJ's discussion (R.D. pp. 60-65), and our discussion (Opinion and Order at p. 23), concerning the lack of any probative evidence, presented by the parties, relating to managerial inefficiency or imprudence. Instead, the OCA, in its Petition, has focalized its attention on the ALJ's isolated statements relating to future contractual litigation.

The Commission's standard continues to be one of disallowing any construction costs that are unnecessarily or imprudently incurred, unmindful of any potential contractual litigation between the utility and its contractor. It is our opinion that PP&L's expenditures to solve the containment problem were essential to ensure the safety and licensability of the plant. Similarly, the schedule delays precipitated by PP&L's identifying this problem were required.

Finally, we find it appropriate to reiterate that our decision to reject OCA's proposed adjustment relating to inter granular stress corrosion cracking (IGSCC) was not premised solely upon the generic nature of this problem. As stated by the ALJ and adopted by this Commission, the OCA has not shown that expenditures relating to the IGSCC problem were wasteful, extravagant or imprudent. (Opinion and Order, p. 24). Thus, we rejected OCA's proposed adjustment.

The OCA's remaining proposed adjustments are based solely upon PP&L's notices to certain contractors of potential deficiencies in performance. As found by the ALJ and the Commission, such notices do not constitute proof that a contractor's work was in fact deficient. (Opinion and Order, pp. 24, 26-27, Recommended Decision, pp. 66-68, 172, 174). Such notices are a normal part of any construction project.

2. Susquehanna Unit 1 "energy savings"

In its petition, the OCA asserts that there is an "inextricable link" between the "excess capacity" adjustment, adopted by the Commission, and the "energy savings" adjustment, presented by OCA. In support of this contention, the OCA quotes extensively from its Initial Brief and the testimony of its witness. The OCA argues that to the extent than any portion of Susquehanna Unit 1 is allowed to be recognized in rates, the energy savings used to justify this inclusion must be retained in rates as well. Once again, the OCA points out that the Company consistently used the $186 million figure as a primary justification for the inclusion of Susquehanna Unit 1 in rate base.

The petitioner has acknowledged that the evidence and arguments advanced in its petition are the same evidence and arguments considered and rejected by the Commission. By quoting from its Initial Brief and the testimony of its witness, the petitioner has not presented new or novel arguments, not previously heard, or considerations which appear to have been overlooked or not addressed by the Commission. Indeed, the Commission specifically addressed the OCA's proposal to guarantee the realization of the $186 million in "energy savings." (Opinion and Order, pp. 76-76). The adoption of the OCA's "energy savings" adjustment would abrogate the Energy Cost Rate for PP&L.

The assertion by the OCA in its petition that failure to adopt its proposal would allow PP&L to pass through to ratepayers, without hearings, any shortfall in projected Susquehanna energy savings is totally devoid of merit. The ECR over/under collections are monitored by the Commission and are subject to mandatory public hearings under Section 1307(e) of the Public Utility Code (66 Pa. C.S. §1307(e)), at which time the reasonableness of any over/under collections, may be fully considered.

3. Oneida Mining Company Tax Losses

The Commission's August 22, 1983 Opinion and Order rejected, the OCA's proposal to continue the flow-through to ratepayers of the tax losses generated by the sale of the Oneida Mining Company. In its petition, the OCA argues that its proposed adjustment is identical to that adopted by the Commission in PP&L's last litigated rate proceeding at Docket No. R-80031114, and that PP&L is barred by the doctrine of res judicata from relitigating the issue.

First, the issue of whether the tax reductive benefits, generated by these losses should be flowed through to ratepayers, is a policy issue to which res judicata has no application. Secondly, the Oneida investment, the sale of which produced the loss in question, was not made by PP&L's ratepayers. As we noted in our August 22, 1983 Opinion and Order at p. 67, the investment was made by the Company's shareholders who also bore the losses from operation of Oneida while it was owned by PP&L.

4. Land Held for Future Use and the Stoney Creek Amortization

In its petition, the OCA argues that the Commission improperly rejected its arguments that PP&L's claims for land held for future use and amortization of Stoney Creek property losses are barred by Section 1315 of the Code (66 Pa. C.S. §1315). Specifically, the OCA argues that Section 1315 applies to all electric utility facilities and not just construction work in progress. The OCA cites 66 Pa. C.S. §1315, which states, in pertinent part:

> [T]he cost of construction or expansion of a facility undertaken by a public utility producing, generating, transmitting, distributing or furnishing electricity shall not be made a part of the rate base nor otherwise included in the rates charged by the electric utility until such time as the facility is used and useful in service to the public. Except as stated in this section, no electric utility property shall be deemed used and useful until it is presently providing actual utility service to the customers.

(Emphasis supplied). Of paramount importance, according to the OCA, is the fact that the term "facilities," as used in 66 Pa. C.S. §1315, was already defined in 66 Pa. C.S. §102 as, "all the plant and equipment of a public utility, including all tangible and intangible real and personal property without limitation ...."

The OCA submits that a reading of these statutory provisions leads "inexorably" to the conclusion that 66 Pa. C.S. §1315 is not limited to construction work in progress, but refers to all electric utility facilities including land held for future use.

Once again, the OCA has presented in its petition the same argument presented to the ALJ and the Commission. The ALJ and the Commission expressly rejected the OCA's proposed adjustment citing Pa. P.U.C. v. Duquesne Light Co., (R-821945, April 18, 1983), as being supportive of the rejection.

Having carefully considered the assertions and arguments of the OCA, we are not satisfied that our decisions on the four issues of: (1) the construction cost of Susquehanna Unit 1; (2) the Susquehanna Unit 1 "energy savings"; (3) the Oneida Mining Company tax losses; and (4) land held for future use and the Stoney Creek Amortization, were either unwise or in error. Consequently, we deny the petition of the OCA.

PETITION FOR RECONSIDERATION OF CEPA

In its petition, CEPA avers that Susquehanna Unit 1 is not "used and useful" in the future test year and therefore should be totally excluded from rate base. The petitioner also argues that the Commission failed to recognize the "inextricable link" between the "excess capacity" adjustment, adopted by the Commission, and the "energy savings" adjustment presented by the OCA. Finally, the petitioner incorporates by reference, arguments presented by the OCA with respect to the cost of construction of Susquehanna Unit 1, the amortization of consolidated tax savings, and land held for future use and the Stoney Creek amortization.

The Commission has specifically considered and rejected CEPA's proposal to totally exclude Susquehanna Unit 1 from rate base. In rejecting CEPA's proposal, the Commission cited PECO v. Pa. P.U.C., 61 Pa. Commonwealth 325, 433 A.2d 620 (1981), where the Commonwealth Court recognized that a variety of "excess capacity" adjustments are available. (Opinion and Order, p. 20).

The "energy savings" adjustment presented by the OCA was expressly considered and rejected by the Commission (Opinion and Order, pp. 74-76). As we stated in our August 22, 1983 Opinion and Order, the OCA's adjustment which seeks to guarantee $186 million in energy savings is inconsistent with fundamental ratemaking principles and established ECR procedures.

The arguments incorporated by reference by CEPA have been fully addressed in our discussion of the petition for reconsideration of the OCA, supra. We defer to pp. 5-8 of our Opinion and Order Upon Reconsideration.

The petition has not raised matters sufficient to persuade us that our disposition with regard to the issues raised by CEPA was unwise or in error. Consequently, we deny the petition of CEPA.

CONCLUSION

Having carefully considered the assertions and arguments raised by LVPC, the OCA, and CEPA, in their Petitions for Reconsiderations, we are not persuaded to modify our August 22, 1983 Opinion and Order; THEREFORE,

IT IS ORDERED:

1. That the Petitions for Reconsideration of LVPC, the OCA, and CEPA, are denied.

2. That the Motions to Dismiss the Petitions for Reconsideration of LVPC, the OCA, and CEPA, consistent with our Opinion and Order Upon Reconsideration, are granted.

BY THE COMMISSION,

Jerry Rich
Secretary

(SEAL)

ORDER ADOPTED: November 22, 1983

ORDER ENTERED: DEC 1983

APPENDIX H

Main Brief of the
Office of Consumer Advocate

(R-822169)

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	:	
v.	:	R-822169
PENNSYLVANIA POWER & LIGHT COMPANY	:	

MAIN BRIEF
OF THE OFFICE OF CONSUMER ADVOCATE

Philip F. McClelland
Assistant Consumer Advocate

Irwin A. Popowsky
Assistant Consumer Advocate

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Office of Consumer Advocate
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DATED: May 16, 1983

III. THE COST OF CONSTRUCTING SSES, UNIT 1 SHOULD BE REDUCED SO AS TO EXCLUDE THE COST OF ERRORS WHICH OCCURRED DURING THE DESIGN AND CONSTRUCTION PROCESS.

A. Introduction

In this case PP&L has filed for the inclusion in rates of all the projected costs for completing the Susquehanna Steam Electric Station (SSES), Unit 1 and one half of the common facilities. PP&L's 90% share of these costs has been set at $1,673,333,000.* PP&L Future 1, C-1 at 1. Susquehanna Units 1 and 2 are now projected to cost $3.85 billion. The costs of these units were originally projected at $1.1 billion in 1971. PP&L Exh. RCT 2 at 6. Through the course of this litigation PP&L, OCA, and Staff have identified various contractor construction deficiencies and claims filed by PP&L against contractors resulting from various errors which occurred in the actual building of the plant. What follows is a discussion of the more significant errors and an explanation of the role they played in raising the cost of the project.

The principal contractors which worked under the supervision of PP&L on the project were Bechtel, the Architect/Engineer, and General Electric, the party responsible for designing and installing the nuclear reactor. PP&L has identified 72 Bechtel deficiencies and 5 areas of

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* The OCA adjustments to the cost of constructing SSES are generally stated on a 100% cost basis. A comparable 100% estimated cost for constructing SSES, Unit 1 and one half of common facilities would then become $1,859,258,800. To convert a 100% SSES cost to a jurisdictional basis requires multiplying by 90% so as to exclude that portion of SSES allocated to the Allegheny Electric Cooperative and further by 89.49% so as to exclude that portion of SSES allocated to PUC non-jurisdictional FERC customers. See OCA St. 5B, Sch. 7, at 3, (Revised).

cost claims regarding General Electric. See PP&L Exhs. 200.182090 and 200.182014 as attached as Sch. 4 to Staff Exh. 13-A. Although these numerous deficiencies and claims remain as points of dispute between PP&L, Bechtel and GE, PP&L has not reduced its rate base claim in this proceeding to take into account any outstanding claims and deficiencies arising from the project. Tr. 912, 1114, 1115; PP&L Exh. 200.182014 as attached as Sch. 4 to Staff Exh. 13-A.* Further, PP&L has refused to provide a quantification of those identified deficiencies which have not yet been reduced to a specific claim against Bechtel or General Electric. See PP&L Exh. 200.182014 as attached as Sch. 4 to Staff Exh. 13-A, Tr. 924, 925, and PP&L St. R-5, p. 28. Both OCA & Staff have proposed that the cost of Unit 1** should be adjusted so as to reflect the extra costs incurred as a result of project deficiencies and those specific claims which PP&L has made against individual contractors.

The OCA obtained the services of MHB Technical Associates (MHB), specifically Mr. Dale Bridenbaugh and Mr. Gregory Minor, to provide an audit of the SSES construction process and to provide testimony regarding their findings. OCA St. 3, pp. 5-9. Messrs. Minor

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* More specifically, at PP&L Exh. 200.182014 PP&L stated:

> PP&L has not completed an evaluation or quantification of the costs incurred to remedy the problems identified or to identify those claims which relate to "construction defects."
>
> ...
>
> At this date, any costs incurred for Susquehanna Unit No. 1 are included in the rate case claims for that unit.

** Unit 1 ratemaking claims by PP&L include both Unit 1 and one half of Common facilities. In this discussion these costs will simply be referred to as the costs of Unit 1 unless otherwise noted.

and Bridenbaugh hold degrees in engineering and have worked in the nuclear field since the mid-1960's. They were employed in the General Electric Company, Nuclear Energy Division until 1976. Since leaving General Electric they have provided consulting services to citizen groups and governments in the United States and Europe. OCA St. 3, pp. 1-5, and Attachments A & B. Mr. Bridenbaugh has appeared before the PUC in the case of Investigation Upon The Commission's Own Motion Into the Extended Outages of The Beaver Valley I Nuclear Generating Station, I-79070314. On behalf of the State of California, his work has been cited by the United States Supreme Court. Pacific Gas and Electric Company v. State Energy Resources Conservation and Development Commission, 51 L.W. 4449, 4450, n. 2, Issued April 20, 1983.

MHB has engaged in a six month construction audit of the SSES project. This audit involved written discovery and numerous informal conferences with PP&L. OCA St. 3 at 6-8. MHB has recommended that "...certain costs which appear to have been incurred as a result of errors in design, workmanship, or management practices...." should be withheld from the cost of the project. OCA St. 3, p. 5. The MHB recommended adjustments result in a reduction to the cost of constructing Unit 1 of $182,479,000. This results in a reduction of $146,970,000 in jurisdictional plant in service. OCA St. 5B, Sch. 7, p. 3, Rev. This plant cost reduction and the associated effect upon return upon investment, depreciation expense and income taxes leads to an overall revenue adjustment of $43,806,000.*

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* The original proposed adjustment of MHB at OCA St. 3 as calculated at OCA St. 5, Sch. 7, p. 3 of $186,196,000 has been reduced by the adjustments shown at OCA Ex. 27, and OCA Rebuttal St. 3A, pp. 1, 2 and represented in final form at OCA St. 5B, Sch. 7, p. 3, (Revised). The revenue effect has been reduced from $44,311,000 to $43,806,000 as a result of these revisions. OCA St. 5 at 5.

Trial Staff through Mr. Michael Gruber has also proposed an adjustment to the Unit 1 plant in service and depreciation expense in consideration of "...contractor errors which have inflated the cost of the unit." Staff St. 13, p. 11. While OCA has calculated an adjustment in recognition of contractor errors involving a selected number of major PP&L and contractor deficiencies, Staff has applied a 10% factor to the cost of Unit 1 in recognition of all contractor deficiencies identified by PP&L. Staff St. 13, p. 11. Staff rate base adjustment has been quantified in the amount of $166,650,900 which is comparable to the OCA adjustment of $164,231,000. See Staff St. 13, p. 11 and OCA St. 5B, Sch. 7, p. 3, Rev.*

B. Summary Of Adjustments

The OCA proposes that Unit 1 cost adjustments should be made in a number of areas involving PP&L and contractor deficiencies which occurred over the course of the construction project. In several instances MHB has quantified these adjustments by merely reflecting the PP&L stated claims against contractors which remain outstanding, i.e., rework of piping to prevent Intergranular Stress Corrosion Cracking ($2.1 million) and revisions and corrections to the Advanced Control Room ($.52 million). In other instances MHB has quantified the cost of correcting other deficiencies by reviewing PP&L SSES construction project records, i.e., redesign and rework in containment to correct for hydrodynamic load estimation errors ($38.57 million), electrical problems regarding electrical cables of excessive length and substandard

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* These adjustments have been compared on the basis of PP&L's 90% share in the project without taking into account any PUC/FERC jurisdictional factor which would further reduce the OCA adjustment to $146,970,000.

insulation ($3.54 million), and the inspection and reinstallation of improperly installed expansion anchors ($2.4 million). The AFUDC accrued on the costs of correcting these deficiencies is estimated at $7.254 million. OCA St. 5B, Sch. 7, p. 3, Rev. In addition, OCA submits that the containment redesign and rework and other construction errors, as referred to above, also delayed project construction by a minimum of 6 months requiring an adjustment of $125 million. Finally, PP&L has admitted that certain SSES costs were over-allocated to Unit 1 thus yielding a $3.1 million adjustment. PP&L St. R-5 at 26. These adjustments are set forth below in tabular form as follows:

	Adjustment (000,000)
Redesign and Rework of containment	$ 38.57
Redesign and Modification of Electrical Cables	$ 3.54
Rework of Piping to Correct Intergranular Stress Corrosion Cracking	$ 2.1
Reinstallation of Expansion Anchors	$ 2.4
Revisions and Corrections to Advanced Control Room	$ .52
AFUDC on the Above Costs	$ 7.25
Cost of 6 Months Delay Due to Redesign and Rework of Containment	$125.0
Reallocation of Special Engineering Studies	$ 3.1
Total	$182.48*

* Calculated on the basis of 100% Unit 1 costs without taking into account PP&L's 90% share or the PUC/FERC jurisdictional factor. These costs reflect all revisions to OCA St. 3 at OCA Ex. 27 and OCA St. 3A at 1.

C. Under Established Pennsylvania Precedent, Ratepayers Should Not Be Forced To Bear The Cost Of Correcting Errors In The Original Design And Construction Of Unit 1.

Throughout the course of the project various errors occurred in the design or construction of Unit 1. These errors or deficiencies frequently resulted in redesign and reworking of the affected plant equipment. OCA submits that the ratepayers should not pay for plant design and construction which proved to be inadequate. As the costs of correcting such inadequacies in the Unit 1 design and construction could have been avoided had PP&L, or those contractors working for PP&L, applied reasonable management practices, these costs should not be included within rates. Two different ratemaking standards support this approach.

In the case of Pa. PUC v. Metropolitan Edison Company, R.I.D. 626, March 22, 1979, at 12-15; 28 PUR 4th 555, 562,563 the Commission ruled that the risk of performance failure should lie with the utility and its stockholders. This decision was rendered even though the Commission found no lack of prudent judgment on the part of management. Thus when extra costs are incurred in the construction of a utility facility as a result of the failure of a component to perform as intended the utility must bear the costs of such performance failure. In the Metropolitan Edison case the utility was required to bear the cost of failure in view of the fact that the utility was in exclusive control of the construction process and the ratepayers had no opportunity to share in the decisions which resulted in the increased costs.

In that case the PUC found:

> We conclude that, although the malfunctioning of the TMI-2 steam safety values is not attributable to a lack of prudent judgment on the part of management, and while respondent asserts that it should not bear any costs that are not recovered in its pending suit against Lonergan and Company, we believe that this situation is analogous to that of the TMI-1 girder ring (RID 170-171, 50 Pa. PUC 77, 102), and as there, we are of the opinion that respondent's ratepayers should not be made to bear the burden of the costs of replacing the malfunctioning steam valves, for it was the respondent, not its ratepayer, which selected the contractor to provide the valves and respondent and its stockholders should bear the risk of performance failure.
>
> We believe that the costs actually incurred in replacing the steam valves is most properly measured by staff's figure of $7,860,000.

Pa. PUC v. Metropolitan Edison, R.I.D. 626, 28 PUR 4th 555,563 (1979) (Emphasis added). It should be noted that this Staff adjustment related to valve replacement, also includes the cost of revision and associated project delays.

In subsequent cases where an adjustment was made for more generalized management practices the standard applied would require the utility to absorb the costs of its errors when such costs are caused by unreasonable or imprudent management practices. See generally Pa. PUC v. Pennsylvania Gas & Water Co., 492 Pa. 326, 340, 424 A.2d 1213, 1220 (1981) and Park Towne v. Pa. PUC, 61 Pa. Cmwlth. 285, 295-303, 433 A.2d 610, 616-619 (1981). OCA submits that such a standard of reasonableness or prudence as applied to this case must be established by weighing the efforts taken by management to make certain that the design and construction of the facility are adequate and free from error in view of the consequences likely to flow from such an error. Such a standard when applied to the construction of a nuclear facility must take into account the level of oversight required by the Nuclear Regulatory Commission whenever a utility constructs a plant such

as SSES, Unit 1. As cited by Mr. Bridenbaugh these regulations, as found at 10 CFR Part 50, Appendix B, require close inspection and supervision of the design and construction process as follows:

> I. Organization
>
> The applicant shall be responsible for the establishment and execution of the quality assurance program. The applicant may delegate to others, such as contractors, agents, or consultants, the work of establishing and executing the quality assurance program, or any part thereof, but shall retain responsibility therefor. The authority and duties of persons and organizations performing activities affecting the safety related functions of structures, systems, and components shall be clearly established and delineated in writing. These activities include both the performing functions of attaining quality objectives and the quality assurance functions. The quality assurance functions are those (a) assuring that an appropriate quality assurance program is established and effectively executed and (b) verifying, such as by checking, auditing, and inspection, that activities affecting the safety-related functions have been correctly performed.
>
> ...
>
> III. Design Control
>
> Measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in §50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions.
>
> ...
>
> The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. The verifying or checking process shall be performed by individuals or groups other than those who performed the original design, but who may be from the same organization. Where a test program is used to verify the adequacy of a specific design feature in lieu of other verifying or checking processes, it shall include suitable qualifications testing of a

prototype unit under the most adverse design conditions. Design control measures shall be applied to items such as the following: reactor physics, stress, thermal, hydraulic, and accident analyses....

...

XVI. CORRECTIVE ACTION

Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

See discussion at Tr. 2154.

PP&L has stated that any adjustment to the cost of constructing Unit 1 should only be made if PP&L is successful in recovering contested construction claims and then only in the recovered amount. PP&L St. R-5 at 21, 24, 25, 28, 29. Similar arguments were put forth by Metropolitan Edison when Three Mile Island (TMI) Units 1 and 2 were to be placed in rate base at the conclusion of that construction project. Specifically, when TMI 1 was to be placed in service, Metropolitan Edison argued that even though deficient construction practices had been followed requiring "extensive rip-out and rework" to replace a faulty ring girder, no ratemaking adjustment was appropriate as ratepayers would be given the benefit of any recovery received from the contractors when and if such recovery ever occurred. Pa. PUC v. Metropolitan Edison, R.I.D. 170, 50 Pa. PUC 82, 102, issued June 22, 1976. In the later case following the completion of TMI 2 which was

discussed above, Metropolitan Edison again argued that even though certain malfunctioning steam valves had to be replaced resulting in costs related to reconstruction and delay, no adjustment should be made pending the results of a suit against the valve manufacturer. Pa. PUC v. Metropolitan Edison, R.I.D. 626, 26 PUC 4th 176, 181 (1979) issued March 22, 1979. In each instance the PUC flatly rejected this contention.

OCA submits that the ratepayer should only be required to pay for the construction of Unit 1 for the "first time" and not for the repetitive tearing out and replacement of work which was not adequately designed or installed in the first instance. Under the Metropolitan Edison standard, as set forth above, such rework costs should not be included in the utility cost of service as they are the result of "performance failures" for which the ratepayer cannot in any sense be deemed responsible regardless of which party participating in the project is found to be responsible. Each of the proposed adjustments at a minimum are consistent with this standard. In addition, OCA's adjustments quantify those deficiencies and the related costs which PP&L could have avoided had PP&L pursued proper management practices in a timely manner to correct certain deficiencies before these deficiencies became part of the design and construction of Unit 1. OCA St. 3 at 5, 12, 13; Tr. 2152, 2153. The actions which should have been taken are described in greater detail below. Moreover, OCA submits that given the tremendous cost of nuclear generating stations the utility has a great responsibility to closely scrutinize each design element and component involved in a nuclear project. This is not only endemic to the nature of the project but specifically required by the NRC through the

regulations specifying utility quality control and assurance functions, as discussed above, which require that the design and construction process be closely monitored.

D. A Description Of The Errors Which Occurred During The Design And Construction Of The Project.

1. Nuclear Equipment Was Extensively Redesigned And Reworked As A Result Of PP&L's Failure To Accurately Assess The Hydrodynamic Loads In The Containment.

During the course of the construction of Unit 1 a significant error occurred regarding the underestimation of the hydrodynamic loads as it effected the nuclear equipment within the containment. PP&L has described the hydrodynamic loads problem as "...the most difficult technical issue in BWR [Boiling Water Reactor] history." PP&L Exh. RCT 1 at 127.* As such, the failure to adequately consider these hydrodynamic loads was first recognized by PP&L in 1974-1975 and dominated the later stages of the project. Thus the design error was not recognized until long after project design work began in 1970 and was not resolved until 1982. PP&L St. R-5 at 6, 9; OCA St. 3A at 2-5, PP&L Exh. RCT 1 at 33. This deficiency required a massive amount of redesign and rework to the equipment within the primary and secondary containment. OCA St. 3A at 2-6. OCA submits that ratepayers should not bear the costs of such redesign and rework in addition to the cost of the original design and construction which was continually revised and altered.

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* PP&L has offered into evidence "An Historical Assessment of the Susquehanna Nuclear Project" and a 1980-1982 Update of this report as performed by Robert C. Traylor of Management Analysis Corporation as Exhibits RCT 1 and RCT 2. This audit report contains discussions of construction problems and is frequently referred to herein.

Any understanding of the hydrodynamic loading problem must be based upon an understanding of the Mark II containment system as designed by GE and used in this project. The primary containment structure of Unit 1 is a large vessel some 160 feet in height with 6 foot reinforced concrete sides. Tr. 880. A drawing of this containment structure has been provided by PP&L as NWC Exhibit 1 and is attached to this Main Brief as OCA Appendix C. Surrounding the primary containment is the much larger reactor building or secondary containment structure. Tr. 879, 880. Both the primary and secondary containment structure are designed to prevent releases of radioactive materials following an accident. OCA St. 3 at 15, PP&L St. R-5 at 3.

The primary containment structure must be constructed so that it will withstand the dynamic forces placed upon it during the ordinary operation of the reactor or any unusual events such as a nuclear accident or an earthquake.* These events exert forces or loads on the containment and the equipment within the plant and thus the plant must be designed and constructed to withstand these loads. Tr. 887-890, PP&L St. R-5 at 4. One type of loads--hydrodynamic loads--are created by the release of steam through the 16 safety relief valves (SRV's) and the related discharge lines and the 87 downcomer pipes in the containment. PP&L St. R-5 at 4, 5 and PP&L Exh. NWC 1 as attached as Appendix C.

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* The primary containment vessel is often simply referred to as the containment and the secondary containment as the reactor building. Throughout this brief these common references will be used even though both structures serve a containment function.

The steam released as a result of the operation of the SRV's or the downcomers during a Loss of Coolant Accident is transmitted from the drywell, where the reactor vessel and the primary steam lines are located, down to the wetwell and into a deep pool of water. Tr. 880. The operation of the 16 SRV's is considered a normal part of reactor operations while the release of steam through the 87 downcomer pipes would only occur as the result of a major break in a steam pipe within the containment thus creating a Loss of Coolant Accident (LOCA). PP&L St. R-5 at 4, 5; Tr. 882. The loads created by the release of steam through these two distinct mechanisms are termed "SRV loads" and "LOCA loads" respectively. PP&L St. R-5 at 5; OCA Exh. 16 at 4.

The operation of the downcomers and the resulting LOCA loads has been described by PP&L's witness Mr. Traylor, a consultant employed by Management Analysis Corporation, as follows:

> The water which acts as a coolant in the reactor vessel is circulated through the system at high speed, under intense pressures and at temperatures near 600 degrees Farenheit. If a major break should occur in certain pipes associated with the reactor vessel, this hot, pressurized, fast-moving water would be released within the containment drywell. When this happens, the water quickly expands, turns into steam, then plunges downward through pipes into a water-filled suppression chamber. The water in the chamber quenches the steam, thereby reducing the pressure. When the steam condenses in the water, large forces are exerted against the containment. The "hydrodynamic" loads are transmitted to all parts of the containment and reactor building, causing a great deal of structural vibration.
>
> With this vibration comes a danger of many items being damaged. Unless securely held in place, other pipes may become overstressed, thus breaking and causing further damage. The systems which provide for safe shutdown of the reactor must be protected from damage. If not, the accident could continue ultimately resulting in possible rupture of the reactor vessel and containment.

PP&L Exh. RCT 2 at 18. Similarly the release of steam through the SRV's creates SRV loads on the containment as well. PP&L St. R-5 at 4, OCA St. 3 at 18. In summary, these hydrodynamic loads generate a force upon the containment similar to an earthquake. Tr. 889.*

The substantial rework, which occurred as a result of severely underestimating these hydrodynamic loads, took many years to complete. In 1972, PP&L contracted with General Electric (GE) to supply the actual Unit 1 reactor. Tr. 883. In the early and mid 1970's GE performed tests to verify the adequacy of the containment design as used at Unit 1 and other GE BWR reactors and the hydrodynamic loads placed upon the nuclear equipment. OCA St. 3 at 16-18. GE then provided to PP&L and Bechtel the essential characteristics of the hydrodynamic forces within the wetwell in the Mark II design. Tr. 884. Bechtel, operating under PP&L's supervision as the project Architect/ Engineer, then translated these loads into the containment and equipment design and actually constructed the equipment so as to withstand these loads. Tr. 884.

During the period 1971 through 1974 several GE BWR's experienced heavy vibrations and the breaking of welded steel restraints as a result of discharges from the SRV's. OCA St. 3 at 18, OCA St. 3A at 3. Tests conducted by GE between 1972 and 1974 for the first time

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* It should also be noted that in the design of the plant these hydrodynamic loads were combined with the forces generated by a potential earthquake or seismic loads in order that all equipment within the primary and secondary containments could be assured of meeting both types of loads. Tr. 890. While the magnitude of the hydrodynamic loads as it affected the equipment within the containment continued to evolve throughout construction the definition of the earthquake loads remained constant during the life of the project. Tr. 889, 890. Often the term "seismic qualification" was used in describing the redesign of nuclear equipment for both seismic and hydrodynamic loads. Tr. 890.

determined that in the event of a LOCA a pool swell "wave" of 15 to 18 feet of water would occur in the wetwell directly beneath the reactor. OCA St. 3 at 18, 19; OCA St. 3A at 3, OCA Exh. 10, p. 22; Tr. 2175. Even though the Mark II model represented a significant design departure from the earlier Mark I containment no basic design verification regarding hydrodynamic loads had ever been undertaken prior to the recognition of these hydrodynamic loads in 1974-1975. Tr. 2175* These LOCA and SRV loads upon the containment structure had been completely overlooked in the original design of Unit 1. OCA St. 3 at 18, 19; OCA St. 3A at 3, OCA Exh. 16, p. 4.

Before contracting with GE, PP&L had never investigated the accuracy of the hydrodynamic loads as defined by GE. Tr. 886. PP&L did not learn of the problems experienced at operating BWR's with SRV loads until some time after these problems first occurred. Tr. 886, 887. Although PP&L received a construction permit and began work in November of 1973, this most difficult technical problem was never even recognized by PP&L until late 1974 and early 1975 through correspondence with the AEC and GE. Tr. 885, 886; RCT 1 at 41, 127. Thus PP&L did not recognize the problem until the design process had been underway for several years. Tr. 892, PP&l Exh. RCT 1 at 33.

The recognition of these hydrodynamic loads required redesign

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* See PP&L Exh. RCT 1 at 76-79 and OCA St. 3 at 16-18 for a comparison between the GE Mark I and Mark II designs.

and reworking of the plant which had already been constructed.* Mr. Traylor reviewed this design deficiency for PP&L and explained the process as follows:

> Design changes were made using higher loads than previously considered but the problems were not completely resolved. At that time, the engineers were compelled to make conservative allowances in the design without a thorough understanding of the new loads. Such an understanding could only be obtained by subsequent extensive analysis, tests and studies.
>
> The analysis of the complex loading conditions continued long after the postulation of the new loads in 1974. Resolution of the problem required new work and many modifications to completed work, continually increasing the scope of the contruction effort as the project progressed. This rework is most evident inside the Susquehanna Unit 1 containment structure. There, even an untrained eye can see the signs of much rework. Welds that once connected supports and piping based on earlier designs have been ground away leaving only polished metal, while a newly installed support of later design can be seen only a few feet away. The amount of rework could not be calculated from the records reviewed, but it is obvious that many thousands of man-hours were expended replacing, adding and modifying previously completed work inside the containment. The majority of the containment rework was the result of the hydrodynamic load problem.
>
> It is truly a balancing act to control costs and at the same time to assure that the design is reliable, safe and licensable. Increased engineering costs can be the smallest part of the impact that can result from untimely design changes. If changes are made in the design of a system or structure prior to fabrication or construction, the impact can be limited to the increased engineering cost and the differences between the estimated cost of the

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* These hydrodynamic loads will be referred to herein simply as containment loads in recognition of their impact upon this structure. PP&L often referred to the loads placed upon the containment as a result of the hydrodynamic loads as "new loads." Tr. 887. OCA does not consider these loads "new" in any sense as they were always associated with the GE BWR Mark II containment structure but remained unrecognized for a substantial period of time. OCA St. 3A at 3. There was no change in nuclear equipment to create these "new" loads. Tr. 2362.

> original and revised design. But when design changes occur after fabriaction or construction has begun, the impact is increased. Previously purchased material may have to be replaced, most likely at prices higher than originally purchased. Already completed construction work may have to be dissembled or torn out and redone. There may be a schedule impact from additional time required to obtain new material or eqiupment, coupled with the increased construction time for rework. Outside of AFUDC, construction labor is the largest component of direct plant costs and is greatly increased by design changes on completed work.
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> The first effect is the additional work required in dismantling completed work, repairing and new installation. The second effect is the decreased productivity which occurs in the performance of rework. This is caused by difficult access problems, increased complexity and reduced worker motivation caused by the frustration of redoing completed work.

PP&L Exh. RCT 1 at 105, 106.

Mr. Norman Curtis, Unit 1 Project Director, has stated that the identification of the SRV and LOCA containment loads was quite easy while the redesign and rework to meet these loads took a great length of time. Tr. 2737. Nevertheless, this design deficiency regarding the initial hydrodynamic loads was not recognized by PP&L until 1974 and revisions to these loads occurred not once but several times. As much of the Unit 1 piping passed from the nuclear reactor through the concrete containment and into the reactor building, the containment loads were transferred directly from the containment structure to the piping. Thus the pipe hangers which attached these pipes to the containment and reactor building walls were critically affected by the changing assessments of the containment loads. The rework of piping systems in Unit 1 was one of the most costly results of the hydrodynamic loads analysis. PP&L has characterized the initial hydrodynamic design

criteria as it affected Unit 1 piping as Phase 0. Tr. 892. Subsequent to Phase 0 the piping design evolved through phases I, II, and III during the period 1977 through 1981. Tr. 896. The modification to the piping systems in the plant began in 1975 and culminated in an intensive pipe hanger rework program in 1981 and 1982. OCA St. 3A at 5. In all, more than 3,300 pipe hangers were modified and 2,800 added to Unit 1 in order to accomodate these design corrections. OCA Exh. 10 at 98, Tr. 1118. An unknown number of hangers were replaced and removed at an unknown cost. Tr. 975. PP&L has stated that changes to the plant made necessary by the recalculation of hydrodynamic loads would include:

-- Additional concrete work for embedments and anchors.

-- Modification of or additional structural or miscellaneous steel.

-- Modifications to or relocation of equipment.

-- Assessment of mechanical and electrical equipment, piping and instrumentation for adequacy.

-- Addition or modification of supports for pipe, cable tray, conduit and ductwork.

-- Additional engineering and non-manual labor to support the above items.

OCA Exh. 10 at 79. As Mr. Curtis commented in discussing PP&L's attempt to monitor the costs of the hydrodynamic load corrections, "the problem grew and we found that almost the entire plant got enfolded into the grasp of the containment problem." Tr. 935.

In summary, until 1974-1975, the SRV and LOCA load impacts upon the containment were entirely overlooked in designing the plant. When these loads were first recognized Unit 1 construction had already begun and the design of the plant was well underway. Mr. Curtis has

stated that the initial identification of the SRV and LOCA loads was quite easy while the redesign and rework necessary to accomodate these newly recognized loads was much more difficult and time consuming. Tr. 2737. Mr. Bridenbaugh has testified that had PP&L acted sooner and been more diligent in the supervision of those providing the design for the plant the design deficiencies upon which MHB has based their containment adjustments could have been avoided. Tr. 2153. More specifically,

> There were design deficiencies in the containment and the correction of those deficiencies are what contributed to schedule extensions and cost overruns.

Tr. 2157. OCA submits that if these loads had been identified early in the construction and design process, or at least accurately estimated with some degree of conservatism, the construction project would have avoided the difficult and time consuming process of repeatedly reanalyzing and reworking the affected nuclear equipment. Tr. 2152-2157. OCA submits that the ratepayers should not be forced to bear the costs of this oversight whether responsibility is ultimately assigned to PP&L, GE, or Bechtel.

2. The Errors Related To Estimating Containment Loads Caused At Least A Six Month Construction Delay And The Costs Related To This Delay Should Not Be Charged To The Ratepayers.

Any discussion concerning the costs related to PP&L's failure to properly calculate hydrodynamic loads for the plant must not only take into consideration the cost of redesigning and reconstructing the equipment affected by this error but also include the cost to the project of the delay caused by these repeated revisions. Evidence provided by PP&L indicates that plant construction was delayed by one year as a result of the failure to correctly calculate the hydrodynamic loads for the plant. PP&L Exh. RCT 2 at 110. However, MHB has

considered all activities which occurred in the final stages of the project--includng the NRC licensing process--and recommended that 6 months of delay immediately preceding fuel load at Unit 1--from February 27, 1982 to July 27, 1982--should be considered as related to the containment loads modifications.* While MHB has recognized that schedule delays in nuclear plants are difficult to precisely attribute to any one cause, the PP&L material produced on discovery has clearly identified the errors in calculating containment loads as a major reason for delay. OCA St. 3 at 42. Mr. Traylor has also identified the pipe hanger acceptance program difficulties, which occurred late in the project and were closely connected with the recognition of the hydrodynamic loads, as the "Achilles heel" of the project. PP&L Exh. RCT 2 at 11. Thus OCA proposes that a minimum of six months of delay be assigned to the hydrodynamic loads program.

One of the first indications that hydrodynamic loads could cause a delay comes in an early project assessment in 1976 requested by PP&L and produced by the NUS Corporation, an outside consultant. At that stage of the project PP&L was working to modify the structures in the wetwell due to the revised SRV and LOCA loads. NUS remarked that: "This problem has the greatest potential for causing a delay in the Susquehanna Project." OCA Exh. 23 at 4.

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* Unit 1 construction was completed on July 16, 1982 and the NRC authorized fuel loading on July 17, 1982. OCA Exh. 10 at 97. Actual fuel loading began July 27, 1982 due to last minute delays caused by pipe support modifications. OCA Exh. 10 at 97, OCA Exh. 15, Nuclear Notes of 8/6/82. Thus the precise six month delay would extend from February 27, 1982 to July 27, 1982.

During the period from 1977 through 1980, PP&L continued to reanalyze the hydrodynamic loads and as a result these piping loads were revised from Phase 0 to Phase I and then to Phase II. Tr. 896. The PP&L projected cost of Units 1 and 2 also rose from $1.8 billion to $3.0 billion during this time period. PP&L Exh. RCT 2 at 6. Bechtel, under PP&L's supervision, began installing pipe supports to conform to these containment load revisions. This installation of pipe supports or hangers was further complicated by the deficiencies of Bechtel in actually implementing these revised load calculations.* OCA Exh. 4 at 2, 3. Beginning in 1980, the necessary redesign and rework of pipe hangers in order to accomodate these hangers to the revised hydrodynamic loads became a major scheduling concern on the project. For example, in a December, 1980 PP&L Project Report, pipe hangers were listed as one of 5 critical scheduling concerns. Specifically, PP&L stated as follows:

> Pipe Hangers - Physical completion of hangers has not kept pace with project requirements, primarily because of changing design, containment new loads analysis and the need to remove and/or revise many hangers. A large production effort, both in engineering and construction, remains. Additional resources are required in all areas if the nearly 3000 remaining hangers are to be completed by fuel load.

OCA Exh. 22, PP&L Project Report, December, 1980. Similarly, PP&L later commented:

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* Specifically, pursuant to 10 CFR 50.55(e) PP&L reported to the NRC on September 5, 1979 that "The revised pipe support detail drawings do not have factored into them revised piping system stress values which had been developed subsequent to the initial piping system stress calculations." OCA Exh. 4 at 2. This was reported to Bechtel on August 23, 1979 as a Bechtel deficiency under the PP&L Bechtel contract. OCA Exh. 18 at 19. Other Bechtel deficiencies regarding equipment revisions resulting from revised containment loads were reported to the NRC on July 30, 1981 and December 9, 1981. OCA Exh. 4 at 4-12.

Schedule Status

Unit 1 is 91% complete while Unit 2 is 59% complete. This is the third consecutive month in which we have reported no increases in percent complete. Increases in projected labor manhours, particularly in pipe hangers, are the prime reason for the lack of progress as reflected in percent complete.

OCA Exh. 22, PP&L Project Report, March 1981. In this same report regarding critical scheduling areas PP&L commented:

Pipe Hangers. The hanger program continues to suffer setbacks. Analytical problems, changing criteria and increased scope all occurred this month to further hamper the effort. Minor progress had been made in the month but that was negated by the decision to use more conservative design data. Furthermore, engineering's assessment of the number of hangers to be added or revised increased by 1,000 (to 5,000) for the second straight month.

OCA Exh. 22, PP&L Project Report, March 1981. During this same period PP&L released its March, 1981 Quarterly Review to its shareholders and in a discussion of delay stated as follows:

Last October, the Company estimated that Susquehanna's first unit would be in commercial operation in the second quarter of 1982 with the second unit following about a year later. Total cost of the two units was estimated then at $3.0 billion. In February, the Company expressed concerns that delays in getting the required NRC operating licenses could push the timetable back a year and run the total cost up to $3.5 billion.

Estimates now show construction of Unit 1 will be complete in April 1982, with the unit to be in commercial operation sometime during the second quarter of 1983.

The principal reason for the establishment of later construction completion dates is the delay in the progress of certain preoperational tests which have been held up until major modifications can be made to piping system supports and electrical control systems. These modifications resulted from an ongoing analysis of the ability of the plant to

function safely under "extreme" accident conditions and from the correction of equipment deficiencies identified during early testing.

OCA Exh. 32 at 5.* Also in March, 1981 PP&L decided to revise the containment loads for a third time and move from Phase II to Phase III as the latest LOCA loads analysis showed loads significantly higher than expected. OCA Exh. 16 at 24, Tr. 906. This caused additional redesign and rework. In the April 1, 1981 edition of PP&L's Nuclear Notes the pipe hanger scheduling problem was updated as follows:

> Pipe Hangers. Hanger program suffered several setbacks during February. The design effort realized essentially no progress, primarily because "as built" drawings required for the analytical effort were discovered to not actually reflect as-built conditions. Also, estimated quantity of to-go hangers increased to about 4,000 (from 3,000) because of changes in engineering's assessment of hangers that must be revised. Finally, analysis of data from the containment loads program raises potential of additional changes.

OCA Exh. 26. In the February 1982 PP&L Monthly Report Mr. Curtis reported in the Project Director's Overview as follows:

> At this time we continue to feel that we are about five weeks behind the June 1 schedule [for the completion of construction and preoperational testing on Unit 1] but with some prospect of picking up lost time. This assessment is based on the current status of the hanger inspection program which is five weeks behind schedule.
>
> Unit #1 is rapidly nearing physical completion. Over 99% of Unit #1 systems have been turned over to PP&L and 90% of the preoperational testing has been completed. Five relatively minor systems remain to be completed by Bechtel and these systems should not impact the schedule. Preoperational testing is

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* It should be noted that OCA has also proposed an adjustment for the electrical equipment deficiencies, the second reason given above for the one year delay. See Section E2 below.

slightly ahead of schedule and further gains are expected because of an early start of testing of several major systems.

The dominant critical path is still the hanger program which continues to defy all efforts to catch up. Production rates have increased substantially over the past month but, because of delays incurred during the past several months, we are unable to gain on the schedule.

OCA Exh. 26 at 4. In January and April of 1982 both the NRC and PP&L recognized pipe hanger work to be the "pacing item" to Unit 1 fuel load. OCA Exh. 26 at 2, 3.

In proposing this adjustment MHB has recognized that hydrodynamic loads and the related pipe hanger rework were not the only factors which caused a delay in the Unit 1 fuel load. However, MHB has testified that any other factors causing scheduling delays experienced in the project were either inter-related with the hydrodynamic loads problem or could have been resolved prior to February, 1982 when the OCA delay adjustment begins. In reply to Mr. Curtis' Rebuttal Statement at R-5 Mr. Bridenbaugh explained why the delay in Unit 1 fuel loading was primarily caused by the failure to properly calculate the hydrodynamic loads as follows:

> The hanger modifications were the culminating event of the containment load problem which Mr. Curtis describes on page 7 as "one of the most difficult technical issues in BWR history". To look at the final aspect of this one activity and describe the most difficult ever BWR issue as just one more problem is not realistic. The hanger rework extended to piping systems throughout the reactor building at a critical time in the completion, cleanup and check out of the project. The difficulty of completing this work in the congested locations under the working conditions that then existed is cited as a major problem in almost every status report issued in 1981 and 1982. Not only were there physical interferences resulting from

> this problem that disrupted other near-critical activities such as preoperational testing, equipment environmental qualification, and completion of the "N-Stamp" certification process [see PP&L Att. 1 to PP&L St. R-5, Project Critical Path Summary], there were also resource and management impacts that I believe significantly affected PP&L's ability to complete the project on schedule. The compounding effect of this massive effort also affected the NRC's perception of the project and the likely project schedule. I believe that the NRC would have accelerated the licensing review had they truly believed that PP&L could have completed the project significantly earlier. PP&L and Bechtel (correctly, in my view) applied top priority to completing the hanger engineering and modifications, but at the expense of other work, since management and technical resources are by definition limited. Had management attention not been focused on completion of the engineering packages for the hanger program, more attention could have been directed towards the preoperational test program schedule and other late project paths which PP&L has identified as critical or near critical. The final months of a nuclear plant project require management and control of thousands of details and loose ends, and the imposition of a major modification program at the heart of the plant at the same time can hardly avoid being a significant detriment to timely completion.

OCA St. 3A at 4-6.

PP&L's witness Mr. Curtis set forth various activities which in his opinion would have delayed fuel loading until July, 1982 even if the hydrodynamic loading problem would have never occurred. PP&L St. R-5 at 15-20. One of these major activities was preoperational testing. PP&L St. R-5 at 18. Before Unit 1 could be completed and authorized for fuel loading the NRC requires each of the plant systems to be tested. Any lack of completeness in these systems, or others closely related, would necessarily delay pre-operational testing. OCA St. 3A at 5. PP&L has taken the position that the completion of the preoperational testing program was not significantly influenced by the "hydrodynamic load"

problem. PP&L St. R-5 at 18, 19. OCA simply submits that this suggestion is contradicted by evidence in the record which demonstrates the enormous effort required to come to terms with the changing hydrodynamic loads and the degree to which most systems in Unit 1 were affected by this problem. OCA notes that in the March, 1981 PP&L Quarterly Review, as quoted above, the pipe hanger and electrical control systems had already delayed preoperational testing. OCA Exh. 32 at 5. Further, Mr. Curtis has admitted that as of December, 1981 the hanger program impacted the performance of preoperational testing. Tr. 1047, 1048. Thus OCA submits that preoperational testing, as well as other late scheduling concerns which PP&L has identified of critical importance, were also delayed by the hydrodynamic loads problem.

PP&L has also identified the NRC licensing process as the critical factor which was likely to delay PP&L's attempt to load fuel at Unit 1. PP&L St. R-5 at 16-18. As noted above, PP&L completed Unit 1 construction on July 16, 1982, and received its license to load fuel from the NRC on July 17, 1982. OCA Exh. 10 at 97. One of the primary factors which caused the NRC licensing process to remain critical to fuel loading was a substantial disagreement between PP&L and the NRC as to when construction completion was likely to occur and the NRC's permission to load fuel was going to be required. For example, in November, 1980 the NRC believed that PP&L would not require a fuel loading license until March, 1982 because of the hydrodynamic loading problem while PP&L estimated a June, 1981 date. In January, 1981 the NRC again revised its licensing projection to November, 1982, and then shortly thereafter in April, 1981, this estimate was brought forward to June, 1982. PP&L Exh. RCT 2 at 23, 24.

As PP&L began to realize that it could not possibly meet its projected fuel load date of June, 1981, or its commercial operation date of the second quarter of 1982, it revised the commercial operation estimate in May, 1981, by one year to the second quarter of 1983 with a fuel loading date of April, 1982. PP&L Exh. RCT 2 at 25, OCA Exh. 32 at 5. Thus in May of 1981 NRC licensing appeared to be crucial to scheduling given the NRC fuel load licensing date of June, 1982 and the PP&L estimate of construction completion of April, 1982. In fact, each of these estimates turned out to be optimistic. As discussed above, construction completion and fuel load licensing occurred simultaneously in July of 1982, 3 months after the NRC licensing estimate. In January, 1982 PP&L finally revised its fuel load schedule to July 1, 1982. OCA Exh. 25 at 1. As PP&L realized that fuel load could not begin until July of 1982 NRC licensing was dropped from PP&L's critical scheduling concerns. Tr. 1048. In the judgment of OCA based upon the evidence produced it is submitted that NRC licensing could have been available to PP&L if it had completed construction six months earlier, and thus, licensing should not be considered a reason for delay. OCA St. 3A at 5.

