

RELATED CORRESPONDENCE

Testimony of Jim Lazar



A critique of the financial filings of the applicants must look deeply into the assumptions used by the companies in formulating their estimates. In reviewing the information in the prefiled testimony, certain inaccuracies in the data are immediately evident. Beyond the inaccuracies, the over-optimism of the applicants regarding future construction and financing costs must be reconciled. The increased cost associated with required schedule revisions must be allowed for. Finally, these calculations must be evaluated in order to more accurately ascertain the ability of the applicants to successfully finance their participation. To some extent, a short review of the ability of the applicants to obtain the rate relief they will require, and to sell power at the price required to amortize the ~~projects~~ they are participating in must be considered.

A number of errors occur in the data which should be corrected by the applicants prior to a final analysis of their financial capability. None of the utilities have correctly reported their share of costs for WNP-3. WPPSS has just released their preliminary 1980 budget, and although they have indicated that further upward revision will be required in the wake of the Three Mile Island mishap, at least these most recent figures should be worked into the utility reports to this board. None of the utilities correctly shows expenditures for Pebble Springs slipped to reflect the 1989-91 operational dates announced by PGE May 22.

None of the capital cost estimates for any of the plants for which report is being made by the applicants are achievable in the

current inflationary market in which large power plants are built. The utilities have reported underestimates of plant cost, financing cost, inflation rates, and fuel and operating costs. At the same time, they have overestimated plant capacity factors, allowed for generous rate relief, and expressed a highly optimistic picture of corporate financial stability. Puget in particular has consistently reported the most optimistic market scenario, while even their own calculations show them to be at the edge of their financing capability. With such heavy exposure in one project, Puget's optimism should be replaced with caution, in order to avoid possible corporate suicide.

All of the participants are presently selling stock below book value. Attempting to raise the tremendous amounts of capital required for the construct program they have proposed will place extreme risks of further diminution of existing stockholder's equity. While all participants report that they will get back over book value in the next year or so, there appears to be little justification for their optimism. For them to report any other expectation would only result in further deterioration of the marketability of their securities. With extremely tight internal cash generation, the capability of the applicants to weather any unanticipated adversity during construction is questionable. At the same time, virtually all utilities now engaged in a high rate of capital expansion are experiencing little other than adversity. Construction costs are skyrocketing, interest rates are high, plant performance is below expectation, demand is slackening, and rate relief is lagging. Without a cushion of internal cash generation, the appli-

cants cannot handle any of the escalation and schedule delays which are inevitable under the overoptimistic construction cost and schedule scenario they have drawn.

When the cost and schedule estimates are properly revised by the applicants, the inability of these utilities to successfully undertake a program of the magnitude they propose will be fully evident. Until such time as this is done, the gaps and inconsistencies in the data presented make meaningful analysis impossible. Each applicant has reported at least two different cost estimates for the projects, as well as for their other projects. Puget and Pacific have both provided four separate conflicting estimates of eventual project cost, all of which are theoretically up to date. Until their cost and schedule estimates can be reconciled with one another, and with the experience of the industry as a whole, it is only possible to describe the wide gap between their capability to finance the projects and the costs which they will face if the project is placed under construction.

Beginning with their schedule for construction, and proceeding through their cost estimates and financial reports, this attempt to critique the applicants will draw heavily on reports made by the three Washington applicants with the Washington Utilities and Transportation Commission (WUTC) in Cause U-78-05, a generic rate proceeding in which Puget, Pacific, and Water Power are all respondents, and in which my client Fair Electric Rates Now (FERN) is an intervenor. Unfortunately, comparable data is not available for PGE. Some of the inconsistencies between the data filed with the WUTC and those presented to the ASLB may be the result of slightly

different timing. Many of the differences do not appear to have any temporal relationship.

The exhibits submitted with this testimony are either individual record requisitions or excerpts from larger publications. The full publications are available for review if a need should arise.

CONSTRUCTION SCHEDULE

The planned operational date for the projects, September, 1986, and September, 1988, are unachievable. Operation in 1986 would allow only 72 months construction time, assuming 6 months between issuance of a Limited Work Authorization (LWA) in September, 1979, and issuance of a Construction Permit (CP), and allowing an additional 6 months between fuel load and commercial operation. A number of extensive studies have been completed recently, and all indicate that much longer time horizons are appropriate. The studies, completed by the RAND Corporation for the Department of Energy (COST ANALYSIS OF LIGHT WATER REACTOR POWER PLANTS, RAND, June, 1978), by the General Accounting Office of Congress (TENNESSEE VALLEY AUTHORITY CAN IMPROVE ESTIMATES AND SHOULD REASSESS RESERVE REQUIREMENTS FOR NUCLEAR POWER PLANTS, PSAD 79-49, March 22, 1979) and by the Washington Public Power Supply System (NUCLEAR POWER PLANT COST SCHEDULE AND PRODUCTIVITY, AN OVERVIEW OF THE INDUSTRY AND IMPLICATIONS FOR THE FUTURE, WPPSS, April, 1979) have all analyzed nuclear power plant construction schedules. All indicate that a construction period considerably in excess of that proposed will be required to complete a reactor being licensed for construction at the present time. This schedule delay will significantly

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affect project costs, which are already straining the capability of the participants to finance new construction.

The RAND study develops a multiple regression model for estimating power plant construction time and cost. The formula (exhibit page 1-A) for construction schedule, when applied to Skagit 1, indicates that an LWA in September, 1979, followed by a CP in March, 1980, would result in a 107-month construction period, less a small adjustment for the experience of the Architect/Engineer. This would result in fuel load in February, 1989, and commercial operation in October, 1989. This is approximately three years longer than proposed by the applicants.

The GAO study on construction schedules, completed in March, 1979, indicated that the construction schedules used by TVA were 1-2 years optimistic. Their analysis of construction history, ranging from an average of 46 months for plants completed prior to 1970 to 90 months for plants completed in 1977, appears below.

<u>Calendar Year</u>	<u>Number of Reactor Units</u>	<u>Average Construction Duration for First Units</u>
Before 1970	12	46.0 months
1970	4	47.6 months
1971	4	54.9 months
1972	5	66.0 months
1973	7	68.0 months
1974	10	66.9 months
1975	3	78.7 months
1976	4	91.4 months
1977	4	90.4 months

A regression analysis between date of completion and time required for completion provides a surprisingly good curve fit, with $R^2 = .94$; a completion date advancement of one year is accompanied

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by an increase in time required for construction of 6.18 months. This is a somewhat obtuse mathematical relationship, appearing to put the cart before the horse. The outcome is somewhat akin to Alice's experience on the treadmill, having to run ever faster in order to remain in the same place. Perhaps we are fortunate that the relationship is not exponential in form.

The trend shown by GAO indicates that a plant completed in 1986 would have required 148 months to complete, requiring a construction permit in 1974. It is certainly evident that a construction period of only 72 months is inconsistent with recent experience or with the direction of the trend which has occurred.

In evaluating the schedule problems being experienced by TVA, the GAO noted with respect to the Sequoyah power plant that:

"The first unit at TVA's second plant, Sequoyah, is scheduled for fuel loading in April, 1979, after a construction period of about 120 months. The Authority does not consider the Sequoyah time typical, because rework to satisfy new NRC requirements has extended the construction time. However, the Sequoyah experience is consistent with the trends in private industry."

The WPPSS study of April, 1979, analyzed all nuclear plants now under construction and all that have been completed in the United States. This was undertaken to ascertain if the problems being experienced by WPPSS with their construction program were unusual, or if they were typical of the industry. The Supply System had just gone through an embarrassing budget and schedule revision, in which

their estimated costs were escalated by \$1.6 billion, and their completion dates for the five projects advanced by an average of 11 months, compared with the estimates made 12 months earlier. They found themselves facing a hostile public trying to explain why they were no closer to completion than a year earlier, measured either in terms of financing requirements or completion dates.

Their study divided the time required for completion of a LWR into five periods. The first two, duration from Nuclear Streams Supply System award to submittal of a PSAR, and between PSAR and CP, are unrelated to this financial analysis. The three periods following issuance of a CP will be dealt with by the applicants if a CP is issued, and should be considered in establishing a likely operational date for the project under consideration.

WPPSS has estimated an elapsed time of about 7 months from date of issuance of CP to the first pouring of concrete, the third milestone they have identified for a plant being built under the conditions prevailing in 1979. (Exhibit page 2-A)

The period between first concrete and fuel load, longest of the time periods involved in construction, is estimated at approximately 100 months for large plants constructed under the 1979 framework of power plant construction. WPPSS has forecast this duration as increasing to as much as 125 months for projects loading fuel in 1982. They note that the present fuel load date estimates of plants now under construction are optimistic by as much as four years. (Exhibit page 2-B) They have not made a specific forecast beyond 1983, as they have surmised that the construction interval between first concrete

and fuel load will eventually level at about 90-100 months. (Exhibit page 2-C)

Finally, they have estimated a six month period between fuel load and commercial operation. The total of these three periods indicates a plant authorized for construction in 1979 would require between 103 and 138 months for construction. As shown in their analysis, time required for completion has already risen from 66 months for plants completed in 1967 to 132 months for those finished in 1976. (Exhibit pages 2-D, -E)

Even with a 103 month construction period between CP and Commercial Operation, the earliest date the WPPSS study would provide for Skagit would be October, 1988, some two years longer than proposed by the applicants. The other end of the forecast range, 138 months, would draw this out to September, 1991. The WPPSS model suggests the same range as noted by the GAO as "consistent with the trends in private industry" in their analysis of the 120 month construction period for Sequoyah. The WPPSS forecast is also very consistent with the estimate provided using the RAND model. WPPSS commentary in their abstract was not encouraging to other potential nuclear plant builders:

"Plants committed in 1966 took 7 years to build. Today they will take 15 unless conditions change appreciably."

"Most plants will now attain commercial operation as much as 2 to 3 years later than their current schedules."

The point of agreement in these three studies is that construction of nuclear power plants takes considerably in excess of the 6 years allowed by the applicant. The schedule revision is recognized as a major cause of budget increases for power plant construction,

causing both increased AFUDC and allowing additional inflation to affect total project costs.

PROJECT COST ESTIMATES

The cost estimates provided by the applicant and by the staff are far lower than industry experience, and need to be fully revised. Table 1 of the supplemental testimony of Mr. Winters shows an applicant cost estimate of \$3325 million, and a staff estimate of \$3191 million. These estimates are low by a factor of two when compared with cost estimates recently completed by other analysts. Further, the schedule revision which would be required if the projects were to be built would increase the costs of this project over others presently under construction. It is also somewhat difficult to understand why the applicants are in apparent disagreement as to the currently anticipated cost of the projects.

The five nuclear plants now under construction in Washington by WPPSS have all suffered from budget and schedule revision. WPPSS has indicated that future cost increases will be experienced as changes in design are mandated as a result of the Three Mile Island investigations, and as other unanticipated events occur. I have completed a detailed analysis of the areas of probable cost escalation for WPPSS (THE OFFICIAL BOND STATEMENTS OF THE WASHINGTON PUBLIC POWER SUPPLY SYSTEM, A CRITIQUE, Lazar, March, 1979) and have concluded that future cost escalation will be substantial, probably in the range of 25% above current estimates, with eventual power cost nearly double the present estimates for some of the plants. WPPSS has indicated that they expect future construction cost escalation to be in the 10-25% range above the preliminary 1980 budget. The original and more recent capital cost estimates for WPPSS are shown below.

PROJECT	ORIGINAL BUDGET	REVISED BUDGET	\$/KW	ESCALATION RATE	COMPLETION DATE
WNP-1	\$622	\$2348	\$1878	27%	12/83
WNP-2	\$405	\$1823	\$1668	19%	9/81
WNP-3	\$789	\$2266	\$1827	23%	12/84*
WNP-4	\$1009	\$2633	\$2106	27%	6/85
WNP-5	\$1251	\$2707	\$2183	21%	6/86

*WPPSS Consultant study by Holmes and Narver recommended 1985 operating date for WNP-3; 12/84 adopted as official target date.