In summary, PP&L concedes that the pipe hanger rework continued as a major construction activity until the completion of the project. In the March, 1981 PP&L Quarterly Review PP&L identified modifications to pipe hangers caused by the containment loads and electrical control problems as reasons for a one year delay in construction completion. OCA Exh. 32 at 5. Mr. Traylor commented upon the construction delay as follows:

> The one-year delay in completion was the most signficant factor that affected the estimated cost of Susquehanna since 1980. The most significant factor affecting schedule and, thus the cost of

> Susquehanna, was a massive body of changes and problems in the design of the plant. The changes were made to maintain the highest level of confidence in the ability of the plant to be operated safely and in accordance with NRC requirements. An enormous engineering effort was required as a result of the decision to incorporate new hydrodynamic loads. This culminated in extensive field work, installation of new pipe hangers and modification of old ones. In our opinion, no other plant in our comparison underwent changes in this area as severe as Susquehanna did.

PP&L Exh. RCT 2 at 110. OCA has identified these delay costs related to PP&L's failure to properly calculate the hydrodynamic loads as construction costs which ratepayers should not be forced to bear. PP&L has also raised the problem of licensing delays as a critical path to scheduling completion. MHB has concluded that the NRC would have accelerated the licensing review if the NRC had believed that PP&L could have completed the project significantly earlier. OCA St. 3A at 5. The record shows that more than 6 months before project completion PP&L no longer considered licensing to be critical to scheduling. OCA St. 3 at 42. Mr. Traylor has noted that NRC documents have concluded that a license to load fuel could have been awarded as early as April, 1982, approximately three months before actual construction completion. PP&L RCT 2 at 112. Considering each of these factors MHB has concluded that it is reasonable to make an adjustment related to 6 months of delay costs. The precise calculation of this adjustment will be explained in Section F 3 b ii below.

E. Other Deficiencies Which Occurred During The Course Of The Project Also Added Costs Which The Ratepayers Should Not Be Forced To Bear.

1. Introduction

In addition to the massive rework caused by the failure of PP&L, GE and Bechtel to properly design the plant in order to withstand

light of the fact that PP&L does not even know the cost of the deficiencies which it has identified.

In light of these failures it should be clear that the OCA estimates of the costs required to correct these deficiencies represent, at the very least, the best available quantification of these costs. As the following discussion shows, OCA has prepared a conservative estimate of the costs which PP&L ratepayers should not be required to bear.

3. OCA Has Quantified The Cost Of Project Errors.

a. Criteria For Proposing Adjustments

The MHB criteria for adjusting construction costs for ratemaking purposes is set forth in their testimony. OCA St. 3. Specifically, MHB has allowed the costs of constructing Unit 1 so that it would be licensable by the NRC and operable for the purpose intended. OCA St. 3 at 11. More specifically, reasonable "first time design, analysis, procurement and installation costs were allowed." OCA St. 3 at 11. However, "[r]ework, repair, removal, replacement, and reanalysis of equipment resulting from improperly completed first-time work..." was not allowed for ratemaking purposes. OCA St. 3 at 11. OCA agrees with PP&L that rework is essentially the process of "...tearing out something that has already been put in place, whether it is complete or incomplete and redoing the work." Tr. 908. The $179.38 million adjustments calculated above (excluding the allocation error of $3.1 million) arose directly from rework in these several areas. Thus the MHB adjustments quantify those deficiencies and the related costs which PP&L could have avoided had PP&L or the PP&L contractors, i.e., Bechtel and General Electric, acted in a timely and prudent manner to correct certain

construction deficiencies before these deficiencies became part of the design and construction of Unit 1. OCA St. 3 at 5, 12 13; Tr. 2152, 2153.

It should also be noted that OCA's adjustments have made allowance for a normal amount of design evolution and construction breakage and thus OCA submits that its proposed adjustments for rework are quite conservative. OCA St. 3 at 11. In addition, where PP&L has quantified the cost of certain contractor deficiencies and filed claims to recover those costs, such outstanding claims are directly reflected in the OCA adjustments. OCA St. 3 at 12, 27, 40. Thus, under any reasonable ratemaking theory OCA's proposals must be considered the minimum adjustment that must be made to insure that ratepayers are not burdened with unreasonable and inappropriate costs.

b. Quantification Of OCA Adjustments

i. Nuclear Equipment Was Extensively Redesigned And Reworked Due To PP&L's Failure To Accurately Assess The Hydrodynamic Loads In The Containment.

OCA has applied the criteria and standard set forth above at Section F3a and has quantified several adjustments regarding the construction deficiencies related to the containment loads as discussed at Section D1. These adjustments are set forth at OCA St. 3 at 23-27 and 42, 43 as revised by OCA St. 3A at 1, 2 and OCA Exh. 27. MHB has studied the Bechtel Cost Trends and Bechtel Forecasts in order to relate specific construction problems to projected costs. PP&L has confirmed that Bechtel Cost Trends represent the best available cost data by which costs related to construction deficiencies may be estimated. While PP&L used Bechtel Cost Trends in attempting to estimate the cost of project

deficiencies (Tr. 940) it kept no records of actual construction costs incurred with relation to project deficiencies. Bechtel Cost Trends identify construction problem areas and the likely project cost increases which are related to these problem areas. OCA Exh. 10 at 1-3. See OCA Exh. 17 for a compilation of Bechtel Cost Trends and underlying documentation packages which explain the Cost Trend estimation process. In response to an OCA interrogatory PP&L collected a number of Cost Trends which it believed were at least partially related to certain construction problem areas.* OCA Exh. 25 at 4-13. These Cost Trends as collected by PP&L were analyzed by MHB in the estimation process although not all of them were included in the cost of error estimate.

MHB attempted to quantify the cost of containment load rework and redesign and made an adjustment on this basis. Thus MHB allowed the costs of constructing the containment and equipment to withstand the forces created by the containment loads which were necessary for the safe operation and licensing of the plant. Only those costs resulting from rework and redesign caused by earlier errors in the underestimation of these loads were removed. OCA Exh. 3 at 25. MHB has also increased these and all other Bechtel costs contained within these adjustments by 20%, a practice consistent with PP&L's procedure in asserting claims against contractors, in order to capture PP&L overhead costs for contract administration and site supervision. Tr. 920. These costs were then divided by 2 where the work performed applied to both Units 1

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* It should be noted that prior to PP&L's responding to this OCA interrogatory PP&L had not previously collected these cost trends for the purpose of analyzing the cost of fixing these errors. Tr. 952, 953.

and 2 in order to represent a conservative allocation to Unit 1.* OCA St. 3 at 29, Table 1. These 20 cost trends, as set forth in OCA St. 3, Table I, then yielded an adjustment of $26,682,000 which was then adjusted upward by 20% to yield $32,020,000. OCA also calculated the approximate date for these expenditures as July, 1982 in order that the AFUDC on these costs could be calculated as well. OCA St. 3 at 25.**

The rework in Unit 1 caused by PP&L's original failure to properly estimate containment loads caused some inefficiency in design of pipe hangers. This inefficiency is reflected in a comparison between the large pipe hangers installed in Unit 1 and Unit 2. MHB found this difference to be 631 hangers. OCA St. 3 at 26.*** Mr. Curtis also reported that the construction of Unit 2 has benefited from the analysis performed in Unit 1 and therefore fewer hangers were required in Unit 2 than Unit 1. Tr. 976. Thus OCA proposes an adjustment based upon the difference in the number of pipe hangers in Units 1 and 2 in order to roughly reflect the greater efficiencies obtained in the construction of Unit 2 over Unit 1 with regard to the resolution of the containment

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* Because Unit 2 benefited from the experience of adopting hydrodynamic loads to containment equipment in Unit 1 an allocation factor of 1/2 likely underestimates the appropriate allocation to Unit 1. OCA St. 3 at 47.

** The AFUDC charges related to all OCA adjusted non-delay costs are set at $7,254,000 and were calculated by measuring the AFUDC costs consistent with the date of expenditure. OCA St. 5B at Sch. 7, p. 3, Rev. No AFUDC adjustment was made to delay costs as the delay adjustment reflects these charges directly.

*** There may also be some difference in the number of small hangers, but as these were not tracked by PP&L no adjustment could be calculated for this difference. Tr. 976.

loads problems. MHB has calculated the hanger quantity adjustment by tracking the cost of extra hangers late in the project through Cost Trend 11-2-39. This analysis yielded an adjustment for 631 extra hangers of $3,825,500.*

An adjustment was made for rework in the wetwell which occurred in addition to the adjustments stated above. These wetwell modifications were taken from Cost Trend 1-061 and a Bechtel Forecast 9 item for wetwell modifications.** OCA St. 3 at 24, 25; OCA Exh. 17, C.T. 1-061. These amounts were adjusted for a one half allocation to Unit 1 and PP&L overhead to yield an adjustment of $2,720,000. OCA St. 3 at 25. Overall, the above containment adjustments equal $38,566,000.

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* This adjustment was determined by multiplying the average cost per hanger at C.T. 11-2-39 by the 631 extra hangers. The original cost calculation is shown at OCA St. 3, Att. E. At C.T. 11-2-39 the number of hangers attributable to the cost increase of $12,500,000 is represented by summing the small and large pipe hangers under New Scope. OCA Exh. 17 at 11-2-39. The number of added hangers per nuclear unit is 735 large hangers and 502 small hangers (21 + 481). This yields a total per unit of 1,237 or 2,474 for both units. If the $12,500,000 trend amount is divided by this figure the result is $5,052 per hanger. Note that this likely understates the cost of large pipe hangers as both small and large pipe hangers were used in this averaging. This amount is then multiplied by the 631 large pipe hangers in order to yield a total cost of $3,187,812 (631 X $5,052). This amount is increased in order to reflect PP&L's 20% overhead to yield $3,825,500. This amount was originally calculated at $5,968,000. However, in response to PP&L St. R-5 the amount was reduced by $2,143,000 so as to eliminate a double accounting problem caused by the use of C.T. 11-4-39 when calculating the average cost per hanger. OCA St. 3 at 27, Att. E, OCA St. 3A at 1.

** Bechtel Forecasts are similar to Bechtel Cost Trends inasmuch as each relates construction problems to anticipated cost increases. See PP&L Exh. 175.282019 for the specific relation between this Cost Trend and Forecast item.

ii. The Errors Related To Estimating Containment Loads Caused At Least A Six Month Construction Delay.

OCA has also proposed an adjustment to take into account the costs of delay related to the redesign and rework of Unit 1 to correct for the errors in miscalculating the hydrodynamic loads. In late 1980 and early 1981 as the difficulty in completing the work related to the revised hydrodynamic loads became apparent PP&L announced a delay of one year and an increase in total project costs, i.e., Units 1 and 2, of $500 million. See discussion above at Section D2. PP&L Exh. RCT 2 at 27. OCA has proposed a minimum of a 6 month delay related to the underestimation of containment loads. OCA St. 3 at 42, 43. Further OCA has, consistent with its other adjustments, only allocated 1/2 of these delay costs to Unit 1 although PP&L has estimated that 70% should be allocated to Unit 1. OCA Exh. 10 at 89. Even though the costs of delay will necessarily increase over the one year period, MHB has allocated only 1/2 of the delay cost to the last 6 months of the period. OCA St. 3 at 43. Thus the delay adjustment has been calculated by dividing $500 million by 4 yielding $125 million.

In a more detailed analysis of the cost of delay PP&L reports that these delay costs are primarily related to an additional year of project staffing and the continued accrual of AFUDC on the project. OCA Exh. 10 at 88. In particular, PP&L has stated that $435 million of the $500 million in increased costs was being related to delay, i.e., $170 million for increased staffing and $265 million for additional AFUDC charges, and has allocated 70% of these costs to Unit 1. OCA Exh. 10 at 89. Such a calculation would yield a $305 million in delay cost for

Unit 1. If 1/2 were allocated for a 6 month delay this would yield an adjustment of $152.5 million as opposed to the OCA adjustment of $125 million.

iii. Errors In The Purchase, Design And Installation Of Electrical Equipment.

These errors have been described above at Section E2. Mr. Traylor has noted that the excessive voltage drop in the electrical circuits could involve costs running into millions of dollars. PP&L Exh. RCT 2 at 43. PP&L believes this deficiency resulted from Bechtel engineering errors. PP&L Exh. RCT 2 at 43. The voltage drop deficiency also delayed some construction activities at the site. PP&L Exh. RCT 2 at 25, 38.

MHB has quantified the costs related to electrical problems wherever Bechtel Cost Trends and Forecasts were available. See OCA St. 3 at 33, 34. The Cost Trends used are contained at OCA Exhibits 17 and 21. As no Cost Trends were available to track costs related to defective cable pulling, no adjustment for this deficiency is proposed. The entire adjustment is set at $1.74 million for the voltage drop problem and $1.8 million for the replacement of the defective cable.* OCA St. 3 at 33, 34.

iv. Deficiencies In The Design And Installation Of The Advanced Control Room.

MHB has quantified an adjustment related to the ACR by looking directly to the claims which PP&L has filed against GE

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* Note the adjustment for voltage drop has been revised from $2.10 million at OCA St. 3 at 33 to $1.74 million as a result of a miscalculation. See OCA Exh. 27.

concerning the ACR deficiencies. This was discussed above at Section E3. PP&L has an outstanding backcharge against GE for $.52 million related to this claim. OCA St. 3 at 40, 41. Thus OCA has proposed a $.52 million adjustment. OCA St. 3 at 41.

v. Errors In The Installation Of Expansion Anchors.

Errors in the installation of expansion anchors were discussed at Section E4. MHB quantified the expansion anchor adjustment by examining applicable Bechtel Cost Trends. These Cost Trends are listed at Table 4 in OCA St. 3. OCA St. 3 at 38. Certain Cost Trends provided by PP&L related to expansion anchor installation errors were excluded from the adjustment as these Cost Trends were not well enough documented to be included within the analysis. OCA St. 3 at 37. The entire adjustment is $2.4 million.*

vi. Certain Piping In The Reactor Required Rework In Order To Avoid Susceptability To Intergranular Stress Corrosion Cracking.

This adjustment was discussed above at Section E5. The quantification of the IGSCC adjustments has been taken directly from the claim filed by PP&L against GE. Mr. Curtis has stated that $4.2 million of this claim remains unpaid by GE. MHB has applied a 50% allocation factor against this amount and proposes a $2.1 million adjustment for Unit 1. OCA St. 3 at 27, 28.

vii. Allocation Of Special Hydrodynamic Load Studies.

MHB has proposed that as the Special Hydrodynamic Studies commissioned by PP&L benefited both Units 1 and 2 that the costs should

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* This adjustment reflects a revision from $2.7 million at OCA St. 3 at 38 to $2.4 million as a result of a miscalculation. OCA Exh. 27.

be equally shared between the units. OCA St. 3 at 45, 46. It was determined through the cross-examination of Mr Curtis that these costs had not been equally allocated. Tr. 964, 965. On rebuttal, Mr. Curtis conceded that an error had occurred in the allocation of these studies which overallocated $3.1 million of costs to Unit 1.* PP&L St. R-5 at 26.

G. Conclusion

Such adjustments as have been proposed in this case are required either under the general Metropolitan Edision standard concerning performance failures or the "imprudence" or "unreasonableness" standard relative to management performance as set forth above at Section C. At Sections D and E various errors concerning the construction of the plant are set forth in detail. In each instance some component of the plant failed to perform as required and so additional costs were incurred to redesign or rework the defective equipment. For example, the forces which would be exerted upon the containment as a result of the hydrodynamic loads were entirely overlooked when the plant was designed. The underestimation of these loads which affected the very heart of the Mark II containment design developed into the single most significant deficiency in the construction process. As stated above, PP&L was required by NRC regulation to verify the adequacy of all elements of plant design. PP&L did not investigate the reasonableness of these loads before it became contractually committed to GE for the construction and provision of the reactor itself. Tr. 886. Thus this significant aspect of plant design

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* Mr. Curtis refers to an adjustment of $2.8 million which is stated on a 90% share basis.

was not even identified until several years into the project and long after design had commenced. Such an oversight required many millions of dollars and years of continuous redesign and rework to correct as, in Mr. Curtis' words, "almost the entire plant got enfolded into the grasp of the containment problem." Tr. 935. Similarly, electrical cables were installed which were much too long to serve their required function and expansion anchors were embedded in concrete in a manner which was later identified as inadequate to serve their load bearing function. These and other various inadequacies as identified above could have been avoided by prudent supervision of the design and construction process. In any event, each of the above instances demonstrates an example of a significant performance failure for which ratepayers have no responsibility and thus should not be required to bear any of these costs.

APPENDIX I

Reply Brief of the Office of Consumer Advocate

(R-822169)

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	:	
v.	:	R-822169
PENNSYLVANIA POWER & LIGHT COMPANY	:	

REPLY BRIEF OF THE OFFICE OF CONSUMER ADVOCATE

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DATED: May 25, 1983

III. CONSTRUCTION AUDIT

The OCA has set forth a description of the Unit 1 design and construction process and the ratemaking adjustments which should be applied as a result of the deficiencies identified in detail in the OCA Main Brief at pages 46 to 94. PP&L has responded to these OCA adjustments, and those proposed by Trial Staff, in the PP&L Main Brief at pages 11 to 53. OCA will not reiterate the detailed analysis as provided in its Main Brief but will respond to the major arguments set forth by PP&L.

A. The Ratepayers Should Not Bear The Costs Of Major Performance Failures On The Project, Particularly When This Failure Was Caused By Management Imprudence.

OCA has previously discussed the ratemaking standards to be applied whenever the PUC is asked to include in rates the costs related to a new generating facility. OCA Main Brief at 51-56. PP&L cites a large number of cases from Pennsylvania and other states in its Main Brief concerning the ratemaking standards to be applied in considering the costs of utility plants. PP&L Main Brief, Vol. II at 11-15, 31. Quite significantly PP&L has failed to cite the two PUC cases involving Metropolitan Edison which have directly addressed the problem of the ratemaking standards to be applied to significant errors in the construction of nuclear power facilities. Pa. PUC v. Metropolitan Edison, R.I.D. 170, 50 Pa. PUC 82 (1976) (TMI 1) and Pa. PUC v. Metropolitan Edison, R.I.D. 626, 28 PUR 4th 555 (1979) (TMI 2). The ratemaking effect of these Metropolitan Edison cases are discussed at greater length below.

PP&L also quotes in part from the case of Pa. Power & Light Co. v. Pa. P.S.C., 128 Pa. Super. 195, 216, 193 A. 427, 436-37 (1937).

PP&L Main Brief, Vol. II at 15. It must be emphasized that the passage quoted did not address the issue as to how the proper value of a utility plant should be established. In this 1937 case the issue before the Commission was whether Pennsylvania Power & Light should be allowed to charge its ratepayers for a gas manufacturing plant when the utility was then serving its customers by locally produced natural gas. The Court stated:

> The question for the Commission and for this court is therefore whether there is evidence from which it may be concluded that good management will require this Company at this time to junk its manufactured gas plant. We do not believe the record will support a conclusion that the directors in this respect were wasteful or improvident. What value should be allowed is a different question.

Id. Thus the Court was specifically not discussing the value of the plant to be included in rate base in the passage as quoted in the PP&L Brief.

PP&L cites various other cases to the effect that a utility does not have the burden of proof to support its proposed inclusion of this nuclear plant in rates. PP&L Main Brief, Vol. II at 12. The Public Utility Code states quite clearly that the utility shall have the "burden of proof to show that the rate involved is just and reasonable...." 66 Pa. C.S. §315(a). There exists no presumption in the law of Pennsylvania that the utility should be allowed within measures of value each dollar that it has expended in the construction process.

PP&L also discusses at length the prudence standard as applied to utility plant construction and cites the case of Pa. PUC v. Philadelphia Electric Co., 37 PUR 4th 381 (Pa. PUC 1980). This case holds that utility plant may be recognized in rates only if it is used

and useful regardless of the prudence of the decision made when it was constructed. See Philadelphia Electric Co. v. Pa. PUC, 61 Pa. Commw. 325, 433 A.2d 620 (1981) (affirming upon appeal). The used and useful standard employed in these cases would also have application to the proper cost of Unit 1 to be included within rates. For example, Mr. Curtis conceded that some pipe hangers were replaced and removed from Unit 1 as a result of the hydrodynamic loads reanalysis. Tr. 975. No estimate of the amount or the cost of equipment which was actually removed as a result of the hydrodynamic loads analysis has been provided by PP&L. Electrical cables purchased for the plant were also found to be defective and thus were not used in Unit 1. OCA St. 3 at 31. Thus OCA submits that some of the equipment and material charged to Unit 1 will not be used and useful in the rendition of utility service.

The two standards discussed in the OCA Main Brief arise from the Metropolitan Edison cases and Pennsylvania precedent regarding management prudence. See Pa. PUC v. Metropolitan Edison, R.I.D. 170, 50 Pa. PUC 82 (1976) (TMI 1); Pa. PUC v. Metropolitan Edison, R.I.D. 626, 28 PUR 4th 555 (1979) (TMI 2); Park Towne v. Pa. PUC, 61 Pa. Commw. 285, 433 A.2d 610 (1981) (Salem 1). Specifically, in the case regarding TMI 2, the costs of replacing certain steam valves and the associated delay costs were excluded from rates, even though the PUC found no lack of prudent judgment on the part of utility management. Metropolitan Edison, 28 PUR 4th at 562, 563. Evidently, the PUC believed that the lack of prudent judgment was shown to lie with a party on the project other than Metropolitan Edison or the risk of performance failure must be borne by the utility regardless of any lack of prudence on the part of any party. In the TMI 1 case the PUC determined that a ring girder

had been poured improperly during the construction of the plant. As the PUC stated: "Extensive rip-out and rework was required because of voids in the concrete which were a result of not adequately taking into consideration the high concentration of reinforcing steel when making the pour." Metropolitan Edison, 50 Pa. PUC at 102. While detailed evidence assigning fault to the various parties involved in the project was not produced pending Metropolitan Edison's own investigation, the PUC determined that regardless of who may be found to be at fault, the ratepayers should not be required to bear these additional costs. Id. As stated in the OCA Main Brief, various errors and deficiencies were committed in the construction of Susquehanna Unit 1. After examining the Metropolitan Edison cases OCA asserts that regardless of which party to the project is found to be at fault and which party, if any, is later determined to be liable under the applicable contracts the ratepayers should not bear these costs.

In the case of Park Towne v. Pa. PUC, the Philadelphia Electric Co. (PE) appealed a PUC determination that the cost of the Salem 1 nuclear facility, which was 43% owned by PE but operated and constructed by Public Service Electric and Gas (PSE&G), should be reduced by $10.5 million as estimated by a Theodore Barry and Associates audit. This adjustment was related to certain hard and soft savings which could have been realized through prudent management. Park Towne, 61 Pa. Commw. at 297, 433 A.2d at 615, 616. Commonwealth Court held that a composite "hard and soft savings" adjustment was inherently ambiguous. Any such "savings" in management practices must reflect costs which could have been avoided by prudent management practices. Id. at 297, 616. Thus even though PE did not directly manage this PSE&G

project the Court did not reject any imputation of management imprudence to PE as a result of the Theodore Barry audit. The Court merely remanded the case to the PUC for more detailed findings and conclusions. Id. at 302-303, 619. Adjustments based upon savings attributable to better "work force utilization" or avoidance of rework through "preferred management practices" were critized for being overly general and non-specific. Id. at 298-299, 617. OCA submits that the holding of Park Towne is that any finding of management imprudence must specifically relate to particular costs which could have been avoided by prudent project management. The OCA has not in this case proposed such generalized adjustments, but rather, has provided detailed criticisms concerning project construction. Thus the OCA adjustments do not violate the rule of Park Towne.

B. OCA Has Presented Testimony On The Prudence Of PP&L.

PP&L has proposed that OCA has not contested the prudence of PP&L management in constructing Unit 1. PP&L Main Brief, Vol. II at 22. Further, PP&L quotes MHB, the OCA witnesses who performed the audit of the Unit 1 project, to the effect that their general impression of the project was that it was reasonably well managed. This quotation must be recognized as being only partial and selective. While MHB did not use the word "imprudent" in their testimony, Mr. Bridenbaugh of MHB discussed PP&L's management performance deficiencies as related to containment loads upon which a finding of imprudence can be based, as follows:

> We are asserting here that when a utility such as PP&L assigns work to Bechtel or GE or an architect/engineer in a nuclear steam supply system as the supplier, they still retain the responsibility for assuring that the work that those suppliers or subcontractors perform is--is properly done, even though they may assign the responsibility for the detail of it to someone else.

...

For example, if you look at 10 CFR Part 50 Appendix B which talks about the quality assurance criteria, they are required to be followed for design and construction of nuclear power plants. It indicates that the utility, for example, may delegate the conduct of such work to other--other suppliers, but in all cases the utility, being the applicant, retains the responsibility as far as the proper conduct of that work.

Q. And with respect to GE, are you testifying that [PP&L] committed error in retaining GE for the design and installation of the reactor?

Mr. Bridenbaugh: No, I am not--not testifying that the selection of GE was--was an error. But it does appear to me that the followup on the oversight of the engineering activities there were not rigidly pursued.

...

Mr. Bridenbaugh: This statement [that "Had PP&L acted more effectively or expeditiously when these problems arose, some of these cost increases could have been avoided or reduced"] is really talking about all of the design, construction quality assurance problems that occurred during the life of the project. And what I'm supposed to be saying here--what we are saying here is that in some cases had PP&L acted more expeditiously, in other words, acted sooner or if they had been diligent in their oversight of their suppliers, that they may have been able to overcome or avoid many of the problems, not all of them but --

Q. Would that--

Mr. Bridenbaugh: --but all that we have identified.

Q. Would that problem then apply to the containment problem?

Mr. Bridenbaugh: Yes.

Q. That statement would apply to the containment problem?

Mr. Bridenbaugh: Yes, to certain portions of the containment problem at any rate.

Q. What portions of the problem?

Mr. Bridenbaugh: The portions that we have recommended for disallowance in our testimony.

...

Q. Now, can you give us any specific errors that PP&L was responsible for as such, leaving out, for the moment, GE and Bechtel?

Mr. Bridenbaugh: Yes, I can--

Q. As it related to containment?

Mr. Bridenbaugh: Yes, I can. The--again, the NRC licensing requirements as called out in Appendix A of 10 CFR Part 50 and Appendix B of 10 CFR Part 50 state that a containment shall be provided at nuclear power plants that is adequate to withstand the effects of accidents and other environmental conditions. And that is a part of the design basis of that particular--of all plants.

The regulations further state that appropriate design control measures shall be incorporated in the design of the plant to assure that--that regulations are appropriately met. And the regulations state that that responsibility remains with the applicant, which is the utility, even though the applicant may assign the details of some of this work to other agents. Those regulations were in effect prior to the beginning of the construction--the design and construction of Susquehanna, and PP&L did not assure that they were appropriately met.

...

Q. Is it your testimony that once this [containment] problem surfaced, PP&L failed to pursue a solution to it?

Mr. Bridenbaugh: No, it is not my testimony that they failed--

Q. Is it your testimony that they failed to pursue a solution aggressively?

Mr. Bridenbaugh: It is my testimony that they failed to arrive at a solution expeditiously.

Q. But that they could have arrived at a more expeditous solution?

Mr. Bridenbaugh: Had they acted earlier, yes, sir.

Q. Earlier than what?

Mr. Bridenbaugh: Earlier than they did, earlier than 1975.

Q. The date when the problem was identified?

Mr. Bridenbaugh: The problem was identified, as I indicated, as early as 1972 basically with the SRVs [Safety relief valve loads].

Tr. 2151-2159.

Even though the witnesses sponsored by PP&L concluded specifically that the management of the project was "prudent," such a conclusion must ultimately be left to the PUC. PP&L St. R-5 at 29, PP&L Exh. RCT 2 at 112. Moreover, the question of prudence is one of law. It has long been the law in Pennsylvania that a witness is not competent to state a conclusion as to the ultimate issue in litigation. Gordon v. Robinson, 210 F.2d 192 (3rd. Cir., 1954); Underhill v. Wynkoop, 15 Pa. Super. 230 (1900). Thus OCA has called the management prudence of PP&L directly into issue in this case, as well as the performance of PP&L contractors such as GE and Bechtel, through the testimony of MHB and the evidence produced upon discovery which was summarized in the OCA Main Brief.

C. PP&L Is Responsible For The Costs Incurred By Those Working For PP&L And The Ratemaking Authority Of The PUC Is Not Limited By The Contracts Which PP&L Has Entered.

PP&L has also argued in its Main Brief that the ratemaking power of the PUC must be controlled by the private contracts which PP&L has executed with its contractors on the project. Under this theory the PUC could not reduce rates by any amounts which PP&L could not recover against others. PP&L has gone so far as to argue that any ratemaking standard which would make PP&L responsible for the errors of its contractors amounts to the imposition of a form of vicarious liability upon PP&L. PP&L Main Brief, Vol. II at 29.

OCA submits that this extensive contractual analysis entirely overlooks the point that utility rates must be "just and resonable" under the Public Utility Code at 66 Pa. C.S. §315(a). Such a ratemaking standard takes precedence over private utility contracts. Thus OCA submits that the ratepayer should not be forced to bear the risks of errors in the design and construction of a plant regardless of which project participant is responsible for the errors and the manner in which the contractual arrangements have been negotiated between these project participants.

The courts which have addressed the issue of public utility regulation and private contracts have come to a similar conclusion. The United States Supreme Court has addressed this issue and stated:

> In Hudson Water Co. v. McCarter, 209 U.S. 349, 357, 28 Sup. Ct. 529, 531 (52 L.Ed. 828, 14 Ann. Cos. 560) it is said that:
>
> > One whose rights, such as they are, are subject to state restriction, cannot remove them from the power of the state by making a contract about them. The contract will carry with it the infirmity of the subject matter.
>
> In L&NRR Co. v. Mottley, 219 U.S. 467, 482, 31 Sup. Ct. 265, 270 (55 L.Ed. 297, 34 L.R.A. [N.S.] 617), this is quoted with approval from Knox v. Lee, 12 Wall. 457, 550, 551, 20 L.Ed. 287, viz:
>
> > Contracts must be understood as made in reference to the possible exercise of the rightful authority of the government, and no obligation of a contract can extend to the defeat of legitimate government authority.

Union Dry Goods v. Georgia Public Service Corp., 248 U.S. 372, 376 (1919). It has also been stated that "[t]he power to fix rates when exerted, is for the public welfare, to which private contracts must yield...." Arkansas Natural Gas Co. v. Arkansas Railroad Commisson, 261 U.S. 379, 383 (1923). In an early Pennsylvania Supreme Court case this

power was given a constitutional foundation. The Court held that no private contract could be placed beyond the reach of utility regulation based upon Article 16, Section 3 of the Pennsylvania Constitution which provided that "the exercise of the police power of the State shall never be abridged or so construed as to permit corporations to conduct their business in such manner as to infringe the equal right of individuals or the general well-being of the State." Springfield Consolidated Water Company v. Philadelphia, 285 Pa. 172, 175, 131 A. 716, 717 (1926).* As cited in the OCA Main Brief, the PUC has ruled in the Metropolitan Edison case that ratepayers shall not bear the cost of performance failures in the design and construction of a utility project regardless of whether or not the utility may recover from the responsible contractor or supplier. OCA Main Brief at 51-56, Pa. PUC v. Metropolitan Edison, R.I.D. 170, 50 Pa. PUC 82 (1976) (TMI 1); Pa. PUC v. Metropolitan Edison, R.I.D. 626, 26 PUR 4th 176 (1979) (TMI 2).

Moreover, OCA submits that if PP&L is to charge the ratepayer for the costs of PP&L's supervision of the project then it is fundamentally inconsistent to attempt to avoid all responsibility for the errors of those being supervised. Mr. Curtis, the PP&L Construction-Nuclear Project Director, stated that of the current PP&L staff of over 900 at least several hundred are employed on the construction site. Tr. 979, 980; OCA Exh. 10 at 95, 96. Total PP&L Staff costs for both units are currently estimated at $190 million. OCA

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* Article 16 of the Pennsylvania Constitution has been repealed and replaced by Article 10 by Constitutional amendment and approval by the voters on November 8, 1966. Const. Art. XVI.

Exh. 10 at 96. Mr. Traylor concluded, after a preliminary review, that the size of the PP&L Nuclear Department staff appeared to be at the high end of a range in terms of number of personnel. PP&L Exh. RCT 2 at 44. Mr. Curtis has stated that this large body of personnel has continuously reviewed and supervised the construction process and made various recommendations concerning construction activities. Tr. 980, 981. Mr. Traylor has also stated that PP&L very closely tracked Bechtel's work both on the project site and in its San Francisco Home Office. Tr. 1092. Thus OCA submits that PP&L should not now be free to shed its responsibility for those it has supervised.

PP&L has also argued that any ratemaking adjustments arising from construction deficiencies should be deferred until PP&L's attempts to either settle or litigate these disputes are concluded. PP&L Main Brief, Vol. II at 32. OCA submits that as ratemaking is essentially prospective in nature, the ratemaking process must make the best estimate possible in adjusting the costs presently claimed by PP&L in this case. Moreover, it is not for PP&L and its contractors to meet privately, agree upon a settlement of these deficiencies, and then advise the PUC of the amount by which rates shall be reduced. The ratemaking process is public by its very nature and should not become dependent upon private agreements which will be reached in the uncertain future. Moreover, if rates are to be established with no regard given to recognized project claims and deficiencies any financial incentive for vigorously pursuing these claims and deficiencies would be entirely removed.

D. The Delay In Recognizing The Effect Of Containment Loads Upon Unit 1 Directly Led To Increased Costs And Delays In Completing Construction.

PP&L also argues in its Main Brief as follows:

> ...[A]ll of the OCA's evidence goes to the question of whether GE might have identified the new SRV and LOCA loads at an earlier date (see OCA St. 3A, p. 3). This is clearly not the relevant issue. The problem was not identifying the loads, but determining the impact of these loads on the plant and how to design for these impacts.

PP&L Main Brief, Vol. II at 35. It should be remembered that engineering for Susquehanna began in 1970, construction activity commenced in 1973, the errors in underestimating the loads on the containment were recognized by PP&L in 1975, and the process of redesigning and reconstructing to meet these revised loads continued until the completion of construction in 1982. PP&L Exh. RCT 1 at 33, 41, 79; PP&L St. R-5 at 15, 16. The final Phase III analysis of these loads was not even completed until as late as 1981, which again required even more re-analysis and reconstruction of the affected equipment in order to achieve a licensable plant. Tr. 896, 903, 905. As argued in the OCA Main Brief it was a significant error to have completely overlooked the impact of the LOCA and SRV loads upon the containment until 1975 thus causing signficant redesign and rework. However, PP&L seems to argue that even if the full impact of hydrodynamic loads would have been recognized from the beginning of the design process, the long and expensive process of redesign and reconstruction would have occurred in any event.

OCA submits that the process of continuously redesigning and reworking the equipment within the plant is inherently expensive and inefficient. That such expense and inefficiency could have been limited

by proper analysis of the containment loads in the first instance is supported by the testimony submitted by the OCA and the discussion of this problem by Mr. Traylor as follows:

> When design changes occurred while construction was in progress, productivity was adversely affected. First, the original work had to be removed or modified greatly, resulting in additional man-hours. Then, the new design had to be installed resulting in even more man-hours. The quantity of material in the final installation might be unchanged, but the total man-hours were much higher. The result of this rework was a high unit rate, which implied poor productivity. Another impact of design changes on unit rates related to worker attitude or morale. When construction workers were required to repeatedly remove or modify completed work, the effect was often a lower performance level than would otherwise have been realized. This was a complication of the difficult rework problem. (PP&L Exh. RCT 1 at 113)
>
> ...
>
> ...[D]esign changes which came late in the project had the most devastating impact on cost and schedule. On Susquehanna, there have been many significant design changes since Forecast No. 10, and when a late design change is made, previously installed material may have to be removed, previous construction work disassembled and new equipment purchased, manufactured, installed, inspected and tested. There can be schedule delays in every step from redesign to retesting. And since construction labor is a large component of plant costs, any design changes on completed work cannot help but have a large cost impact. (PP&L Exh. RCT 2 at 3)

Thus Mr. Traylor concluded that the relatively low labor productivity on the Susquehanna project was related to

> - Extensive rework and increased complexity and congestion associated with continual design evolution

PP&L Exh. RCT 1 at 113. Thus the continual redesign and reconstruction of the plant lead to higher costs which the OCA submits could have been avoided by properly designing the plant in the first instance.

E. GE Containment Loads As Provided To PP&L Were Seriously In Error.

PP&L generally disagrees with the basis upon which OCA has proposed the adjustments relating to the hydrodynamic loading problem. PP&L Main Brief at 24-43. For example, PP&L argues that it is unclear that the containment design which GE provided to PP&L was defective. PP&L Main Brief, Vol. II 31, 32. OCA submits that it is clear from the testimony produced in this case that the GE containment design as originally produced was wholly inadequate to perform the functions required of it. Quite simply, the fact that PP&L spent millions of dollars and years of effort to redesign and reconstruct the equipment within the containment is persuasive evidence that the containment as originally designed and constructed was seriously deficient.

F. Prior To Construction PP&L And GE Failed To Test The Mark II Containment Design In Order To Verify That It Could Sustain Containment Loads.

PP&L also makes certain misleading statements of fact concerning the manner in which the Mark II containment structure was designed as follows:

> Steam released into the wetwell during the SRV openings or LOCA [Loss of Coolant Accident] creates forces or loads in the wetwell which may be transferred to the rest of the reactor building. The Mark II containment was designed to withstand these conditions as they were understood at the time the Mark II containment was developed (PP&L St. R-5, pp. 2-3).

PP&L Main Brief, Vol. II at 25. What is left unsaid in this passage is that as the SRV and LOCA loads were not understood at all by GE when the Mark II containment was originally developed, these loads were entirely overlooked. OCA St. 3A at 2, 3. PP&L also discusses the testing of the

Mark II design as follows: "As explained above, GE analyzed both Mark I and Mark II containments...." and footnotes this passage, stating "For example, GE's tests for LOCA were designed to simulate a LOCA with various equivalent piping break sizes up to a break approximately twice the cross-sectional size of the design-basis LOCA. (OCA St. 3, Attachment D, p. 3)." PP&L Main Brief, Vol. II at 34. The reader is left with the impression that the Mark II design was tested for SRV and LOCA loads before PP&L began building it. Mr. Bridenbaugh has explained GE's testing procedures as follows:

> Q. You were also asked concerning some loading tests that were performed by GE. I believe I am correct, there were some SRV tests and there were some LOCA tests. Were either of these tests conducted on the Mark II?
>
> Mr. Bridenbaugh: No, they were not. The SRV tests that I discussed under cross-examination were conducted at Quad Cities plants and the Browns Ferry plants, which are both Mark I plants, Mark I configurations. Those were done in the early to mid-1970's, 1972, '73, '74, thereabouts.
>
> The LOCA load tests were done both for a Mark I configuration and for a Mark III configuration, that is prior to the identification of this overall generic problem. The Mark I configuration tests were basically done by GE about the mid-1960's when they were in the process of developing for construction the first Mark I-type plant which was to have been the Bodega Bay plant in California but which was never built.
>
> The Mark II configuration, which is a fairly significant departure from Mark I, was never basically tested either for SRV loads or for LOCA loads until after the problem became--came to a head in 1975. The Mark III configuration was tested, as I indicated, at the GE Pool Swell Test Facility in San Jose between the period of 1972 and 1974. So there was a skipover from the Mark I to the Mark III without the basic design verification testing that should have been done on the Mark II.

Tr. 2174, 2175. Thus OCA submits that the failure to require such SRV and LOCA testing of the Mark II design contributed to the failure on the part of GE and PP&L to recognize these significant loads which were later to cost the project so much time and expense.

PP&L also notes that the GE testing of the Mark III containment, which recognized for the first time that the Mark II structure would be affected by the LOCA loads, was assisted by more sophisticated instruments and computerized methods for data processing. PP&L Main Brief, Vol. II at 35. Mr. Bridenbaugh has responded to this argument on Surrebuttal as follows:

> Q. At page 6 of Statement R-5, Mr. Curtis states that the "understanding" of the hydrodynamic loads was aided by the "use of more sophisticated testing facilities and instrumentation which were not available when the problems first arose". Does this mean that the problem could not have been detected at a time early enough to have been incorporated in the SSES original containment design?
>
> A. In my opinion, no. Test facility and instrumentation design capabilities were such that they could have easily detected the loading problem if the decision had been made to perform representative tests to confirm the Mark I and Mark II designs. It is no doubt true that the recent widespread use of mini-computers and digital data recording in such test facilities has aided in the analysis of test data and thus assisted in helping to define the loads more rapidly. However, the main issue with the Mark II hydrodynamic loads was not the inability to quantify them for the original design but rather that two very significant load inputs were totally overlooked in the original loading design. One of these, the LOCA load, results in, among other phenonmena, a pool swell "wave" of 15-18 feet of water. It does not take sophisticated instrumentation to detect such an effect. Similarily, the SRV forces at Mark I facilities broke the structural restraints consisting of welded steel beams. Such forces could have been measured prior to the SSES design if the tests had been properly defined and conducted in a representative facility.

OCA St. 3A at 2, 3. The OCA proposes that PP&L and GE should not be permitted to avoid all responsibility for failing to conduct these tests at an earlier date based upon the argument that such testing was technically impossible.

G. The Difficulty In Analyzing The Containment Loads Issue Does Not Support A Deferral Of This Adjustment Until PP&L Has Determined Its Own Position On The Matter.

PP&L also argues that OCA's containment loads adjustment is premature given the complexity of the hydrodynamic loads problem. PP&L Main Brief, Vol. II at 31, 32. OCA has argued above that the contractual aspects of the containment loads problem should not bar the ratemaking recognition of an adjustment related to these errors. OCA likewise submits that the complexity of this issue does not support its deferral.

OCA agrees with PP&L that the ratemaking issues regarding the construction of this or any other nuclear facility are complex and difficult. OCA has addressed these difficult issues by conducting an extensive audit of this construction project and provided testimony regarding the most serious deficiencies that were encountered. OCA submits that merely because the ratemaking issues which lie at the heart of this large rate increase are difficult does not mean that they should be avoided by deferring these questions to an indefinite process dependent upon PP&L's later analysis.

PP&L's decision to build this multi-billion dollar nuclear facility necessarily gives rise to a number of unique and difficult issues. For example, PP&L seeks an annual accrual of $2.6 million in present rates in order to establish a fund of $103 million to decommission Unit 1 in the year 2022. PP&L Future 1 at D-12. Needless to say, the expense of such decommissioning in the year 2022 is quite speculative and involves complex issues of fact which are difficult to determine at this point in time. Nevertheless, PP&L has proceeded in this rate case, undaunted by such complexity, and made their own estimate of such an expense and further inflated these charges by a 25%

contingency factor to take into account such uncertainties. OCA has not rejected such a claim in its entirety in this case even though the postponement of such ratemaking charges until the year 2022 would allow the ratemaking process to proceed with greater certainty. PP&L should not be allowed to selectively defer issues regarding the Unit 1 measure of value only when the process of deferring such estimated costs works in their favor.

H. The Ratepayers Should Not Bear The Costs Which Arose As A Result Of PP&L's Failure To Make Certain That Unit 1 Was Constructed As Designed.

PP&L also contends that the costs which the OCA has related to errors in designing and constructing Unit 1 to meet hydrodynamic loads were actually related to new NRC requirements. PP&L Main Brief, V. II at 37. Specifically, Mr. Curtis contends that these "new requirements" related to the NRC licensing requirement that the plant "as-built" must correspond to the plant as designed. Tr. 961. Mr. Bridenbaugh has replied that the NRC regulations have always required that the plant "as built" must conform to the "documented instructions, procedures, and drawings" so that the safe performance of the plant "as-built" can be assured. OCA St. 3A at 4. PP&L recognized this problem and commented as follows in one of it publications:

> Pipe Hangers. Hanger program suffered several setbacks during February [,1981]. The design effort realized essentially no progress, primarily because "as built" drawings required for the analytical effort were discovered to not actually reflect as-built conditions.

OCA Exh. 26. It is clear that in some areas Bechtel failed to actually construct the plant in conformance with Bechtel's own drawings. This further added to the expense of reconstructing the plant in conformance with revised hydrodynamic loads. Nevertheless, whether this rework was

caused by failing to initially recognize the hydrodynamic loads or failing to accurately implement the revised designs these costs should not be borne by the ratepayers. Mr. Bridenbaugh has commented upon this as-built verification issue as follows:

> We would describe most of the changes required by the NRC as actions to provide assurances that the design process did in fact result in meeting the regulations. NRC Bulletin 79-14 is a good example of this. It required field verification that the piping system that was constructed in the plant was the same as the system that was analyzed on paper. Many plants found that there were substantial differences between the drawings and the hardware and changes were required. We do not believe such efforts should be blamed on changing regulations but rather to failures of the design process or implementation of the Quality Assurance Program.

OCA St. 3 at 51.

I. <u>While PP&L Believes The OCA Containment Loads Adjustment Is Inaccurate, They Do Not Believe That The Adjustment Is Overstated</u>.

PP&L also disagrees with the manner in which the OCA has calculated its adjustment of $38.6 million regarding the errors in calculating the containment loads. PP&L Main Brief, Vol. II at 36-40. For example, PP&L believes that the OCA containment adjustment concerning rework on pipe hangers is improperly calculated. PP&L Main Brief, Vol. II at 37, 38. Mr. Curtis has discussed the OCA containment loads adjustment as follows:

> Q. On page 12 you state that you disagree with the Minor and Bridenbaugh cost adjustments. And I believe also in your testimony you state that PP&L has not yet determined an accurate estimate for the containment problem, is that correct?
>
> A. That's correct.
>
> Q. Now, have you been working on that cost quantification problem since the last hearing?

A. Yes, we have.

Q. O.K. And have you endeavored to come up with some quantification of those containment problems?

A. Within the time constraints of this hearing we have attempted to provide some quantification in those areas that have been under discussion between us.

Q. Well, have you any opionion then as to whether the Bridenbaugh quantification is either too high or too low regarding the containment problem?

A. No, I don't.

Tr. 2363, 2364. Although Mr. Curtis has conceded that the OCA containment loads adjustment may be understated, PP&L in its Main Brief reiterates its criticisms and states that several of the Cost Trends used by MHB in quantifying the containment load adjustment include costs which were not related to the redesign and reconstruction caused by the underestimation of these loads. PP&L Main Brief, V. II at 38.

Upon cross-examination Mr. Curtis posed this same criticism that various Cost Trends which were included within the OCA containment loads adjustment did not relate to work required due to changing containment loads. Tr. 2365. On that occasion Mr. Curtis was reminded that in answer to an interrogatory posed by the OCA, PP&L provided a list of 43 Cost Trends which were conceded to be at least partially related to the hydrodynamic loads/containment costs. OCA Exh. 25 at 8, Tr. 2366. It was further drawn to Mr. Curtis' attention that the MHB quantification of Cost Trends, set forth at Table 1 of OCA Statement 3 only contained 20 cost trends. Tr. 2365. Mr. Curtis was also presented with OCA Exhibit 30 which lists the large number of cost trends which PP&L has admitted are at least partially related to the hydrodynamic loads/containment problem but were not included in the OCA adjustment. These costs as shown at Exhibit 30 add up to an amount in excess of $47

million. OCA Exh. 30, Tr. 2366, 2367. Mr. Curtis agreed that, although he believed the various cost trends shown at OCA Statement 3 at Table 1 contained costs which were not related to hydrodynamic loads, he had not checked these various Cost Trends set forth at OCA Exhibit 30 to determine if the OCA estimate had also understated containment rework costs by not including some of the Cost Trends related to the hydrodynamic loads problems. Tr. 2367.

In summary, OCA wishes to stress that although PP&L has disagreed with the manner in which the OCA has calculated its hydrodynamic loads adjustment, PP&L has not provided a quantification of its own regarding this adjustment. PP&L has admitted that various costs which PP&L identified as related to the hydrodynamic loads problem were not included within the OCA proposed adjustment. PP&L has no opinion as to whether or not the OCA adjustment overstates or understates the cost of redesigning and reconstructing Unit 1 in order to meet changing hydrodynamic loads. Thus the OCA adjustment stands as the best quantification of these costs available.

J. Mr. Bridenbaugh Has Consistently Held The Position That The Original GE Containment Design Was Deficient As It Failed To Take Into Account The Hydrodynamic Loading Problem.

PP&L has also cited portions of Mr. Bridenbaugh's testimony taken from Congressional hearings before the Joint Committee on Atomic Energy on February 18, 1976. This entire transcript has been placed into evidence by PP&L as PP&L Exhibit NWC-2. In their Main Brief PP&L has selectively cited portions of this transcript where Mr. Bridenbaugh discussed GE's conduct regarding the Mark I containment design. PP&L has included those portions of Mr. Bridenbaugh's statement regarding the negligence of GE in order to demonstrate an apparent inconsistency

between his testimony in 1976 and his testimony in the current proceeding. PP&L Main Brief, Vol. II at 33, 34. Mr. Bridenbaugh has explained the context of that hearing as follows:

> The hearing was called at the request of the Joint Committee on Atomic Energy, and as the title of the exhibit indicates, it was an investigation of charges relating to nuclear reactor safety. The particular timing of the hearing was--was, I think, significant because the hearing occurred in mid February of 1976, and this was just weeks following the required shutdown of a Mark I plant due to the problems that were discovered in the Mark I investigation that I was the project manager of. And that particular plant was the Vermont Yankee plant.
>
> There was a lot of interest on the part of the committee members as to whether or not there had been withholding of information or coverup or--or that sort of thing. And that is basically the context of the question as--as I recall that was asked of me on negligence. It was in the investigation and the details of the analysis of the Mark I program that I was specifically involved with, was there any willful withholding of information from the NRC. And my answer was, no, to my knowledge there had not been any withholding of such information.

Tr. 2176.

Thus, OCA submits that the question as to whether GE was negligent in the willful withholding of information concerning deficiencies in the Mark I design should not be confused with the question as to whether the Mark II containment design, as prepared by GE under the supervision of PP&L, was deficient. Moreover, if Mr. Bridenbaugh's testimony before Congress in 1976 is reviewed in its entirety it is consistent with the testimony he has provided in this proceeding. Portions of the PP&L Exhibit which set forth his testimony as presented to this Congressional committee are attached hereto as Appendix A for the Commission's further review. For example, Mr.

Bridenbaugh provided testimony to the Congressional committee as follows:

> It has been a year since the Mark I containment study was initiated. There have been many changes as a result of that.
>
> Our deep concern is that plants are continuing to be built, plants are continuing to be started up. Plants are continuing to be designed with many of these same basic design deficiencies....

PP&L Exh. NWC-2 at 72. Thus Mr. Bridenbaugh has consistently regarded the initial GE containment design as deficient in that it failed to properly consider the hydrodynamic loads.

K. The Conclusions Of Mr. Traylor That PP&L Acted Prudently Do Not Support PP&L's Position That No Adjustments Should Be Made As A Result Of Project Deficiencies.

PP&L also quotes at length from the conclusions of Mr. Traylor, a consultant to the nuclear industry hired by PP&L prior to this rate case. Mr. Traylor has offered certain conclusions as to PP&L's performance. PP&L Main Brief, Vol. II at 17-20. As argued in the OCA Main Brief it is submitted that these conclusions are of limited applicability to the ratemaking process. OCA Main Brief at 85. While OCA does not contend that valid commercial claims between PP&L and its contractors are necessary before a ratemaking adjustment can be proposed, if such claims exist they should certainly be reflected in the ratemaking process. Mr. Traylor believes that PP&L acted prudently in this project even though he recognized that certain contractors may well be responsible for millions of dollars worth of claims due to their own performance deficiencies. For example, Mr. Traylor recognizes that large expenditures were made in an effort to resolve hydrodynamic loads deficiencies in design, that GE has been cautious in its dealings with PP&L as a result, and that the "financial responsibilities and

APPENDIX J

Exceptions of the Office of Consumer Advocate

(R-822169)

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	:	
v.	:	R-822169
PENNSYLVANIA POWER & LIGHT COMPANY	:	

EXCEPTIONS
OF THE OFFICE OF CONSUMER ADVOCATE

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DATED: July 13, 1983

I. INTRODUCTION

At page 2 of his Recommended Decision (R.D.), the Administrative Law Judge (ALJ) states that his recommended annual revenue increase of $201,652,000 "is the lowest reasonable amount which can be suggested on the record consistent with the provision of safe and adequate service."

The Office of Consumer Advocate (OCA) disagrees.

First, it should be noted that the ALJ's recommended increase does not include state tax adjustment surcharge revenues and is thus not directly comparable to the $315,000,000 figure utilized by the Company and cited by the ALJ at R.D. 1. Rather, the ALJ's recommendation may more properly be compared to the $296,068,000 set forth on the Company's pro forma income statement at PP&L Exh. Future 1, Sch. D-1, p. 1. When state tax adjustment surcharge revenues are added at a 6.3% rate, the impact of the ALJ's recommendation is to increase the Company's revenue requirement by approximately $21¼ million, or some 17% over present rates. See PP&L Exh. Future 1, Sch. D-3, p. 3; OCA Main Brief at 3, footnote 2.

More importantly, when coupled with the ALJ's apparent rate structure recommendation that residential ratepayers receive an increase of up to 150% of the average increase, R.D. 176, the ALJ's recommendation produces an even greater increase to residential ratepayers than the 24.91% which the Company originally proposed. PP&L Exh. Future 1, Sch. D-3, p. 3. For the reasons set forth more fully below, the OCA urges that the Commission totally reject the ALJ's rate structure recommendations both as to cost and revenue allocations. The OCA submits that the ALJ's summary rejection of the cost of service analyses by the OCA as well as the Company is unsupported by the evidence and results in the improper allocation of costs to the residential class. The ALJ's proposed revenue allocation is also unsupportable on the record of this case and produces drastic and totally unjustified increases to residential customers. Thus, although the ALJ recommended nearly a one-third

reduction in the Company's overall revenue increase, the entire benefit of that reduction apparently would go to non-residential customers. PP&L's nearly 900,000 residential customers would have been better off if the Company's proposed rates had been allowed to go into effect as filed.

With regard to overall revenue requirement, the OCA strenuously excepts to the ALJ's rejection of the OCA adjustments to the exorbitant costs of the Susquehanna Unit 1 construction project. What is most distressing with regard to this issue is the ALJ's position that the Commission must await the outcome of any litigation or commercial settlement between PP&L and its contractors with regard to construction cost overruns before any rate adjustment can be made. See, e.g., R.D. 66, 67-68, 70. Such a policy is not only unfair to ratepayers, who certainly were not responsible for the construction deficiencies of either PP&L or its chosen contractors, but is also directly contrary to Commission precedent. See, e.g., Pa. PUC v. Metropolitan Edison Co., 28 PUR 4th 555, 563 (1979) where the Commission reduced the cost of TMI-2 by $7.9 million dollars and held that "we are of the opinion that respondent's ratepayers should not be made to bear the burden of the costs of replacing the malfunctioning steam valves, for it was the respondent, not its ratepayers, which selected the contractor to provide the valves and respondent and its stockholders should bear the risk of performance failure." Under the Recommended Decision in the present case, it is the ratepayers who must bear the risk of construction cost overruns, while deferring all questions of construction deficiencies to an indefinite process of commercial negotiation or litigation to be conducted at some unknown point in the future. The OCA submits that ratepayers should not be required to pay for errors and deficiencies in the initial construction of Susquehanna, regardless of whether the responsibility for these deficiencies is ever resolved by PP&L and its contractors.

In addition, the ALJ's recommended rate increase is excessive in its suggested rate of return and in its rejection of several OCA accounting

importance and extraordinary negative impact on residential ratepayers of the rate structure and construction audit issues noted above, the OCA will touch only briefly in these Exceptions on the more traditional rate case issues concerning rate of return and accounting. As more fully developed in our earlier Briefs, however, the OCA stands by each of its proposed ratemaking adjustments and submits that the Company can justify an increase of no greater than $157,119,000, including state tax adjustment surcharge revenues.*

Finally, the OCA excepts to the ALJ's adoption of the convoluted and unlawful procedure which the Company has proposed for the collection of Susquehanna related costs which the Company has been permitted to defer on its books under the Commission's Declaratory Order at P-820357. Under the proposal adopted by the ALJ, ratepayers will be subject to a still unspecified additional rate increase on April 1, 1984, subject only to review by the Bureau of Audits but without further hearings. It must be recognized that while the Company undoubtedly began to defer Susquehanna capital, operating, and maintenance costs when the unit was declared to be in commercial operation on June 8, 1983, the deferred energy savings with which the Company intended to partially offset these costs have already been reduced by four unscheduled outages in the first five weeks of the plant's commercial operation. For this reason and for the reasons set forth more fully below, the OCA submits that the Company's proposal for collection of deferred Susquehanna costs without hearing and outside of the context of a rate case is not permitted by the Public Utility Code and is contrary to sound ratemaking policy.

While the OCA obviously endorses several important aspects of the ALJ's Recommended Decision, particularly with regard to PP&L's excess capacity and

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* The OCA's recommended increase, net of state adjustment surcharge revenues was $147,807,000. See OCA St. No. 5B at 2; OCA Main Brief at 3, footnote 2.

the "locking in" of certain energy cost reductions which the Company included in its pro forma ratemaking claim in this case, the OCA excepts to those portions of the decision outlined above. For the Commission to adopt the ALJ's recommended decision, especially with regard to rate structure and the cost of Susquehanna, would be thoroughly unjust and unreasonable to residential ratepayers, who would be asked to bear a totally disproportionate share of an unjustifiably high rate increase.

II. CONSTRUCTION COSTS

The OCA has proposed that $144.47 million of costs incurred in the construction of Susquehanna Unit 1 be deducted from the recognized cost of plant in service in the calculation of return on rate base and depreciation expense in order to adjust for various performance deficiencies on the part of PP&L and its contractors. OCA Main Brief, at 46-95; OCA Reply Brief 15-46, St. 5B, Sch. 7 p. 3. Staff has proposed an adjustment on a similar basis in the amount of $149.97 million. The OCA has calculated the revenue effect of its adjustment at $43.8 million. OCA Main Brief at 48. Each of these adjustments has been dismissed by the ALJ. R.D. at 48-74.* OCA excepts to the dismissal of its construction cost adjustments.

Throughout the course of the project PP&L has identified various categories of deficiencies which have occurred in the construction of the Susquehanna nuclear units. Specifically, PP&L has identified 72 deficiency claims against Bechtel, the project Architect/Engineer, and 5 against General Electric, a major contractor on the project. Staff Exh. 13-A, Sch. 4; OCA Main Brief at 46, 47. While PP&L has recovered some deficiency claims against GE, it has neither quantified nor recovered any deficiency claims

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* The only construction cost adjustment which was accepted by the ALJ is a $2.5 million allocation adjustment on a jurisdictional basis which was proposed by OCA and accepted by PP&L.

against GE for the costs related to the underestimation of hydrodynamic loads, the most significant source of cost overruns on the project. No deficiency claims have been recovered against Bechtel. Staff Exh. 13-A, Sch. 4; OCA Main Brief at 92, 93.

The ALJ has dramatically departed from Commission precedent in this case by dismissing all construction cost adjustments even in those cases where the deficiency has been recognized by PP&L and the cost quantified. Throughout the ALJ's discussion of these issues no reference whatsoever is made to those cases in which this Commission has decided to reduce utility ratemaking claims for the costs of constructing nuclear generating stations. Notably, no mention is made of this Commission's decision which ordered ratemaking adjustments in the costs of constructing Three Mile Island Units 1 and 2. These decisions have held that ratepayers should not be burdened with construction errors whether or not these deficiency claims proposed by the utility have been recovered or would be recovered from other parties engaged in the project. These decisions are quoted as follows:

> Another item of contention is a faulty ring girder concrete pour made during construction. Extensive rip-out and rework was required because of voids in the concrete which were a result of not adequately taking into consideration the high concentration of reinforcing steel when making the pour. The record indicates that the total cost at TMI for the faulty pour was between $6 million and $9 million. Commonwealth contends and respondent agrees, that litigation against contractors for recovery of this cost is likely to occur. Commonwealth is of the opinion that in the meantime, ratepayers should not be burdened with this cost and that the Commission should take the total average cost ($7,500,000) and eliminate respondent's share ($3,750,000) from rate base. Municipal Complainants contend that a minimum of $3 million, which represents one-half of respondent's witness' minimum assessment of increased expense due to the faulty ring girder pour, should be deducted from respondent's claim. Respondent avers that, "If and when any recovery is made, the ratepayers would promptly be given the benefit of it." It is apparent from the record that imprudent procedures were followed in connection with the concrete pour at TMI. Respondent was reluctant to provide detailed evidence of the culpability for the faulty pour pending completion of its own investigation and possible litigation. Regardless of subsequent litigation which may determine responsibility for the faulty concrete pour at TMI, we are of the opinion that respondent's ratepayers should not be made to bear this burden. Consequently, we disallow $4,500,000 from rate base which represents respondent's

share of an estimate of the faulty concrete pour for the purpose of these proceedings.

PA. PUC v. Metropolitan Edison, R.I.D. 170, 50 Pa. PUC 82, 102 (June 22, 1976) (Emphasis added).

> We conclude that, although the malfunctioning of the TMI-2 steam safety valves is not attributable to a lack of prudent judgment on the part of management, and while Respondent asserts that it should not bear any costs that are not recovered in its pending suit against Lonergan & Co., we believe that this situation is analogous to that of the TMI-1 girder ring, (R.I.D. 170-171, 50 P.U.C. 77, 102) and as there, we are of the opinion that Respondent's ratepayers should not be made to bear the burden of the costs of replacing the malfunctioning steam valves, for it was the Respondent not its ratepayers which selected the contractor to provide the valves and Respondent and its stockholders should bear the risk of performance failure.

Pa. PUC v. Metropolitan Edison Co., R.I.D. 626, at 14, 28 PUR 4th 555, 563 (March 22, 1979). A discussion of these and other applicable cases in Pennsylvania has been developed in the OCA briefs. OCA Main Brief at 51-56, OCA Reply Brief at 15-19, 22-25. In complete disregard of this precedent the ALJ in this case would allow PP&L to charge ratepayers for all funds expended. The ALJ only grants to ratepayers the possibility that they may have rates reduced at some indefinite point in the future if PP&L is successful in recovering the costs of these deficiencies from its contractors. The opinion of the ALJ on this issue is quoted as follows:

> PP&L has paid its contractors the monies involved here. It has disputed some of these costs and has notified these contractors of its position. These issues will be decided after all work at Susquehanna is complete. When these disputes are resolved, the appropriate rate base treatment for any amounts found to be due PP&L can be determined. It would be the height of folly to penalize the utility by making downward adjustments to rate base in anticipation of a favorable resolution of the Company's claim. Such adjustments would be speculative and would only encourage a utility not to contest contractor claims. Again, PP&L should report on the status of these claims in its next filing. When these claims are settled, the Commission can determine the appropriate rate base treatment of any recoveries from the contractors.

R.D. at 74. The OCA takes strong exception to the ALJ's finding that any ratemaking adjustments to plant costs before the issue have been resolved by

commercial settlement "would be the height of folly." As stated above, in the past the Commission has made such adjustments when construction errors were found to have occurred. Such adjustments have not been linked to a favorable resolution of the utility's commercial claims against its contractors.

The unreasonable nature of the ratemaking standard which the ALJ has proposed in this regard is best exemplified by an examination of how this standard has actually been applied to several of the construction deficiencies which the OCA has identified in this case.

A. Advanced Control Room.

OCA has noted that during the construction of the Unit 1 Advanced Control Room, various errors occurred regarding GE's design and construction of this equipment. OCA Main Brief at 75, 76. In recognition of these errors PP&L has filed a claim against GE. Currently $.52 million remains outstanding on this claim. R.D. at 92, 93. The OCA has also discovered an outside audit report which criticizes PP&L for its poor supervision of the Advanced Control Room construction. OCA Main Brief at 76. Nevertheless, the ALJ rejects this evidence of project deficiencies and notes that "some problems are normal" and decides that as GE has disputed the PP&L claim any adjustment would be premature. R.D. at 70. The OCA submits that the mere fact that such problems often occur in the nuclear industry and that GE disagrees with PP&L's claim against them is an insufficient basis upon which to find that PP&L has met its burden of proving that the costs of constructing the Advanced Control Room were prudently incurred.

B. Inter Granular Stress Corrosion Cracking.

PP&L has also filed a claim with GE concerning a "generic design deficiency" inasmuch as the reactor piping was subject to cracking and was unlikely to last for the commerical life of Unit 1. OCA Main Brief at 77, 78. Currently $4.2 million remains outstanding on this claim. OCA Main Brief at 93.

assessment stands as the most accurate estimate upon the record. OCA Main Brief at 80-86.

E. Effect Of Miscalculating Hydrodynamic Loads Upon Containment Construction.

During the course of constructing Unit 1 certain hydrodynamic loads were miscalculated. When the extent of the error was later recognized, extensive rework and redesign became necessary. OCA has estimated the cost of redesigning and reworking the nuclear equipment as a result of these miscalculated hydrodynamic loads at $38.57 million. The delay caused by these efforts to correct this deficiency resulted in costs of approximately $125 million. OCA Main Brief at 87-92. These adjustments were rejected by the ALJ. As this issue was extensively briefed below, very little additional argument will be provided upon these exceptions. OCA Main Brief at 56-63, 79-81; Reply Brief at 15-46.

OCA does not dispute the ALJ's analysis that substantial rework was required to maintain the safe operation of Unit 1 given the original design and construction of Unit 1 which failed to properly calculate the importance of the hydrodynamic loads. R.D. at 61. It is also not contested that given the late date when these loads were fully recognized PP&L was placed in the position of necessarily ordering substantial redesign and rework. R.D. at 63. However, the OCA submits that if Unit 1 would have been properly designed and constructed in the first instance these costs could have been avoided. PP&L chose to begin construction of a GE Mark II containment design, which represented a significant departure from previous GE containment designs, before any testing of the Mark II was ever undertaken. OCA Reply Brief at 28-30. It was this failure to properly test and design the Mark II that was later to cost this nuclear project so much time and expense. OCA submits that ratepayers should not be forced to pay these costs which could have been avoided had PP&L or its contractors properly tested

this design before committing millions of dollars to construction which later had to be entirely redone. OCA Reply Brief at 30.

F. Conclusion.

The standards which the ALJ has proposed for judging the reasonableness of the cost of constructing this nuclear project have been set forth above. In essence, only if the utility and its contractors all agree that a deficiency has occurred and that the deficiency is not generic to the nuclear industry will the cost of the plant be reduced for ratemaking purposes.* Otherwise the ratepayers are to be charged for every dollar spent until the utility and its contractors come to some resolution of the dispute through some indefinite process to be concluded at a time uncertain on terms not yet announced. Such a process is nothing short of a complete surrender of the Commission's power to assess the proper level of construction costs to be included within rates. Moreover, public utility rates should be based upon the reasonble costs incurred for the construction of a facility and not upon the costs reimbursable to the utility through some private commercial relationship.

OCA submits that the policy proposed on this issue by the ALJ is unwise both with respect to this case and later cases which will follow concerning the reasonable cost of nuclear plants to be included within rates. The ratemaking policies of the PUC should not become entirely dependent upon the commercial policies and judgments of each utility which chooses to construct a nuclear generating station. Nor should the Commission accede to the long list of construction deficiencies now considered commonplace in the nuclear industry. OCA proposes that the PUC should exercise its independent judgment based upon the evidence set forth in this record to determine whether PP&L

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* OCA wishes to note that if these conditions were fulfilled the utility would likely have recovered its claim from the contractor and the refund would already have been credited to the cost of the plant, making any further adjustment in rate base unnecessary.

has met its burden and proved that all of the costs related to these recognized deficiencies may reasonably be charged to ratepayers.

III. MEASURES OF VALUE

A. The ALJ Erred By Allowing The Company A Current Return On Its Plant Held For Future Use.

As noted by the ALJ at R.D. 12, it is the OCA's position that the Company's request to include in rate base some $11.8 million of plant held for future use is violative of the recent amendment to the Public Utility Code, 66 Pa.C.S. §1315. See, OCA Main Brief at 97-100; OCA Reply Brief at 46-47.

Section 1315 states in relevant part that, with certain exceptions not relevant here:

> [T]he cost of construction or expansion of a facility undertaken by a public utility producing, generating, transmitting, distributing or furnishing electricity shall not be made a part of the rate base nor otherwise included in the rates charged by the electric utility until such time as the facility is used and useful in service to the public. Except as stated in this section no electric utility property shall be deemed used and useful until it is presently providing actual utility service to the customers.

The Company contended, and the ALJ agreed, that the above-quoted section does not apply to land held for future use. The OCA submits that this is an improper interpretation of the express statutory language of this recent amendment to the Public Utility Code. As noted by the OCA in its Main Brief at 98, Section 1315 applies by its terms to the cost of construction or expansion of electric utility facilities. The term facilities is defined in Section 102 of the Public Utility Code, 66 Pa.C.S. §102, as:

> All the plant and equipment of a public utility, including all tangible and intangible real andpersonal property without limitation, and any and all means and instrumentalities in any manner owned, operated, leased, licensed, used, controlled, furnished, or supplied for, by, or in connection with, the business of any public utility.

(Emphasis added.)

APPENDIX K

Rebuttal Testimony of Norman W. Curtis

(PP&L Statement No. R-5; R-822169)

PENNSYLVANIA POWER & LIGHT COMPANY

Statement R-5

Rebuttal Testimony of Norman W. Curtis

Docket No. R-822169

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

A. My name is Norman W. Curtis and my business address is Two North Ninth Street, Allentown, Pennsylvania, 18101.

Q. Mr. Curtis, have you testified previously in this proceeding?

A. Yes, I submitted direct testimony (Statement No. 8) and was cross-examined on February 23 and 24, 1983.

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my testimony is to respond to the testimony of the Consumer Advocate's witnesses, Gregory C. Minor, Dale G. Bridenbaugh, and Trial Staff's witness, Michael J. Gruber. Mr. Minor and Mr. Bridenbaugh have identified certain costs which they contend were incurred as a result of errors in design, workmanship, or management practices, and have further recommended that these costs be disallowed from PP&L's rate base claim. Mr. Gruber has also recommended that a cost adjustment be made in proposed rate base as a result of alleged contractor errors experienced on the project. It is the Company's position that these recommendations are unreasonable and unjustified.

Q. In the testimony of Messrs. Minor and Bridenbaugh, it is suggested at Pages 13 through 26 that a $40.7 million deletion from PP&L's Susquehanna Unit 1

rate base addition would be appropriate on account of the "containment problems." On Page 13 at Line 9, it is stated that "had PP&L acted more effectively or expeditiously when these problems arose, some of these cost increases could have been avoided or reduced." On Page 14, Line 15, it is stated that "the cost of constructing an adequate (licensable) primary reactor containment was substantially increased due to errors made by PP&L and/or those working for or under contract to PP&L." Do you agree with these comments?

A. No, I do not. Mr. Minor and Mr. Bridenbaugh have presented a simplistic and erroneous analysis of how the containment problem affected Susquehanna. In order to understand and appreciate the containment problem, a detailed description of its development is required. When PP&L initially set out to construct a nuclear facility, we conducted a review of all reactor manufacturers. After careful and comprehensive consideration, we selected General Electric as our supplier in 1968. General Electric had extensive experience in this area and was recognized as a leader in the industry. For Susquehanna PP&L selected a BWR reactor and a Mark II containment. The Mark II containment, like Mark I and Mark III, is a pressure suppression design which has been used with all BWRs built since 1962. A simple diagram of the containment

was included as Exhibit NWC-1. The primary containment is basically a safety structure which surrounds the reactor and is intended to prevent steam releases to the environment following a postulated accident. GE's pressure suppression containment had been subjected to extensive review, testing and acceptance by the industry. Both the Mark I and II designs are similar, although their pressure suppression structures differed; Mark I involving the doughnut shaped torus, the Mark II using the suppression pool as its base. The Mark II structure, as originally designed, proved to be superior in handling the increased dynamic loads since it required no major structural changes. The Mark II design was repeatedly approved by The Atomic Energy Commission (AEC), and had been purchased by many other utilities prior to PP&L's purchase.

At the time PP&L selected the Mark II containment, there was no reason to believe its containment design would not be licensed by AEC upon completion of the project.

Indeed, the AEC reaffirmed its approval of the Mark II containment for Susquehanna when it issued PP&L's construction license in 1973. The AEC would not have issued a construction permit had there been a significant concern about the design of the Mark II containment or other major components of the plant.

The development of nuclear reactors did not stop when PP&L purchased the Mark II from GE. Throughout the construction of the plant, GE was developing new designs and testing those designs to verify their operating characteristics and to improve the margin of safety at which they would operate. Moreover, as additional plants began to operate at commercial levels, even more data became available. Arising from these developments, it was discovered in the mid-1970's that two hydrodynamic loads, which affected the containment structure, required further analysis - Safety Relief Valve (SRV) loads and Loss of Coolant Accident (LOCA) loads.

Q. Please describe the SRV loads.

A. Sixteen SRV lines are attached to four primary steam lines running from the reactor to the turbines. In the event of a plant transient, these valves open and vent steam through the diaphragm slab into the water in the containment suppression pool. Generally, such venting is considered a part of normal reactor operations.

In the early 1970's, operating experience at reactors with Mark I containment structures indicated that these steam discharges through the SRVs created vibration of the torus pool structure. The vibrations sometimes resulted in mechanical damage. Based on these events and on further testing done by GE, the

problem was identified as potentially significant in late 1974 and early 1975.

Q. Please describe LOCA and LOCA loads.

A. Water, which acts as a coolant, circulates in the reactor vessel under pressure and at a temperature of over 500 degrees Farenheit. In the event of a major break in the pipes carrying water or steam from the reactor, large amounts of steam would be released into the containment. An accident of this type is known as a loss of coolant accident (LOCA). This steam is vented from the drywell through downcomer pipes into the wetwell where it condenses and reduces the pressure in the containment. Mark II containments were designed to withstand a loss of coolant accident.

During testing of Mark III containments in 1973-74, it was discovered that these LOCA loads were greater than previously anticipated. These tests were conducted by GE at its Mark III test facility which was not built until 1973.

Q. How did these "hydrodynamic loads" affect plant design?

A. In combination, SRV and LOCA loads, along with existing seismic loads, constituted the "new loads" containment problem as it was <u>first</u> identified in early 1975. In order to obtain an operating license, PP&L had to design for the simultaneous occurrence of all three loads.

The likelihood of all three loads occurring simultaneously is extremely remote. Nevertheless, a satisfactory solution to the phenomena created by such an occurrence was required before the NRC would issue an operating license to the affected plant. Resolution of the problem was necessary from a safety and licensing perspective.

It is also important to emphasize that the "new loads" were not identified to us until 1974-75, well after construction had begun at Susquehanna. It is, therefore, not reasonable to assume that PP&L could have begun to address this problem before that time. Nor am I aware of any facts to establish that the "new loads" problem could have been fully identified before 1974.

Additionally, the ability of the industry to understand the loads was aided over time by the evolution and use of more sophisticated testing facilities and instrumentation which were not available when the problem first arose.

Q. Please describe PP&L's activities in pursuing a solution to the "containment problem"?

A. In my opinion, PP&L aggressively and effectively pursued a solution to the so called "containment problem."

The generic industry-wide containment problems

that arose in 1975, presented one of the most difficult technical issues in BWR history. The problem, which was first observed in a German boiling water reactor, evolved from what was thought initially to be only a minor problem in the older Mark I containments to a significant dynamic load affecting the design of all boiling water reactor facilities worldwide. To appreciate just how complex and technical the problem was, one must consider that it took hundreds of engineers, working in Europe, Japan, and the United States, many years just to diagnose and quantify the effect of these loads.

When PP&L first learned of the problem, the Company was instrumental in the formation of a utility group to address the containment issue for Mark II BWRs. A massive effort extending over many years was undertaken by the Mark II owners group and General Electric to solve this complex problem. Due to the highly sophisticated nature of the phenomena, and our overall concern with its potential effect on project schedule, PP&L sought additional expertise from Stanford Research Institute and other domestic consultants, and also contracted with a German company, Kraftwerk Union (KWU), to perform tests related to these containment problems. Our overall objective in pursuing a solution to this problem was to assure a

safe design for Susquehanna and to minimize the effect on the construction schedule and ultimately the cost of the plant.

Soon after GE notified the owners of Mark II BWR containments of the problem, a task force was formed by Bechtel, GE and PP&L to evaluate the existing SSES design with respect to the newly defined SRV and LOCA loadings. In May, 1975, Bechtel completed the preliminary study incorporating the effects of the new phenomena in the design criteria for the containment and certain related safety equipment. Based on the new criteria, wetwell structural design was enhanced by adding more reinforcing steel, providing additional embedments, and relocating some equipment.

With respect to the SRV issue, the Mark II Owners Group program was on a timetable which would not satisfy Susquehanna schedule requirements. Based upon a review by PP&L, it appeared that the SRV discharge loads could be mitigated by using a quencher device at the end of the SRV discharge lines. It further appeared that all known quencher designs were based on data from Kraftwerk Union (KWU). PP&L employed KWU to design a Susquehanna-unique quencher device. KWU provided PP&L with such a design and tested the new quencher to demonstrate design adequacy and quality. The quencher solution to SRV loads was available by

1979. Ultimately all but one of the Mark II plants incorporated this quencher into their designs.

With respect to the LOCA issue, in addition to the efforts by the Mark II Owners Group, PP&L contracted with KWU to perform a series of Susquehanna-unique full scale tests. Based on this test data, KWU developed a new LOCA load definition for Susquehanna. In part, PP&L's decision to do this was based upon the fact that the Mark II Owners Group effort was not on a timetable schedule which was consistent with the Susquehanna schedule.

I might point out that following completion of the LOCA load testing and SRV testing, we verified that the original containment structural design, including the initial structural modifications that we implemented in 1975, were adequate and met our safety requirements. Thereafter, testing and analysis of the combined effects of SRV, LOCA and seismic loads proceeded to determine the adequacy of supports (i.e., hangers) required for pipes, the bracing of downcomers and the location of equipment in the suppression pool area. The hanger support program continued into 1982.

Overall, we feel that our independent efforts in pursuing a solution to this problem were successful and contributed to the early completion and licensing of Susquehanna. In the process, Susquehanna surpassed

several other BWR-Mark II plants which were called "lead plants" that were further along in completion than Susquehanna at the time the hydrodynamic load problem was identified. This demonstrates our aggressiveness in pursuing a solution to the problem.

Q. Do you agree with MHB's proposed $40.7 million adjustment for rework relating to the containment problem?

A. No, for two reasons.

First, one must realize that at the time the containment problem was identified, Susquehanna had been under design and construction for several years. We were faced with a choice of stopping work on the plant while the problem was resolved, or using a set of assumed loads and continuing construction in parallel with the containment technical program. We chose the latter course.

At the time of these decisions, it was recognized that some "rework" might be required. In my opinion, the cost of this rework, most of which resulted from modification of pipe hangers, was modest when compared to the cost penalty of not continuing and completing the plant. In solving the containment problem, we had the additional uncertainty of a changing body of knowledge and test results evolving at the same time as both design and construction. Our decisions to proceed

with those design and construction activities were made knowing that final test results and design loads being built into the plant would ultimately have to be reconciled. The fact that Susquehanna's Phase III loads were higher than earlier loads could not have been known at our key decision points. Had we waited for Phase III loads, we would have risked project delays for potentially no reason, if the earlier load definition had been shown to be adequate.

As an illustration of this, I would like to deal with the wetwell modifications. Many of the modifications cited by Mr. Minor and Mr. Bridenbaugh would have been required even if hydrodynamic loads had been identified prior to the start of construction. We believe the wetwell modifications were a first-time design resulting from the new hydrodynamic loads. In 1975, the containment structure was under construction. In order to support the project schedule, PP&L and Bechtel modified the original containment design by designing the diaphragm slab for pressure uplift, adding more reinforcing steel in the suppression chamber walls, adding embedments for pipe restraints and adding shear ties to the suppression chamber walls. These changes, made without removal of any existing materials, were necessary and required to protect the safety of the public. Failure to implement these

changes may have resulted in the NRC not granting the Unit 1 license. Therefore, we believe that costs associated with the wetwell fixes should be allowed.

The second reason is that I disagree with cost estimates prepared by Mr. Minor and Mr. Bridenbaugh. For example, I believe that the containment rework costs are improperly stated.

The costs are stated in error in several ways. First, the costs include components which are not related to the containment new loads. We know this is true because several of the cost trends identified in Mr. Bridenbaugh's testimony include elements of cost which were related to facilities which were not affected by the containment new loads. The only facilities affected by containment new loads were the containment itself, the Reactor Building and the control structure. Costs associated with other facilities, since they were not affected by new loads, should not have been part of the adjustment.

There are other reasons why I believe the containment rework costs are misstated. In reporting costs in cost trends, we generally made no attempt to factor out the effect of regulations by the NRC from those costs arising solely from the containment new loads. Therefore, the costs included in many of the cost trends identified as containment rework, also

include costs solely arising due to new NRC requirements which would have occurred with or without containment new loads. The largest cost impact of these new NRC regulations was due to the requirement to implement an as-built verification process to control and document the final configuration of the piping and pipe hanger design. It was the imposition of the process itself more so than rework arising from the process, which added significant cost to the project.

I also feel the costs are misstated because components of these costs were associated with providing additional stress-carrying capabilities in order to handle the more severe plant loads regardless of when the containment problem developed. Portions of these costs were associated with providing this increased capability, in order to meet our licensing requirements to the NRC and to the public, on a first-time basis.

Q. Have you quantified these latter two effects?

A. No, I have not and I believe it would be very difficult to segregate the effects of continually evolving NRC regulations and increased design capability from the costs indicated above in the time frame that would have been necessary to provide an accurate estimate for these proceedings.

Q. Do you agree with the adjustment of hanger quantities

proposed by Mr. Bridenbaugh?

A. No, I do not. It is my belief that the difference between the number of hangers in Unit 1 and 2 as reported in PP&L's response to Interrogatory Question 193 is due mainly to factors other than the containment new loads. The two main causes of the difference in quantities are optimized Unit 2 design which minimized congestion throughout the plant, and differences in physical configuration between the two units. The main evidence that we have which indicates that the difference is not due to containment new loads, is that more than 500 of the 631 hangers referred to by Messrs. Bridenbaugh and Minor are associated with the Turbine Building, a facility unaffected by containment new loads. I therefore believe that this entire adjustment should be rejected. Even if it were true that the difference in quantity was due to new loads, I believe that this proposed adjustment is double counted by virtue of the fact that hanger quantity increases are also included in Cost Trends 11-4-39 and 10-7-41, which have been included by Mr. Bridenbaugh in the containment rework cost category.

Q. Mr. Curtis, do you have any other comments on MHB's cost analysis of the containment?

A. I feel that PP&L was prudent in the implementation of its containment new loads program and that the costs of

the project which were incurred as a result of this program, were effectively managed and held to a minimum by the Company. I believe that the costs incurred by PP&L to provide for the containment new loads were prudent and necessary in order to provide a safe and operating plant at the lowest cost.

Q. Mr. Curtis, was the so called "containment problem" responsible for a delay in fuel load for Susquehanna Unit 1?

A. No. It is safe to say that the implementation of "hydrodynamic load" modifications increased the scope of work on Susquehanna. The modification work, particularly in the area of pipe hangers, was one of many parallel activities on the critical path to achieving fuel load. However, the existence of a number of other critical activities, not the "hydrodynamic load" modifications alone, precluded PP&L from loading fuel prior to July, 1982. All of these items impacted fuel load independently of the "hydrodynamic load" modifications.

Q. Could you elaborate on some of the activities impacting fuel load?

A. The major critical activities that prevented fuel load from occurring prior to July, 1982, are summarized in the form of a Unit 1 actual critical path summary (Attachment No. 1 to this testimony). This historical

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION, et al.	:	
v.	:	Docket No. R-850152
PHILADELPHIA ELECTRIC COMPANY	:	

MOTION IN LIMINE/MOTION TO STRIKE OF
PHILADELPHIA ELECTRIC COMPANY

NOW COMES Philadelphia Electric Company ("PECO" or the "Company"), by its attorneys, and moves for a determination of the issues which may be litigated and the evidence which may be admitted in the above-captioned proceeding. In support of its Motion, the Company respectfully represents the following:

1. The instant proceeding was initiated with the Company's filing of Supplement No. 15 to its Tariff Electric - Pa. P.U.C. No. 26 on September 27, 1985. Supplement No. 15 is designed to produce an increase in the Company's annual electric revenue of approximately $670.7 million, based on budgeted sales for a future test year ending June 30, 1986. The principal reason for the Company's rate filing is to reflect the increased capital and operating costs and decreased energy production costs associated with the Limerick Nuclear Generating Station Unit 1 and 100% of common plant ("Limerick 1").

2. A central issue in this proceeding is the reasonableness of the cost of Limerick 1. Limerick 1 is a 1,055

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mw boiling water reactor with a General Electric ("GE") Mark II Pressure Suppression Containment.[1/] The Office of Consumer Advocate (the "OCA") has pre-filed testimony in this proceeding alleging that GE was negligent and imprudent with respect to the design and the testing of the Mark II containment, that these errors substantially increased the cost of Limerick 1, and that PECO should bear the costs associated with GE's alleged imprudence.

3. In Pa. P.U.C. v. Pennsylvania Power & Light Company, Docket No. R-822169, 55 PUR4th 185 (1983), the identical issue of GE's prudence with respect to the design and testing of the Mark II containment structure was raised and fully litigated by the OCA, and the Pennsylvania Public Utility Commission (the "Commission") entered a final Order finding that there was no showing of GE imprudence in the design and testing of the Mark II containment and rejecting the OCA's proposed rate base adjustment. As set forth below, relitigation of the issue of GE's imprudence with respect to the Mark II containment design in the instant proceeding is barred by the doctrine of collateral estoppel, and the evidence on the issue presented by the Office of Consumer Advocate should be excluded from this proceeding.

1/ The containment structure in a nuclear power reactor provides an enclosure around the reactor to prevent releases of radioactivity into the environment. Its purpose is to isolate radioactivity within the reactor core and primary reactor fluids from outside the reactor area in the event of any incident or accident.

4. Application of the doctrine of collateral estoppel requires the presence of four conditions: (1) the issues decided in a prior adjudication and raised in the current proceeding are identical; (2) there was a final judgment and adjudication on the merits; (3) the party against whom collateral estoppel is asserted was a party or in privity with a party to the prior adjudication; and (4) the party against whom collateral estoppel is asserted had a full and fair opportunity to litigate the issue in the prior action. See Keystone Building Corp. v. Lincoln Savings & Loan Association, 468 Pa. 85, 92 n.7, 360 A.2d 191, 195 n.7 (1976); Schubach v. Silver, 461 Pa. 366, 377, 336 A.2d 328, 333 (1975); Day v. Volkswagenwerk Aktiengesellschaft, 318 Pa. Super. 225, 464 A.2d 1313 (1983); Thompson v. Karastan Rug Mills, 228 Pa. Super. 260, 323 A.2d 341, (1974); Davis v. O'Brien, 230 Pa. Super. 449, 326 A.2d 511 (1974). Thus, when the issue is identical, a final adjudication on the merits was rendered, and the party against whom collateral estoppel is asserted had a full and fair opportunity to litigate the issue in question, collateral estoppel bars relitigation of that issue in subsequent actions.

5. The Commission and the Commonwealth Court have held that collateral estoppel is applicable to proceedings before the Commission and bars relitigation of the same issue in later cases. See Pa. P.U.C. v. Keystone Water Company-White Deer District, 55 Pa. P.U.C. 744, 752-755 (1982). The applicability

of collateral estoppel in rate proceedings was recently affirmed and further clarified by the Commonwealth Court in Keystone Water Company - White Deer District v. Pa. P.U.C., 81 Pa. Cmwlth. 312, 474 A.2d 368 (1984). See also Mobilfone of Northeastern Pennsylvania, Inc. v. Pa. P.U.C., 73 Pa. Cmwlth. 340, 349-350, 458 A.2d 1030, 1036 (1983). In Keystone, the Court held that, although res judicata does not apply to rate proceedings because each rate case is a separate cause of action, collateral estoppel does apply and bars the same party from relitigating the same issue in a subsequent rate proceeding (474 A.2d at 373):

> "It was the Commission, which in Philadelphia Electric, supra, advanced res judicata as the principle which precluded the relitigation of the factual issues of PECO's asserted incompetent management as the cause of the $10.5 million overrun [in constructing the Salem Nuclear Plant Unit No. 1]. The Commission here says that, not the principle of res judicata, but that of collateral estoppel, should have been named as the principle which in Philadelphia Electric. . . barred relitigation of the factual issues of PECO's imprudent management. . . . The Commission asserts that res judicata was inapplicable because the causes of action in the first and second rate cases, were different because each considered a different test year. We agree with the Commission that both it and we were guilty of a misnomer. . . .
>
> The principal of collateral estoppel was, however, applicable in Philadelphia Electric, because the issues and the parties were identical, there was a final adjudication in the first action and the issues in question were fully litigated." 474 A.2d at 371 n. 1.

In addition, the Court further defined the "identity of issues" element of collateral estoppel, stating: "Collateral estoppel is

designed to prevent relitigation of issues which have remained substantially static, factually and legally." 474 A.2d at 373.

As set forth below, the requisite conditions for the application of the doctrine of collateral estoppel are present in the instant proceeding and bar the relitigation of the issue of GE's imprudence with respect to the Mark II containment design and testing.

6. The issue of GE imprudence which the OCA seeks to relitigate in this case is the same issue fully litigated and decided in the 1983 PP&L rate case, and the facts relevant to this issue are historic and not subject to change.

In the instant proceeding, the OCA has filed testimony by Dr. Stephen H. Hanauer (OCA Statement No. 2; Appendix A) on the Mark II containment issue. Dr. Hanauer's testimony sets forth a detailed explanation of the general function of the containment structure (Appendix A, pp. 7-9), GE's alleged failure to adequately design and test the Mark II containment, the alleged problems resulting from this inadequate testing and how they were discovered (Appendix A, pp. 9-15), the nuclear power industry's alleged reaction to the Mark II problem (Appendix A, pp. 23-32), the alleged role of the NRC in correcting the Mark II design problems (Appendix A, pp. 18-19; 22-23), and the alleged impact of GE's errors on the cost of nuclear units employing a Mark II containment (Appendix A, p. 32). Dr. Hanauer's allegations are aptly summarized in his statement of "Findings and Conclusions" (Appendix A, pp. 47-48):

"All nuclear power plants are required to provide a containment system. For Limerick, the Company chose a Mark II Pressure Suppression Containment as recommended by General Electric.

General Electric, in developing the pressure suppression containment concepts and basic designs, imprudently failed to adequately measure, predict, or specify the loads and forces which this type of containment would develop in the quenching process, both from loss-of-coolant accidents and from safety/relief valve operation during normal operation and anticipated transients. The technology was available in the 1960's to make such measurements and specifications.

The errors were not detected by General Electric, the plant owners or the regulatory authorities until actual plant damage occurred during transients, and additional tests disclosed that the problem would exist for both safety/relief valve discharge and accident circumstances.

* * *

The Mark II cost, that would not have had to be spent if the plant had been designed correctly to start with, was unreasonably and imprudently spent and should be dissallowed."

The OCA has also presented the testimony of James J. O'Brien (OCA Statement No. 1; Appendix B) which quantifies the alleged impact on Limerick 1 costs of the alleged errors in the plant's containment design. Mr. O'Brien proposes an adjustment of $160.7 million to the costs of Limerick 1 construction (Appendix B, pp. 32-33).

In the 1983 PP&L rate case, the OCA presented the prepared testimony of Gregory C. Minor and Dale G. Bridenbaugh (OCA Statement 3; Appendix C) who argued that GE was imprudent in

the testing and design of the Mark II containment and that the costs of Susquehanna Steam Electric Station Unit 1 ("SSES") associated with GE imprudence should be disallowed from PP&L's claim (Appendix C, p. 14). In their testimony, the OCA witnesses provide extensive descriptions of the general function of the containment structure (Appendix C, pp. 15-17), GE's alleged failure to adequately design and test the Mark II containment (Appendix C, pp. 17-18), the alleged problems resulting from this inadequate testing and design and how they were discovered (Appendix C, pp. 17-19), and the alleged role of the NRC in correcting the Mark II design problem (Appendix C, pp. 19-23). Dr. Hanauer's testimony in this case, as described above, recounts these same historical facts in connection with the alleged Mark II containment problems.

The alleged imprudent conduct of GE with respect to Mark II design and testing is the stated basis for the cost adjustment proposed by Minor and Bridenbaugh (Appendix C, pp. 14; 19-20):

> "The cost of constructing an adequate (licensable) primary reactor containment was substantially increased due to errors made by PP&L and/or those working for or under contract to PP&L. Additionally, the time required for plant completion was drastically affected by containment problems.
>
> * * *
>
> In resolving the Mark II problems at SSES, literally thousands of piping and conduit support modifications were required, relocation of wetwell equipment was necessary, and strengthening of the containment diaphragm floor was required. <u>These actions were</u>

required as a result of inadequate definition by GE of the Mark II containment design loads...." (emphasis added).

The evidence presented by the OCA in the 1983 PP&L rate case was considered and rejected by the ALJ in his Recommended Decision (Recommended Decision of ALJ Joseph J. Klovekorn; Appendix D). The ALJ concluded:

> "[I]t is undisputed that PP&L's expenditures to solve the containment problem were necessary to build a safe and licensable plant. Failure to expend these dollars would have resulted in a completed plant without a license. PP&L's effort to evaluate and incorporate the new loads in the design of Susquehanna was prudent and essential to commercial operation of the plant and the investment to solve this problem should be recognized in rate base. Secondly, there is no showing that GE was imprudent in the design of the Mark II containment.
>
> The record shows that GE analyzed both Mark I and Mark II containments and the Mark II design was repeatedly approved by the AEC and was purchased by many utilities. Additionally, OCA has failed to demonstrate that the containment problem was reasonably discoverable by GE at any earlier point in time. The SRV loads were first identified at operating Mark I plants (PP&L St. R-5, p. 4). The additional LOCA loads were discovered during testing at GE's Mark III test facility, which was not even constructed until 1973." (footnote omitted) (emphasis added).

(Appendix D, p.61)

On August 22, 1983, the Commission entered a final Order (Opinion and Order of August 22, 1983; Appendix E) on this issue and ruled that the evidence presented by the OCA was insufficient to establish imprudence on the part of GE and rejected the OCA's

proposed adjustment to the cost of SSES with respect to Mark II containment:

> "Based upon a thorough consideration of PP&L's management philosophies during the design and construction of the Susquehanna project, and a detailed analysis of OCA's arguments relative to its proposed adjustments, the ALJ concluded that there is no support for the $38.6 million adjustment because (1) it is undisputed that PP&L's expenditures to solve the containment problem were necessary to build a safe and licensable plant; (2) PP&L's efforts to evaluate and incorporate the new loads in the design of Susquehanna were prudent and essential to commercial operation of the plant; (3) the record does not demonstrate that the containment problem was reasonably discoverable at an earlier point in time; (4) the problem was not in identifying the loads, but determining the impact of the loads on the plant and how to design for the impact; (5) there is no showing that General Electric was imprudent in the design of the containment; (6) there are serious deficiencies in the components of the $38.6 million adjustment. Likewise, the ALJ rejects the $125 million proposed adjustment because (1) there is no evidence to support a finding that the "new load" problem was solely responsible for the specified delay in fuel load; (2) the six-month period incorporated into the $125 million adjustment has no evidentiary support; (3) PP&L was not imprudent. (See generally, R.D. pp. 60-65)." (emphasis added).

(Appendix E, p. 23)

Subsequent to the Commission's August 22 Order, the OCA filed a Petition for Reconsideration (OCA Petition for Reconsideration; Appendix F) in which it once again raised the issue of GE imprudence. In its Opinion and Order upon Reconsideration,

entered in December 1983 (Opinion and Order upon Reconsideration, December 1983; Appendix G), the Commission denied OCA's Petition.

Moreover, the testimony which the OCA seeks to introduce in this proceeding recounts historical and immutable facts and circumstances with respect to the Mark II containment which took place in the 1960s and 1970s, all of which were considered in the 1983 PP&L rate proceeding. These facts have not changed with the passage of time and are "substantially static." The question of GE imprudence is the type of issue the relitigation of which (as the Commonwealth Court stated in Keystone, supra, 474 A.2d at 373) the doctrine of collateral estoppel is designed to prevent.

As the foregoing discussion demonstrates, the issue of GE imprudence with respect to the Mark II containment design and testing, fully litigated and subject of a final Commission Order in 1983 PP&L rate case, is again presented by the OCA, contrary to the Pennsylvania law of collateral estoppel, for relitigation in the instant proceeding.

7. The issue of GE imprudence was the subject of a final Commission Order on the merits in the PP&L case. As set forth above, the Commission entered a final Order and Order upon Reconsideration on the merits of the issue of GE imprudence, and the OCA did not take an appeal to the Commonwealth Court on this question.

For purposes of res judicata or collateral estoppel, a judgment is final if it is not tentative or conditional and

represents the completion of all steps in the adjudication of the claim by the court or agency. See Restatement (Second) of Judgments §13 (1982); Philadelphia Electric Company v. Pa. P.U.C., 61 Pa. Cmwlth. 325, 335, 433 A.2d 620, 626 (1981); General Accident Fire & Life Assurance Corp. v. Flamini, 299 Pa. Super. 312, 445 A.2d 770 (1982).

Moreover, for purposes of collateral estoppel, an issue is actually litigated even when the determination is based on a failure of proof. See Restatement (Second) of Judgments §27, at 255; Schubach v. Silver, supra, 336 A.3d at 333 (the Restatement of Judgments is "the accepted law in Pennsylvania."); see also Nichols & Company, Inc. v. United States, 586 F.2d 826, 829 (C.P.A. 1978). Therefore, it is of no significance, for the application of collateral estoppel in the instant proceeding, that the Commission rejected the OCA's proposed adjustment based on the fact that there was no showing by the OCA of GE imprudence in the design and testing of the Mark II containment.