The WPPSS experience is typical, rather than an aberration. A study done for the Bonneville Power Administration by Theodore Barry and Associates (Roles and Relationships between BPA and WPPSS, Barry, 1979) indicated that WPPSS was controlling costs within 3-4% of what was possible. 4% on a \$12 billion project amounts to nearly \$500 million, so the report made a number of recommendations for improving management at WPPSS, but was largely supportive of the technical expertise amassed by the Supply System. If the Skagit project were to be constructed in the time frame proposed, the applicants would be competing with WPPSS for some of the limited expertise available in the nuclear power field.

By comparison with the cost being experienced at WPPSS, the Shoreham plant, being built by Long Island Lighting Co. is now scheduled for operation in mid-1981, just before WNP-2, and is budgeted at \$1.54 billion, or \$1880/kw, slightly higher than WNP-2.

The NRC staff used the CONCEPT model to analyze the budget prepared by the applicants. The testimony of Mr. Winters indicates that the analysis is based on the December, 1977 run of CONCEPT. It is fairly evident that any power plant costing model as obsolete as 1977 is inappropriate for budget analysis in an age where power plant inflation is generally running 13-19%, annually, as reported by Barry. With construction schedules requiring a 6 month extension with every year of delay, the model to be used should reflect the most recent market conditions. The RAND study referred to in my discussion of project completion dates described the CONCEPT model as follows:

"In 1967, ERDA began an independent examination of LWR capital costs that eventually culminated in the creation of the CONCEPT model. The CONCEPT model is a machine-operated computer code that adjusts the cost of a base-case LWR at a hypothetical site to the cost of an LWR at any selected location, in any selected year, and in a variety of configurations. The model relies on the base-case cost estimate and on appropriate cost-adjustment factors that reflect locational economic factors and time-related escalation. There is no evidence that results from the CONCEPT model have been used as data; however, the base-case inputs, which have been prepared by United Engineers and Constructors, are widely quoted, usually without making note of the fact that (they are minimum-cost estimated of a plant at an ideal hypothetical site.)" Emphasis added.

One would hope that the NRC staff would provide the pessimism needed to balance the optimism of the applicants. Instead, the NRC has used a "best possible" costing model to evaluate a "best possible" scenario presented by the applicants. Just as the costing models I will discuss which use an "average" approach to cost forecasting are largely in agreement on the cost of a future plant, the staff and applicant are in close agreement with their "best possible" models. Unfortunately, the bond market and rate payer seldom finance a "best possible" project.

It is necessary to search for other costing models in order to develop a realistic picture of the financing requirements for the Skagit project. Several generic studies have been completed, and all of them indicate a much higher probable cost than presented in the applicant's testimony.

In September, 1978, EBASCO Services published an article dealing with the current costs of coal and nuclear power plants. (DRAMATIC CHANGES IN THE COSTS OF NUCLEAR AND FOSSIL-FUELED PLANTS, EBASCO, 1978) Their conclusions (exhibit page 3A,B) was that a plant coming on-line in 1988 would cost \$1648/kw, and produce power at 63.8 mills/kwh at a 70% capacity factor. Their study allows \$100/kw for further regulatory requirements, and anticipates fuel cost at 16.3 mills levelized over 10 years. EBASCO is Architect Engineer for WNP-3&5, and is generally considered to be a nuclear advocate. Their study concludes that nuclear generation is less expensive than coal, by a very slight margin.

In testimony last October before the New Jersey Board of Public Utilities, Charles Komanoff presented a detailed costing model for both nuclear and coal plants. His analysis was somewhat lower in capital cost than the EBASCO study, but was directed at a 1985 operational date. His capital cost estimate of \$1575/kw escalated at the 7% inflation rate used by Ebasco results in a comparable estimate of \$1929/kw in 1988. At the 13-19% inflation rate assumed-by presented by Barry, both of these would be much higher. Komanoff has done extensive research on plant reliability, and concluded that a 55% capacity factor was appropriate. His summary (exhibit page 4A) shows nuclear busbar power at 90 mills, compared with 60 mills for coal, based upon 1985 on-line operation.

Stone and Webster Engineering Co. has also completed a study of generic power plant costs, presented to the Atomic Industrial Forum last February. (The ECONOMICS OF NUCLEAR POWER, Stone and Webster, 1979) The conclusion of this report was that plants scheduled for completion in 1990 would cost \$1937/kw, including a \$50/kw

contingency included for further regulatory changes. They concluded that power at the bus from a nuclear source in 1990 would cost somewhat in the vicinity of 90 mills, using a 60% capacity factor. (Exhibit Page 5A).

The RAND study of plant costs referred to earlier provided a regression equation for analyzing eventual project costs. Assuming issuance of an LWA in September, 1979, and a CP in March, 1980, the RAND formula predicts a cost of \$2266/kw for the Skagit plant, less an adjustment for the experience of the Architect/Engineer. As discussed earlier, this is based on an assumption of an operational date for Skagit 1 of approximately October, 1989. This estimate is higher than the others, but lower than the current estimate of any of the WPPSS plants escalated at 7% to 1989.

Finally, the WPPSS study mentioned earlier conducted a limited analysis of future project costs. Their conclusions are less detailed than those of the previous studies, but their commentary describes a likely scenario which is consistent with the other studies:

...under present conditions, plants will now take 15 years rather than 7 to come on line, and one committed in 1979 will cost in excess of \$3 billion to construct. Perhaps this is a fair and reasonable price to pay for the protection of our society, but it must be emphasized that this is a social price, not a technical one. It is a price that nuclear construction management can neither control nor be held accountable for. Emphasis added.

Escalating the present estimate of cost for WNP-5 to 1989, the year most of the schedule models indicate is reasonable for Skagit to become operational, using the midpoint of the Barry range of inflation, 16%, yields a cost of \$3,407/kw, or approximately \$8.8 billion for the entire Skagit project, nearly three times the staff cost estimate. To the extent that the investor-owned utilities will have a higher AFUDC rate, this will be higher; to the extent they are able to control costs more successfully than WPPSS, it could be lower.

and more than double this figure by the report of Puget to my client FERN in the present proceeding before the WUTC. (Exhibit page 8A)

So many different cost estimates for the Skagit project are available from the applicants that it is nearly impossible to make any attempt at analysis of eventual project costs based upon their data. Listed below are a number of the estimates which I have received in the past few months, together with their origin. I have listed them all in per kw terms, and separated the estimates which do not include AFUDC.

Source	w/AFUDC	w/o AFUDC
Puget: ASLB Docket 50-522	\$1291	\$1079
WUTC Cause U-78-05 (FERN #1)	\$1373	
(Staff B-3)	\$1201	\$1053
Bond Prospectus 7/11/78	\$1126	
Pacific: ASLB Docket 50-522		\$1139
WUTC Cause U-78-05 (FERN #1)	\$1618	
(Staff B-3)	\$1744	\$1298
Bond Prospectus 3/28/79	\$1618	
Water Power: ASLB Docket 50-522		\$1087
		\$1021
WUTC Cause U-78-05 (Staff B-3)	\$1293	\$938
(FERN #1)	\$1294	\$923
Stock Prospectus 9/21/78		

The sources of these figures from outside this proceeding are contained in exhibit pages 8 - 10.

It is clear from this confusion that the participants are uncertain of the project costs. They do not even appear to use the same sources of information. The recent estimates by Pacific for Skagit are much higher than those used by either the applicants or the staff in this proceeding, although they are still lower than the generic studies. At the same time, all of the participants estimates for their share of the cost of the WPPSS plants in which they are participants is much lower than their arithmetical share of the budgets which WPPSS has released. Pacific's March bond statement reported costs for WNP-3 of \$1360, and of WNP-5 of \$1502. At that time, the official budget of WPPSS for those projects

were \$1570/kw and \$2010/kw respectively, although they have now been raised to \$1827 and \$2183 respectively. The Pacific estimates do not include the cost of first core, which the WPPSS estimates do, but the difference considerably exceeds the cost of first core. The other applicants have also understated their cost obligations for WPPSS.

It is clearly evident that all of the cost figures being used by the applicants in this proceeding are artificially low. Before any further consideration can be made of the ability of the participants to finance participation, these figures should be updated, using one of the more recent costing models available. In my further analysis at this time, I will be using the result of the RAND regression model, unadjusted for either the high wage rates in Washington or for the experience of the A/E. I believe these will be offsetting adjustments. The figure produced by the RAND model, \$2266/kw, with an operation date of October, 1989, assuming issuance of a LWA in September, 1979, and a CP in March, 1980, results in a total project cost of \$5,837,000,000, an increase of 75% over the applicant's estimate.

COST OF POWER

Based upon the estimate of \$1291/kw, the applicant has indicated that capital amortization of the project will cost 40 mills/kwh. Using the figure of \$2266/kw, the amortization cost rises to 70 mills, based upon the 75% capacity factor used by the applicant. Dropping the capacity factor to 60%, as used in the Stone and Webster report to the AIF, brings amortization up to 87 1/2 mills. The staff fuel cost estimate of 14 1/2 mills is substantially different than the applicants have reported to the WUTC, although the basis of the staff estimate is unclear. The applicant reports to the WUTC approximately 6 mills, much higher than their own estimates for coal (3-5 mills), but much lower than either the staff (14.5) or any of the generic estimates (11-25 mills). (Exhibit pages 11-13)

The staff estimates of busbar power do not include either O & M or plant update costs. O & M is usually a minor cost in nuclear plants; Stone and Webster used 5 mills, lower than Komanoff, but higher than EBASCO. Plant update is seldom found in prospective budgets, but is required to meet the ever-changing requirements of the various regulatory bodies which affect power plant operations. The Trojan plant costs for update (everything other than amortization, O & M, fuel) detailed in the communication with FERN from BPA (Exhibit pages 14, 14A), equal their costs for fuel or O & M. I will assume they remain low, equal to O & M, although they may rise as rapidly as fuel.

<u>Total busbar cost:</u>	<u>75% Capacity Factor</u>	<u>60% Capacity Factor</u>
Amortization	70 mills	87.5 mills
Fuel	14 1/2 mills	14 1/2 mills
O & M	5 mills	5 mills
Update	5 mills	5 mills
Total:	94 1/2 mills	112 mills

Transmission and distribution costs average 8 mills; Transmission and transformation losses may be as low as 7% on this side of the mountains, although Pacific has reported 14% average system losses (Exhibit Page 14b). Adding these to the busbar costs results in a delivered power price of 110 mills at 75% plant factor, and 128 mills at 60% plant factor.

ABILITY OF APPLICANTS TO SELL POWER AT PRODUCTION COST

Both Puget and Water Power have indicated that their current cost estimates for construction produce a need for approximately a 12% annual rate hike, compounded through the operating dates of the projects. While I have not revised their figures, it is evident that a reevaluation of the construction costs for all of the projects in which they are involved will force that revenue requirement far above the 12% estimated. It is unlikely that they will be able to sustain their forecast 5.3% and 4% rates of load growth teamed with a compound rate hike of

something well in excess of 12% annually.

Historically the Northwest has had stable electricity prices. Water power rates declined, in real terms, by a substantial proportion since 1960, as shown by the graph they have filed with the WUTC. (Exhibit page 15)

Presently, most new construction in the region utilizes electrical resistance space heating, which is responsible for a sizeable chunk of the demand growth the utilities are experiencing. The elasticity associated with space heat saturation is the highest of any market sector, -3.00 according to Puget. This and Puget's other elasticity estimates are contained in Exhibit page 16.

Regional energy forecasts have been dropping, even though the sizeable rate hikes have just barely begun. When the Skagit projects were first proposed, the utilities were forecasting a 6% rate of load growth. The 1979 forecast has dropped to 3.9%. The 1068 West Group Forecast indicated that consumption in 1977-78 would reach 18,000 MW; actual consumption was slightly over 14,000MW.