8. The OCA had a full and fair opportunity to litigate the issue of GE imprudence in the PP&L proceeding. The issue of GE imprudence with respect to Mark II design and testing was raised by the OCA in each stage of the 1983 PP&L rate proceeding. The prepared testimony of Gregory Minor and Dale Bridenbaugh (Appendix C) in the PP&L case, as noted above, presented extensive discussion of the issue of GE imprudence, and these witnesses were cross-examined by PP&L. OCA argued the

issue in its Main Brief (OCA Main Brief; Appendix H, pp. 46-56), in its Reply Brief (OCA Reply Brief; Appendix I, pp. 15-37), and in its Exceptions (OCA Exceptions; Appendix J, pp. 4-7, 13-15). PP&L also presented evidence on the question (PP&L Statement No. R-5, Rebuttal Testimony of Norman W. Curtis; Appendix K, pp. 2-13), PP&L's witness was cross-examined by opposing parties, and PP&L argued the issue in its briefs. Thus, as the record demonstrates, the issue of GE's alleged imprudence was fully litigated by the OCA and the other parties in the 1983 PP&L proceeding.

9. The OCA was a party to the PP&L proceeding. For collateral estoppel to apply under Pennsylvania law, the party against whom collateral estoppel is asserted must have been a party to the prior proceeding. The OCA indisputedly was a party to the 1983 PP&L rate case. Moreover, it is not required that PECO had been a party. As the Superior Court stated in Day v. Volkswagenwerk Aktiengesellschaft, supra:

> "Unlike res judicata, there is no requirement that there be an identity of parties between the two actions to invoke the bar. 'Parties to a subsequent action need not be the same as those in the prior suit in order to raise the question of collateral estoppel. Collateral estoppel may be used as either 'a sword or shield' by a stranger to the [prior] action, as long as the party against whom the defense is invoked is the same.'" (citations omitted).

464 A.2d at 1319. See also Thompson v. Karastan Rug Mills, supra, 323 A.2d at 344; Davis v. O'Brien, supra, 326 A.2d at 512 & n.2.

10. The doctrine of collateral estoppel clearly applies in this proceeding and operates to bar relitigation of the issue of GE imprudence with respect to Mark II design and testing. The party and issue are identical, and there was full litigation culminating in the Commission's final adjudication on the merits.

11. In addition to the specific issue of GE imprudence, the Commission also decided other generic issues relating to the Mark II containment in the 1983 PP&L rate case. The facts and circumstances surrounding these issues were also fully litigated, are historic and immutable, and therefore relitigation of these issues is barred by collateral estoppel. Specifically, the Commission ruled that the problems with the Mark II containment design were not reasonably discoverable at an earlier time and that the specific problem with the Mark II containment did not lie in identifying the hydrodynamic loads but in determining the impact of these loads on plant design (Appendix E, p. 23). The doctrine of collateral estoppel bars relitigation of these issues as well as the issue of GE imprudence in the design and testing of the Mark II containment. In summary, the doctrine of collateral estoppel bars the relitigation of all issues relating to the Mark II containment problem except for the question of the

reasonableness and prudence of PECO's actions in solving the problems caused by the alleged errors with the Mark II containment design.

12. Because the doctrine of collateral estoppel bars relitigation of the issues fully litigated and decided in the 1983 PP&L rate case, the Company further moves that the evidence which the OCA seeks to introduce on this question be excluded and/or stricken from the record in this proceeding. Attachment 1 to this Motion identifies the specific portions of the OCA pre-filed testimony in this proceeding which the Company requests be stricken from the record.

WHEREFORE, for the reasons set forth above, Philadelphia Electric Company requests that its Motion in Limine be granted, that the Office of Consumer Advocate be barred by collateral estoppel from relitigating the issues and matters described in paragraphs 10 and 11 above, and that the Commission rule the evidence presented by the Office of Consumer Advocate related

thereto, as set forth in Attachment 1, be excluded and/or stricken from the record in this proceeding.

Respectfully submitted,

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DATED: January 22, 1986

Attachment 1

1. OCA Statement No. 2 -- Testimony and Exhibits of Dr. Stephen H. Hanauer

(a) p. 1: third Q & A.

(b) Summary: p. 3, first Q & A; pp. 4-6, only A.2, 3, 4, 5, 6, 7, 8, and 9.

(c) Errors Made in Mark II Containment Design, pp. 9-20.

(d) Safety Significance: pp. 20-21, all reference to "design errors."

(e) Programs to Correct Mark II Design: pp. 22, all references to "design errors" or "errors."

(f) pp. 38-39, runover Q & A.

(g) Findings and Conclusions: pp. 47-49, A.2, 3, 4, 5, 6, 7, 8, and 9.

(h) All associated schedules and exhibits.

2. OCA Statement No. 1 -- Testimony and Exhibits of James J. O'Brien

(a) pp. 3-4, runover sentence.

(b) pp. 32-33, last Q. p. 32 to Q & A in middle of p. 34.

(c) All associated schedules and exhibits.

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January 24, 1986

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SECRETARY'S OFFICE
Public Utility Commission

VIA FEDERAL EXPRESS

Honorable Joseph P. Matuschak
97 East Main Street
Uniontown, PA 15401

Re: Pennsylvania Public Utility Commission v.
Philadelphia Electric Company
Docket No. R-850152

Dear Judge Matuschak:

Enclosed please find an original and two(2) copies of the Reply of Occidental Chemical Corporation to Answer of Philadelphia Electric Company to Motion to Compel.

As indicated in the attached Certificate of Service, copies of the enclosed Reply have been served upon all parties of record.

Sincerely,

Earle O'Donnell

Earle H. O'Donnell

Counsel for Occidental Chemical Corporation

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Enclosures

cc: All Active Parties
Secretary Rich

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Public Utility Commission

COMMONWEALTH OF PENNSYLVANIA

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

In re:	
Pennsylvania Public Utility Commission	Docket No. R-850152
v.	
Philadelphia Electric Company	

REPLY OF OCCIDENTAL CHEMICAL CORPORATION TO
ANSWER OF PHILADELPHIA ELECTRIC COMPANY TO MOTION TO COMPEL

NOW COMES Occidental Chemical Corporation ("Occidental") by its counsel, and files this reply to "Answer of Philadelphia Electric Company to Occidental Chemical Corporation's Motion to Compel." Although not specifically contemplated by the procedural rules of the Pennsylvania Public Utility Commission, this reply is necessary because of certain action taken by Philadelphia Electric Company ("PECO") subsequent to January 15, 1986, the date Occidental filed its motion to compel, and will serve, among other things, to substantially narrow the scope of the relief requested in that motion. In addition, it corrects certain factual mistatements and apparent misunderstandings by PECO of the relief requested. Occidental, therefore, respectfully submits that good cause exists for this filing. In this connection, Occidental states as follows:

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1. Contrary to PECO's assertion (p. 5) Occidental filed a motion to compel responses to its first set of interrogatories, served on Philadelphia Electric Company ("PECO") on December 23, 1985, only after PECO failed to provide the majority of its responses to the interrogatories by the January 7, 1986 due date, and only after Occidental's efforts on several occasions to work out a satisfactory arrangement informally with PECO had failed.

For example, prior to filing the motion, Occidental asked PECO on several occasions -- including the January 6, 1986 hearing (Tr. 1626) -- for a firm deadline for its responses to Occidental's first set of interrogatories. Had PECO been willing to commit itself to such a firm deadline, which PECO was not, Occidental would not have had to file the portion of its motion seeking to compel responses to the 28 unanswered interrogatories outstanding as of January 15, 1986 - a week after the 15-day period for responses had elapsed.

2. On January 17, 1986, PECO filed its answer to Occidental's motion to compel. In the answer, PECO states that Occidental "seeks additional relief in the form of an extension of time within which to file its direct testimony." (PECO Answer, at 2). This is not true. In its request for relief, Occidental merely asked for an opportunity "to supplement its testimony in this proceeding" (pp. 8-9) in the event that any data received from PECO after the filing of the motion to compel necessitates

a change in that testimony. (In fact, Occidental filed the testimony of James A. Ross on January 22, 1986). Accordingly, much of PECO's answer is inapplicable to the issues presented in Occidental's motion.

3. In its answer to Occidental's motion to compel, PECO states, in Paragraph 3, that "[a]nswers to all outstanding interrogatories from Occidental's Set I were served on January 16, 1986 . . . ." This also is not true. As counsel for PECO is aware, at least one portion of PECO's response to Interrogatory 15 (consisting of a lengthy PECO report titled "Cost of Service Information, Section 133 of PURPA"), was not served on Occidental until January 17, 1986. See Attachment A (letter from Jennifer Viguers to Earle H. O'Donnell, dated January 17, 1986). Furthermore, PECO has failed to provide, apparently by inadvertence, an attachment to its response to Interrogatory 43. On January 22, 1986, counsel for Occidental telephoned counsel for PECO concerning this attachment. Counsel for PECO has agreed to provide a copy of this attachment to Occidental. Because much of the requested data was provided only recently, (while Occidental was in the midst of finalizing its January 22, 1986 testimony) and was fairly voluminous, Occidental has not been able to review PECO's responses in detail to assure that they are complete and fully responsive.

4. PECO asserts, in Paragraph 4, that Occidental should not be permitted to delay its testimony because Occidental has not shown prejudice from PECO's failure to timely serve its

responses to Occidental's interrogatories. PECO states further in this paragraph that "[i]f Occidental's position is adopted, then any party arguably could delay the filing of its testimony and undermine the schedule established in this proceeding simply by alleging, with no proof of harm or injury, that its interrogatory responses were not received within the 15-day limit." In the first place, it should go without saying that PECO's failure to produce (or for any reason to object to providing) responses to Occidental's data requests in a timely fashion has prejudiced Occidental by affording Occidental insufficient time to review the data prior to the January 22, 1986 due date for filing its testimony. In the second place, as already noted, Occidental has not sought leave to delay its initial testimony. It has merely requested in the motion to compel and in the January 22, 1986 testimony of Mr. Ross that it be permitted to supplement the testimony if late furnished data so warrants.

5. In its motion to compel, Occidental sought not only responses to various unanswered interrogatories, but also certain studies which PECO declined to release in connection with Occidental's Interrogatory 47. These studies relate directly to PECO's selection of a 25% reserve margin. PECO has refused to provide these studies for several reasons listed in Paragraph 5 of PECO's answer.

First, PECO states that it did not in fact review or rely on the studies to establish its reserve margin. Instead,

PECO claims that its "25% planning reserve margin is based upon its contractual obligation to PJM." However, PECO has not provided any support for this claim.

Second, PECO claims that "PJM considers the studies to be confidential." PECO has provided no statement from PJM to this effect -- not to mention any explanation from PJM as to why it considers the studies to be confidential.

Third, PECO claims that the studies cannot be produced because "release of these studies to a third party would require the permission of the entire 11-member PJM Management Committee." However, PECO has made no showing that it has even bothered to ask PJM for the studies.

Finally, PECO asserts that Occidental has made no showing that the studies are relevant to Occidental's case. The relevance of these studies is clearly spelled out in Occidental's motion to compel, at Paragraphs 8, 12.

WHEREFORE, Occidental requests as follows:

1. That except as to Interrogatory 47, Occidental's motion to compel be treated as having been withdrawn without prejudice to Occidental's renewal if review of the responses reveals that the answers are otherwise incomplete or insufficient;

2. That the Presiding Administrative Law Judge enter an order providing that Occidental may file supplemental testimony based on any responses to the interrogatories answered after the 15-day period provided for the procedural scheduled

established by the Presiding Administrative Law Judge on December 3, 1985;

3. That the Presiding Administrative Law Judge enter an order requiring PECO either to:

(a) provide the PJM study requested in Interrogatory 47, or

(b) furnish a complete explanation as to the basis for its refusal to do so and provide the contractual and any other basis for its claim that PECO must utilize a 25% reserve margin target;

4. That the Presiding Administrative Law Judge set a date certain for PECO to take the action requested in the preceding paragraphs;

5. That the Presiding Administrative Law Judge grant such other and further relief as may be necessary.

Respectfully submitted,

Earle H. O'Donnell

Earle H. O'Donnell

Counsel for Occidental Chemical Corporation

Dated: January 24, 1986

CERTIFICATE OF SERVICE

I hereby certify that I have caused copies of the foregoing document to be served by federal express to all active parties in this proceeding.

Mr. Jerry Rich, Secretary
Pennsylvania Public Utility Commission
New Filing Section
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Community Legal Services, Energy Project
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100 Pine Street
Harrisburg, PA 17120

Zori G. Ferkin, Esquire
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Philadelphia, PA 19139

Bernard A. Ryan, Jr., Esquire
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Harrisburg, PA 17102

William T. Hawke, Esquire
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Earle O'Donnell

Earle H. O'Donnell

Counsel for Occidental
Chemical Corporation

Dated: January 24, 1986

WASHINGTON
NEW YORK
LOS ANGELES

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TELEPHONE (215) 963-5000
CABLE ADDRESS MORLEBOCK
TELEX 83-1315

MIAMI
HARRISBURG
LONDON

January 17, 1986

Earle H. O'Donnell, Esquire
Sutherland, Asbill & Brennan
1666 K Street, N.W.
Washington, D.C. 20006-2803

Re: Pennsylvania Public Utility Commission v.
Philadelphia Electric Company
Docket No. R-850152

Dear Mr. O'Donnell:

Enclosed please find the Attachment to IR-Chem-1-15 which was inadvertenty omitted from the Interrogatory Responses sent January 16, 1986 in the above-captioned proceeding

Sincerely yours,

Jennifer Viguers
Legal Assistant

cc

CC: Anthony Tummarello
James Ross

ATTACHMENT A

DOCKET NO. R-850152

CASE NAME PUC, et al. vs. Philadelphia Electric Company

HEARING LOCATION Philadelphia, PA.

HEARING DATE January 21 & 22, 1986

ALJ Matuschak

RECEIVED

JAN 24 1986

Office of A. L. J.
Public Utility Commission

HEARING REPORT

CHECK THOSE BLOCKS WHICH APPLY:

Hearing concluded yes

Record closed no

Briefs to be filed

Further hearing yes

Estimated add'l days

BENCH DECISION

REMARKS:

DOCKETED

JAN 29 1986

Names and addresses of parties or counsel of record
Please Print Clearly
Incomplete Information May Result in Delay of Process

NAME	ADDRESS			APPEARING FOR
Walter R. Hall, II David B. MacGregor Stuart Fraser Morgan, Lewis & Bockius	2000 One Logan Square			Philadelphia Electric Company
	City: Phila	State: PA	Zip: 19103	
David Wersan Scott Rubin Susan Perkins Weston	1425 Strawberry Sq			Office of Consumer Advocate
	City: Hbg	State: Pa	Zip: 17120	
Mildred E. V. Pitts General Services Administration	Ofc of General Counsel - LK Room 4002 18th & F Sts., NW			Federal Executive Agencies
	City: Washington	State: DC	Zip: 20405	
CHARLES RAINEY	15th Flr. Municipal Services Bldg			CITY OF PHILA
	City: PHILA	State: PA	Zip: 19102	

Check this box if additional parties of counsel of record appear on back.

Robert J. Stonaker (CRC Inc.)

Report

City	State	Zip

Address

City	State	Zip

Address

City	State	Zip

Address

City	State	Zip

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City	State	Zip

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City	State	Zip

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City	State	Zip

Address

Check this box if additional parties of counsel of record appear on back.

APPEARANCE SHEET

HEARING REPORT

DOCKET NO. R-850152

CASE NAME Pennsylvania Public Utility Commission, et al. vs. Philadelphia Electric Company

HEARING LOCATION Media, PA

HEARING DATE January 23, 1986

ALJ Maruschak

CHECK THOSE BLOCKS WHICH APPLY:

Hearing concluded ✓

Record closed [illegible]

Briefs to be filed

Further hearing [illegible]

Estimated add'l days

BENCH DECISION IDF

REMARKS:

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JAN 28 1986
Office of A. L. J.
Public Utility Commission

DOCKETED
JAN 29 1986

Names and addresses of parties or counsel of record
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Incomplete Information May Result in Delay of Process

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	City Phila	State PA	Zip 19103	
David Wersan Susan Perkins Weston Office of Consumer Advocate	1425 Strawberry Square			Consumer Advocate
	City Harrisburg	State PA	Zip 17120	
Daniel P. Delaney	628 North Office Bldg			Commonwealth Bldg
	City Hbg	State PA	Zip 17120	
	City	State	Zip	

Check this box if additional parties of counsel of record appear on back. ☐

Robert J. Stonaker (CRC INC)
Reporter

ORIGINAL

COMMONWEALTH OF PENNSYLVANIA
GOVERNOR'S ENERGY COUNCIL
P.O. BOX 8010
300 N. 2nd STREET
HARRISBURG, PENNSYLVANIA 17105
(717) 783-9981

RECEIVED
JAN 30 1986
SECRETARY'S OFFICE
Public Utility Commission

January 28, 1986

Jerry Rich
Secretary
Pennsylvania Public Utility Commission
P.O. Box 3265
North Office Building
Harrisburg, Pennsylvania 17120

Re: Pennsylvania Public Utility Commission v. Philadelphia Electric Company Docket No. R-850152

Dear Secretary Rich:

Enclosed is an original and three (3) copies of a notice of appearance for Roger E. Clark for the Governor's Energy Council in the above-captioned proceeding. Mr. Clark has previously noted his appearance on this record (Tr. 1672).

I hereby withdraw my appearance in this proceeding.

Very truly yours,

Zori G. Ferkin
Chief Counsel

Enclosures

CC (w/enclosures): Honorable Joseph P. Matuschak
All Active Parties

RECEIVED
JAN 30 1986
SECRETARY'S OFFICE
Public Utility Commission

COMMONWEALTH OF PENNSYLVANIA

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION, et al.	:	
v.	:	Docket No. R-850152
PHILADELPHIA ELECTRIC COMPANY	:	

NOTICE OF APPEARANCE

Please enter my appearance in the above - designated matter on behalf of the Governor's Energy Council.

I am authorized to accept service on behalf of the Governor's Energy Council in this matter and I request that as of this date, my name replace that of Zori G. Ferkin for the purpose of serving the Governor's Energy Council.

Respectfully submitted,

Roger E. Clark

Roger E. Clark, Esq.
Governor's Energy Council
P. O. Box 8010
Harrisburg, PA 17105
(717) 783-9981

January 27, 1986

DOCKETED
JAN 30 1986

EDWARD C. FIRST, JR.
ROBERT H. GRISWOLD
MOSES K. ROSENBERG
ARTHUR L. BERGER
FRANCIS B. HAAS, JR.
G. THOMAS MILLER
DONALD R. WAISEL
RICHARD R. LEFEVER
J. THOMAS MENAKER
CLYDE W. McINTYRE
S. BERNE SMITH
ROD J. PERA
EDWARD W. ROTHMAN
ROBERT A. MILLS
W. JEFFRY JAMOUNEAU
HERBERT R. NURICK
DAVID E. LEHMAN
NORMAN I. WHITE
F. MURRAY BRYAN
RICHARD W. STEVENSON
WILLIAM A. CHESNUTT
HENRY R. MacNICHOLAS
WILLIAM M. YOUNG, JR.
ROBERT M. CHERRY

DAVID B. DISNEY
H. LEE ROUSSEL
MAURICE A. FRATER
C. GRAINGER BOWMAN
JOHN S. OYLER
DELANO M. LANTZ
HARVEY FREEDENBERG
EDWARD J. RIEHL
JASON S. SHAPIRO
ERIC L. BROSSMAN
ROBERT D. STETS
TERRY R. BOSSERT
MARY JANE FORBES
JEFFREY B. CLAY
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NEAL S. WEST
JESSIE L. SMITH
BRUCE A. FELDMAN
FRANKLIN A. MILES, JR
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MICHAEL G. JARMAN
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STERLING G. McNEES
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DAVID M. WALLACE
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HARRY H. FRANK
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JAMES H. KING

OF COUNSEL

GILBERT NURICK
SAMUEL A. SCHRECKENGAUST, JR.
JEFFERSON C. BARNHART

January 29, 1986

Re: Pennsylvania Public Utility Commission, et al.,
v. Philadelphia Electric Company
Docket No. R-850152

RECEIVED
JAN 30 1986
SECRETARY'S OFFICE
Public Utility Commission

William E. Zeiter, Esquire
Morgan, Lewis & Bockius
2000 One Logan Square
Philadelphia, PA 19130

DOCUMENT FOLDER

Dear Mr. Zeiter:

Enclosed are the responses of Philadelphia Area Industrial Energy Users Group to the following requests for production of documents and data of the Philadelphia Electric Company:

(1) Set II - Nos. 1 through 13, 17 and 18.

(2) Set III - Nos. 3 through 5, 9 through 16, 20, 21, 25 and 26.

Included in these responses are several bulk materials which have been provided only to Philadelphia Electric Company. Any other party desiring copies of these bulk responses can contact me directly.

In response to Interrogatory Set II Nos. 2 through 4 and Set III No. 5, PAIEUG has included materials which are proprietary in nature. We understand that a protective agreement will be reached subsequently between PECo and PAIEUG in order for these materials to be adequately protected in the context of this proceeding.

Finally, we now understand that PAIEUG witness Randall J. Falkenberg has now been scheduled for cross-examination on February 14, 1986 in Harrisburg.

Very truly yours,

McNEES, WALLACE & NURICK

By David M. Kleppinger

DMK/jf
Enclosures
HAND DELIVERED - MLB Harrisburg Office

cc: All Parties of Record (w/indicated enclosures)

R-850152

RECEIVED
JAN 30 1986
SECRETARY'S OFFICE
Public Utility Commission

Responses to Data Request of the
Philadelphia Electric Company Set 2 Addressed to the
Philadelphia Area Industrial Energy Users' Group

Q. 1. Reference p. 1, l. 25-27. Describe in detail all load studies you performed as a Rate Engineer for Minnesota Power, including the methodologies you employed and the results you obtained.

A. 1. Mr. Falkenberg was involved in load research activities at Minnesota Power Company as a Rate Engineer in 1977. Mr. Falkenberg's duties included development of all cost allocation factors utilized in Minnesota Power Company's 1978 retail rate request. The workpapers for this request were filed with the Minnesota Public Service Commission and were audited by members of the Minnesota Public Service Commission Staff. The approach utilized in this study was development of demand energy and customer related cost allocation factors utilizing stratified load research data obtained from other utility companies. The allocation factors were developed utilizing coincident peak methodologies.

In addition, Mr. Falkenberg participated in rate design studies at Minnesota Power Company. In these studies it was concluded that lifeline rates were not an efficient means of assisting low income consumers in handling the difficulties created by increasing utility rates. Mr. Falkenberg also assisted in other rate design studies where it was concluded that declining block rates more accurately reflect the cost of providing service to residential customers than did inverted rates.

Mr. Falkenberg was involved in development and design of Minnesota Power Company's first load research program. This program initiated a sample on the residential general and space heating class of customers. The sample design was performed utilizing Neyman allocation techniques and produced a stratified sample consisting of over 100 test meters. Mr. Falkenberg was involved in the design of the reporting requirements for the computer printouts which would summarize the data from the load research program.

In addition, Mr. Falkenberg was involved in analysis of price squeeze allegations made by wholesale rate intervenors in Minnesota Power Company's FERC rate filing in 1977 and 1978. The analysis performed by Mr. Falkenberg indicated that as a result of load diversity, price squeeze allegations by wholesale intervenors were unfounded.

Additional information concerning Mr. Falkenberg's activities at Minnesota Power Company may be obtained directly by contacting Mr. Falkenberg's supervisor at Minnesota Power Company, Mr. Ronald J. Knauss.

DOCUMENT
FOLDER

DOCKETED
JAN 30 1986

Q. 2. Reference p. 2, l. 3-7. Describe in detail all sales and revenue forecasts you prepared as a Research Analyst for Puget Sound Power and Light Company, including the methodologies you employed and the results you obtained.

A. 2. Attached you will find a report containing the results of the two year sales and revenue forecast performed by Mr. Falkenberg at Puget Sound Power and Light Company. This report describes in detail the methodologies employed and the results obtained. Also attached are other reports describing computer models utilized to perform the analysis described in the report. Also attached you will find a copy of the analysis performed by Mr. Falkenberg in development of an end use load forecasting model for analyzing the energy requirements of Puget Sound Power and Light Company's residential customer class. The report details the methodologies employed and the results obtained.

In addition, Mr. Falkenberg was involved in the development of econometric models used in projecting the sales of the commercial customer class of Puget Sound Power and Light, as well as time series analyses utilizing Box Jenkins techniques to examine the growth prospects for the residential and industrial customer classes. The results from these methodologies have not been saved because they were preliminary investigations designed to determine more appropriate and accurate methods for performing load forecast studies at Puget Sound Power and Light.

In addition, Mr. Falkenberg was involved in analyses of load forecasts performed by intervening parties in Puget Sound Power and Light Company's rate cases. In particular, Mr. Falkenberg was involved in analysis of load forecasts performed by a professor at the University of Washington utilizing the same technique as proposed by Professor Hogan in PECO's Limerick 2 investigation.

Q. 3. Reference p. 2, l. 3-7. Describe in detail the methods you developed to perform both near and long-term load forecasting studies. Provide the results of all studies performed using your methods.

A. 3. See Answer to Question 2.

Q. 4. Reference p. 2, l. 9-17. Please describe in detail the studies in load research and utility planning you performed at Ebasco, including the methodologies you employed and the results you obtained.

A. 4. See Attached samples of load research and utility planning studies perfomed by Mr. Falkenberg while employed at Ebasco. The reports show the methodologies employed and the results obtained. Other studies not particularly addressed in these analysis include the following:

1. An analysis of the load forecasting and planning activities of the Tucson Electric Company on behalf of the Arizona Public Service Commission.

2. An analysis of the load research and load forecasting activities and audit of the load research and load forecasting activities of the St. Joseph Power and Light Company on behalf of the management of the Company.

3. Assistance in development of a methodology for determining proper avoided costs calculations for determining cogeneration and rate designs on behalf of the Wisconsin Public Service Commission.

4. Analysis of the rate impacts of excess generating capacity and analysis to determine if cost savings outweighted excess generating capacity cost performed for Iowa Resources.

Q. 4. Reference p. 2, l. 9-17. Please describe in detail the studies in load research and utility planning you performed at Ebasco, including the methodologies you employed and the results you obtained.

A. 4. See Attached samples of load research and utility planning studies perfomed by Mr. Falkenberg while employed at Ebasco. The reports show the methodologies employed and the results obtained. Other studies not particularly addressed in these analysis include the following:

1. An analysis of the load forecasting and planning activities of the Tucson Electric Company on behalf of the Arizona Public Service Commission.

2. An analysis of the load research and load forecasting activities and audit of the load research and load forecasting activities of the St. Joseph Power and Light Company on behalf of the management of the Company.

3. Assistance in development of a methodology for determining proper avoided costs calculations for determining cogeneration and rate designs on behalf of the Wisconsin Public Service Commission.

4. Analysis of the rate impacts of excess generating capacity and analysis to determine if cost savings outweighted excess generating capacity cost performed for Iowa Resources.

Q. 5. Refer to p. 13-14. Have you made any attempt to determine what percentage of Limerick common plant will be in use as of the start of commercial operations of Limerick Unit 1? Assuming that greater than one-half of Limerick common plant will be in use, why should investment rates for PECO customers be considered in determining what percentage of common plant should be the rate base?

A. 5. Mr. Falkenberg assumes that nearly all of Limerick common plant will be needed at the start of commercial operation of Limerick Unit 1. The basis for this assumption is that inasmuch as it is defined as common plant, it is plant in service required to operate both generating units and not simply plant required for the operation of one of the generating units at Limerick. Regarding the question of why investment rates for PECO consumers should be considered it is important to recall that by including Limerick common plant in rates at the current time customers will in fact be subsidizing their own or other customer's rates in future years. Thus, the economic choice is whether or not to have lower electric rates in the future and higher rates today. Inasmuch as customers have many other investment opportunities it is clear that to the extent that those opportunities yield greater profits for customers than do paying higher electric rates today then it is in the customers interest to utilize his funds most effectively. Thus, it is entirely appropriate to consider the consumers investment alternatives in deciding the percentage of Limerick common plant to include in rate base at the current time.

Q. 6. What is the rationale for splitting common plant between two units at a generating station? Referring to p. 14, please elaborate on what you mean by "the wisdon of this approach."

A. 6. The rationale for splitting common plant between two generating units at a station is as follows:

It is possible to split the common plant in an infinite variety of ways. For example, 0% of common plant could be allocated to Unit 1 and 100% to Unit 2. It does not appear that this approach would be considered favorable by PECO. Secondly, 100% of common plant could be associated with Limerick Unit 1 and 0% associated with Limerick Unit 2. However, the precident by the Public Utilities Commission has always been to equally split common plant in two units under the assumption that it is required equally by both plants when in service and therefore will be required as a part of the cost-of-service of providing electricity from each generating plant. As regards the "the wisdon of this approach", it is apparent that this is a wise approach for the Commission to follow. First of all, this approach is the method which has historically been utilized by the PUC. No other approach can make that claim. Secondly, this approach will result in lower revenue requirements for customers over time than would the approach of assigning 100% of common plant to current customers. Finally, it is important to recall that Limerick Unit 2 is not an economic capacity addition to Philadelphia Electric Company. Therefore, the Commission may wish in a future proceeding to utilize a different rate treatment for Limerick Unit 2 than Limerick Unit 1. However, common plant will necessarily be associated with Limerick Unit 2. Thus, to the extent that Limerick Unit 2 should have a different rate treatment than Limerick Unit 1 it is important that some split of common plant be made between the two units to allow for rate treatment that recognizes the fact that Limerick Unit 2 should have a different rate treatment than Limerick Unit 1 including the common facilities required to support the plant.

Q. 7. Refer to p. 14-15. What is the basis for your statement "PECO implied in the recent Limerick 2 investigation that the Company would include only 50% of common plant into the rate base if it was given perfmission to complete Limerick Unit 2" and your statement regarding PECO's prior commitment to rate base only one-half of Limerick common plant, until Unit 2 is completed or cancelled."

A. 7. See Attached Workpapers from the Limerick Unit 2 investigation. In the Limerick 2 investigation as was pointed out in the testimony of Mr. Falkenberg it was made clear by the Company that the assumption for the economic analysis it performed was that in the event Limerick Unit 2 were cancelled 100% of Limerick common plant would be included with Limerick Unit 1 in rate base. However, in the cases where Limerick Unit 2 was completed the Company assumed that 50% of Limerick common plant should be included in rate base with Limerick Unit 2.

Q. 8. Refer to p. 15. What is your basis for concluding that placing more than one-half of Limerick common plant into the rate base would "provide PECO with unnecessary financial rewards at consumers' expense"?

A. 8. To the extent that the Limerick generating unit with common plant produces net economic losses to consumers over the life of the plant and to the extent that that generating plant is not needed now to provide reliable service it is clear that Limerick Unit 1 and common plant is not used and useful capacity. Inasmuch as this capacity is not used and useful application of the PP&L precident would allow no equity return or profit on this investment. Thus, any return on Limerick Unit 1 and common plant might well be considered an unnecessary financial reward which is being made at customers expense. Clearly, by increasing the amount of common plant included in rate base the amount of plant which is not used and useful and which is earning an equity return is thereby increased and therefore increases the unnecessary financial reward.

Q. 9. Refer to p. 22 and Falkenberg Exhibit 5. Please defin the phrase "installed capacity."

A. 9. The definition of the phrase "installed capacity" utilized on page 22 of Falkenberg Exhibit 5 includes capacity which was installed and capable of operation prior to the retirements of the combustion turbines and oil fired generating capacity taken out of service by PECO in 1985 and 1986. As noted in detail in the testimony this capacity did not need to be removed from service and was in fact only removed because the addition of the Limerick generating plant resulted in PECO having excess levels of reserves. By removing this capacity from service PECO has reduced its reserve margins computed on the basis of active capacity. However, the amount of capacity which the Company could have made available to serve load, had it so desired, includes the capacity which was retired by the Company in order to reduce the excess level of capacity reserves accompanying the Limerick Unit 1 generating unit into service. Clearly the fact that PECO was able to take out of service over 900 MW of capacity when the Limerick 1 unit entered service indicates that little (if any) of the Limerick Unit capacity was needed to serve customer load.

Q. 10. Refer to p. 22 and Falkenberg Exhibit 5. Please provide a listing of all generating units you assume in calculating PECO's installed capacity. What criteria did you employ in determining whether a plant was to be considered as installed capacity. ?

A. 10. See Answer to Question 9.

Q. 11. Refer to p. 25, lines 13-14. Did the ALJ in the Limerick 2 investigation specifically adopt your life extension analysis?

A. 11. The Honorable Judge Allison J. Turner did not specifically adopt the life extension analysis performed by Mr. Falkenberg. However, the Honorable Judge did note that Mr. Falkenberg's analysis did provide additional evidence that Limerick Unit 2 was not an economic capacity addition for PECO under a set of assumptions which could be considered plausable.

Q. 12. Refer to p. 24, lines 16-18. What is the basis for you statement that "Clearly, one large nuclear plant which is expected to be available only 65% of the time cannot provide the same level of reliability as several smaller units."? What factors did you consider in reaching this conclusion?

A. 12. The answer to this question is obvious to anyone with an understanding of simple mathematics. Limerick Unit 1 is expected to operate 65% of the time. Thus, the unit is only available to serve load 65% of the time due to maintenance requirements and random forced outages. Clearly, the loss of 1000 MW of capacity is a situation which will adversely impact the Company's operating reliability at any particular point in time. However, PECO intends to remove much more capacity from several smaller units. The probability of loosing 1000 MW from ten small units, all at the same time, is equal to the forced outage rates of those ten units to the tenth power. For virtually any reasonable forced outage rate this probability is much smaller than the 65% presumed for Limerick. For example, if it is assumed that the smaller units also have a 35% forced outage rate the probability of loosing all ten of these smaller units simultaneously is less than 1%. Thus, it would be virtually impossible for the many smaller units to be as unreliable as one large unit.

Q. 13. Refer to p. 26, lines 7-8. What is the basis for you conclusion that economic retirement of generating plants "just slightly reduces the economic burden of excess capacity."? Please provide all studies upon which you relied in making this statement.

A. 13. The observation that the economic retirement of generating plants "just slightly reduces the economic burden of excess capacity" has been vividly proven in this case. In this case the Company is requesting a rate increase of over $670 million to account for the increase cost of service associated with the Limerick Unit 1 generating unit. The Company is also crediting its rate increase with the savings attributable to the economic retirement and life extention of older units. However, the magnitude of this rate increase is such that it clearly overwhelmes any minute benefits which may have occured as a result of these early retirements of the unneeded generating plants.

This experience has been quite common in the utility industry in the last few years. In 1984 for example, Florida Power Company requested a rate increase on the order of $100 million to include a new base load coal fired plant into rate base. However, at the same time the Company was shutting down several hundred megwatts of older units. The cold shutdown of these older units did reduce the size of Florida Power Corporation's rate increase by a small amount but not nearly enough to offset the $100 million total request the Company desired.

In late 1985, West Penn Power Company sought a substantial rate increase (on the order of $80 million) to include into its cost of service the Bath County pump storage generating plant. Once again there was a economic retirement or extended cold shutdown of older oil-fired plants. Once again the savings attributable to these early retirements or economic cold shutdown was much less than the overall rate increase requested.

In mid 1985 Duke Power Company requested a $340 million rate increase to include into its cost of service Catawba 1 nuclear plant. At the same time the Company announced an extended cold shutdown program of 997 MW of old oil fired plants. Once again the savings attributable to the cold shutdown of the older plants was not anywhere near the rate increase requested to reflect the cost of the new nuclear powered generating station. Incidentially, the cost of the Catawba 1 nuclear generating plant was substantially less than the cost of the Limerick 1 generating plant.

Just recently in November of 1986 Northeast Utilities filed for a large rate increase (ultimately over $400 million) to reflect the cost of service of the Millstone 3 nuclear generating plant. In this case the Company is proposing to put into early retirement some 360 MW of older oil fired generating plants. Once again the savings attributable to the older oil fired generating plants - on the order of $12 million over the next ten years - is substantially less than even the first year rate increase sought under the Northeast utilities phase-in plan.

It is clear from all of the examples that the phenomena of early retirement of economic cold shutdown of now unneeded generating plants is wide spread in the utility industry. At the same time it is clear that in none of the examples cited was the reduction in cost created by the savings attributable to the economic

retirement program anywhere near the increase in rates attributable to the new generating plants which were entered into service.

Q. 17. What are the reasons for using trend line forecasting?

a. Are there reasons other than the observation that trend line analysis was in retrospect lower than PECO's forecast?

b. Would it have been reasonable for a forecaster in the years following the Arab oil disruptions to forecast load growth based solely on prior trends? If so, why? If not, what additional factors should such a forecaster have considered and what additional methodologies should such a forecaster have employed?

A. 17. Part a - The premise of this question is flawed because analysis of Falkenberg Exhibit 12 will show in some instances the trend line model forecast actually produced higher predictions than PECO's own forecast. Thus, to the extent that PECO's forecast outperformed the trend model prediction this information has clearly been presented in this case. The fact that the trend forecasts were lower than PECO's forecasts in some instances had no bearing on the selection of this techniuqe for the purposes of this exhibit. These forecasts were selected simply because they best represented the observed trends which had occurred prior to the development of the corresponding PECO load forecast. Thus, these forecasts are designed to produce an alternative forecast which would have been based solely on historical data available at the time when PECO's forecast was made, and not because of any notion as to whether these forecast would have produced higher or lower results than the Company's. It must be borne in mind that the result of the forecast could not have been known prior to the analysis and the development of the data used in the forecast. Thus, it would have been impossible for Mr. Falkenberg to have concluded the trend forecast would have been lower than PECO's forecast, prior to analysis of data and selection of the technique.

Part b - It may or may not have been reasonable for a forecaster in the years following the Arab oil disruptions to forecast load growth solely on prior trends. However, the analysis of prior trends certainly provide the forecaster with some useful information regarding the observed pattern of growth. Additional factors that the forecast probably should have considered would have been the fact that after the oil disruption the price of oil and therefore the price of electricity generated from oil or electricity generated from coal transported by oil burning machinery would be higher than it had been in the past. Thus, the impact of increasing electric prices due to the increased cost of oil would have been another factor that a reasonable forecaster may have wanted to include in his analysis. Likewise, the increased cost of oil led to general inflation in many sectors of the economy. This impacted the cost of constructing new generating plants for example. At the same time more stringent air quality control regulations were making the cost of building new generating plants higher. Thus, the forecaster may have seen an advantage in including the impact of increased cost of building generting plants into the load forecast performed after the Arab oil embargo as well. As a result of these considerations it would appear that the trend based forecast utilized after the Arab oil embargo may have represented the most reasonable upper limit on the load forecast. The reason for this is that it would appear that the factors influencing the demand for electricity would have been effected in such a way that it would be unlikely that the trend of previous years could be maintained in the future.

Q. 18. Refer to p. 47, lines 14-18. You imply that a "reasonable analyst" could have done better than just extrapolating observed trends. On what other information would you have had them base their estimates of peak load, given that you've already stated that the peak data prior to '59 or '60 could not be relied upon?

A. 18. It would appear that a reasonable analyst would have done a better job in extrapolating observed trends. Much other information would have been available to the forecaster working at PECO in the 1970's. In the analysis performed by Mr. Falkenberg of ten years only a hand full of data points were analyzed. However, PECO forecasters would have had available monthly peak loads, weather data and the price of electricity charged by PECO over the historic period. Additionally, population and other economic data would have been available to PECO forecasters. Likewise monthly and annual sales data would have also been available. Thus, it is clear that substantially more information could have been incorporated into PECO's load forecast than would have been contained in the examination of a few data points. The point of the preceding discussion is simply as follows. The trend line analysis performed by Mr. Falkenberg is indeed a very low standard of comparison by which to judge the reasonableness of the PECO load forecast. The reason is that a reasonable analyst would have had much more data and therefore have been in a position to perform a much better forecast than simply extrapolating historic trends.

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Responses to Data Request of the

Philadelphia Electric Company Set 3 Addressed to the

Philadelphia Area Industrial Energy Users' Group

Q. 3. On page 14, at line 5, Mr. Falkenberg uses the phrase "higher rates." Is it correct to infer that Mr. Falkenberg is referring to higher current rates? If not, please explain the meaning of the cited passage.

A. 3. On page 14, line 5 Mr. Falkenberg states "clearly investing in Limerick common plant through higher rates is not an attractive investment for PECO's customers". This statement does not simply refer to current rates it actually refers to the present worth of revenue requirements (the present worth to PECO's rates through time). To the extent that consumers have a higher discount rate than PECO's, (and in fact Mr. Falkenberg has clearly established that this is the case), then it is clear that the present value of rates to customers will be much lower if Limerick common plant is not currently included in rate base.

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Q. 4. Please explain the meaining of the following statement that appears on page 15 of the testimony, at lines 12 through 15.

The denial of one half of Limerick common plant from rate base is perhaps an effective means to encourage PECO to pursue the prudent and economically sensible alternatives to completing Unit 2.

A. 4. The meaning of this statement is as follows. Limerick Unit 1 is not a cost effective economical capacity addition for PECO. Mr. Falkenberg established in the Limerick 2 investigation that Limerick 2 was also not an economical capacity addition for PECO. Including the entire cost of Limerick common plant in rate base will reduce the financial pressure on PECO, because it will reduce the amount of external financing required by PECO to undertake its construction program. The fact that the Company will have to finance additional construction of Limerick 2 if the Company pursues completion is an important incentive for management to make the most prudent choice as regards completing or cancelling the Limerick Unit 2. Thus, to the extent which consumers are not required to help finance Limerick Unit 2 PECO's management will have to obtain financing from conventional sources for the Limerick Unit 2 plant. In this case, management will have to strive to make the most appropriate decision as regards Limerick 2 unit.

Q. 5. It appears that many of the calculations supporting Mr. Falkenberg's testimony were made using a so-called spreadsheet software package on micro-computer.

a. Is this the case?

b. If so, which software package was used?

c. Please provide copies of all diskettes containing files that were used in the preparation of the testimony.

d. If this not the case, (i.e., answer to part a is no), please explain how the calculations supporting the testimony were made.

A. 5. Part a - Yes Mr. Falkenberg has performed calculations on micro computers utilizing spreadsheet software packages.

Part b - The software package which was used was the Micro-Soft Multiplan program.

Part c - See attached data diskette.

Part d - Not applicable.

Q. 9. Reference page 18, lines 12 through 24. Please explain clearly and precisely the logic that leads Mr. Falkenberg to propose a six percent sinking fund rate.

A. 9. In development of the 6% sinking fund depreciation rate as Mr. Falkenberg pointed out on page 18 of his testimony, it is first noted that straightline depreciation was really sinking fund at a 0% sinking fund rate. It would seem entirely appropriate to Mr. Falkenberg to use the PECO's cost of money at 12.7% as the sinking fund rate. However, Mr. Falkenberg adopted a less aggressive approach to implementation of the sinking fund depreciation utilizing the 6% sinking fund rate. The 6% rate approximates the projection for the long-term rate of inflation, utilized by many analysts today. Thus, the 6% sinking fund rate would allow customers to pay the same amount of depreciation expense in real dollars over the life of the Limerick generating plant. In addition, utilization of this rate produces a level of depreciation expense which is generally consistent with the levels approved by the PUC in the recent Susquehanna case. In addition with the utilization of the 6% level does reduce the deferral of the collection of depreciation expense into the future, an area of concern noted in the PUC's SSES-2 Order.

Q. 10. Assuming that the Commission adopts Mr. Falkenberg's recommendations for the phase-in as described in Falkenberg Exhibit 1, please explain why, in Mr. Falkenberg's view, it is necessary to use the sinking fund depreciation approach as a method of reducing the potential for over-collection.

A. 10. The adopting of the sinking fund depreciation approach is not necessarily predicated on the assumption that its only benefit is to reduce the potential for overcollection in revenues which does accompany the current PECO phase-in proposal. However, the fact that sinking fund depreciation will reduce the changes in Limerick revenue requirements over the phase-in period, and therefore reduce the potential overcollection of revenues which will accompany the PECO's phase-in proposal is certainly another one of the important advantages of the proposed sinking fund depreciation technique. As noted throughout the testimony of Mr. Falkenberg, the sinking fund depreciation technique has many important and signficant advantages beyond its ability to somewhat reduce the overcollection of revenue requirements built into the PECO phase-in proposal.

Q. 11. What effect on Mr. Falkenberg's recommendations for the phase-in would result from the use of sinking fund depreciation?

A. 11. Please refer to Falkenberg Exhibit 3. Falkenberg Exhibit 3 shows in the fifth column the phase-in of Limerick revenue requirements assuming the sinking fund depreciation and 50% of common plant is included in rate base. Under this assumption PECO would have a revenue requirement for the test year of $439 million. Under the PECO type of phase-in approach this would be phased-in as $146 million in 1986, $393 million in the year two, $439 million in year three, and $586 million in years four through six. The correction to this phase-in would be reduce the test year revenue requirement by $35 million from $439 million to $404 million. This is shown clearly on column 6 of Falkenberg Exhibit 3. The result is during year one revenue requirement would be $135 million, $269 million for year two, $404 million for year three and $539 million for years four, five and six. Thus adoption of the sinking fund depreciation technique consistent with the assumptions of Falkenberg Exhibit 3 would be to reduce the test year revenue requirement by $35 million or to reduce the phased-in test year revenue requirement by $11 million from $146 million to $135 million.

Q. 12. Reference page 19, lines 9 through 11.

a. Please state why Mr. Falkenberg sees the sinking fund approch as having additional flexibility.

b. This claimed advantage of sinking fund depreciation is an advantage relative to what alternatives, according to Mr. Falkenberg?

A. 12. The sinking fund approach offers additional flexibility to the Commission in tailoring PECO's rate treatment to its financial requirements. Suppose for example in the year 2000 or later PECO prudently decides to construct a new large generating plant. At this time the Company would likely need to seek external financing for the cost of this plant. Depending on the circumstances at the time, the Company may desire some extraordinary rate relief via CWIP in rate base or a higher rate of return than would ordinarily be allowed. This extraordinary rate relief would of course come at the expense of consumers. However, if the sinking fund depreciation technique was being utilized on Limerick, the Commission would have another avenue available to it to change the rate treatment of PECO and to increase its internal cash generation. In this hypothetical event in the future the Commission could simply straightline the depreciation for the remaining Limerick plant balance over the remaining life of the plant. This approach would produce greater depreciation expense than would be the case than if straightline depreciation had been utilized up to that point in time. In addition, the rate base associated with Limerick would also be higher, resulting in higher earnings for the Company. Thus, it is clear from this preceeding discussion, that utilization of the sinking fund depreciation technique allows the Commission another avenue to provide PECO with additional rate relief without having to adopt unusual approaches such as CWIP in rate base.

Part b - The advantage of sinking fund depreciation is an advantage relative to the straightline alternative as explained in part a to this response.

Q. 13. Please give a summary of Mr. Falkenberg's understanding of the concepts of mature and immature forced outages at generating stations.

a. Would Mr. Falkenberg expect the capacity factor of a newly commercial generating unit to be more likely to be above or below the unit's eventual lifetime capacity factor?

A. 13. If one were to the plot the forced outage rate of a generating plant as a function of time throughout the generating plant's life, the result would show that the forced outage would seem to be higher in the early years of operation relatively flat in the mature years of operation and once again higher in the later years of operation of the plant. This is a well known phenomena. Clearly during the first few years of operation of a generating plant it is not unusual for the plant to experience higher forced outages than it would ultimately be expected to have.

As a response to part a Mr. Falkenberg would expect that the capacity factor of a new commerical generating unit would likely be below the unit's eventual life time capacity factor.

Q. 14. Please explain the use on page 22, at line 7, of the phrase "at most."

A. 14. On page 22, line 7 of Mr. Falkenberg's testimony it is stated that Falkenberg Exhibit 3 shows that if the PP&L order were applied to this case PECO's total rate request would be reduced by $609 million. Thus, instead of a $671 million increase PECO would be allowed at most a $61 million increase. The meaning of the term <u>at most</u> in this phrase means "no more than." In the case of Pennsylvania Power and Light Company, the Company identified several millions of dollars worth of rate claims that the Company could have made but which it did not make in order to reduce its rate request. If any or all of these were applied in this case, it is possible that PECO might in fact have a lower rate increase granted than PP&L. The second implication of the term "at most" is that the assumption that Falkenberg Exhibit 4 was that all other PECO claims in this case would be acted upon positively by the Commission. Thus, it would be assumed that PECO's requested rate of return as well as all other expense adjustments would be accepted. In the event that any of these other cliams or adjustments are not accepted by the Commission then the fact PECO would receive less than the $61 million implied in Falkenberg Exhibit 4.

Q. 15. On page 24, Mr. Falkenberg gives two amounts of capacity scheduled for retirement, 1585 megawatts and 962 megawatts. Please provide detailed calculations including workpapers that support these two figures.

A. 15. Please see the workpapers of Randall J. Falkenberg already provided in this proceeding. The sheet in question is attached.