The Northwest Energy Policy Project identified some 75 billion kwh/year of conservation potential in the region which was cost-effective at 20 mills, their estimated cost of new power resources. With rapidly increasing electricity prices, it is reasonable to expect that energy awareness will improve, and that more conservation potential will be developed. The conservation study done for BPA by Skidmore, Owings, and Merrill in 1976 concluded that conservation was six times as cost effective as new generation; while new generation costs have increased (in this region) by more than 20% annually since then, conservation costs have not risen as fast. Other conservation studies show the same relationship. While the costs of both conservation and generation may rise at the same rate in the future, even this would result in an increased number of dollars to be saved by moving to conservation. The "monetary illusion" will probably prove to be a valid and significant economic force in energy markets in the future in the

Pacific Northwest, as historically stable electrical prices (in a world of inflation) suddenly begin to outpace other cost escalation. The 40-60% rate hikes the PUD's will impose this winter as they begin to pay for WPPSS will be the initial evidence of this. There is very little marketing experience in the region for 110 mill power; it is doubtful that a market will be developed.

The applicants report that they expect to be able to secure whatever rate increases are required in order to fund the projects; if their confidence were justifiable, I would do well to seek work outside of the utility ratemaking process. The type of rate relief they would require in order to more confidently pursue financing would be for inclusion of construction work in progress (CWIP) in their rate bases. Financial advisors to the utilities, Blyth Eastman, Dillon and Co., asked for this type of relief before the Washington Legislature last session; HB 828, which would have authorized this practice, was not enacted. Ballot measure 9 in Oregon has prohibited this practice. The veto of HB 435 in the 1975 Washington Legislative Session prevented the WUTC from granting full inclusion of CWIP, as the utilities have requested. A letter from the former Chairman of the NRC to Governor Ray gave an indication of the impact of CWIP on utilities ability to finance expensive generation. (Exhibit Page 17) The loss of CWIP has been the major reason that Public Service of New Hampshire has been forced to liquidate much of their share of Seabrook. (Exhibit Page 18)

FINANCING PROBLEMS

Ordinarily, at least 25% of any capital expansion program should be funded through internally-generated funds. Regulated public utilities have often been permitted to drop below this margin, but a minimum of 15% is now considered prudent by most financial analysts in today's difficult financial markets. Puget has used the 15% minimum in the arguments before the WUTC. (Exhibit Page 19A)

The remainder of the project can be financed with a mix of common and preferred stock and long-term debt. Puget, on page 4 of their exhibit, shows internal cash generation producing less than of construction expenditures in all years between 1979 and 1986, the years in which they expect to build the Skagit projects. In 1984, this funding source falls to less than 2%. Cost escalation of the projects beyond that anticipated in this application, or any effective resistance to the rate relief they anticipate receiving, will totally cut off internally generated funds. Even under the best of situations, as presented by the applicants, internal fund generation is inadequate to satisfy the expectations of financial analysts, or the minimum requirements of the company, as indicated in their arguments before the WUTC.

The margins by which some of the applicants meet their required financial tests are already quite slender. For Puget and PGE, their present calculations show both interest coverage and preferred dividend coverage already at the limits. Further cost escalation, which is inevitable, or inadequate rate relief, which is probable, would force them below their requirements. Pacific is slightly better off, but by no means comfortably above their required coverage. Water Power appears to be in fairly good shape, but is the smallest participant in the project.

Participant	Interest Coverage		Preferred Divident Coverage	
	Requirement	Projected	Requirement	Projected
Puget	2.0X or more	2.1-2.9X	1.5 or more	1.5-1.9
PGE	2.0X or more	2.2-4.1X	1.5X or more	1.3-2.2X
Pacific	2.0X or more	2.1-2.5X	1.5X or more	1.7-1.9X
Water Power	2.0X or more	2.9-3.6X	1.5X	5.9-8.2X

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While coverage ratios have traditionally provided the basis on which financial ability has been analyzed, a different perspective is now being taken by some analysts. The incident at Three Mile Island has had tremendous reverberation through the financial community; in the year before the accident, nuclear dependent utilities routinely had bond ratings one step lower than non-nuclear dependent utilities. The gap has widened even further now, with virtually all nuclear

dependent utilities selling for a substantial discount to book value .

Since the Pennsylvania Public Utility Commission removed TMI from the rate base of Penelec and Metro Edison, many financial analysts are beginning to consider the degree of exposure which a utility has in any particular plant. GPU, the parent company for the participants in TMI, has about 60 million shares of common stock outstanding, representing about \$1.2 billion in stockholder's equity at book value. With roughly \$300 million in casualty insurance on the plant, a drop of roughly $7\frac{1}{2}$ points of GPU common stock has resulted in a coverage for the accident of \$720 million; GPU stock had dropped below 8 during the weeks after the accident, but has stabilized at $10\frac{1}{2}$ or so, which is in keeping with the dividend announced after the accident, and consistent with the loss of a \$700 million plant.

Last year, when Trojan was shut down, the dependence of PGE on a single generating site became evident. With $67\frac{1}{2}\%$ ownership, and a Public Utility Commissioner unwilling to allow pass-through of purchased power costs, PGE (and Pacific and EWEB) have sued their builder. Puget would be in a far more precarious position if Skagit were built and worked poorly.

In constructing a worst-likely scenario, it is reasonable to assume that Pebble Springs will not be built, due to dropping demand forecasts, and effective local opposition. Even Governor Ray has indicated that a reduction in the rate of growth for electricity to 3% would allow cancellation of Pebble Springs. We can look at Puget's capital structure in 1988 adjusted to show the alterations which have been discussed thus far.

Reported 1988 Structure

Debt:	\$2,897
Preferred:	792
Common equity:	<u>\$2,186</u>
	\$5,875

Cancellation of Pebble Springs reduces this by \$724 (Exhibit page 8E)
 Bringing the cost of Skagit up to realistic levels increases the estimate
 by \$1,005 million. The resulting adjusted capital structure would have
 the following form:

Debt:	\$3,016
Preferred:	862
Common	\$2,277

Of this total, some \$2334 million represents the company share of Skagit.
 While GPU was able to lose TMI by absorbing the loss as a reduction of the
 market value of stockholder's equity, Puget could do nothing of the sort; their
 investment in Skagit would exceed the total of stockholder's equity. GPU
 retained roughly \$615 million in equity; Puget would have essentially none,
 and would thus not be in a position to seek any sort of credit whatsoever.
 This would place Puget in the position of being regarded as a speculative
 investment. Utilities make for poor speculation; at least in casinos there is
 no regulation of the rate of return...a potential for a high return comes with
 the high degree of risk involved. Puget is already a BBB/Baa rated utility.
 Most investment analysts are already downgrading nuclear investments, including
 the Bank of America, which has announced that they are no longer investing in
 nuclear projects, calling such investment "imprudent." It is highly optimistic
 to believe that a company with the level of exposure Puget would face could
 finance the level of participation they have committed themselves to.

Public Service of New Hampshire recently ran into this type of problem with
 Seabrook, and was forced to sell off 60% of their participation in order to
 reduce their exposure to the point where they were financeable. (Exhibit page 16)
 It is questionable if any customers could be found in the Northwest. Several
 WPPSS participants are presently reevaluating their participation in those projects,
 recognizing that their financial commitment has gone beyond the prudent level.

As reported by the Seattle Post-Intelligencer June 19, Chip Greening, Executive Director of the Public Power Council has said that the small public utilities have invested heavily in the nuclear plants (WNP 4&5) and face "disaster" if construction costs can't be spread to all the region's electrical users. This report is basically a confirmation of my analysis of WPPSS mentioned earlier. If WPPSS needed to find customers for their plants, and Puget were in the same situation as Public Service New Hampshire, seeking to spread their participation, the ability of either project sponsor to finance completion of their respective projects may be seriously impaired. The result would be a tremendous amount of capital tied up, but no power production.

Some discussion of the rate hikes which the utilities have reported should be considered. Puget and Water Power have indicated that their current cost estimates show a need for a 12% compound rate of increase in revenue/kwh. Revising the cost estimates for both Skagit and Pebble Springs to reflect realistic conditions would raise this to perhaps as high as 17%. The result would be an increase in average Puget rates from 18 mills in 1979 to 101 mills in 1990. Even at 12% rates would reach 63 mills. With the average all-electric home using in excess of 26,000 kwh/year, households may be seeing annual electric bills of over \$2500/year. Storm windows, insulation, and heat pumps amortize themselves very quickly at that level of energy cost. Alternatively, many customers may choose to form Public Utility Districts, which would reduce the load which Puget has to serve, forcing additional rate hikes to produce the needed revenue. If Puget cannot maintain a 5.3% rate of load growth at rates increasing between 12-17% annually, they will be unable to derive the revenue they require.

Puget has indicated to the WUTC that without an increase in the rate of inclusion of CWIP, and rapid rate relief, that they will be in a difficult position when seeking financing. Since their coverage ratios are already marginal, their internal cash generation is shown to be inadequate to secure financing, proper response from the WUTC would seem absolutely critical to their ability to finance the project. However, in the rate case just closed, Puget was given only 67% of their request; the closing arguments of the company indicated that a reduced amount of rate relief would not be adequate to support the company's construction program, described as "The largest construction program for it's size of any electric utility in the United States." (Exhibit page 19C)

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Fortunately, the regulatory system is moving away from average cost pricing to inverted rates, allocating the low-cost power we have available to all users in limited quantities at the embedded cost of production, and applying higher rates to more expensive power from new resources. Such rate structures will allow

power users to optionally hold usage down, or pay new resource cost. They also force new resources to be largely self-sufficient, which would likely render many new projects unnecessary by providing a financial incentive for conservation investments at costs approaching the marginal cost of new generation. For this reason the utilities confidence in their ability to get the rate relief they require should be considered very carefully; they may receive rate relief which will allow them to finance the projects if there is a market for the power at the costs associated with them. The GAO concluded in their report on the Northwest electrical energy situation (REGION AT THE CROSSROADS) that we could reduce electrical consumption in the Northwest by 30% by implementing replacement cost pricing. Incremental pricing will likely accomplish much of this reduction.

The financial calculations and assumptions of the applicants need to be completely reworked and resubmitted. As described earlier, the raw data on project costs are unrealistic. Their other assumptions are not much better. The utilities have used optimistic assumptions regarding future money costs and future rates of inflation. Puget has reported a 7% inflation rate for calculating the costs of all of their thermal projects, while the nuclear industry is experiencing 13-19% inflation and the coal industry is not far behind.

Puget has assumed a 9% prime rate for short term borrowing, $2\frac{1}{2}\%$ lower than what is presently in effect. Their estimate for long-term debt, 9-10 $\frac{1}{4}\%$ is at the extreme low-end of the market experience this year for Baa rated utilities, although Baa rated utilities with major nuclear projects have avoided the market since the incident at TMI, so the market figures may be skewed downward at present. These rates could, of course, rise or fall in the future. Their assumed 9% interest rate appears extremely optimistic, and should be adjusted to .2% above the bond rate, perhaps in the vicinity of 10 $\frac{1}{2}$ -11%

PGE has been somewhat more conservative with an allowance for a 12.1% prime rate, and a 10½% bond rate. While starting from a higher base, PGE anticipates only a 9.9% rate hike annually, but this will have to be revised upward to reflect the actual costs of the power plants they are building. The result will be a very similar pattern to that of Puget, and both will run into elasticity problems, particularly among their electrically heated homes.

Pacific has more properly treated the preferred dividend rate at 9.4%, although it is still too low. Their assumption of a 14.3% average rate of return may shock the various utility commissions which presently regulate them, but I agree that such increases will be imperative if projects such as this are to be financed, in order to compensate the investor for the high risk of nuclear plant ownership.

Water Power, with a superior bond rating, has also been somewhat more cautious in their estimates of future financing cost, although they share the optimism of Puget that financing costs will decline in the near future, which is anything but assured. Most economists see a significant recession coming, which will tighten up money markets as savings are consumed.

The pattern among the companies is quite clear. Those with the greatest exposure, and the least ability to finance the project, Puget and PGE, are consistent in using overoptimistic data. Pacific, with a highly diversified rate base and very limited nuclear investment, utilizes more realistic assumptions, with their latest bond statement showing a nearly accurate estimate of potential Skagit construction costs, compared with the unwarranted underestimation of the other participants. Puget, at the other extreme, is already showing themselves to be at the limit of ability to finance anything, with coverage ratios already approaching their limits, internal cash generation close to zero, and their extreme underestimates of both project costs and financing charges. As cost escalations occur, they will undoubtedly violate their fiscal parameters and articles of incorporation.