Q. 16. On page 27, at lines 6 and 7, Mr. Falkenberg states that in light of the results of Dr. Hieronymus' life cycle results, the analysis of prudence conducted by Dr. Hieronymus is irrelevant. Please give any and all support work for this statement.

A. 16. Mr. Falkenberg shares some of Dr. Hieronymus' views as regards prudence. In Dr. Hieronymus' view of prudence if it appears there is no adverse consequence to an imprudent action, than in fact there is no basis for an imprudence disallowance. In the language of basketball this might be a called a no harm no foul situation. In the case at hand, if Dr. Hieronymus is correct that Limerick Unit 1 is a $3.2 billion lifetime benefit to PECO's consumers, it is simply irrelevant whether PECO obtained this asset as a result of prudence, imprudence, luck or any other means. Simply stated if Limerick is indeed a lifetime benefit and a cost effective capacity addition for PECO then there can be no harm from any possible imprudence as regards planning decisions or forecasting for the need of the Limerick Plant. In the case that there is no economic harm, and indeed an economic benefit from Limerick, then clearly there would be no basis for any disallowance of Limerick based on imprudence in the Company's planning or forecasting. This of course would not refer to possible imprudence in the Company's construction management of engineering design of the plant. To the extent that the testimony with Perl, Wile, and Guth address the planning decisions concerning Limerick if the plant is considered a cost effective capacity addition, their testimony is indeed irrelevant. However, testimony put in by these witnesses concerning the engineering design construction and management of the plant may have some relevance.

Q. 20. Please provide a copy of the EEI study referred to at pages 29-30 of Mr. Falkenberg's testimony.

A. 20. Please refer to Falkenberg Exhibit 7 as this exhibit contains the EEI study which shows that the vast majority of electric utilities in the United States under the American System of Utility Regulation have utilized the incremental cost of capital as their discount rate. This survey establishes the fact that those individuals such as Dr. Hieronymus who believe that the after tax discount rate is the appropriate tool for use in evaluating the economic benefits of a investment alterntive are clearly in a small minority in the electric utility industry in the United States.

Q. 21. On page 30, at line 14, Mr. Falkenberg states "whether PECO should profit from its mistakes." Please explain what Mr. Falkenberg means by PECO profiting from its mistakes.

A. 21. The question is raised as to whether PECO should profit from its mistakes. The economic analysis performed by Mr. Falkenberg shows that Limerick is clearly a mistake for PECO. The plant is not needed capacity and will result in much higher rates for customers over time than alternatives would have. On this basis "profiting from its mistakes" would mean earning a return on an asset that is not used and useful. It would not mean "having learned from their mistakes."

Q. 25. At various places in the testimony, such as line 18 on page 35, Mr. Falkenberg discusses the "profits of the utility company." By profits, does Mr. Falkenberg mean a just and reasonable return on equity? Please explain.

A. 25. At various points in the testimony Mr. Falkenberg discusses the profits of the utility companies. Mr. Falkenberg presumes that Philadelphia Electric Company like the members of the Philadelphia Area Industrial Energy Users' Group and Kennedy and Associates is engaged in providing a useful service to society in return for the opportunity to make a profit. Profit is a key element in the continued success of American free enterprise. Mr. Falkenberg expects that the management of PECO is engaged in the activities of managing the enterprise in order to earn a profit for the shareholders of Philadelphia Electric Company and provide service to consumers. The term "just and reasonable return on equity" could perhaps be a term which would describe the level of profits of the utility company taking into account the fact that the enterprise is regulated. However, it is important to bear in mind that the "just and reasonable return on equity" allowed by the Public Service Commission is not a guarantee that that level of profitability will be met. In the event that a utility company is able to attract substantial new load growth, or stringently control costs it is quite possible that the Company could actually earn greater profits than would be allowed under the Commission's just and reasonable allowed return on equity. Mr. Falkenberg is aware of only one case where utility companies have actually been required to reduce rates because return levels exceeded the "just and reasonable return on equity" allowed by the Public Service Commission. However, Mr. Falkenberg is aware of numerous cases where utility companies sought to increase rates because they did not believe they were earning the just and reasonble level of return that the Company believe the Commission should allow.

Q. 26. On page 35, at lines 20 through 23, Mr. Falkenberg states, "Based on this prudence principle, reduction in consumption, due to economic self-interest of customers, conservation, or innovation, is destined to fail in substantially reducing consumers' payments to facilities."

a. Does Mr. Falkenberg mean to imply that if a customer reduces his consumption of electricity by 30%, the customer will not see a similar reduction in his electric bill?

b. Is Mr. Falkenberg's comment at the cited passage in the testimony related only to the capital recovery portion of revenue requirements rather than the total revenue requirements.

A. 26. On page 35 of his testimony Mr. Falkenberg points out that if prudence were the only concern of the regulator then, in fact, the fixed portion of revenue requirements (including shareholders profits, fixed operating and maintenance expenses and administrative and general expenses) of the utility company would not be affected by changes in sales. This simply means the utility would over a long period of years recover all of their required fixed costs of providing service. Only variable costs such as fuel costs or variable O&M expenses would change as a result of changes in consumption. The result of this "prudence only" approach would be that if a individual customer reduced his consumption of electricity by 30%, he might see in the short term a reduction in his electric bill. However, over the period of time required for the utility to seek an increase in electric rates (to cover the decline in profitability accompanying this customer's reduction in consumption) one of two events would occur. Either other consumers would have likewise reduced their consumption in which case, overall revenue requirements for each customer would not change substantially, or the allocation of revenue requirements between customers would have changed. In either case, the consumers in total would contribute the same number of dollars to cover the fixed costs (including profits) of the utility.

GSA STATEMENT No. 2

PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

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SECRETARY'S OFFICE
Public Utility Commission

Testimony of

DAVID E. KELLEY

Adjustment to O&M Expenses

General Services Administration
on Behalf of the Federal Executive Agencies

General Services Administration (PUR)
Room 6317
18th & F Streets, N.W.
Washington, DC 20405
(202) 566-1034

January 9, 1986

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DIRECT TESTIMONY OF DAVID E. KELLEY

Q: PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A: My name is David E. Kelley. My business address is Office of Public Utilities, Public Buildings Service, General Services Adminstration, 18th & F Streets, N.W., Washington, D.C. 20405

Q: WHAT IS YOUR POSITION WITH THE GENERAL SERVICES ADMINISTRATION?

A: I am an Operation Research Analyst in the Office of Public Utilities. My duties include analysis of rate case issues, such as capital structure, rate of return, disparities among class rates of return, and time of use rates. I also present testimony on the above issues. I am the project manager for auditing Federal customer bills in order to determine the most cost effective rate schedule. A statement of my educational background and professional experience is contained in Appendix A of the testimony.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A: The purpose of my testimony is to recommend an adjustment to Operation and Maintenance (O&M) expenses for the test year ended June 30, 1986. PECO has increased some O&M expenses by

a corporate inflation factor of 5.8%. I recommend an inflation factor of 3.3%. I recommend a decrease to PECO O&M expenses of $7,439,000 as a result of using the inflation factor of 3.3% instead of PECO's inflation factor of 5.8%.

Q: WHAT IS YOUR BASIS FOR DETERMINING THAT PECO HAS OVERESTIMATED THE INCREASE DUE TO INFLATION FOR TEST YEAR O&M EXPENSES?

A: PECO has estimated a corporate inflation factor of 5.8% for use when increases to O&M expenses are unknown. Using the GNP implicit price deflator as a measure of inflation, an unbiased estimate of inflation during the test year ended June 30, 1986 is 3.3%. The inflation estimate of 3.3% is based on actual inflation and the average of 50 well known econometric forecasters (Schedule 1). So PECO has overstated inflation by 2.5%, and the excessive inflation rate causes an overestimate in O&M expenses whenever it is applied.

Q: WHAT IS THE BASIS FOR YOUR RECOMMENDATION THAT PECO'S INFLATION ESTIMATE IS TOO HIGH?

A: The amount estimated by PECO using the 5.8% corporate inflation factor is excessive because actual inflation, as measured by the GNP implicit price deflator, is more than three percent below the inflation rate estimated by PECO for

the same period, while the inflation rate forecast by 50 well known econometric forecasters in Blue Chip Economic Indicators, December 10, 1985 is about two percent below the PECO inflation rate estimate for the same period.

PECO estimated inflation at 5.25% for 1985, while inflation, as measured by the GNP implicit price deflator, was 2.3% in the third quarter of 1985. The third quarter of 1985 represents the beginning of the test year ended June 30, 1986. The average inflation forecast of 50 well-known econometric forecasters in Blue Chip Economic Indicators, December 10, 1985 is 2.9% for the last half of 1985, well below the inflation estimate of 5.25% made by PECO. PECO estimated inflation at 6.4% for 1986, while the average of about 50 well-known econometric forecasters in Blue Chip Economic Indicators, December 10, 1985, is 3.7% for the first half of 1986. For the test year ended June 30, 1986, PECO has estimated a composite inflation rate of 5.8%, while the composite of actual inflation and the average inflation forecasts of about 50 well-known econometric forecasters in Blue Chip Economic Indicators, December 10, 1985, is 3.3%. Thus, PECO has likely overestimated inflation by more than 2%.

Q: HOW HAS PECO'S HIGH ESTIMATE OF INFLATION RESULTED IN OVERESTIMATING THE EFFECT OF INFLATION ON O&M EXPENSES?

A: The high inflation estimate of 5.8% is used by PECO to increase FERC accounts between 500 and 556 and other accounts for the test year ended June 30, 1986. The amount in each FERC account that is increased by 5.8% is not known, so it is necessary to estimate the increases resulting from PECO's use of the 5.8% inflation factor. PECO uses the 5.8% inflation factor when the actual increase for the test year is unknown. For example, if all increases in O&M expanses are unknown, the increase from applying a 5.8% inflation factor is roughly $82,000,000 (Schedule 2).

The inflation estimate of 5.8% is too high. Using the GNP implicit price deflator as a measure of inflation, an accurate estimate of inflation for the test year is 3.3%, based on actual inflation and the average forecast of 50 econometric forecasters. Assuming that all increases for the test year are unknown, the increase to O&M expenses for inflation of 3.3% is roughly $48,000,000 (Schedule 3). There is a difference, in the case where all increases in O&M expenses are unknown, of $34,000,000. Although $34,000,000 overstates the effect of PECO's overestimate of inflation, since many test year increases are probably known, this

example shows that PECO's high inflation factor can have a dramatic effect on test year O&M expenses.

Q: **HAS PECO PROVIDED DATA IN THIS CASE THAT SHOWS WHAT PROPORTION OF O&M EXPENSES ARE INCREASED BY THE 5.8% INFLATION FACTOR?**

A: No. PECO does not know the amounts increased by the 5.8% inflation factor. This is clear from IR-GSA-1-44, shown below.

> "Q: Reference the table found on page 8 of PECO Statement No. 19. Identify by account number and description, all expenses to which PECO has applied these inflation factors."
>
> "A: Identification by account is not possible due to the decentralized nature of the budget process and the fact that the General Inflation factor is offered as an alternative to specific known or anticipated costs changes."

Q: HOW HAVE YOU ESTIMATED THE AMOUNT OF TEST YEAR O&M EXPENSES THAT RESULTS FROM PECO USING A 5.8% INFLATION FACTOR INSTEAD OF THE 3.3% INFLATION FACTOR YOU RECOMMEND?

A: The high inflation estimate of 5.8% is used by PECO to increase FERC accounts for amounts where the increase, for the test year ended June 30, 1986, is unknown. The amount in each FERC account that is increased by 5.8% is not known, so it is necessary to estimate the effect of PECO's use of the 5.8% inflation factor.

I recommend that the major variances for test year ended June 30, 1986 over test year ended June 30, 1985, attributed to inflation, be adjusted to reflect the inflation estimate of 3.3% instead of the inflation estimate of 5.8% used by PECO. The total of major variances attributed to inflation is $17,259,000 (Schedule 4). This amount is reduced by $7,439,000 to reflect the 3.3% inflation estimate instead of the 5.8% inflation estimate (Schedule 5).

Q: WHY DO YOU RECOMMEND REDUCING ONLY THE MAJOR VARIANCES IN THE TEST YEAR BUDGET, ATTRIBUTED TO INFLATION?

A: Decreasing the amounts for O&M expenses for the test year by $7,439,000 corrects for the overestimate due to PECO's high inflation estimate. Viewing the major variances due to

inflation as a proportion of total O&M expenses, the major variances are about 1/5 of the total (Schedule 6) Reducing only the inflation increases shown as major variances takes into account the likelihood that known increases represent a large proportion of the increases in O&M expenses due to inflation. When there is a known increase, the 5.8% inflation factor is not applied. PECO has not shown the actual proportion of O&M expenses increased by their 5.8% inflation factor. The major variances due to inflation are a reasonable amount to be adjusted downward to compensate for the effect of PECO's use of an inflation factor of 5.8%. As previously stated in my testimony (see pp. 2, et seq.) 3.3% is a more reasonable estimate of the inflation factor at issue.

Q: DO YOU HAVE A RECOMMENDATION FOR IMPROVING THE ACCURACY OF ESTIMATES FOR THE EFFECT OF INFLATION ON O&M EXPENSES IN A PARTIALLY FORECASTED TEST YEAR?

A: Yes. PECO's use of an inflation estimate, without knowing the amounts to which it is applied, causes a severe problem for determining accurate test year levels. Inflation rates are seldom forcasted well. To improve the accuracy of test year levels for O&M expenses, I recommend that PECO determine

a reasonable estimate of the increases that result from applying the corporate inflation factor in future rate case filing.

Q: DOES THAT CONCLUDE YOUR TESTIMONY?

A: Yes.

APPENDIX A

EDUCATIONAL AND PROFESSIONAL SUMMARY

NAME: David E. Kelley

EDUCATION:

AB in Pure Mathematics, August 1977
University of California at Berkeley.

MS in Applied Mathematics, with a Minor in Economics,
September 1981
George Washington University.

EMPLOYMENT:

Operations Research Analyst
Regulatory Intervention Division
Office of Public Utilities
Public Buildings Service
General Services Administration
Washington, D.C.
September 1982 to present.

Operations Research Analyst
Regulatory Intervention Division
Office of Public Utilities
Transportation and Public Utilities Service
General Services Administration
Washington, D.C.
June 1980 to September 1982.

Operations Research Analyst
Management Planning and Review Division
Office of the Executive Director
Transportation and Public Utilities Service
General Services Administration
Washington, D.C.
August 1979 to June 1980.

Operations Research Analyst
Policy and Programs Division
Office of the Executive Director
Public Buildings Service
General Services Administration
Washington, D.C.
August 1977 to August 1979.

PARTICIPATION IN REGULATORY PROCEEDINGS

Case	Issue	Date
Texas Power & Light Company Docket No. 3780	Effect of market pressure and flotation costs on the cost of common equity.	May 1981
Public Service Company of Colorado Docket No. 1525	Effect of market pressure and flotation costs on the cost of common equity.	October 1981
Philadelphia Electric Company Docket No. R-811626	Effect of market pressure and flotation costs on the cost of common equity.	Novembe 1981
Texas Power & Light Company Docket No. 4321	Effect of market pressure and flotation costs on the cost of common equity.	April 1982
Washington Gas Light Docket No. 787	Cost of Capital.	August 1982
Potomac Electric Power Company Docket No. 7662	Cost of Capital.	Novembe 1982
Baltimore Gas & Electric Co. Docket No. 7695	Cost of Capital.	March 1983
Public Service Electric & Gas Co. Do. 837-620	Cost of Capital.	Septemb 1983
Commonwealth Edison Co. Docket No. 83-0537	Cost of Capital.	Februar 1984
Potomac Electric Power Co. Docket No. 813	Cost of Capital.	April 1984

PARTICIPATION IN REGULATORY PROCEEDINGS

Commonwealth Edison Co. Docket No. 83-0537 & 84-0555	Cost of Capital.	May 1985
Potomac Electric Power Co. Docket No. 834	Time of Day Rates	July 1985
Oklahoma Gas & Electric Co. Docket. No. 29450	Equalization of Class Rates of Return	July 1985
Potomac Electric Power Co. Docket No. 7874	Time of Day Rates	July 1985
Potomac Electric Power Co. Docket No. 813	Equalization of Class Rates of Return	August 1985

GSA STATEMENT No. 2

PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

Exhibits of

DAVID E. KELLEY

Adjustment to O&M Expenses

General Services Administration
on Behalf of the Federal Executive Agencies

General Services Administration (PUR)
Room 6317
18th & F Streets, N.W.
Washington, DC 20405
(202) 566-1034

January 9, 1986

Schedule 1

ESTIMATE OF INFLATION FOR THE
TEST YEAR ENDED JUNE 30, 1986

GNP Implicit Price Deflator

Actual Annaul Rate

1985 3rd Quarter	2.3%

Forecasted Annual Rate,
Blue Chip Consensus [1]

1985 4th Quarter	3.6%
1986 1st Quarter	3.6%
1986 2nd Quarter	3.8%

Inflation rate for period from 1985, 3rd Quarter to 1986, second quarter is $(1.023)^{1/4}$ $(1.036)^{1/4}$ $(1.036)^{1/4}$ $(1.038)^{1/4}$ = 1.033
i.e. a 3.3% inflation rate.

[1]/ From Blue Chip Economic Indicators, December 10, 1985, 50 econometric forecasters.

Schedule 2

ESTIMATE OF EFFECT OF USING 5.8% INFLATION FACTOR WHEN ALL INCREASE ARE UNKNOWN

The total of O&M expenses is $1,502,703,000 (p. A-1, TPH-2). If all increase are unknown, the amount of increases due to inflation is $1,502,703,000-($1,502,703,000/1.058)=$82,378,800.

Schedule 3

ESTIMATE OF EFFECT OF USING 3.3% INFLATION FACTOR WHEN ALL INCREASES ARE UNKNOWN

The total for O&M expenses is $1,502,703,000.(p.A-1, TPH-2). If all increases are unknown, the total amount of increase due to inflation is $1,502,703,000-($1,502,703,000/1.033) = $48,005,030.

Schedule 4

MAJOR VARIANCES DUE TO INFLATION FOR TEST YEAR ENDED JUNE 30, 1986 OVER TEST YEAR ENDED JUNE 30, 1985

FERC Account No.	Increase Due to Inflation for Test Year Ended June 30, 1986 over Test Year Ended June 30, 1985 ($1,000's)
500	834
502	2,090
510	526
511	496
512	3,548
517	698
524	2,190
529	203
530	926
531	550
532	298
553	341
556	332
902	719
903	1,910
920	1,598
TOTAL	17,259

From PECO Supplement No. 15, Attachment II-D-1b, Sheets 1-6.

REDUCTIONS TO MAJOR VARIANCES DUE TO INFLATION FOR TEST YEAR ENDED JUNE 30, 1986 OVER TEST YEAR ENDED JUNE 30, 1985

FERC Account No.	Reduction to Inflation Amount in Schedule 4 to Reflect Inflation Rate of 3.3% Instead of the Inflation Rate of 5.8% ($1,000's) [1]
500	359
502	901
510	227
511	214
512	1,529
517	301
524	944
529	88
530	399
531	237
532	128
553	147
556	143
902	310
903	823
920	689
TOTAL	7,439

[1] The reduction is calculated as follows:

Reduction = (Schedule 4 amount) x (1-.033/.058).

Schedule 6

PROPORTION OF MAJOR VARIANCES DUE TO INFLATION TO TOTAL INCREASE DUE TO INFLATION IN O&M EXPENSES FOR TEST YEAR ENDED JUNE 30, 1986 OVER TEST YEAR ENDED JUNE 30, 1985

Major variances due to inflation are $17,259,000 (Schedule 3).
Total variances due to inflation are $82,378,800 (Schedule 2).
The proportion of major variances due to inflation to total increases due to inflation for O&M expenses is $17,259,000/$82,378,800 = .21, i.e., roughly 1/5.

JK
1-28-8
Hbg
R-85015

Q.IR-Staff-REO-19

Provide an explanation for the use of a 25% forced outage rate for Keystone 2, when the unit has experienced an average rage of 17.64% for the 5-year period ending 6/30/85.

A.IR-Staff-REO-19

Refer to IR-Staff-REO-21 for the general discussion of Forced Outage Rates used in the ProdCost computer runs. With respect to Keystone No. 2 unit, the following additional comments are presented.

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Public Utility Commission

The unavailability of Base Load units, not only in total for the year but also the timing of outages at Base Load units in conjunction with outages at other Base Load units on a day-to-day basis, has a significant impact on the loading of PJM oil and CT units. If the 5-year average Forced Outage were used for each unit, then the projection for a particular 12-month period would show all Base Load units running at the average and the oil and CT's for PJM would not be required to generate at their historical level. However, this result fails to reflect actual day-to-day operating conditions in which simultaneous outages of Base Load units do occur and where operation of the CT's and oil units is required. For this reason, as well as those outlined in response to IR-Staff-REO-21, operating experience and engineering judgement is required to establish reasonable fixed outage rates that reflect the operation of all units on the system on a daily basis. Since both units at Keystone Station are identical, this station affords the opportunity to adjust the Forced Outage Rates of the two units to arrive at a reasonable station availability and also help to provide the opportunity for the random number generator to simulate the coincident forced outage situations that simulate the loading of PJM's and, therefore, PECO's oil and CT units.

If you examine the five years statistics for the two units at Keystone Station and group the statistics to show the five best unit years and the five worst unit years, you will find that both Keystone No. 1 and Keystone No. 2 unit Forced Outage Rates are reasonable values and in conformance with the discussion contained in IR-Staff-REO-21.

Responsible Witness: J. J. Carroll, Staff Engineer, Services Division

APPEARANCE SHEET

ALJ HEARING REPORT

DOCKET NO. R-850152

CASE NAME PUC, et al. vs. Philadelphia Electric Company

HEARING LOCATION Harrisburg, PA.

HEARING DATE Jan. 28, 29, 30 & 31, 1986

ALJ Matuschak

CHECK THOSE BLOCKS WHICH APPLY:

Hearing held	YES ✓	NO
Testimony taken	YES ✓	NO
Hearing concluded	YES	NO
Further hearing needed	YES ✓	NO
Estimated add'l days		
RECORD CLOSED	YES	NO
Briefs to be filed	YES	NO
BENCH DECISION	YES	NO

Date

Date

REMARKS:

Cancel hearing for 1/28/86

Cancel hearing for 2/5/86

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DOCKETED FEB 3 - 1986

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DOCKETED FEB 3 - 1986

NAMES, ADDRESSES AND TELEPHONE NUMBERS OF PARTIES OR COUNSEL OF RECORD
PLEASE PRINT CLEARLY
INCOMPLETE INFORMATION MAY RESULT IN DELAY OF PROCESS

NAME and TELEPHONE NUMBER	ADDRESS			APPEARING FOR
ROGER E. CLARK 717 783 4981	GOV'S ENERGY COUNCIL P.O. BOX 8010			GOV'S ENERGY COUNCIL
	City H'BURG	State PA	Zip 17105	
David M. Kleppinger McNees Wallace & Nurick	100 Pine St P.O. Box 1166			Phila Area Industrial Energy Users Group
	City Hbg	State Pa	Zip 17108	
MARLANE R. Chestnut DANIAL P. DELANEY VERONICA A. SMITH	P.O. Box 3265			Commission Trial Staff
	City Hbg	State PA	Zip 17120	

COMMONWEALTH REPORTING CO.
By Tom A. Kelly
Sandra Hollis
Judith A. Fohrman
Reporter

CHECK THIS BOX IF ADDITIONAL PARTIES OR COUNSEL OF RECORD APPEAR ON BACK. [X]

Reco Smith Shawn McCl

Address 1600 Ave of the Arts Building

SEPTA Amtrak

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Phila	Pa	19107

David Wersan
Susan Perkins Weston
Scott J. Rubin

Address 1425 Strawberry Sq

Office of Advocate

City	State	Zip
Hbg	Pa	17120

David B. MacGregor
Anthony C. DeCusatis
Morgan, Lewis & Bockius

Address 2000 One Logan Sq

Philadelphia Electric Company

City	State	Zip
Phila	PA	19103

Michael J. Ettner
(202) 566-1156

Address 18th & F Streets, NW Room 4002

General Services Administration

City	State	Zip
Washington	DC	20405

Charles Rainey Jr

Address 15th Flr Municipal Service Bldg

City of Phila

City	State	Zip
Phila	PA	19102

Address

City	State	Zip

Address

City	State	Zip

Address

City	State	Zip

Address

City	State	Zip

Address

City	State	Zip

Address

City	State	Zip

Address

City	State	Zip

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P. O. BOX 3265, HARRISBURG, Pa. 17120

January 30, 1986

IN REPLY PLEASE
REFER TO OUR FILE

R-850152

To: All Interested Parties
(see 1/9/86 notice)

Pennsylvania Public Utility Commission, et al.
vs.
Philadelphia Electric Company

N O T I C E

This is to advise that further hearing in the captioned proceeding scheduled for Wednesday, February 5, 1986, at Philadelphia, is cancelled. Further hearing will be held, as previously scheduled, Thursday and Friday, February 6 and 7, 1986, at 10:00 a.m., in Room 1306, Philadelphia State Office Building, Broad and Spring Garden Streets, Philadelphia.

With the exception of the above, future hearings will be held in accordance with our notices dated January 9 and 14, 1986.

Please mark your records accordingly.

cc: Judge Matuschak
Law Bureau
Bureau of Rates
Mr. Bramson
Ms. Dickson
Ms. Crouse
File Room

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ORIGINAL

MORGAN, LEWIS & BOCKIUS
COUNSELORS AT LAW
2000 ONE LOGAN SQUARE
PHILADELPHIA, PENNSYLVANIA 19103
TELEPHONE: (215) 963-5000
CABLE ADDRESS: MORLEBOCK
TELEX: 83-1315

WASHINGTON
NEW YORK
LOS ANGELES

MIAMI
HARRISBURG
LONDON

WILLIAM E. ZEITER
DIAL DIRECT (215) 963-5367

January 31, 1986

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SECRETARY'S OFFICE
Public Utility Commission

Jerry Rich, Secretary
Pennsylvania Public Utility Commission
North Office Building
Commonwealth & North Streets
Harrisburg, PA 17120

Re: Pennsylvania Public Utility Commission
v. Philadelphia Electric Company
Docket No. 850152

Dear Mr. Rich:

Enclosed for filing with the Commission please find the original plus nine copies of Philadelphia Electric Company's Motion for Certification of Interlocutory Order in the above-captioned proceeding, together with a Certificate of Service.

Sincerely,

William E. Zeiter
Counsel for Philadelphia
Electric Company

WEZ/gin

Enclosures

cc: Honorable Joseph P. Matuschak
All active parties.

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CERTIFICATE OF SERVICE

I hereby certify that on January 31, 1986, I have caused copies of the Philadelphia Electric Company's Motion for Certification of Interlocutory Order on all active parties in the Limerick No. 1 Rate Case at Docket No. R-850152 by Federal Express and Regular Mail as indicated below:

John Hanger, Esquire
Community Legal Services, Energy Project
3638 North Broad Street
Philadelphia, PA 19140 - By Hand

David M. Kleppinger, Esquire
100 Pine Street
Harrisburg, PA 17120 - By Federal Express

Zori G. Ferkin, Esquire
Governor's Energy Council
P.O. Box 8010
300 N. 2nd Street
Harrisburg, PA 17105 - By Federal Express

Scott Rubin, Esquire
Office of Consumer Advocate
1425 Strawberry Square
Harrisburg, PA 17120 - By Federal Express

Mildred E. V. Pitts, Esquire
Information Resources & Utilities Division
General Services Administration
Room 4002
18th and F Streets, N.W.
Washington, DC 20405 - By Federal Express

Charles E. Rainey, Jr., Esquire
Municipal Services Building
Law Department, 15th Floor
Philadelphia, PA 19102 - By Hand

Nancy Schuster, Esquire
1 Pond Street
Bristol, PA 19007 - By Federal Express

Patricia M. Gustin
Pennsylvania Public Utility Commission
Room G-33
North Office Building
Harrisburg, PA 17108 - By Federal Express

Earle H. O'Donnell, Esquire
Merrill L. Kramer, Esquire
Sutherland, Asbill & Brennan
1666 K Street, N.W.
Washington, D.C. 20006-2803

Mark P. Widoff, Esquire
Widoff, Reager, Selkowitz & Adler
129 State Street
Harrisburg, PA 17101

Michael Browne, Esquire
Reed, Smith, Shaw & McClay
1600 Avenue of the Arts Building
Broad and Chestnut Streets
Philadelphia, PA 19107

Wayne L. Emery, Esquire
Kenneth R. Pepperney, Esquire
Rafael Caminero, Esquire
600 Grant Street, Rm. 1580
Pittsburgh, PA 15230

Alan R. Squires, Esquire
Greenstein, Gorelick, Price,
Silverman & Laveson
900 Two Penn Center Plaza
Philadelphia, PA 19102

Anthony G. Tummarello
Director of Energy
Occidental Chemical Corporation
P.O. Box 4020
River Park
Darien, CT 06820

Stephen Bosch, Esquire
450 Carnell Hall
Broad Street & Montgomery Avenue
Philadelphia, PA 19122

Martha Bush, Esquire
Pa. Energy Ratepayers Coalition
237 S. Melville Street
Philadelphia, PA 19139

Bernard A. Ryan, Jr., Esquire
Dechert Price & Rhoads
800 N. Third Street
Harrisburg, PA 17102

William T. Hawke, Esquire
Joseph J. Malatesta, Esquire
212 Locust Street
Harrisburg, PA 17108 - By Federal Express

Honorable Joseph P. Matuschak
Pittsburgh State Office Building
300 Liberty Avenue
Pittsburgh, PA 15222

William E. Zeiter
Consel for Philadelphia
Electric Company

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION :
:
v. : Docket No. R-850152
:
PHILADELPHIA ELECTRIC COMPANY

MOTION FOR
CERTIFICATION OF INTERLOCUTORY ORDER

Philadelphia Electric Company ("PECO" or the "Company"), pursuant to Section 5.633 of the Commission's Regulations (52 Pa. Code §5.633), hereby petitions your Honorable Commission to amend its Order of January 21, 1986 (the "Order") to state expressly that the Order involves a controlling question of law as to which there is a substantial ground for difference of opinion and that an immediate appeal from the Order may materially advance the ultimate termination of the subject matter of the Order.

The Commission has essentially acknowledged in the Order that the standard set forth in 52 Pa. Code §5.633 has been satisfied when it stated that: "We will review the material question since we view the issue raised by the question as constituting extraordinary circumstances which will expedite the conduct of the proceeding when resolved." Order, January 21, 1986 at p. 5.

This motion is filed to prepare the way for the filing of a "protective" petition for permission to appeal in the Commonwealth Court pursuant to 42 Pa.C.S. §702(b) and Pa. R.A.P. 1311, or alternatively, if the Commission fails or refuses to amend its Order as herein requested, the filing of a protective petition for review in the Commonwealth Court under 42 Pa.C.S. §702(b) and Pa.R.A.P. Ch. 15.

The Company has concluded that it is essential to take a timely present appeal from the Order because:

1. Exclusion of major evidence on the prudence of the 1976 and 1978 Limerick deferral announcements will prejudice PECO by creating an incomplete record.

2. To make the Commission's imprudence "criticism" in the Limerick Investigation, 56 Pa. PUC 47 (1982), a binding finding of fact in this case in the face of the Supreme Court's decision in Pa. P.U.C. v. Philadelphia Electric Company, 501 Pa. 153, 460 A.2d 734 (1983) causes substantial prejudice to PECO whose due process rights are violated by (a) ruling that a "criticism" it could not appeal is final and binding, and (b) excluding evidence which forms the basis for a critical PECO position in this proceeding developed in reliance upon the Commission's prior statements and the Supreme Court decision.

3. The Commission's Order relies, inter alia, on the doctrines of res judicata, citing Philadelphia Electric Company v. Pa. P.U.C., 61 Pa.Commw. 325, 433 A.2d 620 (1981), and collateral estoppel, citing Fincher v. Township of Middlesex, 64 Pa.Commw. 355, 439 A.2d 1353 (1982), doctrines which are generally applied to forever bar relitigation of previously decided claims or issues.

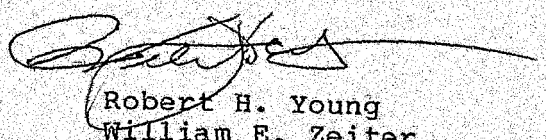
4. The applicable law is not clear as to whether the Company's present right to seek interlocutory review of the Order involves a compulsory or permissive appeal (compare Pa.R.A.P. 311(d)).

Consistent with the limited protective purpose of this Motion, the Company will request in its petition to the Commonwealth Court that the Court stay its review of the Order

until such time as the entire rate case at Docket No. R-850152 comes before the Court on appeal (or until the time has expired for any such appeals without any such appeals having been taken; in which case the Company would discontinue its appeal from the Order). This procedure will insure that, at this late date, the current rate proceeding will continue in an orderly manner, while fully preserving the Company's eventual right to obtain appellate review of the Order under applicable law.

WHEREFORE, the Company respectfully requests that the Commission amend its Order of January 21, 1986 to state expressly the conclusions required by 42 Pa.C.S. §702(b) as a prerequisite to interlocutory review of the Order in the Commonwealth Court.

Respectfully submitted,



Robert H. Young
William E. Zeiter
Thomas T. Loder
Counsel for Philadelphia
Electric Company

OF COUNSEL:

Edward G. Bauer, Jr., Esquire
Vice President and General Counsel
Philadelphia Electric Company
2301 Market Street
Philadelphia, PA 19101

MORGAN, LEWIS & BOCKIUS
2000 One Logan Square
Philadelphia, PA 19103

DATED: January 31, 1986

Services Administration General Counsel Washington, DC 20405

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SECRETARY'S OFFICE
Public Utility Commission

January 31, 1986

William E. Zeiter
Morgan, Lewis & Bockius
2000 One Logan Square
Philadelphia, PA 19103

Re: Pa. PUC vs. Philadelphia Electric Co.
Docket No. R-850152

Dear Mr. Zeiter:

Enclosed please find the General Services Administration's Data Request No. 4 directed to Philadelphia Electric Company in the above referenced matter. Please send responses to:

Michael J. Ettner, Esquire
General Services Administration (LK)
18th & F Streets, NW - Room 4002
Washington, D.C. 20405

If any problems arise in providing the requested information, feel free to contact Mr. Ettner at (202) 566-1156.

Sincerely,

LW Rhein
For R. COLETTE MCKENNA
Acting Assistant General Counsel

Enclosure

cc: Joseph R. Reifsnyder
Service List

DOCUMENT FOLDER

Before The
Pennsylvania Public Utility Commission
Docket No. R-850152
GSA's Fourth Set of Interrogatories to PECO
January 31, 1986

IV.1. Follow-up to IR-GSA-III-1.

(a) Indicate whether the increases of trended expenses provided in response to IR-GSA-III-1 represent all increases to accounts 500-556, for the test year ended June 30, 1986, due to application of the 5.8% corporate inflation factor. If the data provided in response to IR-GSA-III-1 are not all increases to accounts 500 through 556 due to use of the 5.8% corporate inflation factor, provide estimates for all such increases and indicate the accuracy of the estimates.

(b) If the data provided in response to IR-GSA-IV.1(a) above are estimates, describe how the estimates are made and indicate the accuracy of the estimates.

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IV.2. Follow-up to IR-GSA-III-2.

(a) Provide all increases in accounts 901 through 935, for the test year ended June 30, 1986, due to application of the 5.8% corporate inflation factor. Also, indicate the accuracy of the data which is provided.

(b) Explain how the data provided in response to IR-GSA-III-2 can be a reasonable basis for determining the increases in accounts 902, 903 and 920 due to the use of the 5.8% corporate inflation factor, when you also state that the amounts of increases are not available.

COMMONWEALTH OF PENNSYLVANIA

OFFICE OF CONSUMER ADVOCATE
1425 Strawberry Square
Harrisburg, Pennsylvania 17120

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Public Utility Commission

DAVID M. BARASCH
Consumer Advocate

(717) 783-5048

February 3, 1986

DOCUMENT FOLDER

Jerry Rich, Secretary
Pennsylvania Public Utility
Commission
P.O. Box 3265
Harrisburg, PA 71120

Re: Pennsylvania Public Utility Commission, et al. v. Philadelphia Electric Company,
Docket No. R-850152

Dear Secretary Rich:

Enclosed for filing please find an original and three (3) copies of the Answer Of The Office Of Consumer Advocate To The Motion In Limine/Motion To Strike Of Philadelphia Electric Company, in the above-captioned proceeding.

As per attached Certificate of Service copies have been served upon all parties of record.

Sincerely,

David Wersan

David Wersan
Assistant Consumer Advocate

Enclosure
2700P

cc: ALJ Joseph Matuschak
All parties of record

CERTIFICATE OF SERVICE

Re: Pennsylvania Public Utility Commission
v.
Philadelphia Electric Company
Docket No. R-850152

I hereby certify that I am this 3rd day of February, 1986, serving either in person or by first class mail the foregoing document, Answer Of The Office Of Consumer Advocate To The Motion In Limine/Motion To Strike Of Philadelphia Electric Company, in the above-captioned proceeding.

William E. Zeiter, Esq.
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Electric Division
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Administrative Law Judge
PA Public Utility Commission
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Public Utility Commissio

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION, et al.

v.

PHILADELPHIA ELECTRIC COMPANY

Docket No. R-850152

DOCUMENT FOLDER

ANSWER OF THE OFFICE OF CONSUMER ADVOCATE TO THE MOTION IN LIMINE/MOTION TO STRIKE OF PHILADELPHIA ELECTRIC COMPANY

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I. INTRODUCTION

Before responding specifically to the allegations contained in the Company's Motion in Limine/Motion to Strike with respect to certain OCA testimony, the OCA feels compelled to point out the fundamental and dangerous flaw in the Company's reasoning, which, if adopted by this Commission, could lead to disastrous results for ratepayers throughout the Commonwealth.

The thrust of the Company's position here is that, through the use of offensive collateral estoppel, the Office of Consumer Advocate can be precluded from litigating an issue on behalf of one utility's ratepayers simply because the OCA previously failed to win that issue on behalf of another utility's ratepayers. In other words, in the present case,

even though PECO ratepayers have not previously litigated an issue, they will be forced to bear all the costs related to that issue simply because the OCA, as the representative of PP&L ratepayers, lost that issue in a prior case.

The beauty of this argument from the utility's perspective is obvious.

Since each utility is a separate entity, no utility can be collaterally estopped from litigating a particular rate claim simply because the Commission ruled against another utility on the same issue. Each utility would have a right to relitigate a losing issue, even where the factual and legal elements are identical.

Ratepayers, however, are not so fortunate under the Company's view of collateral estoppel. Because the General Assembly has seen fit to create a single office to represent the interests of all Pennsylvania ratepayers, the Company suggests that a "defeat" for the ratepayers of one utility legally precludes the ratepayers of all other utilities in the Commonwealth from even raising (let alone winning) the same argument, at least to the extent that they wish to raise that argument through their statutorily created representative, the OCA.

There are two possible solutions to the obvious inequity created by the Company's position. One solution would be to establish a separate Office of Consumer Advocate for every utility in the Commonwealth. In that way, the ratepayers of each utility would stand on the same legal footing as the

utility itself, and ratepayers in Erie need not fear that they will be legally bound by a Commission decision several years earlier which was adverse to the interests of ratepayers in Scranton or Philadelphia. The other, more sensible solution is to recognize the Company's position for what it is: a total misuse of the principles of collateral estoppel in a situation where the application of that doctrine is clearly unjust and inappropriate.

Assuming for the moment that all of the allegations in the Company's Motion are correct (which we do not), the Company's position is this: because the Office of Consumer Advocate lost an argument on behalf of PP&L ratepayers in a previous case regarding the cost of the Susquehanna Unit 1 containment structure, the OCA is legally precluded from making the same argument on behalf of PECO ratepayers regarding the cost of the Limerick Unit 1 containment.

This is true even though the Company has identified $136.1 million in direct costs (plus AFUDC) relating to this issue, costs which PECO ratepayers will simply have to pay, even though the OCA is prepared to present the testimony of one of the Nation's leading experts in nuclear safety technology who has concluded that these costs were imprudently incurred. This is also true, even though PECO has the burden of proof on this issue, a burden which the Company apparently feels it has somehow already met, due to the OCA's failure to prove imprudence in a case involving another utility three years

earlier.

PECO ratepayers thus have two choices. They must either pay the costs which OCA's expert witness contends were imprudently incurred as a result of the improper original design of the Limerick containment structure; or they must hire a new representative -- other than the OCA -- who is not tainted by the failure to prevent PP&L's ratepayers from bearing those costs when they were presented as part of that utility's Susquehanna Unit 1 rate base claim.

It is difficult to imagine a more fundamental subversion of the General Assembly's intent in creating a single Office of Consumer Advocate to represent the interests of Pennsylvania ratepayers. The General Assembly has authorized the Consumer Advocate "to represent the interest of consumers as a party, or otherwise participate for the purpose of representing an interest of consumers, before the commission." 71 Pa. Stat. Ann. §309-4(a) (Purdons 1985 Supp.). The OCA's enabling legislation goes on to state that: "Any action brought by the Consumer Advocate before a court or an agency of this Commonwealth shall be brought in the name of the Consumer Advocate." Id. at §309-4(d).

When the OCA files a complaint, as it did in this case, it does so on behalf of the ratepayers of that utility. Obviously, David M. Barasch is not a PECO ratepayer, and his status in filing a complaint in this case is derived from his statutory authority to represent PECO ratepayers. Similarly,

the complaint filed by former Consumer Advocate Walter W. Cohen in the 1983 PP&L rate case was filed not on Mr. Cohen's own behalf, but on behalf of PP&L ratepayers. The ratepayers of PP&L and PECO are the parties whose economic interests are at stake in these proceedings. Thus, when the Company blithely states at page 12 of its Motion that "the OCA was a party to the PP&L proceeding" and therefore is precluded from raising certain arguments in the current PECO case, it overlooks the central role and purpose of the OCA in both of those cases.

It would be ludicrous to argue that PECO is precluded from making certain claims for Limerick 1 because the Company is represented by Morgan, Lewis & Bockius, the same law firm which represented PP&L in the Susquehanna Unit 1 case. Yet the Company is quite willing to argue that PECO ratepayers are precluded from defending themselves against certain claims because their statutorily created representative "lost" this issue on behalf of PP&L ratepayers.

There is no question that, as with many of the issues in this case, the Commission's decisions in the PP&L Susquehanna cases carry precedential weight. It is a far cry, however, from citing the PP&L case as precedent to arguing that the Commission's decision in that case <u>legally precludes</u> PECO ratepayers, through their statutorily established representative, from even raising viable defenses to the Company's multi-million dollar claims.

For reasons that go beyond the merits of the Company's particular claim in this case, PECO's Motion in Limine/Motion to Strike must be denied.

II. PRINCIPLES OF COLLATERAL ESTOPPEL MAY NOT PROPERLY BE APPLIED AGAINST PECO RATEPAYERS, OR THE OFFICE OF CONSUMER ADVOCATE, IN THIS PROCEEDING.

While the Company's description of the doctrine of collateral estoppel at pages 3-4 of its Motion is generally accurate, the same cannot be said for its conclusion that "the doctrine of collateral estoppel clearly applies in this proceeding and operates to bar relitigation of the issue of GE imprudence with respect to Mark II design and testing." Motion at 13.

Leaving aside for the moment the issue of whether GE's imprudence was fully litigated in the PP&L case, it is eminently clear that PECO ratepayers never litigated this issue, and therefore a fundamental element of collateral estoppel is missing. That is, while the party asserting the use of collateral estoppel need not, under certain circumstances, have been a party to the prior litigation, the party against whom the doctrine is asserted must have been such a party. Otherwise, that latter party is clearly deprived of its due process rights to a hearing on the matter at issue.

As stated by the Pennsylvania Supreme Court in Estate of Ellis, III, 460 Pa. 281, 287, 333 A.2d 728, 731 (1975):

> [A] plea of collateral estoppel is good where the party against whom it is asserted has had a full and fair opportunity to litigate the issue in question in a prior action.

(Emphasis added.)

Thus, while as noted above, the OCA (or, more accurately, Walter W. Cohen) was a party to the PP&L rate case,

and the OCA (or David M. Barasch) is a party to the current case, the OCA's status in both cases is as a representative of the respective utility's ratepayers.

PECO ratepayers in this case are being presented for the first time with a claim to pay the costs of Limerick 1, including the substantial costs of correcting a major error in the Mark II containment design. PECO ratepayers may not be deprived of their opportunity to at least attempt to defend themselves against the imposition of these costs, regardless of the outcome of the previous PP&L case on this issue.

While there are administrative benefits that can be obtained by preventing relitigation of issues by the same party, these benefits are clearly outweighed by the obvious unfairness of applying the results of such litigation against parties who were not involved in the original litigation. The PECO ratepayers who are now being asked to pay for the Mark II containment errors simply were not parties to the PP&L litigation and cannot be bound by the findings in that case. This statement is not altered by the fact that the OCA represented the interests of the respective utilities' ratepayers in both cases.

Since PECO ratepayers were not a party to the previous PP&L litigation, the doctrine of collateral estoppel therefore simply may not be applied to them in this case.

For purposes of collateral estoppel, the OCA submits that PECO ratepayers, not the OCA, are the relevant parties whose rights must be considered. It is they who are being

presented with a claim for the first time regarding the cost of correcting the Mark II containment problem at Limerick 1 and it is they whose rights would be violated if the Company's Motion were granted.

Even if it were assumed, however, that the OCA, and not the PECO and PP&L ratepayers were the relevant "party" for purposes of a collateral estoppel analysis, the OCA submits that the doctrine still should not preclude the litigation of the Mark II containment issue in this case.

The Restatement of Judgments, 2d, which sets forth the modern rule on collateral estoppel, specifically cites a number of circumstances in which that doctrine should not be applied. Even where the parties to successive proceedings are identical, the Restatement indicates that collateral estoppel should not be applied, for instance, where:

> There is a clear and convincing need for a new determination of the issue (a) because of the potential adverse impact of the determination on the public interest or the interests of persons not themselves parties in the initial action.

Restatement of Judgments, 2d, §28(5). Most significantly, in the Official Comments to that Section, the Restatement notes:

> There are many instances in which the nature of an action is such that the judgment will have a direct impact on those who are not themselves parties. For example, an agency of government may bring an action for the protection or relief of particular persons or of a broad segment of the public, or an individual may sue as representative of a class. In such cases, when a second action is brought, due consideration of the interests of persons not themselves before the court in the prior action may justify

relitigation of an issue actually litigated and determined in that action.

Id., §28, Comment h. (Emphasis added).

The situation in the present case is the type of compelling circumstance in which the above Comment applies. Where a government agency such as the OCA represents the interests of one segment of the public, i.e. PP&L ratepayers, in one case, the decision in that case should not be permitted to preclude the agency from attempting to raise similar or even identical arguments in defense of another segment of the public, such as PECO ratepayers, which was not and could not have been represented in the earlier proceeding.

While the precise issue in this Motion has never before been raised before this Commission, to the OCA's knowledge, a somewhat analogous situation was addressed by ALJ Matuschak in a case involving OCA's standing to challenge West Penn Power Company's use of aerial herbicide spraying in its right of way maintenance program. There, Judge Matuschak rejected the utility's challenge to the OCA's standing and wrote:

> The Consumer Advocate has been authorized by the Legislature to represent the consumers of public utilities in protecting their interests before this Commission. The office of the Consumer Advocate was created with the full realization that the consumers, especially individual residential consumers, cannot adequately represent themselves in utility matters before this Commission, and that the functions of the Commission can best be performed in an adverse proceeding by counsel at least as skilled as counsel for public utility companies, and who possess

> resources sufficient to conduct in-depth investigations and to enlist expert evidence. See Citizens of Florida v. Mayo, 333 So.2d 1 (1976). The resources of the Consumer Advocate, however, are not unlimited, so the Legislature left it to the Consumer Advocate's discretion as to the consumer interests in which he will become involved before this Commission.
>
> If the public utility consumers have standing to intervene in, or to institute, proceedings within this Commission's jurisdiction, the Consumer Advocate has standing to represent such consumer interests, if he so elects. If consumers, either individually or as a group, have standing, the Consumer Advocate has standing to represent such interests.
>
> If, on the other hand, West Penn would agree that consumers, individually or as a group, have standing, but not through representation by the Consumer Advocate, then its objection would not be against standing, as such, but only against effective standing, a position that would certainly be contrary to the intent and will of the Legislature.

Walter W. Cohen, Consumer Advocate v. West Penn Power Company, Docket No. C-823151, Ruling on Preliminary Objections of West Penn Power Company, Opinion at 11-12 (December 7, 1982) (Emphasis in the Original).

If, as in the West Penn case, PECO ratepayers have a right to object to the imposition of Mark II containment costs upon them, then OCA may not be precluded from presenting that objection on their behalf. As noted by Judge Matuschak in the West Penn case, and as exemplified by the OCA's presentation in the present case, it is the OCA, not individual residential ratepayers, who can marshall "resources sufficient to conduct

in-depth investigations and to enlist expert evidence" in response to utilities' massive rate increase claims. To deny the OCA the right to present the results of its expert investigation on behalf of PECO ratepayers, who have never previously litigated this important issue, would be to effectively force ratepayers to bear these allegedly imprudent costs without even an opportunity to object on the basis of expert evidence.