CONCLUSIONS

It is wholly evident from the interaction of all of the inconsistencies and inaccuracies presented by the applicants that the financial scenario they have proposed is far more optimistic than even the most generous of evaluations could support. As they are already showing their financial coverage at the edge of the permissible range for both preferred and bond coverage, and have virtually no internal cash generation, any adverse events will force them into an unmanageable situation. Even their own data shows internal cash generation inadequate to support a construction program of the magnitude proposed, even before adjustment of the data to reflect realistic cost scenarios.

The adverse events which the applicants will experience are easily identified by comparison of their data with other similar projects now underway. The cost overruns which have been experienced by WPPSS are typical of the industry, as supported by the recent study by the Supply System, and by the Barry report. The costs of the last two plants WPPSS is building, scheduled for operation long before the Skagit plants could be in service, amount to 61% more than the applicant's estimate, even though WPPSS is able to accrue AFUDC with tax-exempt securities, and ignoring the fact that inflation is rampant in the power plant business, with WPPSS acknowledging that further escalation is inevitable.

All of the independent costing and schedule models indicate that the applicants have grossly underestimated the time and expense associated with their proposal. The assumptions for financing cost are not reflective of the capital market as it now exists, or as most analysts anticipate the future. Finally, there is little evidence that the applicants will be able to secure the rate relief they will require, or be able to sell power from the projects at those rates, due to the high elasticity the region will experience as we move from an age of declining real energy prices to an era of rapidly increasing prices.

QUALIFICATIONS OF JIM LAZAR

PRESENT POSITION: Consulting economist in utility rate design and energy conservation. Clients include Fair Electric Rates Now, Olympia, WA (Research Director); Communities United for Responsible Energy, Lewis County, WA; Tacoma Light Coalition, Tacoma, WA; Pacific County Public Energy Forum, Raymond, WA; all involved in utility rate proceedings. Also providing assistance to members of Tacoma City Council and Mason County PUD #1 on energy planning issues.

EDUCATION: Western Washington University, B.A., 1974 (Economics)
Western Washington University, M.A. in progress (Environmental Administration and Energy Economics)

EXPERIENCE: Washington State Legislature, Research Analyst 1977-79
Involved primarily in transportation and energy research, including analysis of alternate energy resources, electrical generation cost, and capital budgeting for large state construction projects.

Economist, Sierra Club, 1975; engaged in comparison of energy conservation costs with energy production.

Chairman, Energy Policy Team, Bellingham, WA City Council, 1974-75; Involved in developing alternate scenarios for energy production and consumption 1975-2000.

Professional Organizations: American Economics Association
Association for Evolutionary Economics

RECENT PUBLICATIONS: ALLOCATING POWER COSTS TO PROMOTE CONSERVATION: A RATEPAYER'S GUIDE, (FERN) July, 1979

CONSERVING ELECTRICITY IN THE NORTHWEST (Jointly with Dr. R. Frye) April, 1979

THE BOND STATEMENTS OF THE WASHINGTON PUBLIC POWER SUPPLY SYSTEM: A CRITIQUE

Recent Testimony: U.S. Senate Committee on Energy and Natural Resources, Pacific Northwest Electrical Energy Planning and Conservation Act, S-885; May 24, 1979

Oregon Senate Environment and Energy Committee, Need for Pebble Springs nuclear project; May 22, 1979

Washington Utilities and Transportation Commission, Ability of Baa rated utility to finance nuclear power construction program; Cause U-78-21, December 18, 1979

RELATED CORRESPONDENCE



Exhibit of Jim Lazar

COST ANALYSIS OF LIGHT WATER REACTOR POWER PLANTS

PREPARED FOR THE DEPARTMENT OF ENERGY

WILLIAM E. MOOZ

R-2304-DOE
JUNE 1978

Rand
SANTA MONICA, CA. 90406

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the substitution of the BW indicator shows that plants using BW equipment took about 11 months longer to construct. Locational variables, whether or not a cooling tower is used, and whether or not the plant is colocated with another plant, appear to have little effect on construction time. The regression indicates that learning exists, and that the coefficient is significant. It also indicates that there is a countertrend to this one that is related to CPIS. It can be thought of as a time trend toward longer construction times that is countered by the experience curve of the architect-engineer.

Since the t-statistics of the location indicators, colocation indicator, and tower indicator are so low, we eliminate these terms and run one last regression analysis. The results, shown in Table 5, are what would be expected from the preceding analyses, and each term is significant at the 0.01 level or less. The regression equation has

Table 5

THIRD T2 REGRESSION ANALYSIS FOR 65-PLANT DATA BASE

SAMPLE SIZE	65
SUM OF WEIGHTS	6.5000D 01
ESTIMATED STD DEV	1.3111D 01
R SQUARED	0.5355

VARIABLE	COEFFICIENT	ESTD STD DEV	T
0	-2.7082D 02	8.6755D 01	-3.1217*
3 CPIS	4.5478D 00	1.3125D 00	3.4650*
10 SIZE	4.3643D-02	8.9292D-03	4.8877*
24 BW	1.3065D 01	4.8822D 00	2.6761*
31 LN	-8.0039D 00	1.9505D 00	-4.1035*

3 T2 DEPENDENT VARIABLE

ANALYSIS OF VARIANCE

SOURCE	DF	SS	MS	F
REGRESSION	4	1.1890D 04	2.9726D 03	17.293
ERROR	60	1.0314D 04	1.7190D 02	
TOTAL	64	2.2204D 04		

* All coefficients significant at 0.01 or less.

Table 11

THIRD REGRESSION ANALYSIS OF 39-PLANT DATA BASE

SAMPLE SIZE 39
 SUM OF WEIGHTS 3.9000D 01
 ESTIMATED STD DEV 1.0471D 02
 R SQUARED 0.7643

VARIABLE	COEFFICIENT	ESTD STD DEV	T
0	-8.8855D 03	1.0499D 03	-8.4636*
3 CPIS	1.4134D 02	1.5373D 01	9.1939*
10 SIZE	-2.1943D-01	9.8099D-02	-2.2368†
20 TOWER	9.2040D 01	3.4354D 01	2.6792*
13 LOC1	1.2812D 02	4.1363D 01	3.0976*
31 LM	-7.2422D 01	2.0119D 01	-3.5997*

33 COST/KW DEPENDENT VARIABLE

ANALYSIS OF VARIANCE

SOURCE	DF	SS	MS	F
REGRESSION	5	1.1735D 06	2.3470D 05	21.405
ERROR	33	3.6184D 05	1.0965D 04	
TOTAL	38	1.5353D 06		

* Significant at 0.02 or less.

† Significant between 0.02 and 0.05.

even show that these increases have been more pronounced than has been generally understood. As we will see, other factors have helped to mitigate the temporal cost increases.

Two questions arise concerning the CPIS coefficient. The first concerns how real it is. We have already noted the high collinearity of CPIS and T1, and have discarded T1 as a major cost determinant except as its variability is captured by the other equation variables. This decision was based on the statistical characteristics of T1RSID. The hypothesis that T1 itself lacks cost significance can be further tested by using another argument. The data base shows that T1 increased approximately 15 months over the 5-year period covered by the 39 data points. If the measured increase of \$700 per kWe were really due to increases in T1, it would imply that construction permit

the substitution of the BW indicator shows that plants using BW equipment took about 11 months longer to construct. Locational variables, whether or not a cooling tower is used, and whether or not the plant is colocated with another plant, appear to have little effect on construction time. The regression indicates that learning exists, and that the coefficient is significant. It also indicates that there is a countertrend to this one that is related to CPIS. It can be thought of as a time trend toward longer construction times that is countered by the experience curve of the architect-engineer.

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Table 5

THIRD T2 REGRESSION ANALYSIS FOR 65-PLANT DATA BASE

SAMPLE SIZE 65
 SUM OF WEIGHTS 6.5000D 01
 ESTIMATED STD DEV 1.3111D 01
 R SQUARED 0.5355

POOR ORIGINAL

VARIABLE	COEFFICIENT	ESTD STD DEV	T
0	-2.7082D 02	8.6755D 01	-3.1217*
3 CPIS	4.5478D 00	1.3125D 00	3.4650*
10 SIZE	4.3643D-02	8.9292D-03	4.8877*
24 BW	1.3065D 01	4.8822D 00	2.6761*
31 LX	-8.0039D 00	1.9505D 00	-4.1035*

8 T2 DEPENDENT VARIABLE

ANALYSIS OF VARIANCE

SOURCE	DF	SS	MS	F
REGRESSION	4	1.1890D 04	2.9726D 03	17.293
ERROR	60	1.0314D 04	1.7190D 02	
TOTAL	64	2.2204D 04		

* All coefficients significant at 0.01 or less.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

NUCLEAR POWER PLANTS

**COST, SCHEDULE, AND PRODUCTIVITY,
AN OVERVIEW OF THE INDUSTRY
AND IMPLICATIONS FOR THE FUTURE**

Prepared by:
The Project Planning and Measurement Department

J.P.M. MAIDMENT
Project Management Specialist
April 1979

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✓2

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DURATION FROM ISSUE OF CONSTRUCTION PERMIT TO FIRST CONCRETE vs CP ISSUE DATE

- LARGE PLANTS
- SMALL PLANTS
- EXCLUDED FROM ANALYSIS

POOR ORIGINAL

REPRESENTS 75 PLANTS

RANGE ± 4 MONTHS

MONTHS FROM CP ISSUE TO FIRST CONCRETE

CONSTRUCTION PERMIT ISSUE DATE

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DURATION FROM FIRST CONCRETE TO FUEL LOAD vs FUEL LOAD DATE

MONTHS FROM FIRST CONCRETE TO FUEL LOAD

ACTUAL (40 PLANTS)

PRESENT ESTIMATES (65 PLANTS)

LARGE PLANTS

SMALL PLANTS

POOR ORIGINAL

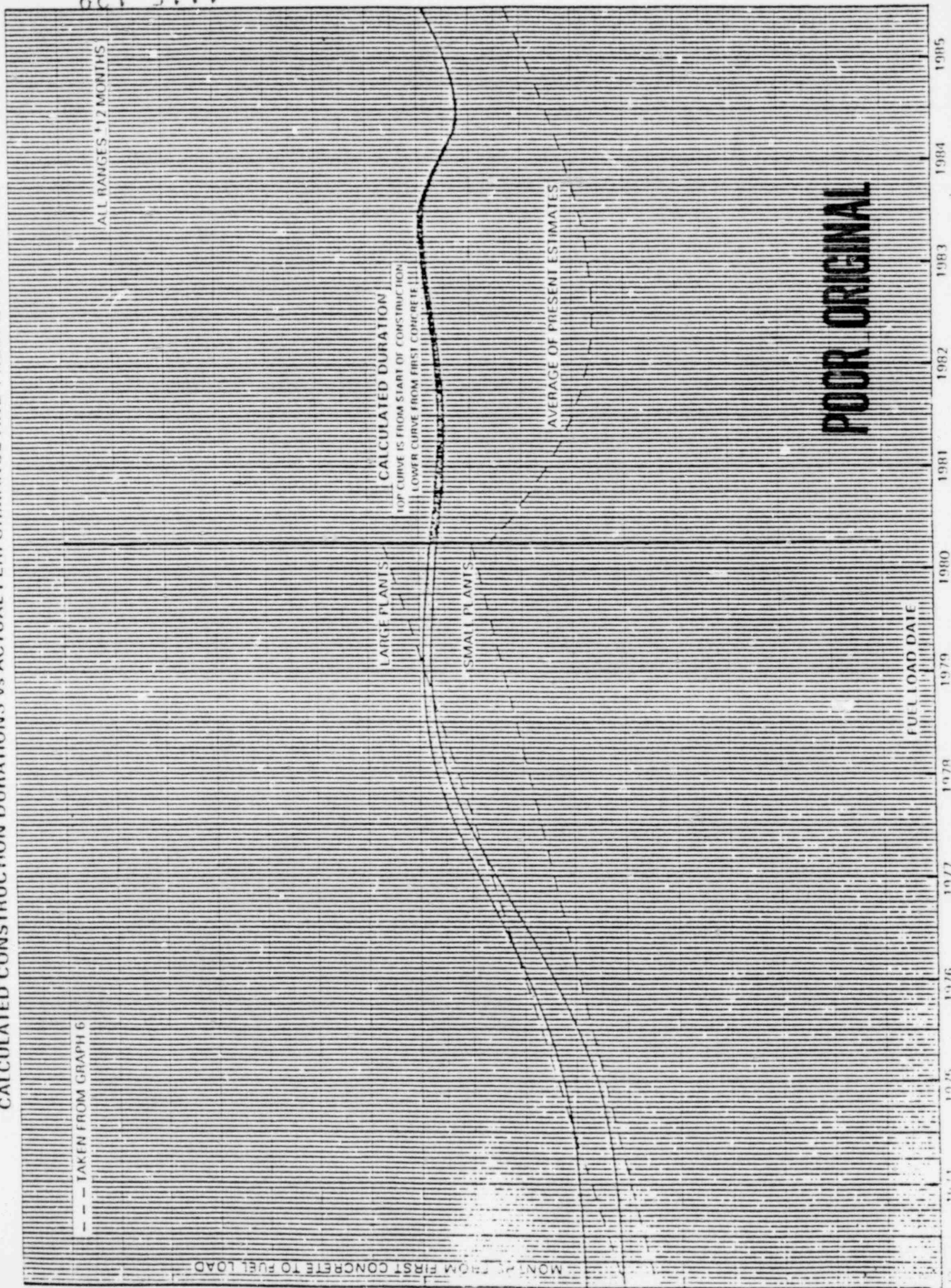
NOTE:
2ND PLANT DURATIONS HAVE BEEN
REDUCED BY 13 MONTHS TO MAKE
THEM EQUIVALENT TO 1ST PLANTS

- SMALL PLANTS
- ⊗ LARGE PLANTS
- CORRECTED 2ND PLANTS

FUEL LOAD DATE

1976 1975 1974 1973 1972 1971 1970 1969 1968 1967 1966 1965 1964 1963 1962 1961 1960 1959 1958 1957 1956 1955 1954 1953 1952 1951 1950 1949 1948 1947 1946 1945 1944 1943 1942 1941 1940 1939 1938 1937 1936 1935 1934 1933 1932 1931 1930 1929 1928 1927 1926 1925 1924 1923 1922 1921 1920 1919 1918 1917 1916 1915 1914 1913 1912 1911 1910 1909 1908 1907 1906 1905 1904 1903 1902 1901 1900 1899 1898 1897 1896 1895 1894 1893 1892 1891 1890 1889 1888 1887 1886 1885 1884 1883 1882 1881 1880 1879 1878 1877 1876 1875 1874 1873 1872 1871 1870 1869 1868 1867 1866 1865 1864 1863 1862 1861 1860 1859 1858 1857 1856 1855 1854 1853 1852 1851 1850 1849 1848 1847 1846 1845 1844 1843 1842 1841 1840 1839 1838 1837 1836 1835 1834 1833 1832 1831 1830 1829 1828 1827 1826 1825 1824 1823 1822 1821 1820 1819 1818 1817 1816 1815 1814 1813 1812 1811 1810 1809 1808 1807 1806 1805 1804 1803 1802 1801 1800 1799 1798 1797 1796 1795 1794 1793 1792 1791 1790 1789 1788 1787 1786 1785 1784 1783 1782 1781 1780 1779 1778 1777 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470 469 468 467 466 465 464 463 462 461 460 459 458 457 456 455 454 453 452 451 450 449 448 447 446 445 444 443 442 441 440 439 438 437 436 435 434 433 432 431 430 429 428 427 426 425 424 423 422 421 420 419 418 417 416 415 414 413 412 411 410 409 408 407 406 405 404 403 402 401 400 399 398 397 396 395 394 393 392 391 390 389 388 387 386 385 384 383 382 381 380 379 378 377 376 375 374 373 372 371 370 369 368 367 366 365 364 363 362 361 360 359 358 357 356 355 354 353 352 351 350 349 348 347 346 345 344 343 342 341 340 339 338 337 336 335 334 333 332 331 330 329 328 327 326 325 324 323 322 321 320 319 318 317 316 315 314 313 312 311 310 309 308 307 306 305 304 303 302 301 300 299 298 297 296 295 294 293 292 291 290 289 288 287 286 285 284 283 282 281 280 279 278 277 276 275 274 273 272 271 270 269 268 267 266 265 264 263 262 261 260 259 258 257 256 255 254 253 252 251 250 249 248 247 246 245 244 243 242 241 240 239 238 237 236 235 234 233 232 231 230 229 228 227 226 225 224 223 222 221 220 219 218 217 216 215 214 213 212 211 210 209 208 207 206 205 204 203 202 201 200 199 198 197 196 195 194 193 192 191 190 189 188 187 186 185 184 183 182 181 180 179 178 177 176 175 174 173 172 171 170 169 168 167 166 165 164 163 162 161 160 159 158 157 156 155 154 153 152 151 150 149 148 147 146 145 144 143 142 141 140 139 138 137 136 135 134 133 132 131 130 129 128 127 126 125 124 123 122 121 120 119 118 117 116 115 114 113 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

CALCULATED CONSTRUCTION DURATIONS vs ACTUAL PERFORMANCE AND PRESENT ESTIMATES



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CONSTRUCTION PROGRESS CURVES — ANNUAL INDUSTRY AVERAGES 1967 TO 1975

— ACTUAL
- - - ESTIMATED

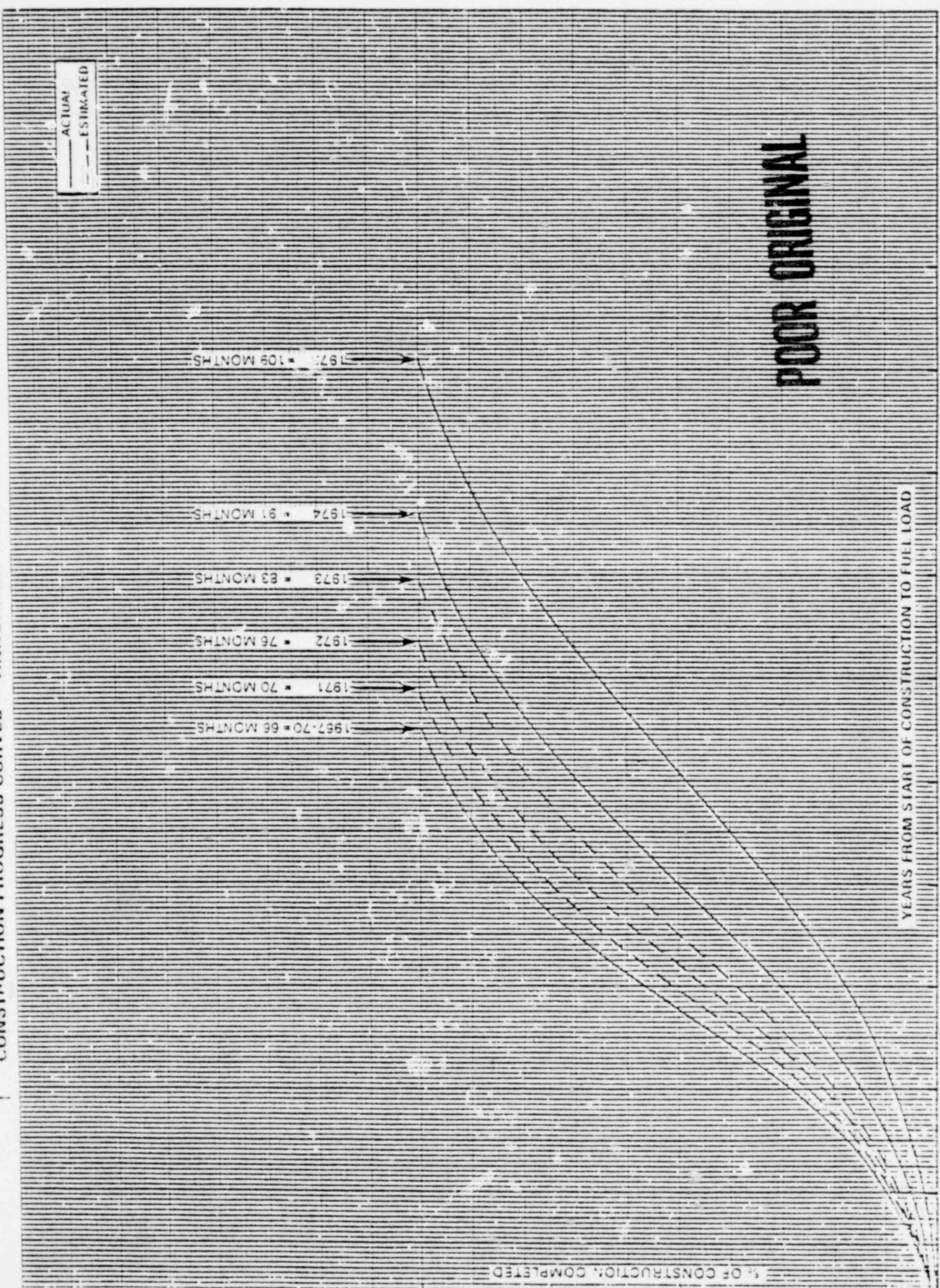
1967-70 = 66 MONTHS
1971 = 70 MONTHS
1972 = 76 MONTHS
1973 = 83 MONTHS
1974 = 91 MONTHS
1975 = 109 MONTHS