Finally, the OCA submits that, under traditional rules of collateral estoppel, it is inappropriate to preclude PECO ratepayers from litigating an issue simply because the OCA previously litigated this issue as the representative of another group of ratepayers. Thus, for example, analogous questions concerning whether collateral estoppel or res judicata can be applied to a party in its representational status, have been addressed by the Pennsylvania courts in cases regarding trustees. In the early case of Lightner's Estate, 187 Pa. 237, 241, 41 A. 46, 46-47 (1898), the Pennsylvania Supreme Court wrote:

> As the estate, the trustee, the investment, the trustee's conduct with reference to it and the period of time covered were all the same, the appellant argues that the matter is res adjudicata by the decision in Lancaster Trust Co.'s Appeal, supra, and cannot now be reopened. This claim however cannot be sustained. There is no estoppel by former adjudication, because there is not identity of parties as well as subject-matter. The Lancaster Trust Co., in that proceeding, was trustee of a different fund, though part of the same investment, and the other appellees, the children of Mrs. Alexander, were not parties, being then

> only remote heirs with no legal interest in the estate. They were entitled therefore in this proceeding to a hearing on their own presentation of their case, and if they have established it by the preponderance of evidence the previous decision is not a bar to their recovery.

(Emphasis added). See also Security Trust Co. of Pottstown v. Feist, 333 Pa. 536, 5 A.2d 119 (1939). Similarly, where the OCA is a party in two cases representing two completely different sets of ratepayers, principles of collateral estoppel may not prevent the OCA from raising the same arguments on behalf of both sets of ratepayers.

In sum, the fact that the OCA litigated an issue on behalf of another utility's ratepayers cannot preclude the OCA from litigating a similar or even identical issue on behalf of PECO ratepayers. If, as in the PP&L case, PECO can meet its burden of proving that the costs at issue here were prudently incurred then, and only then, may PECO ratepayers be required to bear those costs. Until that time, however, neither PECO ratepayers nor their statutorily created representative, the OCA, may be required to merely "roll over" and let PECO collect these costs without even being given an opportunity to demonstrate the impropriety of the charges.

III. THE LEGAL CONTEXT AND EVIDENTIARY PRESENTATIONS IN THE PP&L AND PECO CASES ARE NOT IDENTICAL WITH RESPECT TO THE MARK II ISSUE. THE DOCTRINE OF COLLATERAL ESTOPPEL THEREFORE DOES NOT APPLY.

A. Introduction.

In its original filing in this case and pursuant to Section 1308(f) of the Public Utility Code, PECO submitted Exhibit 2, identifying the specific reasons for the substantial increases that had occurred during the construction of Limerick Unit 1. At page 8 of PECO Exhibit 2, the Company attributes $136.1 million of increased direct costs to the "impact of Mark II", and begins its discussion of this problem by noting: "A new category of load phenomena associated with BWR Mark II containments was identified in 1975."

The issue, which is being presented in this case for the first time, is whether the additional costs associated with these Mark II load phenomena at Limerick 1 should be charged to PECO ratepayers.

The testimony of OCA witness Dr. Stephen H. Hanauer addresses this issue and concludes, inter alia, that General Electric, the original developer of the Mark II containment and the supplier of the Limerick Nuclear Steam Supply System, had "imprudently failed to adequately measure, predict, or specify the loads and forces which this type of containment would develop." OCA Statement No. 2 at 4. Dr. Hanauer further concludes that "the technology was available in the 1960's to make such measurements and specifications" and that this technology "could and should have been used in the tests."

Id., at 4, 14. Dr. Hanauer has been a Professor of Nuclear Engineering at the University of Tennessee and was formerly the Director of Safety Technology at the Nuclear Regulatory Commission.

The OCA is taking the position in this case that PECO ratepayers should not have to pay any Limerick 1 costs resulting from the imprudence of PECO or its chosen contractor General Electric.

PECO asserts in its Motion that GE's alleged imprudence in the Mark II design process was "fully litigated" in the PP&L rate case regarding Susquehanna Unit 1, which also had a GE Mark II containment. Since the OCA unsuccessfully challenged these costs on behalf of PP&L ratepayers, the Company argues that the OCA is collaterally estopped from raising the same arguments in defense of PECO ratepayers in this case.

As noted in the prior two sections of this Response, the OCA submits that the rights of PECO ratepayers would be grossly violated if the OCA were deprived of the right to litigate this important issue as it applies to the costs of Limerick 1. This would be true even if the legal and factual issues actually decided in the PP&L case were identical.

As shown below, however, the OCA submits that there are important legal and factual distinctions between the two cases which make the application of collateral estoppel here even more inappropriate.

B. The Public Utility Code Has Been Amended Subsequent To The PP&L Proceeding And The Law On Contractor Liability Has Been Clarified.

The Restatement of Judgments, 2d, §28 notes an exception to the general rule of issue preclusion where there has been a change in the applicable legal context. Section 28 (2)(b) states that the relitigation of an issue will not be prevented where

> (2) The issue is one of law and ...(b) a new determination is warranted in order to take account of an intervening change in the applicable legal context or otherwise to avoid inequitable administration of the laws;

This principle was adopted by the Pennsylvania Supreme Court in In Re Estate of Biddle, 487 Pa. 616, 623, 410 A.2d 782, 786; cert. den. 449 U.S. 824 (1980).

The PP&L rate case relied upon here by PECO was filed on November 22, 1982, and a final Opinion and Order by the PUC was entered on August 22, 1983. Subsequently, the Public Utility Code has been amended to specifically address the prudence of costs of electric generating stations by adding 66 Pa.C.S.§§ 515 and 1308(f). P.L. 602, No 123, §§1 and 3, July 6, 1984. Section 515(b) states as follows:

> From and after the beginning of construction of an electric generating unit, the commission, or its designee, and the Consumer Advocate, or his designee, shall have reasonable access to the construction site and to any oral or documentary evidence relevant to determining the necessity and propriety of any construction cost.

Section 1308(f) states as follows:

> Whenever there is filed with the commission any tarriff stating a new rate based in whole or in part on the cost of constructing an electric generating unit, the commission shall compare the estimated construction cost filed in accordance with section 515(a) (relating to the construction cost of electric generating units) with the actual construction cost submitted by the utility in support of that tariff. If the actual construction cost exceeds the estimated construction cost, the rate determined by the commission under this section shall not be based on any part of that excess unless the public utility proves that part of the excess to have been necessary and proper. In making its determination under this subsection, the commission shall consider all relevant and material evidence, including evidence obtained pursuant to section 515.

(Emphasis added).

The burden of proof in a base rate case is upon the utility to show the justness and reasonableness of its rates. 66 Pa.C.S. §315. Section 1308(f), however, explicitly places the burden of proof on the utility to show that cost increases in the construction of electric generating stations were necessary and proper. PECO, in fact, has filed its Exhibit 2 in direct response to this amendment to the Public Utility Code. PECO Exhibit 2 contains a discussion of, inter alia, the cost increases in Limerick Unit 1 due to the Mark II error.

Section 515(b) requires that a utility must allow the OCA to have reasonable access to both the construction site and to oral and documentary evidence relating to construction costs. Implicit in such a provision is a legislative intent that the OCA, as the representative of utility consumers, have an opportunity to review all construction costs for necessity

and propriety. The OCA, in this case, has presented Dr. Hanauer's testimony, addressing the Mark II error quantified in PECO Exhibit 2.

Sections 515 and 1308(f) show a specific legislative concern over the rising costs of electric generating facilities. These code provisions, adopted after the PP&L case, require increased scrutiny of construction costs, and the reasons for cost increases over original estimates. It is clear from Section 1308(f) that evidence obtained through §515(b) is to be presented as part of the litigation of the reasonable cost of an electric generating station. The Company's Motion to Strike attempts to explicitly preclude the OCA from challenging a direct cost increase identified by the Company of approximately $136.1 million (plus AFUDC). Such an attempt is contrary to the intent of the legislature in 1984 in adopting Sections 515(b) and 1308(f).

The issue of utility liability for contractor imprudence -- which is the key issue on which PECO seeks to preclude the OCA testimony here -- has also been addressed and clarified by the PUC in an Opinion and Order entered subsequent to the PP&L rate case decision. In the case of Pa. PUC v. PECO, P-830453, M-840375, etc., (ECR #8), the Commission reviewed PECO's assertions that errors of vendors or contractors do not impose liability on the utility. At issue in ECR #8, inter alia, was the failure of a generator at PECO's Salem Unit 1 due to a manufacturing defect by Westinghouse.

PECO's Brief and Reply Brief to the PUC in ECR #8 relied upon the PP&L construction decision. The Company stated in its Reply Brief as follows:

> The controlling principle was articulated in Pa. P.U.C. v. Pennsylvania Power & Light Co.,55 P.U.R. 4th 185, 203 (1983) where this Commission refused to attribute an error in the design of a nuclear plant to the utility because there was "absolutely no evidentiary support for the proposition that the level of control" exercised over the independent expert was such as to either "impute imprudence to [the utility] or to result in a direct act of imprudence on the part of [the utility]."
>
> This principle is directly applicable to the Salem 1 situation given the highly technical and subtle nature of the defect.

PECO Reply Brief, ECR #8 at 111.

As can be seen, PECO posited in ECR #8 that the PP&L case absolved it of liability for Westinghouse's error and that the facts of the PP&L case were similar in nature to the Salem 1 ECR #8 case. The Commission's ECR #8 Order, however, rejected the Company's position on the applicable case law and instead, relied on a previous Met-Ed decision as follows:

> In its filed exceptions, PECO vigorously disputes the recommendation of the ALJ that the Company should be held responsible for replacement power costs incurred as a result of a manufacturing defect in the generator attributable to Westinghouse.
>
> * * *
>
> PECO also contends that where a utility may have a cause of action against a vendor, the proper regulatory procedure is to allow recovery of operating expenses and then to require the utility to exercise prudence in its decision concerning litigation.

> We do not share PECO's interpretation of the Met-Ed cases, supra. ALJ Kashi accurately stated our holding in Met-Ed when he concluded: "the Commission concluded that even if Met-Ed's contractor, and not Met-Ed, was responsible for the improper installation, Met-Ed's ratepayers were certainly fault-free, and therefore should not be required to pay for the portion of the plant representing the imprudently incurred costs." The argument that the costs at issue in Met-Ed were plant costs, rather than replacement power costs, appears to us as a difference without a distinction as to the party upon whom the replacement power costs should be placed when the generator failure was do [sic] to the fault of a contractor. We concur with the recommendation of the ALJ that the ratepayers should not be made to bear the burden of the cost of replacement power. Accordingly, PECO's exceptions are denied.

P-830453, etc., Order Entered October 30, 1985, at 71-73 (emphasis added).

The PUC's Order in the ECR #8 case does not explicitly address or distinguish the PP&L case. At best, the effect of the holding in PP&L on the ECR #8 decision is unclear. The ECR #8 Order, however, is unambiguous about the current state of the law.

The OCA submits that ECR #8 holds that PECO may be held responsible for the errors of its vendors or contractors. That holding is directly applicable to the facts of the Mark II issue presented here. Therefore, whatever the basis of the PUC's holding in PP&L, the law for this case has been clarified by the ECR #8 decision. The facts of the Mark II error must therefore be tested against the current status of the law.

C. The Company Has Incorrectly Characterized The Focus Of The PP&L Mark II Litigation And The Extent Of The Testimony In The PP&L Rate Case On GE Imprudence.

The Company states at page 5 of its Motion that the "issue of GE imprudence which the OCA seeks to litigate in this case is the same issue fully litigated and decided in the 1983 PP&L case". The OCA submits that the Company has overstated the extent of the litigation in PP&L on the question of GE imprudence.

ALJ Klovekorn described what was in issue in PP&L concerning Mark II as follows:

> OCA argues that until 1974-1975, the SRV and LOCA load impacts upon the containment were overlooked in designing the plant. When these loads were first recognized, Unit No.1 construction was well underway. Had PP&L acted sooner and been more diligent in the supervision of GE, these design deficiencies could have been avoided. The OCA argues that the ratepayers should not be required to bear the costs of these oversights.

Recommended Decision at 60.

The ALJ's discussion of the evidence and law on this issue stated that "there is no showing 7/ that GE was imprudent in the design of the Mark II containment." Id. at 61. Significantly, the footnote 7 to this discussion then stated as follows:

> Assuming that the issue of GE's responsibility for any design deficiencies should be addressed here - an assumption the ALJ is not prepared to make.

Id. at 61. Similarly, the PUC's Order on this issue summarized ALJ Klovekorn's findings by stating that;

(5) there is no showing that General Electric was imprudent in the design of the containment; ....

Thus, in the PP&L case, the PUC did not strictly find that GE was prudent, but only that there was no showing in that case that GE was imprudent. Moreover, the ALJ indicated that he was not even "prepared" to assume that GE's prudence was an appropriate issue for consideration.

PECO, at page 11 of its Motion, states that in the PP&L case, OCA testimony "presented extensive discussion of the issue of GE imprudence". As can be seen from the ALJ's discussion above, this is not totally accurate. The direct testimony in the PP&L case of OCA witnesses Bridenbaugh and Minor on the explicit issue of GE's error was as follows:

> These actions were required as a result of inadequate definition by GE of the Mark II containment design loads and by the associated design deficiencies committed by Bechtel in the original structure and component design.

Appendices to PECO's Motion in Limine/Motion To Strike, App. C, p. 20.

In the present case, the OCA has presented the testimony of Dr. Stephen H. Hanauer. Dr. Hanauer was formerly Director of the Division of Safety Technology at the Nuclear Regulatory Commission and was also a member and Chairman of the Advisory Committee on Reactor Safeguards. During his tenure at the NRC, Dr. Hanauer was actively involved in the resolution of the Mark II problem. The imprudence of GE in the Mark II design constitutes a major portion of Dr. Hanauer's testimony

here. For example, starting at page 4 of his testimony Dr. Hanauer states as follows:

> General Electric, in developing the pressure suppression containment concepts and basic designs, imprudently failed to adequately measure, predict, or specify the loads and forces which this type of containment would develop in the quenching process, both from loss-of-coolant accidents and from safety/relief valve operation during normal operation and anticipated transients. The technology was available in the 1960's to make such measurements and specifications.

Similarly, at page 5 of his testimony Dr. Hanauer states as follows;

> The inadequate GE load specification was not an act of God or a force majeure; it was a technical error....The technical problem was-is-solvable.

At page 13 Dr. Hanauer discusses the nature of the problem as follows:

> The original design considered the mechanical loads associated with accidents in the drywell, including pressure and temperature increases, earthquake loads, the load from the jet of water coming out of the downcomer, and the usual dead loads, hydrostatic loads and test loads required for the design of any structure. However, the design did not include any allowance for the large dynamic loads from the quenching process which had now been shown to occur for both safety/relief valve events and accidents in the drywell. Therefore, there was no assurance that the containment structures would hold together and perform their safety function on the occurrence of a safety/relief valve discharge or a loss-of-coolant accident.

Dr. Hanauer stated at page 15 that GE was responsible for the error as follows:

Q. Who made the errors?

A. The errors were omissions of essential loads in the GE information furnished to PECO, that was used by PECO and Bechtel as a basis for the design of the containment. The errors were made by GE. These errors then resulted in incorrect design of the containment structures, systems and components, and also other equipment subject to shaking because it is attached to, or supported by the containment.

(Emphasis added).

Dr. Hanauer also stated that the error was not undiscoverable by GE. Thus, at page 14 of his testimony he states as follows:

> No new laws of nature were discovered that showed the need for new design loads. The forces generated during quenching have been known for a long time. During some of the GE pressure suppression tests in the early 1960's, noises were heard indicating large pressure pulses, which would lead to large potential forces. The technology for measuring pressures and forces was available then, and could and should, have been employed in the tests.

(Emphasis added).

In contrast to the PP&L case, the OCA in the present case has determined to focus explicitly, and in depth, on this portion of PECO's burden of proof on the cost of Limerick Unit 1. The OCA believes that the testimony of Dr. Hanauer provides extensive detail on the issue of GE imprudence which was not before the Commission in the PP&L case. Further, the OCA believes that Dr. Hanauer's testimony provides a basis for a ratemaking adjustment which is consistent with current Pennsylvania law, which has been changed and/or clarified since the PP&L decision.

IV. THE COMPANY'S RELIANCE ON COLLATERAL ESTOPPEL IS MISPLACED WHERE FIRST PP&L, AND NOW PECO, HAVE THE BURDEN OF PROOF.

The Company's presentation on the Mark II issue suggests that OCA had the burden of proof in the PP&L case, and failed to meet that burden. PECO's argument on this issue is presented, in part, at page 11 of its Motion, wherein it states that "for the purposes of collateral estoppel, an issue is actually litigated even when the determination is based on a failure of proof." The Company's point might have some relevance if the OCA had had the burden of proof in the PP&L case. Where it was PP&L, and is now PECO, however, with the burden of proof, the Company's reliance on collateral estopped is misplaced.

The OCA agrees that, as noted by the Company, Comment d to §27 of Restatement of Judgments, 2nd, says in part that "A determination may be based on a failure of pleading or of proof as well as on the sustaining of the burden of proof." OCA notes, however, that in the case of Nichols & Company, Inc. v. United States, 586 F.2d 826, 829 (3rd Cir. 1978), which the Company also cites for this proposition, the party sought to be estopped had "failed to rebut the presumption of correctness that attached" to the customs appraisal at issue in the case on the basis of which collateral estoppel was applied. Thus, unlike the OCA in the PP&L case, the party to be estopped in Nichols had the burden of proof in the case on which estoppel was based. OCA further notes that Schubach v. Silver, 461 Pa. 366, 336 A.2d 328, (1975), cited by the Company for the

proposition that "the Restatement of Judgments is 'accepted law in Pennsylvania,'" actually refers to "Restatement, Judgments, §68 which is the accepted law in Pennsylvania." 461 Pa. at 377, 336 A.2d at 333. The reference in Schubach is to §68 of the first Restatement of Judgments, which says with regard to failure of proof that:

> ...if...at the trial the party who has the burden of proof offers no evidence in support of his allegations, and the court directs a verdict against him, the question is litigated and a judgment on the verdict is conclusive between the parties as to the question.

§68, Comment f, p. 303 (emphasis added).

Section 315 of the Public Utility Code, 66 Pa.C.S. §315, places the burden of proof on the utility to prove the justness and reasonableness of its rates in a rate case. PP&L had the burden of proof in its rate case; PECO has the burden of proof here. Further, as noted in section III.B. above, Section 1308(f) of the Public Utility Code specifically addresses the burden of proof in rate cases involving the inclusion in rates of new electric generating stations.

In reviewing and challenging PP&L's claim for costs of construction of Susquehanna 1, the OCA presented testimony challenging the prudence of PP&L's expenditures to correct the Mark II problem. The PUC found that PP&L's efforts on this subject were reasonable and prudent, i.e., that PP&L had met its burden of proof. The present case requires PECO to similarly meet its burden of proof on the construction costs of Limerick Unit 1.

V. THE COMPANY'S MOTION IN LIMINE/MOTION TO STRIKE IS UNTIMELY.

The present rate increase request was filed on September 27, 1985. On November 27, 1985, a week before the prehearing conference, the Office of Consumer Advocate presented PECO with a copy of Dr. Hanauer's Direct Testimony in this proceeding. This testimony, a portion of which is the subject of PECO's Motion to Strike, was based in part on a discovery process implemented in May, 1984. For the majority of the period from May, 1984, to November 27, 1985, PECO was fully aware that the OCA was investigating the costs of construction of Limerick Unit 1 resulting from the Mark II design error. Thus, for example, on June 14, 1984, the OCA presented PECO with the following Limerick Data Request:

> 8. Please provide PECO's best approximation of the cost incurred as a result of the GE Mark II redesign.

On December 3, 1985, the OCA presented PECO, and all parties, with its Pre-Hearing Memorandum in this case. That Pre-Hearing Memorandum stated that:

> The OCA will also present testimony by an expert in nuclear engineering and technology on the impact on the Limerick 1 cost and schedule of the improper design of the Limerick 1 containment structure.

Prehearing Memorandum at 2.

PECO was presented with the Direct Testimony of OCA witness James J. O'Brien on December 6, 1985. This Testimony included calculations of the AFUDC accrual on the Mark II redesign and rework expenditures. Copies of Dr. Hanauer and

Mr. O'Brien's testimony were provided to the Judge and all other parties on December 23, 1985.

It was not until January 24, 1986, that PECO filed its Motion in Limine/Motion to Strike on the issue of Mark II costs. The OCA submits that PECO's Motion is untimely and should be rejected.

It is noteworthy that this is not the first Motion in Limine/Motion to Strike in this case. The first was filed by the Commission Trial Staff on November 20, 1985. The Staff's Motion was presented prior to the Pre-Hearing Conference. Further, PECO's answer, oral argument, and a Bench Ruling were all completed by December 20, 1985. Parties filing testimony on January 14, 1986, thus had notice of the scope of Limerick issues in this case.

PECO's Motion on the other hand, was filed one and one half weeks after all parties' Limerick issues testimony was due. The untimely filing of the Motion serves to prejudice all intervenor parties, and in fact all PECO customers. This is particularly true if one interprets PECO's Motion regarding collateral estoppel as applying only to the OCA, and not to the other parties in this case who clearly were not parties in the PP&L case.

Any party or potential party to a rate case must decide the issues which it will pursue. Part of that decision involves a recognition of what other parties or potential parties will also pursue. Staff, other parties, and PECO

consumers were aware that the OCA had presented testimony on Mark II issues in a prior PP&L rate case, and knew by at least December 3, 1985, that the OCA would present testimony on the Mark II containment issue in this case.

Had PECO presented its motion in a timely fashion, these other parties might have chosen to pursue this important issue which the OCA was purportedly estopped from pursuing on their behalf.

It should be noted that, as discussed in previous sections above, it is the OCA which the Legislature has designated as the representative of PECO consumers. It is therefore natural to assume that PECO consumers would look to the OCA to pursue an issue such as Mark II. With the OCA giving notice to all parties in its Pre-Hearing Memorandum that assumption became fact.

If PECO had presented its Motion in Limine at a timely stage, and had it been successful, some other party could have ostensibly presented testimony on Mark II, either by Dr. Hanauer, or by some other witness.

Given the fact that PECO has had Dr. Hanauer's testimony since November 27, 1985, its failure to move to limit or strike his testimony until January 24, 1986, renders that Motion untimely.

VI. RESPONSE TO THE NUMBERED PARAGRAPHS OF THE COMPANY'S MOTION

1. Numbered Paragraph 1 admitted.

2. Numbered Paragraph 2 is admitted.

3. It is admitted that the PUC entered a final Order in the PP&L case which speaks for itself. All other assertions in Numbered Paragraph 3 are denied, for the reasons set forth in §§II-V above.

4. Numbered Paragraph 4 states a conclusion of law as to which no response is required.

5. Numbered Paragraph 5 states a conclusion of law as to which no response is required. It is denied, however, that the requisite conditions for the application of the doctrine of collateral estoppel are present in this case. See §§II-IV above.

6. The first sentence of Numbered Paragraph 6 is denied. See §III above. It is admitted that the OCA filed testimony on the Mark II redesign problem in the PP&L case by witnesses Bridenbaugh and Minor. It is admitted that the OCA has presented testimony on the Mark II issue in the present case by witness Hanauer. Both testimonies speak for

themselves. It is admitted that the ALJ issued a Recommended Decision and the Commission issued an Opinion and Order and Order on Reconsideration in the PP&L case. Those decisions speak for themselves. Other assertions regarding the nature and identity of litigation issues in the PP&L and PECO cases are denied for the reasons set forth in Section III above.

7. (a) The first sentence of Numbered Paragraph 7 is denied for the reasons set forth in section III above. It is admitted that the PUC entered a final Order and Order on Reconsideration in the PP&L case. Those orders speak for themselves.

(b) The second sub-paragraph of Numbered Paragraph 7 states a conclusion of law as to which no response is required.

(c) The third sub-paragraph of Numbered Paragraph 7 states a conclusion of law as to which no response is required. But see section IV above.

8. It is denied that the issue of GE imprudence was extensively litigated or was the major focus of the PP&L case. It is admitted that the subject of GE's role in the Mark II problem was addressed in testimony and in Brief. The OCA, however, stated that its position was that:

> OCA submits that the ratepayers should not be forced to bear the costs of this oversight whether responsibility is ultimately assigned to PP&L, GE, or Bechtel.

Appendices to Motion in Limine/Motion To Strike, App. H, at 64. See also §III above.

9. It is admitted that the OCA represented the interests of PP&L ratepayers in the PP&L proceeding. It is denied that collateral estoppel may be applied against the OCA in this proceeding for the reasons set forth in sections I and II above. Numbered Paragraph 9 goes on to state conclusions of law as to which no response is required.

10. Numbered Paragraph 10 is denied for the reasons set forth in sections I-V above.

11. It is admitted that the PUC entered a final Order in the PP&L rate case. All assertions regarding the effect of that decision and of the doctrine of collateral estoppel in the present case are denied.

12. Numbered Paragraph 12 is denied. The OCA submits that the evidence which the OCA seeks to introduce on the question of the Mark II containment error should be admitted and should not be stricken.

VII. CONCLUSION

PECO has presented in this case a claim for $136.1 million in direct costs (plus AFUDC) related to the Mark II containment error. PECO ratepayers may not be denied the opportunity, through their statutorily established representative, the OCA, to raise all reasonable defenses against this claim. One of these defenses--which PECO ratepayers have not previously litigated--is the imprudence of the contractor in designing the plant.

The doctrine of collateral estoppel has no application in this case and the Company's Motion must therefore be denied.

Respectfully submitted,

David Wersan

David Wersan
Assistant Consumer Advocate

Susan Perkins Weston
Assistant Consumer Advocate

Irwin A. Popowsky
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DATED: February 3, 1986

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February 4, 1986

Re: Pennsylvania Public Utility Commission, et al.,
v. Philadelphia Electric Company
Docket No. R-850152

RECEIVED
FEB4 1986
SECRETARY'S OFFICE
Public Utility Commission

William E. Zeiter, Esquire
Morgan, Lewis & Bockius
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Dear Mr. Zeiter:

Enclosed are the responses of Philadelphia Area Industrial Energy Users Group (PAIEUG) to the following requests for production of documents and data of the Philadelphia Electric Company:

Set III - Nos. 1, 2, 6, 17, 18, 19, 22, 23, 24, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 41, 43, 44, 45, 46, 48, 49 and 50.

Very truly yours,

McNEES, WALLACE & NURICK

By David M. Kleppinger
David M. Kleppinger

DMK/jf
Enclosures

HAND DELIVERD TO HARRISBURG OFFICE

cc: All Parties of Record (w/encl.)

DOCUMENT FOLDER

CERTIFICATE OF SERVICE

Pennsylvania Public Utility Commission, et al., :
v. :
Philadelphia Electric Company : Docket No. R-850152
:

I hereby certify that I have served a copy of the foregoing document on all known parties of record to this proceeding, all by first class mail (unless otherwise indicated) properly addressed as follows:

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Dated this 4th day of FEBRUARY, 1986, at Harrisburg, PA.

RECEIVED
FEB4 1986
SECRETARY'S OFFICE
Public Utility Commission

Response to Data Request of the
Philadelphia Electric Company
Set 3

Q. 1. On page 9 of the testimony, at lines 21 and 22, Mr. Falkenberg states that the $207 million estimated fuel cost savings is "actually an estimate of the average fuel savings over the next two years." Please provide any and all support bearing on this statement.

A. 1. Please see PECO statement No. 22, pages 25 through 28.

DOCUMENT FOLDER

DOCKETED
FEB 5 - 1986

Response to Data Request of the
Philadelphia Electric Company
Set 3

Q. 2. On page 12 of the tstimony, at line 22, Mr. Falkenberg refers to "PECO's stated desire not to earn interst on the deferred amount." Please indicate where PECO has so stated this desire. Please also provide any other support that Mr. Falkenberg has for this statement.

A. 2. Please see PECO statement No. 17, page 5 lines 8 through 12. While this passage does not specifically state that PECO desires to earn no interest on the deferred amount, it does indicate that PECO has implied that it is not earning any interest on the deferred amount.

Response to Data Request of the
Philadelphia Electric Company
Set 3

Q. 6. On page 17, at line 12, Mr. Falkenberg states that after PECO finishes its nuclear construction program, "it will enter a period fo time where little construction is needed." Please provide any and all support for this statement. Please include specific documentation and workpapers of any analyses conducted by Mr. Falkenberg in support of this statement.

A. 6. Please see attached PECO's Generation Expansion Plan. As will be noted in this plan, which assumes completion of Limerick Unit 2, PECO will not build new base load coal fired generating capacity until the year 2012. No new generating capacity would be built after Limerick Unit 1 until the year 2001. The new unit in that case is a 400 MW combined cycle generating plant. Inasmuch as combined cycle units cost much less to build than coal fired base load units and nuclear plants, it is apparent that PECO's generation construction program will not contain the types of heavy capital expenditures associated with the construction of a new base load generating capacity.

BASE CASE I
PECO LOAD & CAPACITY PROGRAM

LIMERICK 2 (7-90)

1984-2020

YEAR	MW	DATE	CHANGES	REASON	CAPACITY	LOAD	PERCENT RESERVE	MW EXCESS OR DEFICIT OVER 25%
1983					7303	6030	24	-35
	-12	1-84	Rerate Eddy. 1,2 ✓	SO2 Equipment				
	-15	1-84	Retire Barb 5 ✓	Unit Sold				
	-102	6-84	Rerate Conowingo ✓	Water Releases				
	-67	6-84	Croydon CT ✓	Can't Meet Rating				
	-2	6-84	Cromby 1 ✓	Can't Meet Rating				
	-3	6-84	Schuylkill 3 ✓	Can't Meet Rating				
1984	-20	6-84	Southwark 1,2 ✓	Can't Meet Rating	7282	6100	19	-343
	12	9-84	Eddy. 1	Rerate				
	471	1-85	Salem 2	End of Sale to GPU				
1985	-166	5-85	Retire Richmond 9	Econ Retirement	7599	6140	24	-76
	1055	8-85	Limerick 1 4	Service Date				
	-458	10-85	Retire Misc CT's	Econ Retirement				
1986	-338	12-85	Retire Swk. 1,2&D	Econ Ret. 38 Yr	7858	6160	28	158
1987					7858	6180	27	133
1988					7858	6200	27	108
	-253	12-88	Retire Del. 7,8&D ✓ 250	End of 35 Yr Life				
1989	-12	12-88	Retire Sch. 3	End of 50 Yr Life	7593	6220	22	-182
1990					7593	6240	22	-207
	1055	7-90	Limerick 2 4/4	Service Date				
1991	-201	12-90	Retire Cromby 2 ✓ 201	End of 35 Yr Life	8447	6260	35	622
1992					8447	6320	34	547
1993					8447	6380	32	472
1994	-169	12-93	Retire Sch. 1&D ✓ 162	End of 35 Yr Life	8278	6440	29	228
1995					8278	6500	27	153
1996					8278	6560	26	78
1997					8278	6620	25	3
1998					8278	6700	24	-97
1999					8278	6780	22	-197
2000					8278	6860	21	-297
2001	400	1-01	New Comb. Cycle	Service Date	8678	6940	25	3
2002					8678	7020	24	-97
2003					8678	7100	22	-197
2004					8678	7180	21	-297

BASE CASE I
PECO LOAD & CAPACITY PROGRAM

LIMERICK 2 (7-90)

1984-2020

YEAR	MW	DATE	CHANGES	REASON	CAPACITY	LOAD	PERCENT RESERVE	MW EXCESS OR DEFICIT OVER 25%
2005	400	1-05	New Comb. Cycle	Service Date	9078	7280	25	-22
2006					9078	7380	23	-147
2007					9078	7480	21	-272
2008					9078	7580	20	-397
2009	400	1-09	New Comb. Cycle	Service Date	9478	7680	23	-122
2010					9478	7780	22	-247
2011					9478	7880	20	-372
2012	400	1-12	New Coal Unit	Service Date	9878	7980	24	-97
2013					9878	8080	22	-222
2014					9878	8180	21	-347
2015	400	1-15	New Coal Unit	Service Date	10278	8280	24	-72
2016					10278	8380	23	-197
2017					10278	8480	21	-322
2018	400	1-18	New Comb. Cycle	Service Date	10678	8580	24	-47
2019					10678	8680	23	-172
2020					10678	8780	22	-297

Response to Data Request of the
Philadelphia Electric Company
Set 3

Q. 17. On page 27, at lines 7 through 8, Mr. Falkenberg states that the testimony of wtinesses "Perl, Wile, and Guth should simply be ignored." Please state the basis and give any and all support for this statement.

A. 17. Please refer to Answer #16.

Response to Data Request of the
Philadelphia Electric Company
Set 3

Q. 18. Please explain in full the relationship, in Mr. Falkenberg's opinion, between the used and useful standard for rate treatment of utility investment and the prudence standard referred to on page 28 of Mr. Falkenberg's testimony.

A. 18. This relationship is adequately explained in Mr. Falkenberg's direct testimony and can be explained in greater detail in response to more specific questions during cross-examination.

Q. 19. Please explain in full the relationship, in Mr. Falkenberg's opinion, between the used and useful standard for rate treatment of a utility investment and life cycle studies. Please provide any studies or other documentation which supports this opinion.

A. 19. In Mr. Falkenberg's view the use and useful standard is the most appropriate standard for determining the rate treament of a utility investment. The life cycle cost study is an important tool which would allow for a more realistic determination of whether an asset is used or useful over its life.

For example take the case of an investment in a large plant, such as a nuclear plant, which is not needed for reliability purposes in a given test year. Suppose also the plant produces higher rates, in that year. Such an investment would fail to be used and useful to customers. However, provided the same investment produced lifetime economic savings to customers in a present worth sense, then that plant could be said to pass a cost benefit tests. In this case the investment is used and useful when considered over the entire life of the asset. In the case when a unit fails to produce a positive cost benefit over its life, and it fails to produce a positive cost benefit during the test year, then the asset is clearly not used and useful during the test year. It would also not be used or useful over its life. In this case a departure from the ordinary full rate base recognition of the investment would normally be considered an appropriate course of action for the regulator to examine. With regards to documentation relied upon to support this opinion please see attached summary of Utility Commissions and Appeals Court Decision involving excess capacity claims. This document establishes that the used and useful principal has been utilized in numerous excess capacity cases, and the cost benefit analysis has been used as a basis for the determination of an excess capacity claim. In fact, as the document shows it has often been the case that excess capacity claims have been rejected on the basis of a positive showing of a cost benefit of particular generating plant. This clearly establishes in Mr. Falkenberg's opinion the fact that other regulatory commissions have in fact looked at economic considerations as a basis for determining used and useful nature of a generating plant.

FALKENBERG EXHIBIT 6

Survey of Utility Commission and Appeals Court Decisions Involving Claims of Excess Capacity*

*The information on this exhibit was derived from an examination of decisions, when available, and from secondary sources. Not every decision discussed herein has been reviewed.

EXCESS ELECTRIC GENERATING CAPACITY REMEDIES ON A COMPANY-BY-COMPANY BASIS

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
CONNECTICUT DEPARTMENT OF PUBLIC UTILITY CONTROL (Ct. DPUC)			
Connecticut Light and Power Co.	781206/7	6/29/78	Excess capacity found, but penalty not impose. Notation in decision that capacity in excess of 40 percent of peak demand will be taken into consideration in making the determination for revenues subsequent to the time that Millstone is placed in service.
Connecticut Light and Power Co.	800403/4	10/9/80	Excess capacity found, but penalty not impose. Finding plant provided other benefits for rate payers; i.e., reliability purposes, voltage s and area protection benefits; also used for s system sales. However, because of the additi revenue requirements resulting from the units, the DPUC ordered the company to submit engine and economic studies of ways to meet reliabil obligations that are also needed for present and future capacity reserve margins.
Connecticut Light and Power Co.	810602 and 810604	11/25/81	CLEP performed the required retirement study i in the 800403 and 800404 decision. This study that retention of all oil-fired units was eco and that certain oil-fired units were needed f reliability, that gas and jet turbines should retained to provide spinning reserve, black-st capability, blackout restoration ability and t local and subarea reliability but that several of gas turbines, which were in fact retired i could be retired without jeopardizing reliabi increasing revenue requirements. The DPUC accepted the general conclusions of t retirement study and stated that it would cont monitor and review CLEP's generating capacity. The DPUC also rejected various sources of acti respect to generating capacity advocated by p intervenors to the case as not being supporte record including proposal to deny a return to shareholders on 1060 MW of alledged "excess c
Connecticut Light and Power Co.	830715	12/8/83	DPUC deferred action on Millstone 3 as excess capacity until more proximate in time to the operation of the plant in the future.
FLORIDA PUBLIC SERVICE COMMISSION (Fla. P.S.C)			
Tampa Electric Co.	92 PUR 3d 398	1971	Possible excess capacity found, but penalty n applied because of off-system power sales.
Tampa Electric Co.	No. 73604-EU	5/2/74	Excess capacity not established but choice of remedy issue discussed.
P Gulf Power Co.	No. 810136-EU(CR) Order 10557	2/1/82	Excess capacity found with penalty imposed by imputing an addition to operating income equ

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
Gulf Power Co.	No. 820150-EU(CE) Order 11498	2/11/83	the debt and equity returns on excess pl… operating expenses, loss revenues associ… avoided during the test year due to off-… and capacity credits.
Florida Power Co.	No. 820100-EU, Order 11628	2/17/83	Excess capacity not established but chall… issued discussed.
HAWAII PUBLIC UTILITIES COMMISSION (Hawaii P.U.C)			
Hawaii Electric Light Co.	13 PUR 4th 329	1976	No excess capacity found, but company ord… expend funds on additional plant construct… future without P.U.C. approval.
IDAHO PUBLIC UTILITIES COMMISSION (IPUC)			
Washington Water Power Co.	58 PUR 4th 126; 134	2/6/84	The PUC ordered the entire Kettle Falls U… Generating plant excluded from rate base a… "imprudent and unreasonable from its incep… This resulted in $7.3 million of disallowe… PUC determined that company's feasibility … used to forecast its resource deficiency, … the capacity available from two units than … construction. Therefore, since the decisio… was found to be imprudent from its inceptio… were therefore found to be unreasonably los… their recovery was unlawful. (See Order No.
Washington Water Power Co.	Case No. U-1008-185 Order No. 18760	3/27/84	The PUC agreed to rehear the Kettle Falls d… on the Company's assertion that the finding… ing available capacity were not based on co… evidence.
Washington Water Power Co.	Case No. U-1008-185 Supplemental Order No. 18884	7/11/84	The PUC reheard the company's request for i… of Kettle Falls in rate base. In Order No. … on 2/6/84, the PUC excluded the unit from s… entirely as "imprudent and unreasonable." T… on review of the record, found that the deci… to exclude the Kettle Falls plant from rate … based on a significant error stemming from an… plete record on understanding of the company… feasibility study forecast. The PUC found th… company's 1980 studies contained numerous err… improper assumptions. However, none of these… along were sufficient to demonstrate that the… decision in 1980 to build Kettle Falls was i… imprudence.
Utah Power & Light Co.	Case No. U-1009-137 Order No. 19101	9/10/84	The PUC found further that the company's deci… 1982 to continue construction of Kettle Falls … not in the ratepayer's best interests as a le… cost resource to meet the perceived need, not … after taking into account the $23.0 million fi… costs at that time. Because of this fact, the… ruled that only 90 percent of the cost of the … $27 million Kettle Falls plant should be inclu… rate base when it becomes commercially operabl… This decision could result in an additional … $6.6 million in revenue for the company.
			Excess capacity found but mitigating factors e… Case Final Order allowed inclusion in rate base… new Hunter No. 3 generating unit. The PUC rej… an intervenor 3-5 yr. phase-in proposal based …

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
ILLINOIS COMMERCE COMMISSION (Ill. C.C.)			
Commonwealth Edison Co.	33 PUR 4th 49	2/6/80	capacity allegation. The PUC noted that excess use general in the region, not unique to the c Because company had "conscientiously managed its capacity," the PUC found Hunter No. 3 should be phased into rate base. The PUC also rejected the DOE proposal to depre Hunter No. 3 under the sinking fund or annuity
Iowa-Illinois Gas and Electric Co.	81-0747	8/25/82	Commission rejected allegations of excess capaci as highly speculative with little foundation in record. Excess capacity not found. The application of cost-benefit test seems to have greater applicat in retaining alleged excess capacity in, rather excluding it from rate base. Illinois Commissio recognized that savings from economies of scale constructing generating plants make it impossibl adhere to a strict reserve margin test for excess capacity.
Central Illinois Public Service Co.	No. 82-0039, Order	11/23/82	All of utilities' generating capacity was consid used and useful since it will be loaded on an economic dispatch basis, i.e., economic dispatch found to be a significant factor in rejecting assertions of excess capacity. The Commission, recognizing the uncertainty in projecting future electric demand and the limited flexibility in adding capacity on short notice, found that a penalty based on reserve margin would result in unreasonable capacity mix.
INDIANA PUBLIC SERVICE COMMISSION (Ind. P.S.C.)			
Indianapolis Power & Light Company	315 NE2d 814 (Indiana Court of Appeals)	7/12/74	On appeal, the Indiana Court of Appeals ruled in P.S.I. Steel Company v. Indianapolis Power & Light Company that on remand the Indiana Public Service Commission was to formulate specific findings of fact to adequately explain the Commission's determination that capacity from Petersburg Plant Two reasonably necessary.
Public Service Co. of Indiana	51 PUR 4th 6, 11	1/24/83	The Indiana P.S.C. permitted the Company to include in rate base its investment in the newly completed coal-fired Gibson Unit No. 5 generating plant. The commission found that the addition of larger, more efficient units like Gibson Unit No. created substantial "temporary" excess capacity b that such units also provided economies of scale. Viewing the company's excess reserves in the conte of its characteristics, the commission found that: (1) the company had achieved the lowest host rate the state; (2) much of the company's existing capacity consisted of older, more expensive oil-fired units which would be displaced by Gibson Unit No. 5 and then used primarily for peaking; (3) the Gibson Unit No. 5 capacity would be essentially consumed by the time the company's next unit was expected to be completed in 1986; (4) the availability of the unit would provide stability a guard against a sudden shift in demand; and (5) gi the age of a large amount of the company's capacity the alleged excess reserve levels were "somewhat

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
			illusory." Thus, the commission concluded that Gibson Unit No. 5 was reasonably necessary to efficient and reliable provision of utility ser Id. at 12.
			Indiana P.S.C. expressed concern over Northern I future plant addition and urged the company to diligent efforts to sell power.
Public Service Company of Indiana, Inc.,	443 N.E. 24 499 (Indiana Court of Appeals)	5/17/84	In the Office of Utility Consumer Counselor v. Public Service Company of Indiana, Inc. the Cou affirmed Commission's above 1983 decision to al inclusion in rate base of Company's investment Gibson Unit No. 5. Commission's determination to be reasonable, logical and calculated to ser the ratepayers as required by statute by insuri that the utility provides constant, reliable, a efficient service to its customers. Noted the Commission's discussion of uncertainties of for ing of demand levels, long lead times and that temporary "excess reserves" provide ratepayers benefits of economies of scale.
IOWA STATE COMMERCE COMMISSION (ISCC)			
Iowa Power and Light Co.	RPU-78-27, 78-30, and 80-36	2/19/82	A 25 percent reserve requirement was establishe the starting point for excess capacity. The IS adopted a novel adjustment to rate of return ca penalty formula which computes the dollars to b subtracted from the utility's revenue requirem The penalty increases as the amount of excess capacity increases. Therefore, when the excess capacity equals 100 percent, the allowed rate o return on its net investment in plant is zero.
Iowa Public Service Co.	RPU-80-45 and RPU-818	4/30/82	
Iowa-Illinois Gas and Electric Co.	46 PUR 4th 616	5/18/82	ISCC penalized company's rate of return for exce capacity beyond 25 percent created by the 675-M Ottumwa generating station. The ISCC decided t any excess capacity adjustment should be based o average system costs. The adjustment to jurisdi tional return was $258,128.
Iowa Electric Light & Power Co.	E-RPU-83-23	1983	Ruling issued defining excess capacity as reserv excess of 25 percent of peak demand.
			A formula was established for determining all fu excess capacity adjustments:
			$\text{Adjustment} = \frac{\text{Excess Capacity}}{\text{Total Generating Capacity}} \times \text{Rat}$ Investment in Total Generating Cap × (weighted ROE)
Iowa Electric Light & Power Co.	RPU-83-23	5/27/84	No explicit excess capacity adjustment due to finding that generating capacity fell within pre scribed limits. However, the ISCC denied the partial recovery of supplemental capacity purcha related to a ten-year power supply agreement whi provided for gradually lower purchases over the contract. The ISCC determined that although the supplemental agreement provides some benefits to ratepayers, its overall result was to increase t

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
Iowa Power and Light Co.	59 PUR 4th 399	4/6/84	total cost of the power supply agreement by $8.5 million. The ISCC found these additional charges to be imprudent and unreasonable, and therefore reduced IEI's capacity payment expens the first four years of the agreement by $2.1 million, which is one-fourth of the total amount of capacity expenses found to be imprud and unreasonable. This reduced IEI's revenue requirement by $2.1 million.
Iowa-Illinois Gas and Electric Co.	59 PUR 4th 361	4/25/84	The ISCC applied an excess capacity penalty cal using the average system capacity cost. The IS determined that capacity in excess of 125 perce 1983 peak should be considered excess capacity consistent with legislation enacted in 1983, no return should be allowed on the excess capacity regional power pool requires a 15 percent reser The ISCC utilized a total capacity of 1,744 meg a 1983 peak of 1,327 megawatts, and determined company has about 181 MW of excess capacity. Ba upon the following formula (investment per MW x ROE x excess capacity = return adjustment), the reduced the revenue requirement by $7.1 million This adjustment effectively reduced the company overall rate of return by about 50 basis points the ISCC had penalized the company by reducing company's allowed rate base instead of applying revenue penalty, the company's rate base would been lowered by $72.5 million.
Iowa-Illinois Gas and Electric Co.	347 N.W.2d 423 (Iowa State Supreme Court)	4/11/84	ISCC order continues the policy of applying the 125 percent excess capacity rule, therefore den equity return on 127 megawatts of average value excess capacity. This results in an annual rev reduction penalty of $4.7 million. The Mid-Cont Area Power Pool Reserve Standard is 15 percent, order sets a 25 percent reserve ceiling. In Iowa-Illinois Gas and Electric Co. v. ISCC, t Supreme Court upheld ISCC denial of ROE for part capacity found to be in excess of margin. Compa contended that the 1982 decision deprived it of substantive due process because it denied the co a fair return on its property investment and bec it penalized the company for prudent actions tha not demonstrably harmed its customers. However, court replied in its 1984 decision: "In regulati fair return on a utility's investment, substantiv process does not require a regulatory agency to a particular rate. For the courts to interfere process grounds, the return allowed by the agenc be outside a zone of reasonableness." The court dismissed the argument that because the investmen plant was prudent, the penalty constituted a bre due process. "The issue does not turn on an ass of fault, adding in the constitutional requirem that a utility receive a fair return on its inve ment prohibits a lower return from the rate-payi public upon a part of the investment that turns to be unnecessary, even when the utility's decisi to make the investment was prudent. The issue f the Commission was how to allocate the burdens created by a mismanagement investment mistake betwee ratepayers and utility common stockholders."

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
Interstate Power Co.	60 PUR 4th 266	4/11/84	Investment in Louisa Plant deemed prudent and in rate base.
MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES (Mass. DPU)			
Fitchburg Gas and Electric Light Co.	DPU 18296	12/31/75	D.P.U. excluded an older steam generating uni associated operating expenses from rate base adjustment for excess capacity. The DPU offe company an opportunity to justify the units o ation in service in the future.
Fitchburg Gas and Electric Light Co.	DPU 19064	8/31/77	D.P.U. supported prior penalty with findings the unit was on cold standby during the test that exclusion of the plant would not leave c company short on generating capacity; that it not add to the company's costs; and that remov the plant from rate base was not an uncontrolla undertaking. However, as an offset to the rat base and expense removal, it allowed the utili recover the remaining undepreciated value of plant as an amortized operating expense over a five-year period.
Western Massachusetts Electric Co.	DPU 18731	4/8/77	Recently completed nuclear plant (Millstone 3) to be causing excess capacity. The D.P.U. fo the excess capacity, which would continue for years, had resulted from imprudent management chastised WMECO for failing to respond to chan market conditions. Specifically, the D.P.U. c company's failure to retire little-used and in plant or to sell capacity. The D.P.U. refused exclude new nuclear plant from rate base becau contributed to overall system efficiency and w reduce the total cost of electricity produced Instead, the D.P.U. eliminated a number of old depreciated peaking units from rate base. As the financial effect of excluding depreciated much less severe than the effect of excluding undepreciated plant. In addition, the D.P.U. from excluding O&M expenses for the excluded un
Fitchburg Gas & Electric Light Co.	360 N.E. 2d 1304	1978	On appeal, the exclusion from rate base by the was upheld as reasonable and was found to be su substantial evidence. See DPU 19064 above.
Western Massachusetts Electric Co.	37 PUR 4th 219	5/30/80	Affirmative finding that WMECO imprudently over its generating system, denying WMECO request to include the peaking unit in rate base. DPU con to exclude all of the investment in the units f rate base and, in contrast to the earlier case, excluded O&M expenses associated with the units
Western Massachusetts Electric Co.	37 PUR 4th 248	10/29/80	On reconsideration, the D.P.U. reversed itself allowed the peaking plants into rate base after realized that off-system power sales from the u generated significant revenues. Under these cir stances, excluding the peaking plants from rate base actually resulted in a loss to ratepayers b cause the earnings from off-system sales were g than the savings from their exclusion.