% OF CONSTRUCTION COMPLETED

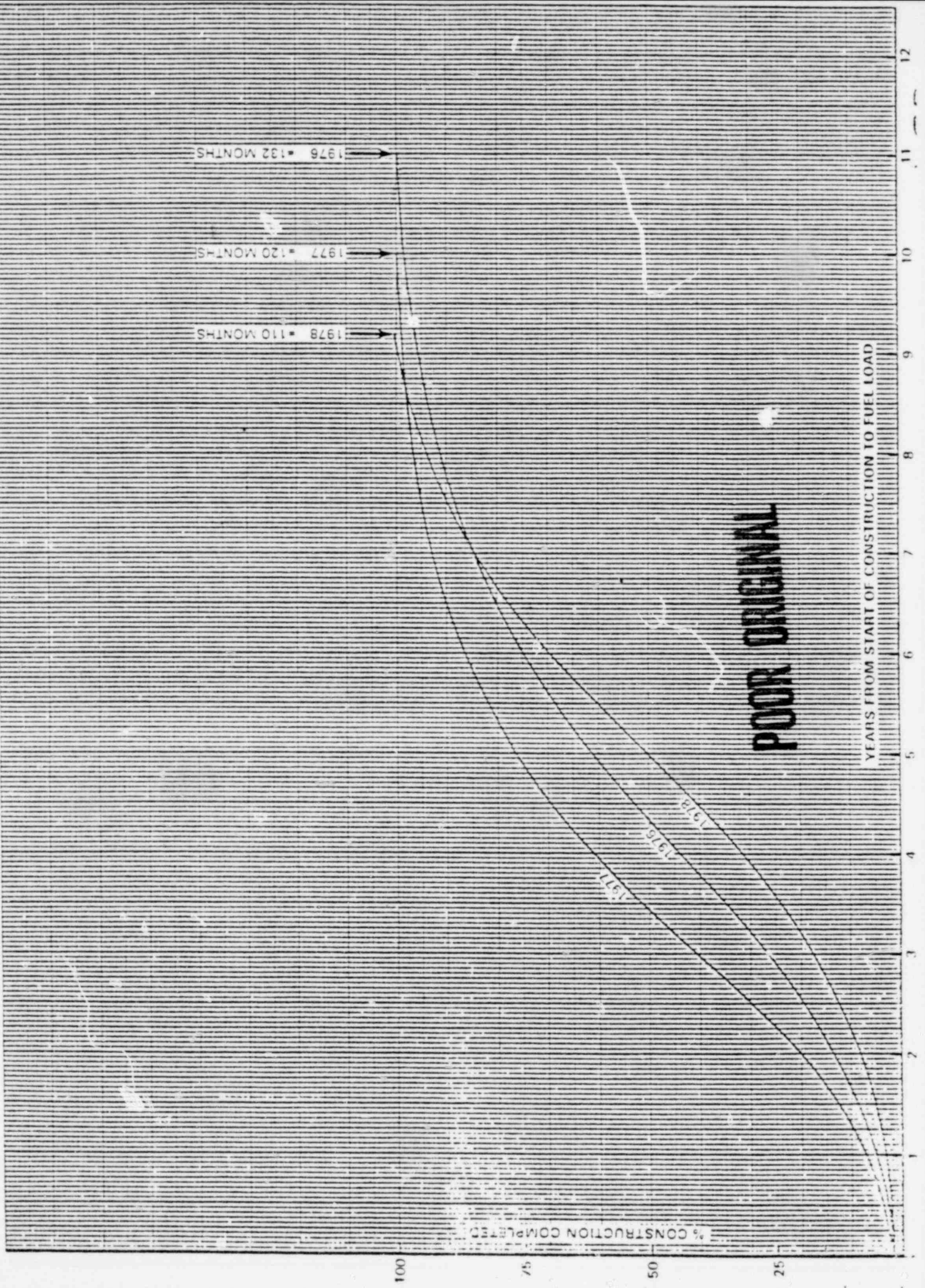
YEARS FROM START OF CONSTRUCTION TO FUEL LOAD

POOR ORIGINAL

1 2 3 4 5 6 7 8 9 10



CONSTRUCTION PROGRESS CURVES — ANNUAL INDUSTRY AVERAGES 1976 TO 1978



EBASCO

DRAMATIC CHANGES IN THE COSTS OF NUCLEAR AND FOSSIL-FUELED PLANTS

by R.R. BENNETT
Engineering Consultant
Ebasco Services Incorporated
and

D.J. KETTLER
Mechanical Engineer
Ebasco Services Incorporated

POOR ORIGINAL

September, 1973

1115 131

ALLOCATION OF PLANT COSTS 1978 ESTIMATES

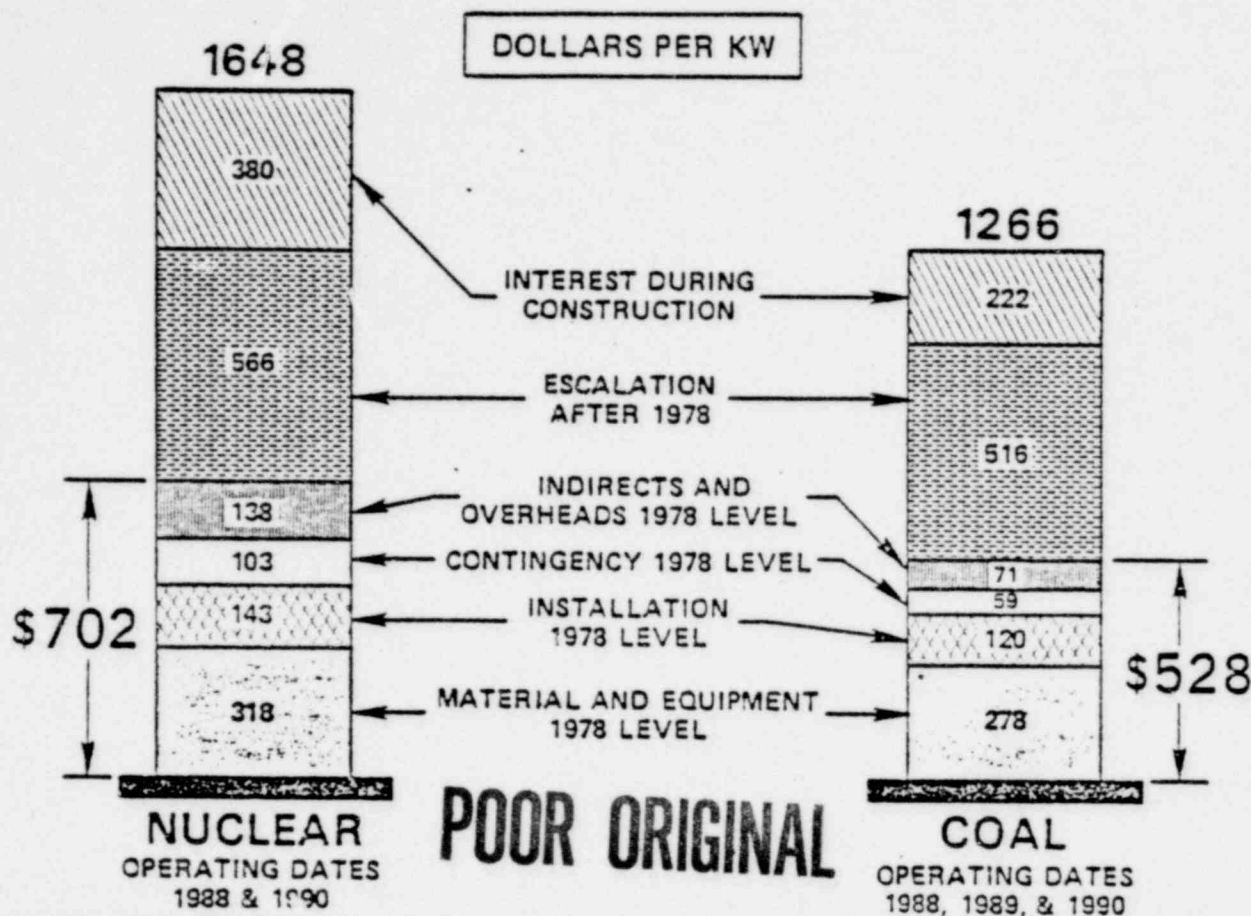


CHART 5

Chart 5 shows the breakdown of these estimates into major elements of cost. The cost of material and equipment will be established by the market conditions existing at the time commitments are made, both as to order price and terms of sale. You simply would pay less in a buyer's market or more in a seller's market.

The installation cost can vary significantly depending upon how well the project is managed and constructed, the labor climate in the area, labor availability and quality and other factors. We have assumed here a controlled, well-managed construction program.

The estimates include an item for contingencies. Here, 13 percent has been used for the coal-fired plant and about 17 percent for the nuclear, primarily because of greater uncertainties as to what may be required for the future.

Indirects and overheads, which include engineering, design and related services are based on a well-managed and well-executed project.

The sum of these items is only about 45 percent of the total project cost. The remaining 55 percent covers estimated escalation and interest during construction.

Escalation is pure judgment since no one can be certain of the escalation or inflation trend as was demonstrated by the unpredicted inflationary binge in 1974 and 1975. Ebasco's present opinion of future post 1978 escalation indicates increases averaging about 7 percent per year.

There is only minimal control over interest during construction. Availability of money at an 8.5 percent per year interest rate and a cash flow requirement typical for the types of plants

LEVELIZED BUS BAR POWER COSTS

First Ten Years Plant Operation (70% CF)

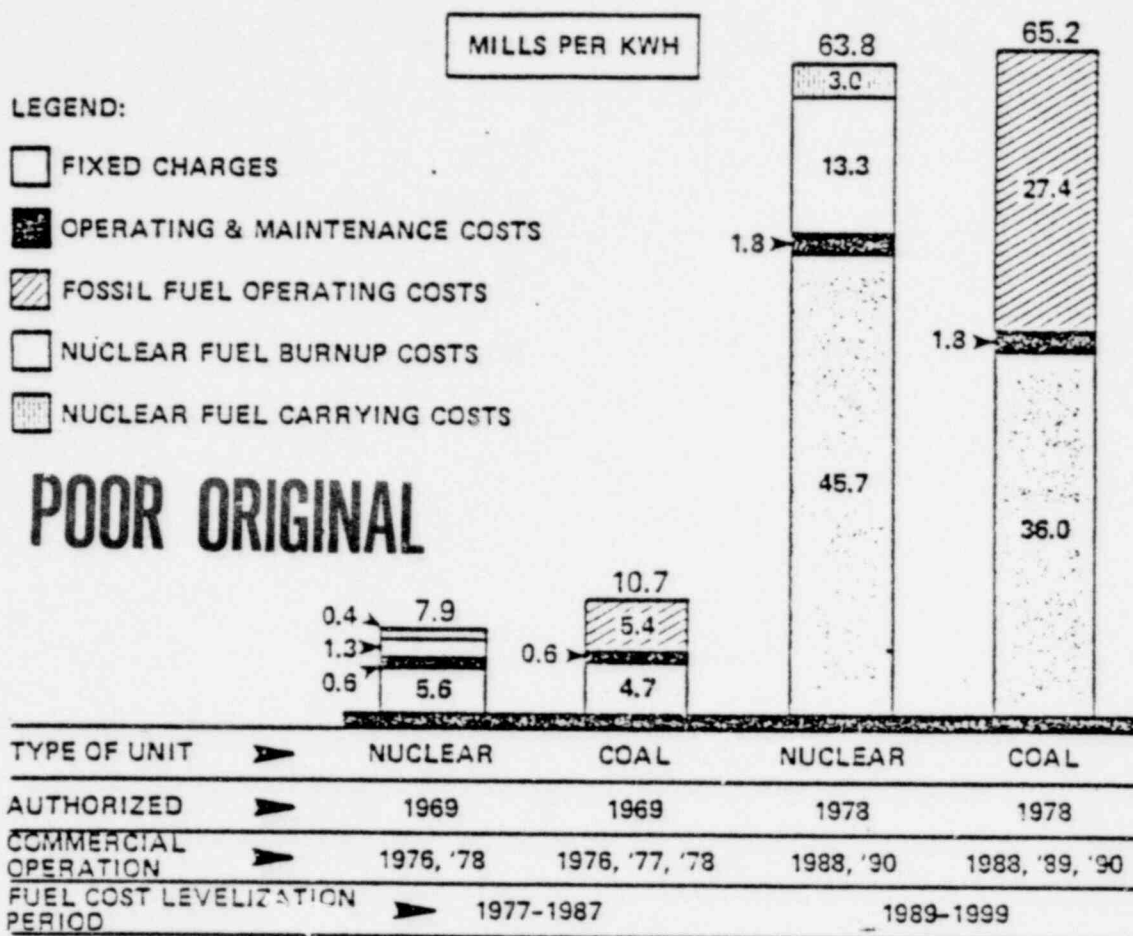


CHART 6

plutonium is allowed by 1989, which Ebasco believes may happen, the cost of nuclear fuel changes significantly. The estimated cost of the initial core remains unchanged at approximately \$1.28 per kWe. The levelized investment in fuel for the first ten years of operation, 1989-1999 increases by \$44/kWe to \$147/kWe. However, the total estimated levelized fuel cycle costs for the first ten years will be 13.70 mills per kilowatt-hour or \$1.34 per million Btu, a 16% reduction from the cost estimate based on no reprocessing.

Assuming no reprocessing, there is a ten-fold increase over the values estimated in 1969. With reprocessing there is a seven-fold increase over the values estimated in 1969.

LEVELIZED BUS BAR POWER COSTS

It is obvious, then that with increased coal-fired

and nuclear plant investment requirements and increased coal and nuclear fuel costs, bus bar power costs will also increase relative to estimates made in 1969.

What are the relative economics between coal and nuclear for base load generation? Obviously, this must be studied for each situation, but the next chart shows how the two examples compare based on the investment and fuel values previously shown.

1115 133

Chart 6 shows the levelized bus bar power costs for the first ten years of operation for the nuclear (no fuel reprocessing) and coal-fired plants estimated in 1969 for initial operation in the 1976-1978 period and as is estimated today for initial operation in the 1988-1990 period.

In 1969, we were projecting bus bar power of about 8 mills per kilowatt-hour for a 2 - 1200

KOMANOFF ENERGY ASSOCIATES

A COMPARISON OF NUCLEAR AND COAL COSTS

by Charles Komanoff

Presented as Testimony before the
State of New Jersey
Board of Public Utilities

on behalf of the
New Jersey Department of Public Advocate
Division of Rate Counsel

In the Matter of the Board's Order
Of Inquiry into the Reasonableness
of Electric Utilities Construction
Programs -- Docket No. 762-194

Phase III

October 9, 1978

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Table 1.1: GENERATING COSTS FOR NEW JERSEY NEW UNITS
(All Costs in 1985 Present-Worth Dollars)

	<u>Nuclear</u>	<u>Coal</u>	<u>Section of This Testimony</u>
Unit Size	1150 Mw	600 Mw ^{1/}	
Capacity ^{2/}	2300 Mw	1800 Mw	8
Capital Cost, per-kw	\$1875/kw	\$1025/kw	2
Fixed Charge Rate	15.56%	13.94%	10
Annual Fixed Charges	\$671.0 Million	\$257.2 Million	
Annual O&M ^{3/}	\$ 56.8 Million	\$ 54.6 Million	9
Capacity Factor ^{4/}	55%	70%	3/5
Annual Generation, mwh	11,081,400	11,037,600	
Fuel Cost, per-kwh ^{3/}	2.43c	3.17c	7/6
Annual Fuel Cost ^{3/}	\$269.3 Million	\$349.9 Million	
Total Annual Cost	\$997.1 Million	\$661.7 Million	
Generating Cost per-kwh ^{5/}	9.00c	6.00c/kwh	

Notes

1. An expansion plan using 300-Mw coal units appears to be slightly less expensive than the 600-Mw coal plan.
2. Unequal amounts of capacity are compared which are equivalent in their contributions to system reliability. The assumed Equivalent Forced Outage Rates are 22.5% nuclear and 15% coal. See Section 8.
3. All variable costs are levelized averages for the 1985-2015 period, present-worth to 1985 at a 10% discount rate.
4. Nuclear capacity factor is average of projections for PWRs (60%) and BWRs (50%).
5. Generating costs are 30-year average levelized to 1985. Costs in 1985 would be 7.72c/kwh nuclear, and 4.58c/kwh coal. This calculation uses 1985 fuel and O&M costs and lifetime fixed charge rates and capacity factors.

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THE ECONOMICS OF NUCLEAR POWER

PRESENTED BY

W. J. L. KENNEDY, VICE PRESIDENT AND
DIRECTOR OF ENGINEERING
STONE & WEBSTER ENGINEERING CORPORATION

TO

ATOMIC INDUSTRIAL FORUM, INC.

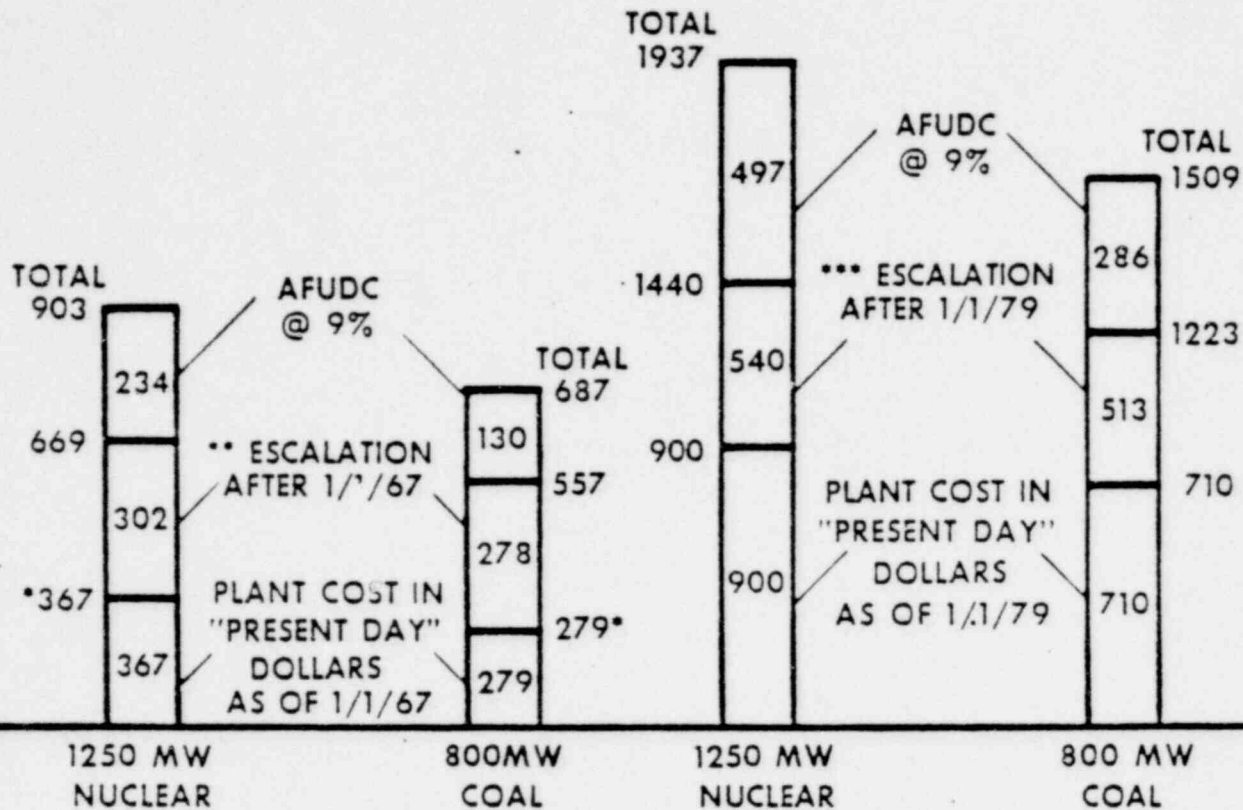
CONFERENCE
ON
NUCLEAR POWER AND THE PUBLIC

KANSAS CITY, MISSOURI

February 26, 1979

1115 136

All costs are in \$/kw net electric sendout based on custom design, first unit on site, once-through cooling, scrubbers on coal plant, designed to regulations and standards applicable as of 1/1/79 except that \$50/kw has been added to 1990 plants for possible future regulatory requirements.



PLANTS PLACED IN SERVICE 1/1/79

** Based on experienced escalation

PLANTS PLACED IN SERVICE 1/1/90

*** Based on assumed 6% compound escalation rate to point of each expenditure

Coal escalation is nearly as high as nuclear, even though it has a shorter schedule, because construction starts later to meet same in-service date.

Estimates are based on plant design as of 1/1/79, not as it would have been in 1967. Numbers marked * are, therefore, higher than would have been estimated in 1967 when regulatory requirements and effects on schedule could not have been anticipated. Estimate assumes 115 months from authorization for detail design and 79 months from construction start to commercial operation date for nuclear, 78 months and 48 months, respectively, for coal.

A standard preapproved nuclear plant would reduce cost by about \$300 per kw.

ALLOCATION OF CAPITAL COSTS

FIG. 2

1115 137

WASHINGTON PUBLIC POWER SUPPLY SYSTEM



SUPPLY SYSTEM PROJECTS:

QUESTIONS & ANSWERS

PREPARED BY  STAFF

FEBRUARY 1979

1115 138

WAGE RATE COMPARISON

<u>Craft</u>	<u>1978 Wage/Hr. - Including Fringes</u>			
	<u>Duke Power Co.</u>	<u>Tennessee Valley Authority</u>	<u>Commonwealth Edison Co.</u>	<u>Hanford</u>
Boilermaker	\$ -	\$13.84	\$16.30	\$19.06
Carpenter	8.82	10.14	13.65	15.96
Electrician	9.30	11.90	15.81	19.36
Ironworker	9.30	11.74	15.53	18.01
Sheetmetal	10.58	12.97	14.54	21.12
Pipefitter	9.30	12.72	14.72	20.50
Laborer	5.25	7.07	10.88	14.51
Operating Engineer	-	9.67	15.10	16.14
Composite Rate	<u>\$ 8.83</u>	<u>\$11.21</u>	<u>\$14.36</u>	<u>\$18.27</u>
Percentage Less Than WHP-2	107%	63%	27%	-

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V/A

AVERAGE HOURLY EARNINGS AND WAGE RATE
DOLLARS
NOT SEASONALLY ADJUSTED

	MANUFACTURING PRODUCTION WORKERS										FARM WAGE RATE	
	U S	ALASKA	ARIZONA	CALIF	HAWAII	IDAHO	NEVADA	OREGON	UTAH	WASH	U S	PCS
1969	3.19	4.59	3.10	3.62	3.05	3.16	3.95	3.58	3.27	3.85	1.55	1.80
1970	3.36	4.89	3.11	3.80	3.21	3.28	4.09	3.82	3.26	4.06	1.64	1.90
1971	3.57	5.42	3.67	4.02	3.39	3.53	4.21	4.09	3.41	4.25	1.73	1.96
1972	3.81	5.96	3.85	4.24	3.65	3.71	4.39	4.30	3.59	4.52	1.83	2.04
1973	4.19	5.90	4.73	4.45	3.95	4.05	4.58	4.60	3.77	4.82	1.98	2.19
1974	4.41	7.06	4.40	4.73	4.25	4.19	4.89	5.02	3.92	5.22	2.32	2.49
1975	4.91	8.05	4.85	5.21	4.64	4.75	5.26	5.53	4.05	5.79	2.45	2.71
1976	5.19	7.82	5.19	5.60	5.09	5.27	5.67	6.08	4.89	6.33	2.65	2.93
1977	5.63	8.87	5.56	5.79	5.49	5.81	6.10	6.61	5.18	6.85	2.90	3.18
1978	6.14	9.80	6.05	6.42	5.93	6.52	6.55	NA	5.68	NA	3.10	3.39
1977 SEP	5.79	9.83	5.70	6.13	5.65	5.88	6.34	6.79	5.27	6.99	NA	NA
1977 OCT	5.42	9.85	5.66	6.12	5.44	6.04	6.33	6.81	5.28	6.97	3.0	3.38
1977 NOV	5.75	9.39	5.72	6.13	5.85	6.03	6.27	6.85	5.10	7.01	NA	NA
1977 DEC	5.89	11.10	5.75	6.19	5.80	6.29	6.29	6.92	5.32	7.23	NA	NA
1978 JAN	5.97	10.92	5.90	6.21	5.94	6.24	6.40	6.95	5.38	7.23	3.18	3.37
1978 FEB	5.98	10.66	5.88	6.19	5.86	6.04	6.17	5.95	5.42	7.29	NA	NA
1978 MAR	5.96	10.09	5.86	6.24	5.96	6.12	6.24	6.98	5.48	7.33	NA	NA
1978 APR	5.90	10.08	5.73	6.29	5.97	6.25	6.36	7.06	5.51	7.38	3.08	3.38
1978 MAY	6.32	11.12	5.92	6.34	5.85	6.26	6.61	7.10	5.55	7.38	NA	NA
1978 JUNE	6.37	11.01	6.00	6.42	5.80	7.04	6.56	7.33	5.63	7.52	NA	NA
1978 JULY	6.17	8.70	6.27	6.47	5.52	7.08	6.69	7.43	5.81	7.65	3.00	3.23
1978 AUG	6.16	9.05	6.08	6.46	5.63	6.93	6.69	7.22	5.74	7.62	NA	NA
1978 SEPT	6.29	10.24	6.15	6.55	6.05	6.62	6.59	7.35	5.81	7.65	NA	NA
1978 OCT	6.32	9.83	6.15	6.57	6.40	6.46	6.63	7.36	5.92	7.68	3.20	3.58
1978 NOV	6.18	9.24	6.22	6.63	6.20	6.69	6.68	7.43	5.90	7.77	NA	NA
1978 DEC	6.47	9.52	6.29	6.72	6.23	6.74	7.00	NA	5.96	NA	NA	NA
1979 JAN	6.48	NA	6.34	6.77	6.40	NA	6.68	NA	6.10	NA	3.49	3.34
1979 FEB	6.50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

POOR ORIGINAL

FOR FOOTNOTES, SEE END OF SECTION

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PROSPECTUS

\$65,000,000

Puget Sound Power & Light Company

First Mortgage Bonds, 9 $\frac{1}{4}$ % Series due 2008

Interest payable January 1, 1979 and semi-annually thereafter on each July 1 and January 1.

The New Bonds are redeemable at any time at the Company's option at the Regular Redemption Prices set forth herein, except that the New Bonds may not be so redeemed prior to July 1, 1983 through certain refunding operations as more fully set forth herein. The New Bonds may also be redeemed at any time at the Special Redemption Price (100% plus accrued interest) from cash in the Depreciation Fund and in certain other circumstances. See "The New Bonds."