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
MINNESOTA PUBLIC UTILITIES COMMISSION (Minn. P.U.C.)			
Northern States Power Co	32 PUR 4th 58	1979	Penalty imposed by removing portion of LFG plant from rate base.
Minnesota Power and Light Co.	No. E-015GR-81-250	4/30/82	Excess capacity found, but P.U.C. declined to dele several generating units from rate base. Instead, they eliminated O&M on two units (but not deprecia tion) from test year cost of service, but allowed company to earn a return on investment.
Otter Tail Power Company	No. E-017/GR-81-315	6/15/82	Intervenor contentions regarding excess capacity found not substantiated.
MISSOURI PUBLIC SERVICE COMMISSION (Mo. P.S.C.)			
Kansas City Power and Light Co.	28 PUR 4th 398, 410	1979	No excess capacity found. Twenty percent reserve margin approved. Decision described company's de cision to bring Iatan No. 1 on line as that of a "rational planner."
Kansas City Power and Light Co.	38 PUR 4th 1	6/19/80	Excess capacity found involving 435 MW Iatan No. 1 generating plant, finding that company had acted imprudently despite numerous signals that plant wa unnecessary upon construction completion. As a re Mo. P.S.C. refused to include the Iatan unit, plant-related investment in the transmission lines and associated additions to a substation in rate base. Mo. P.S.C. also removed O&M Iatan ex penses from test year expenses, fully deleting the effect of Iatan for ratemaking purposes. However, AFUDC allowed to continue accruing and Iatan No. 1 continued to be treated as plant held for future use. Decision made to penalize company not from point of view of plant usefulness, but toward managerial performance. The total revenue disallo ance owing to the excess capacity adjustment was $22 million.
Kansas City Power and Light Co.	43 PUR 4th 559	6/17/81	Reversing prior treatment, Iatan was fully reflect in rate base because it was now seen as fully "use and useful." However, the company had sold capaci to other utilities during the test year and therefo the PSC allowed half of the plant in rate base.
Kansas City Power and Light Co.	48 PUR 4th 598	7/14/82	P.S.C. found Iatan now "used and useful" to Missou ratepayers and therefore included the entire plant in rate base.
MONTANA PUBLIC SERVIC COMMISSION (Mont. P.S.C.)			
Montana-Dakota Utilities Co.	Docket No. 81.1.2 Order No 4799B	10/19/81	Penalty Imposed-- Mont. P.S.C. allowed AFUDC treat ment while at same time excluding 40 MW of the 82 entitlement in the Coyote plant. The P.S.C. ob served that the available pool capacity cancelled any reliability benefit of the added capacity, tha there was no evidence that Coyote's capacity was needed to replace capacity during scheduled mainte nance, and that there was no prospect for off-syst sales. On reconsideration, the P.S.C. reduced the adjustment to 30 MW due to an increased expectati of load growth. AFUDC allowed for investment in e cluded excess capacity. The P.S.C. recognized the obligation to balance the interests of the company

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
Pacific Power and Light Co.	Docket No. 82-6-28 Order No. 4928a	1/25/83	ratepayers with those of its stockholder P.S.C. stated that ratepayers should not for excess capacity, but shareholders wh invested in plant were entitled to some their investment. The Montana P.S.C. declined imposing a re remedy after a finding of excess capacity preference for a "concerted cooperative e allow the Company to "recover some of the associated with new thermal plants." The nature of the decision may be attributed ameliorating effect of the Company's off- and the fact that excess capacity was a re problem. The commission warned the utilit that a rate base adjustment or a revenue be considered in the future if cooperative to provide a remedy.
Montana Power Co.	Docket No. 83-8-67 Order No. 5652-C	8/3/84	Montana Power Company, 30 percent (210 MW) Colstrip Coal-Fired Unit No. 3 and associat 500,000 kV twin transmission facilities wh began operating in January 1984, was exclud entirely from rate base by P.S.C. as not k and useful during the test year. The avail of other cost competitive alternatives to C in the region were also cited as a major co sion. This resulted in approximately $18 of disallowed revenues. This conclusion was upon an examination by the P.S.C. of MPC's and resources for the test year, which led conclusion that Colstrip 3 output was "not to meet test year loads." There was no disc of what is a proper reserve margin for MPC. P.S.C. also refused to permit MPC to accrue Colstrip No. 3.
Pacific Power and Light Co.		8/20/84	Rate request associated with Colstrip 3 deal The P.S.C. ruled that the Colstrip 3 power f plant, which went into service January 1984, "not used and useful" to Montana customers. because the PP&L 75-MW Colstrip sale to Black P&L was surplus, Montana ratepayers could not the revenues resulting from the surplus power
Montana Power Co.		8/23/84	The Montana Supreme Court accepted on August petition by Montana Power to review the issue "used and useful" plant raised in the recent The P.S.C. had contended that it has sole jur authority to determine what constitutes "used plant, while Montana Power insists that the C of Public Convenience and Necessity, granted b Montana Board of Natural Resources pursuant to Facility Siting Act, takes precedence over the authority. Hearings in the case could begin November with a decision expected by year-end.
NEW MEXICO PUBLIC SERVICE COMMISSION			
Public Service Company of New Mexico	Case No. 1804	1/23/84	The P.S.C. issued a ruling on the company's re forlan inventoried capacity plan. Inventorying a way of delaying charges for electrical plant that future time when a particular plant is nee to serve customers.

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
			The P.S.C. approved a stipulation regarding the company's proposal to inventory a limited amount of generating capacity. The approval regarding the Sun Juan coal-fired unit authorizes the company to capitalize 1982 and 1983 carrying charges, similar to AFUDC totaling $16.2 million. Under the agreement, the Company will be allowed to collect an estimated $7.5 million of additional revenue during the next five months to compensate the company for use of inventoried plant and reflects the amortization of a portion of previously capitalized carrying charges. This increased revenue will not result in an increase in 1984 reported earnings. However, internal cash generation will be improved by the P.S.C.'s actions.
NEW YORK PUBLIC SERVICE COMMISSION (N.Y. P.S.C.):			
Niagara Mohawk Power Corp.	16 PUR 4th 317	1976	P.S.C. rejected exclusion of excess plant and inclusion of plant investment AFUDC.
Rochester Gas and Electric Co.	Case No. 27378 Opinion 79-12	4/23/79	P.S.C. eliminated plant from rate base not on grounds of excess capacity, but on basis that its share of Oswego No. 6 purchased would not be in service during the rate year.
Niagara Mohawk Power Corp.	27538-40, ALJ Recommended Decision	11/29/79	Excess capacity found, due to partially used new base load plant and the ALJ recommended exclusion of one-half of new plant from rate base.
Niagara Mohawk Power Corp.	27538-40, Opinion No. 80-7	2/29/80	Excess capacity found, but ALJ proposal that 50 percent rate base, deferred return on Oswego Oil-Fired Unit No. 6 with continued AFUDC remedy was not adopted by P.S.C. The P.S.C. majority determined that all of the generating unit was used and useful and, therefore, it required customers to pay current charges and local taxes on the full investment in the plant. The P.S.C. concluded that there was surplus capacity, but that it should be dealt with in a different manner. It concluded that adoption of the general principle of continuing to accumulate carrying charges on a plant not fully utilized would "increase investor perceptions of risk and make it most difficult for the company to raise capital on reasonable terms." Instead, $7.1 million upward revenue adjustment to net operating income to reflect revenues from sales of excess capacity, having selected an amount equal to revenues which the company would earn under a power sales contract that was not scheduled to take effect until more than two years later. The revenue adjustment was chosen over the rate base adjustment because a rate base reduction was seen as perhaps having actually increased the plant investment ultimately included in rate base, since carrying charges would have to be accumulated over the rate base deferral and added to plant.
Rochester Gas and Electric Co.	38 PUR 4th 143	1980	Excess capacity not found, but choice of remedy issue discussed.
Niagara Mohawk Power Corp.	Case No. 27741 Opinion No. 81-3	3/12/81	Excess capacity found, additional revenues imputed to mitigate effect of excess capacity in rate base. The N.Y. P.S.C. explained that its revenue adjustment did not depend upon a finding that an actual

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Pag Findings/Action
			market existed for sales of surplus power.
			inducement to encourage off-system sales,
			authorized the company to retain all resul
			received equal to the sum of the $6.2 milli
			capacity adjustment plus some $10.5 millio
			ected net benefits from sales to the New Y
			Pool. Additional revenues were allocated
			20-80 percent basis between the company and
Niagara Mohawk Power Corp.	Case No. 27984-86 Opinion 82-4	3/4/82	Excess capacity found, $1.8 million adjustm
			imputed. Based upon a finding that a power
			was imprudent in installing capacity to the
			it was maintaining, the N.Y. P.S.C. imputed
			amount to the company's revenues that it bel
			represented a reasonable level of capacity
			An intervenor proposed that the utility's ex
			capacity be excluded from rate base. The P.
			noted that three years earlier it had reject
			same proposal, finding the exclusion an unre
			able response given the difficulty in matchi
			large increments of capacity with gradual lo
			growth. In its previous order, the P.S.C.
			adopted a revenue adjustment to induce the c
			to mitigate the effect of including the plan
			rate base. In this order, the P.S.C. reitera
			its belief that imputing sales of excess cap
			at the highest level reasonably attainable a
			the excess capacity situation "more responsib
			than the somewhat drastic measure of excludi
			plant from rate base."
New York State Electric and Gas Corp.	28167-69, Opinion No. 83-1	1/11/83	Excess capacity not found, but choice of rem
			issue discussed.
Long Island Lighting Co.	28176-77, Opinion No. 83-3	1/24/83	Excess capacity not found, but choice of rem
			issue discussed. Reliability found to be an
Consolidated Edison Company of New York	Case 27744 Opinion 81-4	3/12/81	important factor.
			P.S.C. agreed with ALJ's inclusion of a
			reasonable generating reserve margin in capaci
			costs as a legitimate cost of service.
NORTH DAKOTA PUBLIC SERVICE COMMISSION (N.D. P.S.C)			
Otter Tail Power Company	44 PUR 4th 219	6/20/81	Findings of excess capacity, but P.S.C. reject
			proposed rate base exclusion with AFUDC treat-
			ment of costs for Coyote plant. The North Dak
			P.S.C. has found that is was able to identify
			the actual source of the excess capacity. In
			rate proceeding, Otter Tail had included its e
			investment in its Coyote generating facility.
			commission found that this resulted in 66 mega
			of excess capacity. The company argued that an
			adjustment should be made because the commissio
			been aware that Coyote would represent excess c
			city when it issued the construction certificat
			in 1976. While the commission admitted that it
			been aware that Otter Tail would have excess ca
			in 1976, it did not agree that this meant it fo
			the capacity used and useful for ratemaking purp
			in 1981. Id. at 227. No evidence of management
			imprudence in the decision to construct Coyote w
			found, however. For that reason the commission d
			to share the cost burden of the excess capacity
			between shareholders and ratepayers. Thus, the

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
Montana-Dakota Utilities Co.	44 PUR 4th 249	8/10/81	shareholders would be denied an equity return excess capacity while the ratepayers would be burden of the remainder of the associated cos since it was the Coyote plant itself that was the excess return allocable to the excess 46 of Coyote capacity. Id. at 228. The result $3.3 million of disallowed revenue.
Otter Tail Power Co.	53 PUR 4th 296, 299	4/19/83	Finding of excess capacity, but rejected propo of rate base exclusions. Instead, disallowed allocable equity return on 46 MW of company-ow 82 MW of Coyote plant. Otter Tail sought to capitalize the disallowed equity return associated with the Coyote lignit fired plant. The N.D. P.S.C. rejected this att to shift the entire cost burden to the ratepaye inappropriate in light of its previous order wh it continued to believe equitably solved the pr The P.S.C. reduced the company rate base by $1.6 million.
OHIO PUBLIC UTILITIES COMMISSION (Ohio P.U.C.)			
Dayton Power and Light Co.	21 PUR 4th 376, 383	7/1/77	Excess capacity claim rejected, in part, due to finding that new plant reduced overall costs and allowed a reduction in costs to customers. Find that shutdown of excess capacity would have led fuel cost increase higher than the attendant reduction in plant carrying charges (cost-benefi analysis).
Monongahela Power Co.	21 PUR 4th 340	1977	Reserve capacity over 20 percent not considered excessive.
Columbus and Southern Ohio Electric Co.	24 PUR 4th 261	1978	Excess capacity found, but penalty not imposed du to difficulty in precisely predicting and matchin demand with generation.
Dayton Power and Light Co.	29 PUR 4th 145	1979	Excess capacity found, but penalty not imposed. Cost-benefit analysis upheld excess capacity.
City of Cleveland vs. Ohio P.U.C.	63 Ohio St. 2nd 62, 406 N.E.2d 1370	7/9/80	State Supreme Court upheld Ohio P.U.C.'s cost-bene analysis in a determination that a unit's availability did not constitute excess capacity. Unit had been found by commission to serve to redu the net cost of providing electric service.
Ohio Edison Co. Cleveland Electric Illuminating Co.	33 PUR 4th 435 38 PUR 4th 494, 507	1980 1980	Alleged excess capacity not found. Proposed 20 percent reserve margin rejected becaus "it is most inappropriate to measure the reasonableness of existing capacity levels by simp comparison to some assumed ideal reserve margin."
Dayton Power and Light Co.	80-687-EL-AIR	7/15/81	Excess capacity not found, but choice of remedy issue discussed.
Dayton Power and Light Co.	53 PUR 4th 217	1983	Excess capacity not found.

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Page Finding/Action
Dayton Power and Light Co.	45 PUR 4th 549, 556	2/3/82	Excess capacity not found. No showing that utility's capacity planning was imprudent. The P.U.C. has emphasized the importance of capacity planning. The commission employed a multipart formula to evaluate excess capacity light of the size of the utility's reserve ma However, the commission indicated that an adjustment based upon application of its form not a hard-and-fast rule since: (1) reserve requirements are company specific; (2) it is impossible to add capacity increments that wi times precisely match a theoretical ideal rese margin; and (3) construction lead times and th size of units being constructed make attaining preserving that match more difficult. Therefo given the multitude of factors that influence construction and lead growth, the commission identified the "real area of concern" as whether the utility could be said to have acted imprud in its capacity planning.
Cleveland Electric Illuminating Co.	46 PUR 4th 63, 73	3/17/82	Excess capacity found, but penalty not imposed. Like the cost-benefit test, a finding that an excess capacity situation is likely to exist only temporarily was cited as justification for including the short-term surplus in rate base. City of Cleveland recommended a rate base adjust ment to reflect alleged excess capacity. The s opposed the adjustment because it found that, although the company might have had excess capa in the 1981 test year, that situation was not expected to continue in 1982 and 1983 when the rates authorized would be in effect. In support of its opposition, the staff noted that it exerc its judgment in such determinations to influence utility actions not to penalize decisions that w prudent when made. The commission agreed with t staff, stating that any recommendation for a rat base reduction must be judged against the reasona ableness of the utility's actions. On the basis of its review of the record, the commission found that no adjustment was warranted. Id. at 74.
Ohio Power Co.	No. 81-782-EL-AIR	7/14/82	
Cleveland Electric Illuminating Co.	NO. 81-1378-EL-AIR	1/5/83	Excess capacity found, but penalty not imposed be cause company had no immediate plans to build add itional capacity.
OKLAHOMA COMMERCE COMMISSION (Okla. C.C.)			
Oklahoma Gas and Electric Co.	Case No. 26782, Order No. 182637	1/19/81	Excess capacity found, but penalty not imposed be cause company addressed declining demand by can- celling construction of several units and deferri ISD of others.
PENNSYLVANIA PUBLIC UTILITIES COMMISSION (Pa. P.U.C.)			
West Penn Power Co.	RID No. 183	7/7/76	Excess capacity not found. Economies of scale found to be an important facto Rate base and rate of return penalty imposed— re appeal/remand below (1978).

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
Pennsylvania Power Co.	27 PUR 4th 426	8/30/78	Pa. P.U.C. imputed additional test-year bulk p transaction revenues to reflect rental value o excess capacity in computing the company's rev requirement.
Philadelphia Electric Co.	31 PUR 4th 15	12/28/78	Pa. P.U.C. reversed administrative law judge's decision to penalize company for excess capaci part because company had attempted to lessen th harmful effects of excessive reserve margins. P.U.C. found that the company had curtailed its construction program, rescheduled in-service da for several nuclear facilities, and had mothball several older generating units for ratemaking purposes. By mothballing the units, company re its reserve margin and voluntarily continued to depreciation, property taxes, and a limited amo of related maintenance expenses for the mothball
West Penn Power Co.	32 PaPUC, Rate Investigation Docket No. 183	1978	The Pa. P.U.C. held that a two-part test must be to justify rate base treatment: "The evidence m show (1) that the investments were prudent when made, and (2) that the property invested in will used and useful during the time the rates will be effect."
West Penn Power Co.	R.I.D. No. 183	12/14/78	A second Pa. P.U.C. decision relied upon a differ combination of mitigating factors as a basis for refraining from imposing a remedy. Addition of Harrison Unit No. 3 (640 MW) caused excess capac at close of the test year, but could not find on record that it would continue over an extended period of time.
			This decision issued on remand from Pennsylvania Commonwealth Court. West Penn Power Co. vs. Pennsylvania Public Utilities Commission, 381 A.2d 1337 (1978). The court ruled that the Co mission failed to adequately discuss the factual basis for its initial decision to remedy excess capacity by adjusting rate of return and reducing the company's rate base. West Penn Power Co., R.I No. 183, Order (Pa. P.U.C., July 7, 1976). On remand, the Commission modified its earlier decisio and refrained from imposing a rate base remedy.
West Penn Power Co.	R.I.D. No. 183 Order on Rehearing	6/29/79	Excess capacity finding upheld, but penalty not imposed.
Philadelphia Electric Co.	37 PUR 4th 381	5/9/80	Fourteen to twenty-two percent reserve approved. The P.U.C. eliminated the depreciated original cost ($25,643,000) of the company's least efficient gen- erating units (748 MW) from rate base, which consti tuted that amount in excess of 18 percent above pe demand, but allowed the company to continue to rece expenses associated with the excluded plants. As i DELCO Cases, DPU 18731), the exclusion of older depreciated plant lessened the financial severity o the rate base exclusion. However, the P.U.C. recog nized, for rate-making purposes, the costs (includi depreciation) attributable to operation of the ex- cluded units.

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
Philadelphia Electric Co.	42 PUR 4th 475	4/24/81	Excess Capacity found, but penalty not impose request of ALJ owing to the fact that the le equipment in question was deemed prudent. Th subject of the proposed adjustment was the le turbines that will be retired from service up completion of the Limerick Nuclear Generating Station. During the proceedings, the P.U.C. that "[w]e are of the opinion that the leasin rather than building of the units in question not obviate the need for the investments to b prudent when made." The P.U.C. ruled that al time the agreement to lease the equipment was the company had properly determined that the was needed. Therefore, the leasing decision prudent one.
Philadelphia Electric Co.	433 A.2d 610 (Pa. Commonwealth 1981)	8/17/81	In Park Terrace v. Pennsylvania Public Utility Commission, the Commonwealth Court of Pennsyl upheld the Commission's decision not to make disallowances due to alleged excess capacity, to the Commission's expression of its concer problems involved with utilities' need to con having to tailor capacity to demand. The Cou surmised that the Commission may have concluded Philadelphia Electric Co. had established tha property to be included in rate base was used useful in rendering service, a determination is committed to the discretion of the Commis
Philadelphia Electric Co. v. Pennsylvania Public Utilities Commission	433 A.2d 610, 623 Pa. Commonwealth Court	1981	Commonwealth Court upheld the findings and co of the Pa. P.U.C. 1980 decision. The court maintained that the Pa. P.U.C. was under a du balance the interests of the company's custom against those of investors; it held that the Commission had appropriately discharged its d by precluding only the investor's return on investment while at the same time allowing th company to continue to recover from ratepayer expenses of operating and maintaining the uni including depreciation. "[T]he touchstone for determining whethe or not a prudently constructed unit shou be included in a utility's rate base is whether or not, during the test year involved the unit will be used and useful in rendering service to the public."
Pennsylvania Power and Light Co.	Docket No. R-822169 Opinion and Order 55 PUR 4th 185, 200, 201	8/19/83	The Pennsylvania commission applied the used useful test in the context of reliability or need for power. Thus, where a utility was fo to have capacity far in excess of its require through the end of the century, the commissio a rate base adjustment of an across-the-board in rate base by a factor representing excess The P.U.C. found that PP&L had 945 MW of exce equal to PP&L share of the newly constructed No. 1 generating unit. However, instead of a the new unit or depreciated old plant from ra as done in the 1980 Philadelphia Electric dec the P.U.C. excluded a 12.6 percent average of depreciated value of all plants to represent capacity; for a $287.2 million reduction in r This resulted in $70 million revenue reductio

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Findings/Action
Pennsylvania Power and Light Co.	Docket No. R-832409	4/6/84	Pennsylvania PUC denied an excess capacity adjustment proposed by the Consumer Advocate and recommended by the Administrative Law Judge. The proposed adjustment would have denied the company including 72 MW of generating plant in rate base average system cost) and lowered the reserve mar 32.6 to 28 percent. The PUC rejection stated that company reserve by end of year will come do 23.8 percent due to economic recovery. The comp maintained that it expected one of its major ind customers to add new load which would have the e of reducing its margin to 26 percent and that a of its peak load would further reduce its reserve Id. at 9. Additionally, the company presented evidence that significant increase in peak requirements could occur if the economic recovery in its service are continued. Id. at 10. Taking notice that the depressed economic conditions in the company's service area were beyond its control, the commission found, according to the particular facts, that the economic conditions existing in the area had contributed to the existing reserve margin which it did not find excessive. Id. at 13. In accepting the company's economic argument, the commission appears to have recognized that the excess capacity situation was temporary, continuing only until the economy of the area improved. "An acceptable reserve margin for any particular electric utility is dependent upon the generation mix, availability of generating units, peak-load requirements, the period during which the peaking capacity is required, rates of forced outages, transmission capabilities, interconnections with other utilities, and transfers of energy during emergency."
SOUTH CAROLINA PUBLIC SERVICE COMMISSION (S.C. P.S.C.)			
South Carolina Electric and Gas Co.	83-307-E, Order 84-142	3/2/84	In a rate case decision primarily based upon the commercial operation of the V.C. Summer Nuclear Station, the P.S.C. made an excess capacity adjustment by excluding $123 million from rate base, equivalent to 400 MW of system plant costs on the system and lowered annual revenue requirements by $20.0 million. The company will be permitted to accrue AFUDC carrying costs on the excluded plant computed at the overall rate of return (11.76 perce and recovered over some future period. The company will also be allowed depreciation and O&M expenses associated with production plant.
SOUTH DAKOTA PUBLIC SERVICE COMMISSION (S.D. P.S.C.)			
Northern States Power Co.	F-3382	12/15/81	Excess capacity remedied by $300K adjustment to common equity which disallowed any return on the company's average investment in that portion, const uting excess beyond reserve margin. The P.S.C. fo a 3/1 ratepayer/shareholder sharing was proper.

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Findings/Action
WASHINGTON UTILITIES COMMISSION (W.U.T.C.)			
Pacific Power and Light Company	60 PUR 4th 160	6/12/84	The South Dakota commission also subscrib section of calculating the equity return o on the basis of average net plant investm company alleged that all its capacity was useful because all its generating units ha used to produce power at some point during year. This allegation, the commission fou not alter the fact that capacity over and company's capacity obligations plus its re margin did exist. It did, however, influe commission's findings that surplus capacity not actually be associated with specific u support the use of average net plant invest calculate the equity return exclusion. Id. 43. The commission believed that the equit ment should not be viewed as a penalty to s holders, but rather as a sharing of the cost surplus capacity between shareholders, who h to bear such risks, and ratepayers, who had the benefits of recent capacity additions. result was particularly appropriate, the com said, in view of the lack of evidence of mana imprudence. Id. at 43.
			The W.U.T.C. held that the company could incl rate base $281,000 of its investment in Colst Even though the unit represented excess capac the plant was found to be used and useful in (1) it currently produced power; (2) power fr plant was used to meet the company's needs in recent past (very cold December, 1983); and (3 power surplus might end in the future. However the W.U.T.C. did not allow the company to earn return on its investment in the plant because allow that would have given PP&L a "double rec of its investment because of the effects of a capacity contract with Black Hills Power & Lig A return on rate base was included in the Black contract.
WISCONSIN PUBLIC SERVICE COMMISSION (W.P.S.C.)			
Madison Gas and Electric Co.	No. 3720-UR-9	2/16/80	Excess capacity remedied by imputing additional ($1.274 million) to company's projected wholesa operating income. Remedy overruled by higher court, 1981.
Madison Gas and Electric Co. v. Public Service Commission of Wisconsin	313 N.W. 2d 847	11/3/81	Wisconsin Appellate Court affirmed a lower court reversal of a P.S.C. decision which imputed $1.2 million of wholesale revenues to company, thereb reducing its revenue requirement. The basis for adjustment, which was based solely on the costs a ciated with maintenance of the company's excess capacity, was the PSC's desire "to shift the bur of excess capacity from ratepayers to the compan and its shareholders." The court, noting that e was not present because of bad management, reject the adjustment on the basis that the utility was deprived of an opportunity to earn a fair rate of return.

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
Madison Gas and Electric Company v. Public Service Commission of Wisconsin	335 N.W. 2d 339	11/2/82	Wisconsin Supreme Court upheld Court of Appeal's decision that P.S.C. decision to shift cost of capacity to shareholders was without requisite determination that excess was either improvidently acquired or not used or useful to ratepayers. Court pointed out that these are the two independent tests either of which could provide sufficient basis for the P.S.C. to allocate all of the cost of the excess capacity to the utility shareholders.
Wisconsin Electric Power Company	NO. 6630-ER-14	1/13/82	In a review of cost overruns associated with the accelerated construction schedule of the Pleasant Prairie Power Plant Unit No. 1, the company shareholders were penalized $3 million for the added cost for acceleration after December 1979 through the 1980 ISD. Evidence showed that the acceleration was based upon the 1976 load forecast which indicated capacity deficient for the 1980 summer. However, a December 1979 forecast showed substantial excess capacity for the 1980 summer.
Wisconsin Public Service Corp.	No. 6690-UR-18,	4/27/82	Excess capacity found, but penalty not imposed for economic reasons. Recognized difficulties in precisely predicting and matching demand with generation, described the "lumpiness" resulting from the addition of new plant to service that was inevitable due to the impracticality, if not impossibility, of adding new generating capacity in small increments over time. Second, despite the fact that the plant addition resulted in increased fixed costs for the ratepayers, it had also resulted in cost benefits, including savings in production costs. Third, the utility had negotiated in good faith for the sale of a portion of the plant's capacity. Fourth, the utility had considered and rejected the option of delaying construction of the unit, which decision was held neither imprudent nor unreasonable. Thus, although it had employed both rate base and revenue adjustments in the past, the commission found that neither was warranted on the basis of this factual situation.
FEDERAL ENERGY REGULATORY COMMISSION			
The Connecticut Light and Power Co.	5 FERC ¶63,004,	10/16/78	Excess capacity found but penalty not imposed because CL&P's capacity planning was found not to be imprudent but "has resulted in overall lower cost to the customers. . . ." Decision affirmed in Opinion 103, 13 FERC ¶61,155.
Central Illinois Public Service Co.	8 FERC ¶63,022	7/26/79	Excess capacity found but proposed penalty "normalizing" rate base rejected because of problem of matching power needs and generating capacity. "Exact matching would result in power shortages and outages during periods of increased power usage. Principles of prudent operation require a utility to maintain a reasonable margin of excess generating capacity." The Commission affirmed the ALJ opinion which was also upheld on appeal in Illinois Cities of Bethany v. FERC 670 F.2d 147 (1981) in which the court recognized" . . . it is notoriously difficult to project accurately the demand for electric power far enough in advance to coordinate need with the

Jurisdiction and Company	Case, Docket, or Decision No. (Citation)	Order Date	Finding/Action
Commonwealth Edison Company	Opinion No. 63 8 FERC ¶61,277	9/14/79	construction of new generating facilities." (at 261. Commission rejected imposition of penalties (excess capacity because it recognized that "(achieve economies of scale, utilities characteristically add capacity in large lum imprudency by utility found.

Response to Data Request of the
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Q. 22. a. Is Mr. Falkenberg familiar with the provisions of Financial Accounting Standards Board, FAS No. 71?

b. Has Mr. Falkenberg taken into consideration FAS 71 in the preparation of his testimony?

c. Is it Mr. Falkenberg's opinion that all of his recommendations will allow PECO to defer for accounting purposes during the phase-in period its expenses associated with his phase-in proposals?

d. Is Mr. Falkenberg familiar with changes in FAS No. 71 that are currently being discussed?

e. Please summarize Mr. Falkenberg's understanding of the proposed changes.

f. Does Mr. Falkenberg anticipate that the proposed changes, if they become effective, would alter his answer to part (c) of this question? If so, how would the answer be altered?

A. 22. Part a - Mr. Falkenberg is generally familiar with the provisions of Financial Accounting Standards Board Rule No. 71. Mr. Falkenberg is not familiar with all of the specific details of the current rules.

Part b - Yes. Mr. Falkenberg has taken into consideration FAS 71 in preparation of his testimony.

Part c - It is Mr. Falkenberg's opinion that all of his recommendations will allow PECO to defer for accounting purposes during the phase-in period its expenses associated with this phase-in proposal. The reason for this is that there are no expenses associated with Mr. Falkenberg's phase-in proposal which would not be associated with the PECO phase-in proposal as well. There will simply be <u>less</u> deferred revenues. Mr. Falkenberg expects that PECO expected to be able to qualify its phase-in under FAS 71, therefore Mr. Falkenberg's phase-in would also be acceptable under FAS 71.

Part d - Mr. Falkenberg is familiar in general with some of the Amendments proposed to FAS 71.

Part e - Mr. Falkenberg understands that some of the proposed Amendments to FAS 71 would require the use of discounting in determintion as to the validity of deferred revenues for immediate earnings recognition. Mr. Falkenberg is also aware of proposed Amendments to FAS 71 which would require an immediate write-off of assets in the event of regulatory disallowances of such investments.

Part f - Mr. Falkenberg cannot determine at the present time if the proposed changes should they become effective would alter his answer to Part (c) of this

question. The reason for this is that there is no general consenses of opinion as to what amendments will be enacted and at what time they woud be enacted. Furthermore, the key element of the validity of any particular phase-in plan would be whether the discounted present worth of deferred revenues provides for full cost recovery for the asset. It is clear to Mr. Falkenberg that the determination of this issue is based upon the proper choice of a discount rate. Attached please find Data Request IR-PECO-PAIEUG-2-57. In this data request Mr. Falkenberg requested Mr. Farthing to provide an opinion as to the proper discount rate for purposes of discounting. Mr. Farthing expressed no opinion of proper discount rate. Inasmuch as Mr. Farthing is PECO's auditor, and Mr. Farthing is unable to determine the appropriate discount rate for determination of the validity of a phase-in plan, it is clear that Mr. Falkenberg could also not determine the impact of his modifications to the PECO phase-in plan based on the proposed amendments to FAS 71.

Q.IR-PAIEUG-2-57. Please provide Mr. Farling's definition of present value. Specify his choice of proper discount rate.

A.IR-PAIEUG-2-57. Present value is defined as the sum of the future billings of unrecovered revenue discounted to the present date at an appropriate rate of interest.

Mr. Farling has formed no opinion on the proper discount rate.

Responsible Witness: David Farling, Coopers & Lybrand

Q. 23. On page 33, at lines 20 through 22, Mr. Falkenberg states, "I also recommend that no interest be allowed under deferred revenue requirements, so that PECO does absorb some of the excess costs of the Limerick plant."

a. Is it correct to infer that Mr. Falkenberg would have PECO bear the debt, preferred, and equity cost of money on these deferred revenue requirements? If so, what is the specific justification for having the company absorb these costs?

b. Please provide any and all support for the position expressed in the testimony and clarified in response to part (a), above.

A. 23. Part a - It is correct to infer that Mr. Falkenberg would have PECO bear any costs of debts, preferred, and equity associated with deferred revenue requirements. To the extent which PECO requires external financing from debt equity or preferred securities it is possible that increase costs may be absorbed by Philadelphia Electric Company. Mr. Falkenberg is proposing that these costs should be recognized. However, Mr. Falkenberg points out that it is possible that the Limerick plant may generate enough internal cash flow through depreciation and deferred taxes that no such external financing may be necessarily associated with the Limerick phase-in.

Part b - The justification for having the Company absorb these costs is for the investors to share the adverse consequences of the excess capacity, created by the Limerick Unit 1 generating plant. In this case the Limerick plant is not used and useful, and it is clear that some sharing of the costs of this excess capacity must be arranged between shareholders and investors. This was generally the reasoning the Commission applied in the Susquehanna case, for example. In this case Mr. Falkenberg proposes to accomplish this by not allowing PECO to collect interest on the deferred revenue requirements.

Part b - Mr. Falkenberg's testimony is replete with support for the position expressed in the testimony and clarified in response to part (a), above.

Q. 24. On page 34, at lines 7 and 8, Mr. Falkenberg states, "the resulting reasonable costs are then phased-in using the same six-year schedule as proposed by PECO".

a. Please explain precisely what is meant by this statement.

b. Is this treatment proposed in place of or in addition to, the exclusion of interest cost on deferred revenues?

A. 24. Part a - By stating that "the resulting reasonable costs are then phased-in using the same six-year schedule as proposed by PECO" Mr. Falkenberg implies that should the Commission adopt other disallowances or other adjustments to PECO's rate increase, then it would be appropriate for these to be included in the test year revenue requirement. Once this test year requirement has been determined, Mr. Falkenberg proposes that these dollars would be phased-in using the same six year schedule as proposed by PECO. This would mean that one third of the test year revenue requirement would be recovered the first year, two thirds the second, the full amount in year three, and four thirds of the test year amount in years four, five and six. It would also be necessary to make the corresponding overcollection adjustment proposed by Mr. Falkenberg. Obviouisly, this proposal of Mr. Falkenberg's must be tempered by a recognition of the level of the total revenue requirement allowed. For example, if the Commission were to adopt the PP&L precident in this case, it would not appear necessary to phase-in the $61 million revenue increase shown in Falkenberg Exhibit 4 over the six year period.

Part b - The treatment proposed is in addition to the exclusion of interest costs on deferred revenues.

Q. 27. Please provide copies of all analyses conducted by or reviewed by Mr. Falkenberg regarding the reliability of the PECO generating system.

A. 27. Mr. Falkenberg has reviewed the testimony of PECO witness Rush in his analysis reliability of the PECO generating system. Mr. Falkenberg also reviewed the testimonies of numerous witnesses in the Limerick Unit 2 investigation on the same topic.

Q. 28. On page 38, at lines 22 and 23, Mr. Falkenberg states, "Clearly, even Dr. Hieronymus would agree that some limits must exist on the application of the prudence standard" (emphasis in original). Please provide any and all support for this statement.

A. 28. Mr. Falkenberg believes that after reading his testimony, Dr. Hieronymus would have to believe that some limit must exist on the application of the previous standard. The reason for this is Mr. Falkenberg has shown that the logical implication of the "prudence only" standard as advocated by Dr. Hieronymus, is a totally ridiculous situation where the last customer would pay all the revenue requirements of the entire utility company. Mr. Falkenberg believes that this outcome was so unrealistic and remote that Dr. Hieronymus would certainly not agree that this was a desirable outcome. Mr. Falkenberg presumed that Dr. Hieronymus, being a rational individual, would recognize that there must be some limit based on the prudence only standard. However, Mr. Falkenberg cannot unequivocally state that even Dr. Hieronymus must agree some limit would exist on the application of the prudence standard. However, Mr. Falkenberg apparently attributed a greater degree of rationality to Dr.Hieronymus' views on the regulatory system especially as regards the prudence standard, than in fact may be warranted.

Q. 29. What standard, in Mr. Falkenberg's opinion, should apply in determining when one should "begin to look beyond prudence" as stated, on page 38 of his testimony?

A. 29. There is no single specifics standard which in Mr. Falkenberg's opinion should apply in determining when one should "begin to look beyond prudence" as stated, on page 38 of his testimony. However, Mr. Falkenberg would note that a number of factors might be considered:

1. In the case of excessive high reserve margins, it would appear that the Commission should look beyond the simple application of the prudence standard in determining if full revenue recovery should be allowed on excess capacity. In the case of Pennsylvania Power & Light Company in the SSES-2 rate case the Commission found no imprudence on the part of PP&L. Yet, at the same time, the Commission disallowed a return on the Susquehanna nuclear plant. This was an example of the Commission looking beyond prudence, or at least not relying soley on the prudence standard.

2. Another case where the Commission may wish to look beyond prudence is in the determination of the rate treatment for a plant that is extremely costly when compared to other sources of power. For example, the Limerick Unit 1 cost $3.8 billion an amount much higher per KW than Pennsylvania Power & Light's investment in the Susquehanna nuclear plant. Clearly, in the case of a competitive market it would be impossible for a firm to stay in business if its cost of production were substantially higher than those of his competitors. For this reason, the Commission may wish to adopt the position that regulation is to serve as a proxy for competition. Therefore, it might pursue a rate treatment for the Limerick nuclear plant that recognizes the adverse consequences of the high cost of this plant.

Q. 30. If one looks beyond prudence, in Mr. Falkenberg's opinion, what standard should then apply in determining the appropriate rate treatment of a utility investment? Please provide the specific basis relied upon and any documentation supporting Mr. Falkenberg's opinion.

A. 30. Mr. Falkenberg would state that in looking beyond the prudence standard, the "used and useful standard" would an appropriate basis for determining the rate treatment of a utility investment. In fact, Mr. Falkenberg would state that the "used and useful" principal should be given greater emphasis by the Commission than the prudence standard.

Response to Data Request of the
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Q. 31. Please provide the source for the yield on U. S. Treasury Bonds cited on page 40 at line 10.

A. 31. Falkenberg Exhibit 11 shows the source for the yield on the U. S. Treasury Bonds cited on page 40 at line 10.

Q. 32. Please describe Mr. Falkenberg's understanding of the concept of seniority of creditors claims in a business liquidation situation.

A. 32. Mr. Falkenberg understands that in the instance of a business liquidation situation the assets of the business are sold to provide payment to creditors. The remaining proceeds from the liquidation would first go to holders of the company's debt. Secondly, remaining assets would be distributed among preferred shareholders. Finally, any remaining funds would go to the common shareholders. This understanding of the seniority of creditors claims in a business liquidation situation is not applicable to the testimony of Mr. Falkenberg, however. Mr. Falkenberg's testimony discusses the return on equity under a situation of no business risk. It is clear that under this assumption there is never any possibility of a business liquidation situation.

Q. 33. Does Mr. Falkenberg believe that the financial markets perceive equity securities to be more or less risky than debt securities? Please explain.

A. 33. Mr. Falkenberg believes that as a general principal that financial markets perceive equity securities to be more risky than debt securities. As noted in the response to Data Request IR-PECO-PAIEUG-3-32, the riskiness of debt and equity securities is not an area of testimony of Mr. Falkenberg except to the extent that a hypothetical situation of zero business risk has been explored. However, Mr. Falkenberg would point out that there could, under certain circumstances, be cases where the equity return on an investment is lower than the debt return. This fact may be established reading the books of noted financial advisor Andrew Tobias "Now if a virtually risk free investment like IBM bonds sell for ten times earnings what should the stock sell for?"

"On the one hand stock should sell for less because it involves more risk. ..... On the other hand a stock should perhaps sell for more, because it involves more potential reward either the earnings or the stock price could go up". Please see attached for further discussion of this point.

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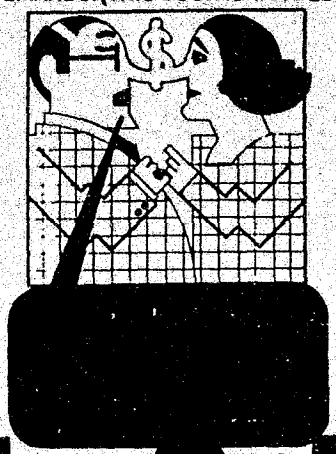

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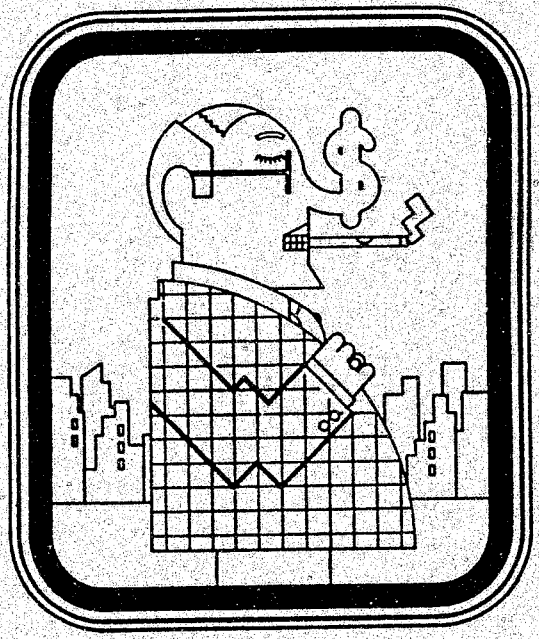

The Stock Market

CHAPTER 5

Meanwhile, Down at the Track

October. This is one of the peculiarly dangerous months to speculate in stocks. Others are November, December, January, February, March, April, May, June, July, August, and September.

—Mark Twain

OK. You have some money in a savings bank; you have set up an Individual Retirement Account—and a Keogh Plan, if possible—and are contributing to them at the maximum rate allowed; you have equity in a home, if you want it; you've tied up $1,000 in bulk purchases of tunafish and shaving cream; you have lowered your auto and homeowner's insurance premiums by increasing your deductibles; you have adequate term life insurance; you've paid off all your 18% installment loans; there is a little solar water heater sitting on your roof above your well-insulated attic; and you own enough IBM (or some other solid common, or even preferred, stock) to take full advantage of the $100 ($200) dividend tax exclusion. In short, you have done all the things that scream to be done. You have made the easy decisions.

Now what?

There are three compelling reasons to invest a portion of your funds in stocks.

1. *Over the long run—and it may be very long—stocks should outperform bonds.* The reason is that stock and bond prices are set in the open market—and the market, over the long run, rewards risk. From 1926 to 1975, the total compounded annual rate of return you would have had from buying risk-free United States Treasury bills was 2.3%; the return from slightly riskier corporate bonds would

have been 3.8%, and the return from stocks would have been 9%. The compounded annual rate of inflation during the same period was 2.3%. Ignoring taxes, $1,000 invested in corporate bonds over that time span would have grown to $6,200, but to $68,200 if invested in stocks.

In the eight years from 1975 through the end of 1982, inflation galloped along at an 8.3% compounded rate and the return you would have earned from Treasury bills—before tax—kept pace. Stocks, when you include their dividends (again before taxes), compounded almost twice as fast.

Of course, you can play with numbers like these, depending on the time periods you choose. There were some pretty dreadful five- and ten-year stretches nestled in among those 57 years (in case you hadn't noticed), during which you would have been much better off in bonds or even a savings account. Timing is very important. Granted, too, the ability of equity (stocks) to outperform debt (bonds)—and to beat inflation—has had much to do with America's more or less steadily improving productivity, which may or may not improve as rapidly in the future. The world has changed. Resources are scarcer; foreign competition is stronger; businesses are more highly regulated, even if that trend may have peaked; confidence in the future, and hence investment, is not what it once was; inflation lurks; and, because of inflation, bond rates are a great deal higher than that 3.8% fifty-year average. Yet the fact remains that over the long run, because the market *knows* all these things, stocks will be priced low enough to offer buyers reason to buy.

(And it just might be that we have been going through a sort of toughening-up process over the last several years, and that our sensational technological prowess has been paving the way for enormous strides forward.)

2. *Unlike bonds, stocks offer at least the potential of keeping up with inflation,* even if that potential is by no means always realized. Once the interest rate on a bond is set, it's set. Bread could go to $2 a loaf, and the bond

wouldn't pay a nickel more in interest. But ITT, which owns the company that bakes the bread, might—might—be able to keep its profits, and its dividend, rising in step with inflation.

3. *If all goes well, stocks can act as a tax shelter.* Long-term capital gains are taxed only 40% as heavily as ordinary income. But more than that, by choosing a stock that pays out little or none of its profits in dividends, you pay little or no tax on your share of those profits. Instead, the company retains and reinvests them for you. If they do so profitably—in a great new product or a more efficient factory, say—future profits, and your share of them, will be even larger. This is the bird-in-the-bush strategy of investing. One of its drawbacks derives from the fact that corporate accounting, even when practiced with pure motives, is a matter of judgment, at best. The only profit statement you can truly bank on is a dividend check that doesn't bounce.

Nonetheless, with this bird-in-the-bush strategy you can ultimately profit two ways. First, after a period of years the company you've invested in may decide to pay out a greater portion of its (by-then-greater) profits as dividends. You will then have to pay income tax on those dividends, but in the meantime you've been reinvesting, through the company, money the government would otherwise have taken. Second, you can sell your stock. If the company has indeed invested your profits wisely, there is a chance, but by no means a certainty, that you will get more for it than you paid—perhaps even several times as much.

It thus becomes a matter of some interest just how well a company is likely to reinvest all those profits they don't pay you as dividends. Unfortunately, there is no way to know for sure. However, you can determine how well they've done—or, because accounting is open to so much qualification and interpretation, *seem* to have done—in the past. The number you are looking for is "return on equity," and it is, simply, the company's profits expressed as a

percentage of all the money shareholders have dumped in over the years, much of it by forgoing dividends.

There are companies like IBM which have been able to reinvest those accumulated unpaid dividends at returns well above 15% a year; and there are others, like B. F. Goodrich, that have earned less than half as much on the money left with them. And then there are the Braniffs, which have diddled it away altogether.

Naturally, investors would much prefer stock in companies like the former than the latter, all other things being equal. So all other things are *not* equal: You have to pay more for stock in companies that are known to reinvest profits at a high rate of return. Indeed, there was a time (1973) when you had to pay $60 or more to get a one-dollar slice of Avon's profit pie, so excited were investors by Avon's ability to earn 25 to 30% on that dollar.* At the same time it cost only $8 to buy a $1 slice of Goodrich's profit pie. What investors failed to note was that, while 25% was a boffo return on that one reinvested Avon dollar, $1—no matter how well it was reinvested—was a pretty lousy return on a $60 investment! Subsequently Avon stock fell about 85% even though profits kept growing admirably, and as I write this you have to pay only $10 for a one-dollar slice of Avon's ever-growing profit pie. (Thirty dollars a share, each of which earned nearly $3 in the preceding 12 months.) One reason for this is that the ever-growing profit pie shrank in 1980, 1981, and 1982.

So there's more to choosing the right stock than finding the company with the highest "return on equity." But I'm getting ahead of myself. I should not talk like this until you know as much about the essentials of the stock market—the forest—as the professionals do. This will take up most of the rest of the chapter. (Getting to know as much about the trees could take up most of the rest of your life.)

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* Avon was earning a little over $2 in profit for each of its shares. The shares went for $140 apiece.

The stock market could hardly be simpler. There are just two ways a stock can go: up or down. There are just two emotions that tug in those opposite directions: greed and fear. There are just two ways to make money on a stock: dividends and capital gains. And there are just two kinds of investors in the market: the "public," like you or me; and the "institutions," like bank trust departments and mutual funds and insurance companies. It's the amateurs against the professionals, and it's not at all clear who has the advantage. Often, both lose. Finally—and here it gets only slightly more complicated—there are just three kinds of stocks:

1. There are 300 or 400 stocks that the institutions keep tabs on and in which they eagerly invest. These command premium prices, although hardly the way they once did, in the early seventies, when Avon was selling for 60 times its profits. You should be wary of these stocks, as they can hardly represent "overlooked value."

2. There are perhaps another 300 or 400 stocks the institutions follow but do not invest in with any enthusiasm. They are out of fashion, and thus at least worth considering. Some day they could return to fashion.

3. And then there are the great majority of stocks that the institutions neither follow nor invest in but simply ignore. These are called the bottom-tier stocks, because they have been relegated to the pits. Some of them, under certain circumstances, may be worth your money.

All stocks fall into another three categories as well. They are all either overvalued, fairly valued, or undervalued.

To suggest any correlation between these two sets of categories—to suggest, that is, that institutional favorites are overvalued, middle-tier stocks fairly valued, and bottom-tier stocks undervalued—would, of course, be the height of oversimplification, not to mention financial heresy. Still, it's a thought to keep in mind.

What is a stock worth? Market veterans will tell you that a stock is worth whatever people are willing to pay for it. Price is determined by supply and demand. If lots of people want it, it will be worth a lot. If everyone ignores it, it won't be worth spitting at.

But it is too simple to say that a stock is worth whatever people will pay for it, because what people are willing to pay for it depends, in turn, on what they think it is worth. It is a circular definition, used as a rationalization of financial foolishness rather than as a rational way to appraise value.

The value of a stock should not be nearly so subjective as, say, the value of a Picasso sketch or a 1909S VDB penny. Rather than entitling its owner to some inestimable esthetic pleasure or some irreplaceable rarity, a share of stock merely entitles the owner to a share of present and future profits (or, in the event of bankruptcy or acquisition by another company, assets). Where two paintings of equal size may reasonably command vastly different values, two companies of equal profits, assets, and prospects should not. Yet they do.

The market veteran will readily agree that this is irrational, but he will ask you, with a laugh, "Who ever said the stock market was rational?"

That gets the market veteran off the hook and may eliminate in his mind the need to search for value. But there are other market veterans, perhaps even a majority by now, who believe that over the long run rationality does pay off in the market. Sooner or later, they say, bubbles burst; sooner or later, bargains are recognized. A company cannot prosper forever without its shareholders at some point benefiting.

Indeed, if the market is driven by irrational greed and fear to excesses of over- and undervaluation, as it surely is, then it is the rational man, they say, seeing these excesses for what they are, who will be buying the excessively undervalued stock, particularly when the market as a whole is depressed; and selling the excessively overvalued stock, particularly when the market as a whole is on

high ground. Thus may he profit from the swings in between.

All of this assumes that a rational man can determine what a stock is "really" worth.

Rational men differ. A company's future prospects—and even its current profits—are open to widely differing assessments. Obviously, no one can answer precisely what a stock is worth. But that doesn't eliminate the need to arrive at some rational valuation, or the possibility of setting some reasonable guidelines for doing so.

What a stock is worth depends at any given time on the alternative investments that are then available. It is a question of relative value. Think of investments as wallets. A 5% savings account is a wallet you can buy for $20 that miraculously fills up with $1 (5%) by the end of every year. It is safe and convenient—you can "sell" it whenever you want and be sure of getting back your full $20—but it's not a great investment. At the time of this writing you can buy other "wallets" that fill up with the same $1 just as fast—not for $20 but for a mere $10. Namely, high-grade bonds that pay 10% interest.

You can say the first wallet sells for "20 times earnings" and the second for "10 times earnings." This is the famous "price/earnings ratio," or "multiple," you have heard so much about, although it's generally applied to stocks, not bonds or wallets.*

Now. If a virtually risk-free investment like an IBM bond sells for 10 times earnings, what should a stock sell for?

On the one hand, a stock should sell for *less*, because it involves more risk. There is no guarantee that the $1 will show up in the wallet by the end of the year—or even that the wallet itself will be in any shape for you to sell it to someone else, should you so desire. What's more, only a portion of your $1 is actually paid out to you as a cash dividend. Much, most, or all of it may be retained by the company.

On the other hand, a stock should perhaps sell for *more*, because it involves more potential reward (either the earnings or stock price could go *up*) and because of the tax advantages referred to earlier.

In deciding how much more or less to pay for a stock than the 10 times earnings you might pay for a savings certificate or high-grade bond—or whatever the going rate is at the time you read this—one weighs the extra risk against the potential for extra return.

For stock in a moribund company whose earnings seem likely to decline each year right into bankruptcy, you would not pay very much no matter how good past earnings have been.

For stock in a company whose earnings over the long run seem about as likely to increase as to decrease—where risk and reward about cancel one another out—you might expect to pay 10 times earnings. So if you find such a stock selling for 5 or 6 times earnings—as many do—it could look pretty good.

For stock in a company whose earnings seem likely to be able to keep pace with inflation—no "real" growth, that is, but growth in earnings all the same—you might expect to pay more than the 10 times earnings you would pay for a high-grade bond, the earnings of which do not rise with inflation. In fact, companies like this have also sold recently at 5 or 6 times earnings. A bargain? You bet.

Finally, for stock in a company whose prospects are really bright, with the possibility of real growth of 5% or 10% or even 20% a year for the foreseeable future, you might expect to pay a lot more than 10 times earnings—as the banks did with Avon. One serious problem, however, is that the future has consistently proved remarkably unforeseeable. There are always loads of well-reasoned and seemingly conservative projections around; but the funniest things happen on the way to the future.

All other things being equal—that is, if *all* stocks were

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* You will find "p/e ratios" listed, along with dividends and prices, in the stock pages of most newspapers.

selling at 10 times earnings—you would choose only those companies whose earnings were expected to grow the fastest. But the question is not whether a fast-growing company is better than a slow-growing one. Any idiot knows that IBM is a better *company* than Suave Shoe. The question is whether you should pay 15 times earnings for the one or 5 to 6 times earnings for the other. Which stock, at any given time, is a better *relative value*? The real trick—and payoff—is to find a company selling for 6 times earnings that you think will grow as fast as the one selling for 15 times earnings. Then you know for sure which one to buy.*

Admittedly, it's not quite this simple. For one thing, it makes sense to look not just at what a company may earn, but also at what it *owns*. A company whose business is lousy, but which happens to be conducted on 50,000 acres of wholly owned real estate between Dallas and Fort Worth, might have a liquidation value—if you closed down the business and paid off all the creditors—of $25 a share. Yet such land might be valued on the company's books at next to nothing, if it had been acquired earlier in the century—so it might not even show up in quick calculations of the company's "book value." It could be what's known as a hidden asset, and well worth buying shares in, regardless of the company's dismal earnings.

I should also stress that the 10 times earnings I've been using as a benchmark is by no means eternal. It all depends on what wallets are going for at any given time. If you can get 15% from a high-grade 20-year corporate bond—or by paying off the balance of your 15% 20-year mortgage, for that matter, which amounts to much the same thing—then you have a low-risk wallet that produces $1 for every $6.67 you put up—6.7 times earnings. The higher the prevailing interest rate on savings certificates or high-grade corporate bonds—or mortgage prepayments—the less you should be willing to pay for stocks. And vice versa.

Now it happens that far from looking at assets or relative value, the professional money managers of the late sixties and early seventies—particularly those at the banks, which manage tens of billions of dollars of other people's money—concentrated their attention and their megabucks on a relative handful of fast-growing companies, bidding their prices up to truly remarkable heights. The "nifty fifty," these stocks were called—"glamour" stocks, "one-decision" stocks (you just had to decide to buy them; you would never sell them, no matter what price you could get). The group included such indisputably fine companies as Polaroid, Disney, Avon, IBM, Coca-Cola, Kodak, Xerox, and McDonald's.

Most stocks they ignored altogether. Not because they lacked merit—although, admittedly, some of them did—but because it's a lot less trouble to put $100 million into Johnson & Johnson than to stay late at the office each night hunting for 50 less visible companies—perhaps better values—in which to invest $2 million each. The first rule of fiduciary bureaucracy was (and is): You can't be criticized for losing money in IBM. Corollary: He who does what everyone else does will not do appreciably worse. In other words, it was *unfortunate* to lose money in IBM, Avon, Polaroid, or Xerox; but it would have been *imprudent* to lose somewhat less money in the stocks of companies no one ever heard of.

In talking with people who managed billions of dollars at some of the nation's largest banks during this period, I got the distinct impression that it would have been *undignified* for top-drawer financial institutions like theirs to invest in anything but large, top-drawer American corporations.

That posture has a fiduciary ring to it, until you consider how much extra the banks were paying to invest in such

* When I wrote this in 1977, IBM was selling around $65 a share (15 times earnings), and the stock I compared it with, U.S. Shoe—not Suave Shoe—was selling at $15 (6 times earnings). Six years later, IBM stock is up 50%, but U.S. Shoe has tripled (and then some). Like IBM's, its earnings grew; unlike IBM's, so did its multiple—from 6 times earnings to 11 times. The pros have begun to like it. So I've had to substitute a different boring shoe company to make the example work.

firms, and how much they ultimately lost for their clients by doing so.

One money manager from a major New York bank told me that it was his bank's policy to invest only in companies whose earnings they expected to grow at an above-average rate. What about companies they expected to grow at only an average or subaverage rate? No, he said, they did not buy stock in such companies. Regardless of price? Regardless of price. Was there *any* price at which the bank would buy stock in an average-growth company?

This question made the money manager uncomfortable. He clearly wanted to answer no, because he clearly would be damned before he would buy stock in such a company. But he couldn't come right out and say that, because he knew that, theoretically, there must be *some* price at which he should choose the stock of the mediocre company over the stocks of his nifty fifty.

It's not that the bank had compared some of the low-multiple stocks with some of the high-multiple stocks and decided consciously that, yes, the high-multiple stocks represented a better value despite their premium prices. Rather, the policy (dogma?) was based on studies that showed how, over the long run, the best way to beat the stock market averages had been to buy stock in companies whose earnings grew faster than average. That's how things had worked in the past, and that's why 51% of this bank's discretionary billions were invested in just 14 stocks, only one of which, at the time of our luncheon, was selling for less than 20 times earnings.

At one point in this madness, in fact, a few years ago, you had a great many of the nation's otherwise intelligent, well-educated, exceptionally well-bred and well-paid fiduciaries valuing the Avon Corporation more highly than the Ford Motor Company and Gulf + Western Industries *combined*. This despite the fact that Ford and Gulf + Western had $25 billion in sales to Avon's $1 billion; $15 billion in assets to Avon's $700 million; and $1 billion in profits to Avon's $135 million. Not only that, Ford and Gulf + Western were paying out $280 million a year in dividends that year, compared with $85 million for Avon.

It was true that if Avon continued to grow at its then-average 14% a year, and if Ford and Gulf + Western grew more slowly, Avon's profits would have grown to equal the combined profits of the other two in a mere 25 years or so (although in the meantime it would have paid out much less in dividends). But why wait 25 years for profits which, for the same money, the money managers could have owned then and there?

Since then, Avon and stocks like it have fallen sharply in price, while Ford and Gulf + Western and others like them—for all the rough sledding of recent years—have done much better. But what's important is not that you should have shorted Avon back then and bought Ford and Gulf + Western (although you would indeed have made a killing); what's important is that this sort of irrational imbalance could have occurred at all.

On Wall Street it happens all the time, if not always on such a grand scale. And herein, I suggest, may lie an opportunity.

Even though the major institutions, which account for two-thirds or more of the trading in stocks, have of late been searching much more widely for good values, there are still a great many companies that are largely or entirely ignored—*whether they are exceptional values or not.*

Subject to the caveats and additional suggestions in the next chapters, here is what for most people has to be about the most sensible way to invest in stocks, if they are going to invest in stocks at all:

1. To begin with, only invest money you won't have to touch, if need be, for many years. Retirement is not a great time to start buying stocks. People who buy stocks when they get bonuses and sell them when the roof starts to leak are entrusting their investment decision to their roofs.

Q. 34. Is it Mr. Falkenberg's understanding that the financial markets normally require higher return rates for investments in equity securities than investments in debt securities? Please explain.

A. 34. It is Mr. Falkenberg's general understanding that the financial markets normally require higher rates of return for investments in equity securities than investments in debt securities. As Mr. Falkenberg has pointed out in the previous two questions, the testimony presented in this case regarding the return on equity investment was applied to a situation of zero business risk. Thus, the conventional requirements of securities markets would have no application to the example that Mr. Falkenberg has presented in this case.

Q. 35. At the bottom of page 43 and the top of page 44, Mr. Falkenberg describes the analytic procedures he employed for pruducing his trend forecasts.

a. On page 43, at line 24, he states that until 1978, he used the model "exhibiting the best statistical results." Please explain in detail what is meant by best statistical results.

b. After 1978, he states that the linear trend model was used. Please explain why different selection procedures were used for the period until 1978 and the period after 1978.

A. 35. Part a - Mr. Falkenberg developed an analytic procedure for producing retrospective trend line forecasts. These forecasts were then compared to the actual forecast developed by Philadelphia Electric Company at various points in time. Mr. Falkenberg's testimony concluded that the simple trend base forecasts would have produced more reasonable forecasts than the ones employed by Philadelphia Electric Company from the period 1972 to 1977. This was a critical time period in the decision making regarding the Limerick Unit. Mr. Falkenberg's trend models were developed by examining exponential and linear trend models from the period 1972 to 1977. By the best statistical results, Mr. Falkenberg means that a variety of statistics for the linear and exponential trend models considered. The key variable examined was generally the R-squared statistic. However, Mr. Falkenberg also examined the T-statistics, the Durbin-Watson statistic, and the standard error of the estimate in certain cases. In instances where the R-squared variable was too close between the two models to make a definitive recommendation as to whether an exponential or linear model should be applied, Mr. Falkenberg pursued further analysis. Even though as the original desire was to project peak demand, it was felt that it would also be necessary to examine the trends in energy sales growth. Thus, in a case when the models for the peak demand forecast were approximately equal, Mr. Falkenberg examined the implications of the energy sales growth models. In a number of these cases Mr. Falkenberg found that the linear sales growth models were a much better representation of the historic data. Thus, Mr. Falkenberg selected on this basis the linear peak demand growth models. The reason for this is that it would not be logical for peak demand to follow an exponential growth pattern while sales grew in the linear fashion. Finally, Mr. Falkenberg also examined in certain instances the trend of the annual increases in peak demand growth to determine if in fact there was any significant evidence of an increase in the annual amount of increase in peak demand.

Part b - Mr. Falkenberg notes that use of a linear trend model is designed to determine if the types of load forecast techniques applied by other analysts within the utility industry in the early 70's would have produced substantially different forecasts than those developed by Philadelphia Electric Company. It is to be noted that judgment of the forecaster has always been an important variable in determining the appropriateness of any particular forecast. In the period of 1978 and beyond it was Mr. Falkenberg's judgment that a linear growth model would

be a more appropriate model for predicting future electric demand. These models also closely track the results obtained by Philadelphia Electric Company and its load forecasting models. In effect, the analysis shows that a reasonable forecaster tempering the analysis of time series data by judgment could have projected approximately the same load growth that Philadelphia Electric Company has projected since 1978.

Q. 36. Please provide a list and copies of any documents that Mr. Falkenberg reviewed that describe the load forecasting procedures used by PECO from 1972 to the present.

A. 36. Mr. Falkenberg reviewed the testimony of witnesses Hieronymus and Guth and employed a procedure which appears to be similar with that employed by these witnesses. In particular, Mr. Falkenberg appeares to use the method quite similar to that of Mr. Guth's. Mr. Guth does not appear to have reviewed PECO's forecast in any detail, rather Mr. Guth has simply compared the results of PECO's forecast to the results that other forecasters within the utility industry obtained. The weakness of Mr. Guth's approach is apparent, for it is not unusual to find that the growth rates employed by PECO may have been similar to those employed by other utilities. However, it is important to realize that in developing a load forecast PECO would not have ever considered it reasonable to simply look at what PP&L, West Penn Power, Duquesne Light or some other utility was projecting for their growth. PECO would have realized, unlike Mr. Guth, that it was necessary to actually look at some of their own historic data or at least make an analysis of their own prospects for load growth in developing load forecasts. Thus, PECO or a reasonable analyst performing a forecast for PECO would have not considered Mr. Guth's approach to be appropriate. However, a reasonable forecaster may well have considered the approach taken by Mr. Falkenberg to be a reasonable method for determining the validity of PECO's load forecast.

Q. 37. Please describe in detail the basis for any knowledge that Mr. Falkenberg has of the methods and procedures used by PECO to prepare its load forecasts during the period 1972 to the present.

A. 37. See the Answer to Question #36.

Q. 39. Relative to your regression analysis in Exhibit 12, at what R squared value or other statistical measurement would you question the ability of the regression equation to yield a reliable forecast?

A. 39. Mr. Falkenberg points out that when the regression equation itself is not statistically significant, i.e., the R-squared variable is not statistically significant then it would be inappropriate to use the regression equation (or at least unnecessary to use the regression equation) as the basis for forecasting. In the event that the regression equation failed to determine any significant trend of growth over time, then the appropriate forecast for the data in question would simply be the simple average value of the data set over the period of history examined.

Response to Data Request of the
Philadelphia Electric Company
Set 3

Q. 41. Please provide copies of all source documents used to obtain the data that was employed in the preparation of Falkenberg Exhibit 15. Please also include a description of how the data were employed.

A. 41. The requested documents have already been provided to Philadelphia Electric Company in the Limerick Unit 2 investigation.

Q. 43. Is Mr. Falkenberg a certified public accountant or does he possess other qualifications as an expert on accounting issues?

A. 43. Mr. Falkenberg is not a Certified Public Accountant. Mr. Falkenberg's qualifications in the area of accounting may be listed as follows:

In 1977 Mr. Falkenberg accepted employment with Minnesota Power Company as a rate engineer. In this function Mr. Falkenberg was involved in various phases of the preparation of cost of service studies utilized in the company's request for increase in electricity rates. Participation in the development of these studies required Mr. Falkenberg to become familiar with accounting records of the Minnesota Power Company.

In 1979 Mr. Falkenberg accepted employment with Ebasco Services as a Consultant in the Utility Rate Department. In this activity Mr. Falkenberg also participated in the preparation of cost of service studies and rate analyses for a variety of utility company clients. Once again this activity required Mr. Falkenberg to develop an understanding of the principles of utility accounting as related to utility cost of service and rate design. During the course of his employment at Ebasco Services Mr. Falkenberg also became involved in projections of future electricity rates for a number of electric utilities. In these analyses Mr. Falkenberg was required to develop an understanding of the impact of new plant additions on the cost structure of the utility companies. In particular, this required development of an understanding of the implications of the financing and construction of new generating plants.

Mr. Falkenberg was also involved in nemerous other analyses which required development of annualized fixed charge rates, development of O&M expenses, etc. Which required analysis of utility accounting records, data and revenue requirements calculations.

In 1982 Mr. Falkenberg accepted the position of Senior Consultant with Energy Management Associates. In this position Mr. Falkenberg was required to develop an understanding and expertise on utility financially modelling systems and as a result, utility financial accounting. During the course of his employment at Energy Management Associates, Mr. Falkenberg was involved in the training of utility planners and accounting specialists for a number of utilities in the implementation of financial simulation systems. This training was designed to inform utility planners in the proper methods for performing economic analyses. This required a detailed understanding of utility accounting and revenue requirements calculations (i.e., (in the areas of investment tax credits, deferred income taxes, rate base, etc.) All of these factors were developed and utilized in numerous analyses which Mr. Falkenberg assisted a number of utility companies in performing.

In January 1984 Mr. Falkenberg became a principal in the firm of Kennedy and Associates. His duties in this function initially required Mr. Falkenberg to

Response to Data Request of the
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Set 3

develop all financial and accounting reporting system utilized by the firm. In addition, Mr. Falkenberg was responsible for day-to-day operations of the firm of an accounting nature. This included federal tax reporting, cash management, ordinary bookkeeping, and administration of Kennedy and Associates payroll. Subsequently, Mr. Falkenberg has supervised the performance of this function of all accounting and financial reporting functions at Kennedy and Associates. In addition, Mr. Falkenberg serves as the Trustee of the Kennedy and Associates Pension Plan.

Since January 1984, Mr. Falkenberg has testified in numerous regulatory jurisdictions regarding revenue requirements associated with large scale new generating plant additions. These testimonies covered the topics of phase-in, rate treatment of excess capacity, rate treatment of cancelled plant, depreciation expense, as well as other issues related to utility accounting such as calculation of utility fuel expenses.

Response to Data Request of the
Philadelphia Electric Company
Set 3

Q. 44. Please provide the results of any other O&M regressions which you may have run in preparing your testimony for this or any other proceeding in the past two years butr did not use in this or any other proceeding in the past two years. Please provide the summary statistics for each such run.

A. 44. No other O&M equations exist.

Q. 45. In specific terms, please explain why, in your life cycle analysis of Limerick 1, the benefits are lower than those calculated by Dr. Hieronymus.

A. 45. Mr. Falkenberg and Dr. Hieronymus both performed economic analyses of the Limerick Unit 1 generating plant. There are some subtle differences between the methods utilized by Dr. Hieronymus and Mr. Falkenberg. First of all, Mr. Falkenberg corrects an error in Dr. Hieronymus' analysis which resulted from use of an inappropriate tax depreciation method. Secondly, Mr. Falkenberg points out that the common plant should be considered in the economic analysis of Limerick Unit 1. Mr. Falkenberg uses somewhat different O&M expense projections than does Dr. Hieronymus. In this instance, Mr. Falkenberg is taking into account the observed historic pattern of real growth in the O&M expenses of nuclear plants.

Finally, the most significantly reason Mr. Falkenberg's analysis is different from that performed by Dr. Hieronymus is that Mr. Falkenberg's thinking is in the mainstream of current practice in utility industry as while that of Dr. Hieronymus' is not. Mr. Falkenberg recongizes, as does over 75% of American Utility Companies that the proper discount rate is the pre-tax cost of funds. Dr. Hieronymus, in sharp contrast, is a member of a minority group, who use the after tax discount rate to evaluate investment alternatives. Thus, Mr. Falkenberg concludes that it is Dr. Hieronymus' refusal to accept the view of the American Utility Industry (and apparently Dr. Hieronymus' view that the vast majority of electric utilities do not know how to properly perform an economic analysis) is the main reason for the difference between Mr. Falkenberg and Dr. Hieronymus' results.

Response to Data Request of the
Philadelphia Electric Company
Set 3

Q. 46. Please show how you derived the "Risk Free" rates of return for equity of 8.36%. Include with this response an explanation of how these rates differ from those used by PECO.

A. 46. Mr. Falkenberg developed a "Risk Free" rate of return of equity of 8.36%. Mr. Falkenberg points out in his testimony that this "Risk Free" rate of return was developed by comparing interest rates currently paid on U. S. Savings Bonds. The rate on U. S. Saving Bonds conceptually could be equivalent to the "Risk Free" rate of return for equity capital in the event of the no business risk situation.

The question at hand in this data request appears to be whether the "Risk Free" rate of return of 8.36% differs from that used by PECO. Mr. Falkenberg believes that the question really is asking whether or not PECO is operating in an environment of business risk. It is Mr. Falkenberg's conclusion that the outcome of this rate case may well determine the answer to the question. It would appear to Mr. Falkenberg, that if Philadelphia Electric Company can completely recovery all of the costs associated with the Limerick generating plant, despite the fact that the unit is not needed, is not used and useful, produces a $1 billion penalty to customers rates over the next forty years, and costs substantially more than a similiar nuclear plant built nearby in the State of Pennsylvania, then it would be clear to Mr. Falkenberg that PECO is not operating in a situation of any business risk.

Response to Data Request of the
Philadelphia Electric Company
Set 3

Q. 48. Please provide in detail the data used and calculations necessary to derive the benefits of Limerick 1 which appear in Exhibit 10. Please break these benefits into fuel savings and capacity charges avoided. Please specify any of your assumptions that differ from those of Dr. Hieronymus.

A. 48. Please see workpapers and data diskettes previously supplied.

Response to Data Request of the
Philadelphia Electric Company
Set 3

Q. 49. Please provide, in machine readable form, a copy of the data base you used to derive your nuclear capital cost regression.

A. 49. Please see previously supplied data diskette.

Response to Data Request of the
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Set 3

Q. 50. Please provide, in machine readable form, a copy of any other nuclear capital cost regressions which you may have run in preparing your testimony in this or any other proceeding in the past two years but which you did not use in this or any other proceeding in the past two years. Please provide the summary statistics for each such run.

A. 50. There were no other nuclear plant regressions run in the development of the testimony of Mr. Falkenberg which have been saved.

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MOSES K. ROSENBERG
ARTHUR L. BERGER
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DAVID M. WALLACE
1942-1967

RETIRED PARTNERS
HARRY H. FRANK
JAMES H. BOOSER
JAMES W. HAGAR
JAMES H. KING

OF COUNSEL
GILBERT NURICK
SAMUEL A. SCHRECKENGAUST, JR.
JEFFERSON C. BARNHART

February 4, 1986

Re: Pennsylvania Public Utility Commission, et al.,
v. Philadelphia Electric Company
Docket No. R-850152

RECEIVED
FEB4 1986
SECRETARY'S OFFICE
Public Utility Commission

John Hanger, Esquire
Janet Parrish, Esquire
Community Legal Services, Inc.
Law Center North Central
3638 North Broad Street
Philadelphia, PA 19140

Dear Mr. Hanger and Ms. Parrish:

Enclosed please find Data Requests of Philadelphia Area Industrial Energy Users Group, Set I, to Consumers Education and Protective Association in the above-captioned proceeding.

Very truly yours,

McNEES, WALLACE & NURICK

By David M. Kleppinger
David M. Kleppinger

DMK/jf
Enclosure

cc: All Parties of Record (w/encl.)

DOCUMENT FOLDER

CERTIFICATE OF SERVICE

Pennsylvania Public Utility Commission, et al., :
v. : Docket No. R-850152
Philadelphia Electric Company :

I hereby certify that I have served a copy of the foregoing document on all known parties of record to this proceeding, all by first class mail (unless otherwise indicated) properly addressed as follows:

Administrative Law Judge
Joseph P. Matuschak
PA Public Utility Commission
97 East Main Street
Uniontown, PA 15401

Marlane R. Chestnut, Asst. Counsel
Veronica A. Smith, Asst. Counsel
Daniel P. Delaney, Deputy Counsel
PA Public Utility Commission
Law Bureau
Room G-18 - North Office Bldg.
P. O. Box 3265
Harrisburg, PA 17120

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Bureau of Rates
PA Public Utility Commission
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Counsel for Philadelphia Electric Compa
Morgan, Lewis & Bockius
Attn: Robert H. Young, Esquire
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Vice President and General Counsel
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Philadelphia, PA 19107

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Occidental Chemical Corporation
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Office of General Counsel
Washington, DC 20405

Bernard A. Ryan, Jr., Esquire
Dechert, Price & Rhoads
800 North Third Street
Harrisburg, PA 17102

David M. Kleppinger

Dated this 4th day of FEBRUARY, 1986, at Harrisburg, PA.

BERORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	:	
v.	:	Docket No. R-850152
PHILADELPHIA ELECTRIC COMPANY	:	

DATA REQUEST
OF
PHILADELPHIA AREA INDUSTRIAL ENERGY USERS GROUP
TO
CONSUMERS EDUCATION AND PROTECTIVE ASSOCIATION

SET I

ITEM NO.	DESCRIPTION
1.	For Exhibit No. 1 to CEPA Statement No. 2, please provide a copy of all workpapers used by Mr. Sterzinger to develop the A1, C1, and average and excess allocators for each of the rate classes shown.

DOCUMENT FOLDER

DOCKETED
FEB 5 - 1986

ROBERT H. GRISWOLD
MOSES K. ROSENBERG
ARTHUR L. BERGER
FRANCIS B. HAAS, JR.
G. THOMAS MILLER
DONALD R. WAISEL
RICHARD R. LEFEVER
J. THOMAS MENAKER
CLYDE W. McINTYRE
S. BERNE SMITH
ROD J. PERA
EDWARD W. ROTHMAN
ROBERT A. MILLS
W. JEFFRY JAMOUNEAU
HERBERT R. NURICK
DAVID E. LEHMAN
NORMAN I. WHITE
F. MURRAY BRYAN
RICHARD W. STEVENSON
WILLIAM A. CHESNUTT
HENRY R. MacNICHOLAS
WILLIAM M. YOUNG, JR
ROBERT M. CHERRY

H. LEE ROUSSEL
MAURICE A. FRATER
C. GRAINGER BOWMAN
JOHN S. OYLER
DELANO M. LANTZ
HARVEY FREEDENBERG
EDWARD J. RIEHL
JASON S. SHAPIRO
ERIC L. BROSSMAN
ROBERT D. STETS
TERRY R. BOSSERT
MARY JANE FORBES
JEFFREY B. CLAY
DAVID M. KLEPPINGER
NEAL S. WEST
JESSIE L. SMITH
BRUCE A. FELDMAN
FRANKLIN A. MILES, JR
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MICHAEL G. JARMAN
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OF COUNSEL

GILBERT NURICK
SAMUEL A. SCHRECKENGAUST, JR.
JEFFERSON C. BARNHART

February 4, 1986

Re: Pennsylvania Public Utility Commission, et al.,
v. Philadelphia Electric Company
Docket No. R-850152

Mark P. Widoff, Esquire
Widoff, Reager, Selkowitz & Adler, PC
P. O. Box 2547
Harrisburg, PA 17105

Dear Mr. Widoff:

Enclosed please find Data Requests of Philadelphia Area Industrial Energy Users Group, Set I, to the Utilities User's Committee/University of Pennsylvania in the above-captioned proceeding, addressed to witnesses S. L. Feldman and R. M. Wirtshafter.

Very truly yours,

McNEES, WALLACE & NURICK

By David M. Kleppinger
David M. Kleppinger

DOCUMENT FOLDER

DMK/jf
Enclosure
HAND DELIVERED

cc: All Parties of Record (w/encl.)

CERTIFICATE OF SERVICE

Pennsylvania Public Utility Commission, et al., :
v. :
Philadelphia Electric Company : Docket No. R-850152

I hereby certify that I have served a copy of the foregoing document on all known parties of record to this proceeding, all by first class mail (unless otherwise indicated) properly addressed as follows:

Administrative Law Judge
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Uniontown, PA 15401

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Office of General Counsel
Washington, DC 20405

Bernard A. Ryan, Jr., Esquire
Dechert, Price & Rhoads
800 North Third Street
Harrisburg, PA 17102

David M. Kleppinger

Dated this 4th day of FEBRUARY, 1986, at Harrisburg, PA.

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION :
:
v. :
: Docket No. R-850152
PHILADELPHIA ELECTRIC COMPANY :

DOCUMENT FOLDER

DOCKETED
FEB 5 - 1986

DATA REQUESTS
OF
PHILADELPHIA AREA INDUSTRIAL ENERGY USERS GROUP
TO
UTILITIES USER'S COMMITTEE/UNIVERSITY OF PENNSYLVANIA

SET I

ITEM NO. DESCRIPTION

The following data requests are directed to S.L. Feldman.

1. On page 4 of the testimony of S.L. Feldman the following statement is made:

> "Fifth, the Company is imposing a disproportionate share of the rate increase upon the commercial, institutional and high-use Residential HT customers -- some twenty - six percent higher than the manufacturing customers in these rate classes".

Please provide a complete copy of all workpapers which develop the percentage increase proposed by PECo to commercial, institutional, high-use Residential HT customers and manufacturing customers in these rate classes.

2. Provide a complete copy of all non-manufacturing tariffs referred to on pages 8 and 9 of S. L. Feldman's direct testimony. In addition to the tariff sheets, include a copy of all associated riders, i.e., STAC, ECR, fuel adjustment clause, city taxes, etc.

ITEM NO.	DESCRIPTION

The following data requests are directed to R. M. Wirtshafter

1. Please provide the usage characteristics of the average commercial customer described on page 3 of the testimony of R. M. Wirtshafter. The characteristics should include actual KW, billing KW, ratcheted billing demand on-peak kwh, off-peak kwh, power factor, etc.

2. Please provide the usage characteristics of the average institutional customer described on page 3 of the testimony of R. M. Wirtshafter. The characteristics should include actual KW, billing KW, ratcheted billing demand on-peak kwh, off-peak kwh, power factor, etc.

3. Provide the studies or reports which support the following statement as found on page 16 of R. M. Wirtshafter's direct testimony:

> "Finally, the ratchet is unfair in that it is regularly imposed on only the non-manufacturing sub-class of customers".

In addition, include all qualitative and quantitative analysis performed to support the above contention.

4. Supply the study and all workpapers which support the statement:

> "Yet, the ratchet is felt only by the non-manufacturing class", found on page 17 of the direct testimony of R. M. Wirtshafter.

5. Provide a complete copy of each of the utility tariffs referred to on pages 4 and 5 of the direct testimony of R. M. Wirthshafter. In addition, include a copy of all associated riders, i.e., STAC, ECR, fuel adjustment clause, city taxes, etc.

MORGAN, LEWIS & BOCKIUS
COUNSELORS AT LAW
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TELEPHONE: (215) 963-5000
CABLE ADDRESS: MORLEBOCK
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WASHINGTON
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LONDON

DAVID B. MACGREGOR
DIAL DIRECT (215) 963-5448

February 4, 1986

RECEIVED
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SECRETARY'S OFFICE
Public Utility Commission

Jerry Rich, Secretary
Pennsylvania Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17120

Re: Pa. P.U.C. v. Philadelphia Electric Co.,
Docket No. R-850152

Dear Secretary Rich:

Enclosed for filing with the Commission are three copies of Philadelphia Electric Company Exhibit TPH-4 which provides a comparison of actual vs. budget conditions for the second three months of the Future Test Year in the above-captioned proceeding.

As shown on the attached Certificate of Service I have today served copies of this document on all parties to the proceeding.

Sincerely,

David B. MacGregor
Counsel for Philadelphia
Electric Company

DBM/bas

Enclosure

cc: Honorable Joseph P. Matuschak
All Parties

DOCUMENT
FOLDER

Philadelphia Electric Company
Electric Operations
R-850152

Actual Experience in the Future Test Year
3 Months Ended December 31, 1985

DOCKETED
FEB 5 - 1986

January 1986

DOCUMENT
FOLDER

...ths Ended December 31, 1985
(Thousand $)

		Budget	Actual	Over/Under Budget
	OPERATING REVENUE			
440	Sales of Electricity:			
442	Residential	$217,825	$215,465	($2,360)
	Small Commercial and Industrial	83,789	90,356	6,567
444	Large Commercial and Industrial	272,598	262,423	(10,175)
445	Public Street and Highway Lighting	10,014	9,651	(363)
446	Other Sales to Public Authorities	-	-	-
447	Sales to Railroads and Railways	14,047	13,960	(87)
448	Sales for Resale	6,050	5,839	(211)
	Interdepartmental Sales	982	1,007	25
	Total Sales of Electricity	$605,305	$598,701	($6,604)
	Other Operating Revenues:			
450	Forfeited Discounts	$2,202	$2,037	($165)
451	Miscellaneous Service Revenues	562	625	63
453	Sale of Water and Water Power	-	-	-
454	Rent from Electric Property	2,596	2,588	(8)
455	Interdepartmental Rents	1,449	1,395	(54)
456	Other Electric Revenues	2,749	3,906	1,157
	Total Other Operating Revenues	$9,558	$10,551	$993
	Total Electric Operating Revenues	$614,863	$609,252	($5,611)
	OPERATING EXPENSES			
401	Operation and Maintenance Expense:			
	Power Production	$289,618	$297,104	$7,486
	Transmission	5,803	5,703	(100)
	Distribution	25,170	27,106	1,936
	Customer Accounts	20,570	21,727	1,157
	Customer Service & Information	2,669	2,641	(28)
	Sales	189	215	26
	Administrative and General Expense	35,709	38,127	2,418
	Total Operation and Maintenance Expense	$379,728	$392,623	$12,895
403	Depreciation Expense	$41,064	$43,280	$2,216
405	Amortization of Other Electric Plant	(160)	(162)	(2)
407	Amortization of Property Losses	420	108	(312)
	Taxes			
408.1	Taxes Other Than Income Taxes	$50,275	$56,782	$6,507
409.1	Income Taxes	34,433	(3,001)	(37,434)
410.1	Provisions for Deferred Income Taxes	53,903	143,911	90,008
411.1	Inc. Taxes Deferred in Prior Yrs-Credit	(33,093)	(30,316)	2,777
411.4	Invest ment Tax Credit Adjustments	(9,870)	(78,943)	(69,073)
	Total Taxes	$95,648	$88,433	($7,215)
411.6&7	Gain or Loss from Disposition of Utility Plant	-	(138)	(138)
	Total Operating Expenses	$516,700	$524,144	7,444
	Operating Income	$98,163	$85,108	($13,055)

3 Months Ended December 31, 1985
(Thousand $)

		Budget	Actual	Over/Under Budget
I.	POWER PRODUCTION EXPENSES			
	STEAM POWER GENERATION			
	OPERATION			
500	Operation Supervision	$3,830	$3,697	($133)
501	Fuel	51,374	54,478	3,104
502	Steam Expenses	9,457	7,942	(1,515)
504	Steam Transferred - Credit	(10,435)	(10,844)	(409)
505	Electric Expenses	1,946	1,673	(273)
506	Miscellaneous Steam Power Expenses	3,454	3,733	279
507	Rents	3,765	3,771	6
	Total Operation	$63,391	$64,450	$1,059
	MAINTENANCE			
510	Maintenance Supervision and Engineering	$2,424	$2,594	$170
511	Maintenance of Structures	1,496	2,759	1,263
512	Maintenance of Boiler Plant	20,138	17,355	(2,783)
513	Maintenance of Electric Plant	6,254	5,292	(962)
514	Maintenance of Miscellaneous Steam Plant	852	1,596	744
	Total Maintenance	$31,164	$29,596	($1,568)
	Total Power Production Expenses-Steam Power	$94,555	$94,046	($509)
	NUCLEAR POWER GENERATION			
	OPERATION			
517	Operation Supervision and Engineering	$3,179	$3,005	($174)
518	Fuel	30,014 (a)	22,499 (b)	(7,515)
519	Coolants and Water	276	143	(133)
520	Steam Expenses	3,611	4,880	1,269
523	Electric Expenses	431	388	(43)
524	Miscellaneous Nuclear Power Expenses	9,600	12,591	2,991
525	Rents	22	17	(5)
	Total Operation	$47,133	$43,523	($3,610)
	MAINTENANCE			
528	Maintenance Supervision and Engineering	$4,070	$3,323	($747)
529	Maintenance of Structures	747	993	246
530	Maintenance of Reactor Plant Equipment	2,674	8,778	6,104
531	Maintenance of Electric Plant	1,895	1,834	(61)
532	Maintenance of Miscellaneous Nuclear Plant	1,195	1,835	640
	Total Maintenance	$10,581	$16,763	$6,182
	Total Power Production Expenses-Nuclear Power	$57,714	$60,286	$2,572

(a) Includes $3,271 associated with spent nuclear fuel disposal expense.
(b) Includes $2,246 associated with spent nuclear fuel disposal expense.

OPERATING EXPENSES
3 Months Ended December 31, 1985
(Thousand $)

		Budget	Actual	Over/Under Budget
	HYDRAULIC POWER GENERATION			
	OPERATION			
535	Operation Supervision and Engineering	$99	$94	($5)
536	Water and Power	-	-	-
537	Hydraulic Expenses	265	206	(59)
538	Electric Expenses	56	58	2
539	Misc. Hydraulic Power Generation Expenses	101	84	(17)
	Total Operation	$521	$442	($79)
	MAINTENANCE			
541	Maintenance Supervision and Engineering	$136	$137	$1
542	Maintenance of Structures	32	24	(8)
543	Maintenance of Reservoirs, Dams & Waterways	23	10	(13)
544	Maintenance of Electric Plant	1,185	538	(647)
545	Maintenance of Miscellaneous Hydraulic Plant	34	26	(8)
	Total Maintenance	$1,410	$735	($675)
	Total Power Production Expenses-Hydraulic Power	$1,931	$1,177	($754)
	OTHER POWER GENERATION			
	OPERATION			
546	Operation Supervision and Engineering	$254	$258	$4
547	Fuel	1,744	2,491	747
548	Generation Expenses	341	299	(42)
549	Miscellaneous Other Power Generation Expenses	460	551	91
550	Rents	-	1,140	1,140
	Total Operation	$2,799	$4,739	$1,940
	MAINTENANCE			
551	Maintenance Supervision and Engineering	$158	$157	($1)
552	Maintenance of Structures	54	251	197
553	Maintenance of Generating and Electric Plant	1,437	2,477	1,040
554	Maintenance of Miscellaneous Other Power	25	38	13
	Total Maintenance	$1,674	$2,923	$1,249
	Total Power Production Expenses - Other Power	$4,473	$7,662	$3,189
	OTHER POWER SUPPLY EXPENSES			
555	Purchased Power	$27,820	$58,603	$30,783
556	System Control and Load Dispatching	1,455	1,312	(143)
557	Other Expenses	101,670	74,018	(27,652)
	Total Other Power Supply Expenses	$130,945	$133,933	$2,988
	Total Power Production Expenses	$289,618	$297,104	$7,486

OPERATING EXPENSES
3 Months Ended December 31, 1985
(Thousand $)

		Budget	Actual	Over/Under Budget
	TRANSMISSION EXPENSES			
OPERATION				
560	Operation Supervision and Engineering	$548	$602	$54
561	Load Dispatching	402	356	(46)
562	Station Expenses	440	417	(23)
563	Overhead Line Expenses	57	137	80
564	Underground Line Expenses	61	167	106
566	Miscellaneous Transmission Expenses	369	486	117
567	Rents	1,644	1,808	164
	Total Operation	$3,521	$3,973	$452
MAINTENANCE				
568	Maintenance Supervision and Engineering	$221	$231	$10
569	Maintenance of Structures	69	57	(12)
570	Maintenance of Station Equipment	1,287	801	(486)
571	Maintenance of Overhead Lines	554	438	(116)
572	Maintenance of Underground Lines	151	183	32
573	Maintenance of Miscellaneous Transmission Plant	-	20	20
	Total Maintenance	$2,282	$1,730	($552)
	Total Transmission Expenses	$5,803	$5,703	($100)
	DISTRIBUTION EXPENSES			
OPERATION				
580	Operation Supervision and Engineering	$1,954	$2,131	$177
581	Load Dispatching	457	407	(50)
582	Station Expenses	1,349	1,367	18
583	Overhead Line Expenses	1,556	2,304	748
584	Underground Line Expenses	739	922	183
585	Street Lighting and Signal System Expenses	170	179	9
586	Meter Expenses	1,132	1,156	24
587	Customer Installation Expenses	1,211	1,160	(51)
588	Miscellaneous Distribution Expenses	2,830	2,924	94
589	Rents	990	1,025	35
	Total Operation	$12,388	$13,575	$1,187
MAINTENANCE				
590	Maintenance Supervision and Engineering	$967	$1,051	$84
591	Maintenance of Structures	236	220	(16)
592	Maintenance of Station Equipment	1,868	1,840	(28)
593	Maintenance of Overhead Lines	5,863	6,015	152
594	Maintenance of Underground Lines	2,463	2,377	(86)
595	Maintenance of Line Transformers	423	606	183
596	Maintenance of Street Lighting and Signal System	274	324	50
597	Maintenance of Meters	396	609	213
598	Maintenance of Miscellaneous Distribution Plant	292	489	197
	Total Maintenance	$12,782	$13,531	$749
	Total Distribution Expenses	$25,170	$27,106	$1,936

OPERATING EXPENSES
(Thousand $)
3 Months Ended December 31, 1985

		Budget	Actual	Over/Under Budget
	IV CUSTOMER ACCOUNTS EXPENSES			
OPERATION				
901	Supervision	$649	$738	$89
902	Meter Reading Expenses	3,519	3,265	(254)
903	Customer Records and Collection	11,726	11,792	66
904	Uncollectible Accounts	4,540	5,793	1,253
905	Miscellaneous Customer Accounts Expenses	136	139	3
	Total Customer Accounts Expenses	$20,570	$21,727	$1,157
	V CUSTOMER SERVICE & INFORMATIONAL EXPENSES			
OPERATION				
907	Supervision	$266	$276	$10
908	Customer Assistance Expenses	1,649	1,555	(94)
909	Informational & Instructional Advertising Exp.	670	742	72
910	Misc. Cust. Serv. & Information Expenses	84	68	(16)
	Total Cust. Serv. & Information Expenses	$2,669	$2,641	($28)
	VI SALES EXPENSES			
OPERATION				
911	Supervision	$31	$35	$4
912	Demonstrating and Selling Expenses	90	85	(5)
913	Advertising Expenses	68	95	27
916	Miscellaneous Sales Expenses	-	-	-
	Total Sales Expenses	$189	$215	$26
	VII ADMINISTRATIVE AND GENERAL EXPENSES			
OPERATION				
920	Administrative and General Salaries	$9,468	$8,590	($878)
921	Office Supplies and Expenses	3,823	4,242	419
923	Outside Services Employed	1,182	1,427	245
924	Property Insurance	2,366	2,625	259
925	Injuries and Damages	2,054	3,211	1,157
926	Employee Pensions and Benefits	11,663	11,589	(74)
928	Regulatory Commission Expenses	1,084	2,267	1,183
929	Duplicate Charges - Credit	(500)	(609)	(109)
930	General Advertising and Miscellaneous	4,183	4,323	140
	Total Operation	$35,323	$37,665	$2,342
MAINTENANCE				
935	Maintenance of General Plant	386	462	76
	Total Administrative and General Expenses	$35,709	$38,127	$2,418
	VIII TOTAL OPERATION & MAINTENANCE EXP.(B-9)	$379,728	$392,623	$12,895
	IX DEPRECIATION AND AMORTIZATION			
940	Depreciation (B-9)	$41,064 (a)	$43,280 (b)	$2,216
943	Amortization of Other Electric Plant	(160)	(162)	(2)
944	Amortization of Property Losses	420	108	(312)
	Total Depreciation and Amortization	$41,324	$43,226	$1,902

(a) Includes $1,047 of nuclear decommissioning accruals.
(b) Includes $1,047 of nuclear decommissioning accruals.

X TAXES	Budget	Actual	Over/Under Budget
TAXES OTHER THAN INCOME TAXES			
State and Local			
Capital Stock - Pennsylvania	$6,152	$7,691	$1,539
Capital Stock - New Jersey	31	9	(22)
Gross Receipts	26,706	26,361	(345)
Real Estate - Local	201	361	160
Real Estate - State	11,864	17,269	5,405
State Unemployment Compensation	360	402	42
Philadelphia Realty Occupancy	112	126	14
Other State and Local	140	227	87
Total State and Local	$45,566	$52,446	$6,880
Federal			
Telephone and Telegraph	$6	$42	$36
Federal Unemployment Compensation	206	203	(3)
Federal Old Age Benefits	4,445	4,044	(401)
Other	52	47	(5)
Total Federal	$4,709	$4,336	($373)
Total Taxes Other Than Income	$50,275	$56,782	$6,507
INCOME TAXES			
State - Pennsylvania	$4,628	($13,992)	($18,620)
State - Maryland	17	(68)	(85)
State - New Jersey	155	(679)	(834)
Federal	29,633	11,738	17,895
Total Income Taxes	$34,433	($3,001)	($37,434)
Provisions for Deferred Income Taxes	$53,903	$143,911	$90,008
Income Taxes in Prior Years - Credit	(33,093)	(30,316)	2,777
Investment Tax Credit Adjustments	(9,870)(a)	(78,943)(b)	(69,073)
TOTAL ALL TAXES	$95,648	$88,433	($7,215)
XI GAIN OR LOSS FROM DISPOSITION OF UTILITY PLANT	-	(138)	(138)
XII TOTAL OPERATING EXPENSES (B-9)	$516,700	$524,144	$7,444

(a) Investment tax credit of ($7,307) less amortization of $2,563
(b) Investment tax credit of ($78,836) less amortization of $107

Philadelphia Electric Company
June 1985 to December 1985
(Thousand $)

Electric Plant in Service	June 1985 Filing	6 Months Net Budget Additions	Budget As of Dec.31,1985	June 1985 Actual Filing	6 Months Actual Additions	Actual As of Dec.31,1985	Over(Under) Budget
Intangible Plant	$163	-	$163	$163	-	$163	-
Steam Production Plant	$1,116,749	($75,505)	$1,041,244	$1,116,749	($28,607)	$1,088,142	$46,898
Nuclear Production Plant	1,372,002	46,895	1,418,897	1,372,002	38,064	1,410,066	(8,831)
Hydraulic Production	83,866	620	84,486	83,866	(5)	83,861	(625)
Other Production Plant	133,955	(10,705)	123,250	133,955	(1,270)	132,685	9,435
Total Production Plant	$2,706,572	($38,695)	$2,667,877	$2,706,572	$8,182	$2,714,754	$46,877
Transmission Plant	$588,114	$12,530	$600,644	$588,114	$4,359	$592,473	($8,171)
Distribution Plant	1,425,028	41,955	1,466,983	1,425,028	49,679	1,474,707	7,724
General Plant	35,113	1,811	36,924	35,113	1,194	36,307	(617)
Total Electric Plant in Service	$4,754,990	$17,601	$4,772,591	$4,754,990	$63,414	$4,818,404	$45,813
Common Plant in Service							
Intangible Plant	$677	-	$677	$677	-	$677	-
General Plant	130,509	3,874	134,383	130,509	749	131,258	(3,125)
Total Common Plant	$131,186	$3,874	$135,060	$131,186	$749	$131,935	($3,125)