THESE SECURITIES HAVE NOT BEEN APPROVED OR DISAPPROVED BY THE SECURITIES AND EXCHANGE COMMISSION NOR HAS THE COMMISSION PASSED UPON THE ACCURACY OR ADEQUACY OF THIS PROSPECTUS. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

	Price to Public(1)	Underwriting Discounts(2)	Proceeds to Company(1)(3)
Per Bond.....	99.287%	.875%	98.412%
Total.....	\$64,536,550	\$568,750	\$63,967,800

- (1) Plus accrued interest from July 1, 1978 to date of delivery.
- (2) The Company has agreed to indemnify the several Underwriters against certain civil liabilities, including liabilities under the Securities Act of 1933.
- (3) Before deducting expenses payable by the Company estimated at \$150,000.

The New Bonds are offered subject to prior sale when, as and if issued by the Company and accepted by the Underwriters, and subject to the approval of certain legal matters by their counsel and by counsel for the Company. The Underwriters reserve the right to withdraw, cancel, or modify such offer and to reject orders in whole or in part. It is expected that delivery of the New Bonds will be made in New York City on or about July 18, 1978.

Merrill Lynch White Weld Capital Markets Group

Merrill Lynch, Pierce, Fenner & Smith Incorporated

Salomon Brothers

Dean Witter Reynolds Inc.

The date of this Prospectus is July 11, 1978

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Power Resources—Under Construction or Planned

Project and Location	Unit No.	Estimated Net Capability (Megawatts)	Energy Source (Fuel)	Estimated Date of Operation (b)	Estimated Total Construction Cost (a)		Company's Ownership Share (%)	Company's Cost to 3/31/78 (c) (Millions)	Estimated Total Cost of Company's Share (Millions)
					per KW	Total (Millions)			
Coistrip, Coistrip, Montana	3	700	Coal	1982	\$ 714 to	\$1,000 to	25%	\$18	\$ 250 to
	4	700	Coal	1983	\$ 786	\$1,100			\$ 275
Pebble Springs, Arlington, Oregon	1	1,260	Nuclear	1986	\$1,151 to	\$2,900 to	20(e)	\$34	\$ 580 to
	2	1,260	Nuclear	1989	\$1,230	\$3,100(d)			\$ 620
Rock Island, Rock Island, Washington	1-8	410	Hydro	1978-79	(f)	(f)	(f)	(f)	(f)
Skagit, Sedro Woolley, Washington	1	1,288	Nuclear	1985	\$1,126 to	\$2,900 to	40(e)	\$61	\$1,160 to
	2	1,288	Nuclear	1987	\$1,165	\$3,000(d)			\$1,200
WPPSS No. 3, Satsop, Washington		1,240	Nuclear	1984	\$1,129 to \$1,210	\$1,400 to \$1,500(d)	5	\$ 8	\$ 70 to \$ 75

(a) Including allowance for funds used during construction and giving effect to estimated future inflation but excluding transmission facility costs. Estimated construction costs are subject to review and may be further revised from time to time due to delays in regulatory action, environmental matters, changes in equipment delivery schedules, contract disputes, financing considerations and other factors which may affect the construction program. Data on Pebble Springs and WPPSS No. 3 are supplied by the sponsor.

(b) These dates represent current estimates. As a result of environmental and licensing proceedings, the Company and other plant sponsors have experienced delays and future delays are possible. See the description of the projects below and "Environment".

(c) Should any of the proposed plants be cancelled, the Company may incur substantial additional costs, including cancellation charges, since the Company must make substantial investments and commitments in proposed plants prior to completion of licensing and other proceedings necessary for their construction and operation.

(d) Not including cost of initial nuclear fuel cores estimated at \$70 million for Unit 1 and \$158 million for Unit 2 of the Pebble Springs Project, \$92 million for Unit 1 and \$100 million for Unit 2 of the Skagit Project and \$63 million for the WPPSS No. 3 Project. See "Skagit Project" and "Fuel Supply—Nuclear Projects" for descriptions of contract disputes that may affect the costs of a nuclear steam supply system for Unit 2 and fuel cores for both units of the Skagit Project.

(e) Joint ownership arrangements for the Pebble Springs and Skagit projects are subject to continuing review and negotiations among the project participants. Pending allocation to other parties of an uncommitted 15% ownership share of the Pebble Springs Project, the Company will carry an additional 3.5% of the project costs.

(f) All construction expenditures for the Rock Island Project will be incurred by Chelan County PUD, the owner of the project. The Company will receive, under a power contract, 100% of the output through the year 2012, subject to reduction after July 1, 2000, as described below. Chelan County PUD has issued \$298.6 million of revenue bonds for construction of the project, including interest during the construction period.

POOR ORIGINAL

PUGET SOUND POWER & LIGHT COMPANY

REVISED ITEM 1. Q. Please provide (1) the capital cost and cost per kilowatt hour as estimated at the time of the original application, and (2) the most recent estimated capital cost per kilowatt hour together with the dates of the estimates for each thermal generating facility in which you are a participant.

A. CAPITAL COSTS ONLY

	(1) <u>ORIGINAL ESTIMATE</u>		(2) <u>MOST RECENT ESTIMATE</u>		<u>1/</u>
	<u>\$X10⁶</u>	<u>Mills/kwh^{2/}</u>	<u>\$X10⁶</u>	<u>Mills/kwh^{2/}</u>	
Colstrip 3 & 4 <u>3/</u>	92.2	4.89	331.3	17.59	
Skagit 1 & 2 <u>3/</u>	688.6	12.33	1415.1	25.34	
Pebble 1 & 2	375.3	12.30	670.8	21.98	
WPN #3	27.4	8.14	77.0	22.91	

1/ Includes Owners Costs, AFDC, Escalations & Taxes

2/ 75% Plant Factor

3/ Includes transmission

4/ The original estimate and the revised estimate are on substantially different basis as described in the testimony of R. V. Myers in WUTC Cause No. U-78-21

PUGET SOUND POWER & LIGHT COMPANY

PART B, ITEM 3-1

WPPSS NUCLEAR PROJECT - UNIT #3 AND FIRST FUEL LOAD
(\$ THOUSANDS)

YEAR	CONSTRUCTION EXPENDITURES	AFOI
1973	198	1
1974	579	33
1975	950	96
1976	3061	206
1977	1995	550
1978	9632	818
1979	10862	1019
1980	10512	1232
1981	12660	1511
1982	7447	1612
1983	3453	1256
	60854	8136

\$ 1,397,000

POOR ORIGINAL

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PUGET SOUND POWER & LIGHT COMPANY

PART B, ITEM 3-2

SFGIT NUCLEAR PROJECT - UNITS 1 & 2, TRANSMISSION & FIRST FUEL LOAD
(\$ THOUSANDS)

YEAR	CONSTRUCTION EXPENDITURE	AFOC
1972	119	6
1973	4462	85
1974	12177	653
1975	16367	1738
1976*	829	109
1977	18916	3123
1978	40433	5682
1979	69409	8914
1980	84085	7107
1981	124033	9213
1982	180795	19026
1983	210161	19771
1984	175209	25553
1985	84702	21516
1986	56393	19801
1987	8593	12248
	1085025	152580

$$E = 1237975 = 1201 / \text{KW}$$

POOR ORIGINAL

PART B, ITEM 3-3

PEBBLE SPRINGS NUCLEAR PROJECT - UNITS 1 & 2 AND FIRST FUEL LOAD
(8 THOUSANDS)

POOR ORIGINAL

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X 8 E

\$100,000,000

Pacific Power & Light Company

First Mortgage Bonds, % Series due 2009

The Bonds will be redeemable, in whole or in part, at any time on 30 days' notice at the option of the Company at the redemption prices set forth herein, provided that, prior to April 1, 1984, no redemption may be made at a general redemption price through refunding at an effective interest cost to the Company of less than the effective interest cost of the Bonds. Such restriction is not applicable to redemptions at a special redemption price for the replacement fund or with certain deposits and proceeds of property. (See "Description of New Bonds.")

THESE SECURITIES HAVE NOT BEEN APPROVED OR DISAPPROVED BY THE
SECURITIES AND EXCHANGE COMMISSION NOR HAS THE COMMISSION
PASSED UPON THE ACCURACY OR ADEQUACY OF THIS PROSPECTUS.
ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

This Prospectus is to be used in connection with the Public Invitation for Bids for the purchase from the Company of the New Bonds referred to herein. The Company will receive bids up to 12:00 Noon, New York Time, on April 10, 1979, at Room 2033, Two Rector Street, New York, N.Y.

An information meeting will be held at The Federal Room, 4th Floor, Manufacturers Hanover Trust Company, 40 Wall Street, New York, N.Y., at 2:30 P.M., New York Time, on April 9, 1979.

The date of this Prospectus is March 28, 1979.

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POOR ORIGINAL

Future Generating Plants

		Company's Ownership						
<u>Energy Source</u>		<u>Sched- uled by Spon- sor</u>	<u>Name- plate Rating</u>	<u>%</u>	<u>MW</u>	<u>Cost through 12/31/78¹</u>	<u>Total Estimated Cost¹</u>	<u>Estimated Cost Per KW¹</u>
			<u>(Mega- watts)</u>			<u>(000)</u>	<u>(000)</u>	
JIM BRIDGER								
Rock Springs, Wyoming	Coal-Fired Steam	No. 4 1979	500	66.7	333	\$144,300	\$225,300	\$ 671
COLSTRIP								
Colstrip, Montana	Coal-Fired Steam	No. 3 1983	700	10.0	70	9,500	130,300	931
		No. 4 1984	700	10.0	70			
WPPSS ⁴								
Satsop, Washington	Nuclear	No. 3 1984	1,240	10.0	124	28,900	168,600 ²	1,360 ²
		No. 5 1986	1,240	10.0	124	21,600	186,300 ²	1,502 ²
SKAGIT ⁴								
Concrete, Washington	Nuclear	No. 1 1986	1,288	20.0	258	43,700	458,900 ²	1,779 ²
		No. 2 1988	1,288	20.0	258	—	376,100 ²	1,458 ²
PEBBLE SPRINGS ⁴								
Arlington, Oregon	Nuclear	No. 1 1987	1,260	29.4 ³	370 ³	58,600	549,300 ^{2,3}	1,485 ²
		No. 2 1989	1,260	29.4 ³	370 ³	2,700	465,500 ^{2,3}	1,258 ²
TOTAL.....					1,977			

¹ Costs and estimated costs include only the Company's portion of jointly-owned plants. Estimated costs are subject to constant review and change.

² Excludes costs of nuclear fuel.

³ The Company's portion is currently funded at 29.4%, but 15% of the plant is available for other participants and, if this entire portion is assigned, the Company's portion would be reduced to 25%; PNGC, a group of Northwestern public agencies, has announced its intent to acquire 10% of Unit No. 1.

⁴ The Company is advised by the sponsors of the nuclear generating facilities in which it is participating that fuel supplies for such facilities have been arranged to allow the units to operate for the periods indicated below:

Trojan	Until March 1983 (March 1988, if the present interim agreement for importation and use of foreign uranium remains in effect)
Pebble Springs No. 1	21 months
Pebble Springs No. 2	No contract
Skagit No. 1	33 months
Skagit No. 2	33 months
WPPSS No. 3	Until approximately 1998
WPPSS No. 5	Until 1990 with approximately 1/3 of the annual requirement for the following eight annual refuelings under contract.

The fuel cycle for nuclear generating units involves the acquisition of uranium concentrate, its conversion to UF₆, enrichment, fabrication of the nuclear fuel assemblies, storage of spent fuel and, if permitted by federal energy policy, its reprocessing. Contracts for uranium concentrate, conversion, enrichment and fabrication, beyond those covering the supplies for projects listed above, will be required for operation of those nuclear projects. The Company anticipates that the necessary additional fuel supplies will be available, but is unable to predict the prices therefor. The Company is informed that no

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Power

PACIFIC POWER & LIGHT COMPANY

Production Plant Construction Expenditure Summary
For the First Year a Project was Included in
The Company's Budget

(Thousands of Dollars)

<u>Description</u> (1)	<u>Budget Year</u> (2)	<u>Company Share-Mw</u> (3)	<u>In Service</u> (4)	<u>Original Total Cost</u> (5)	<u>Cost Per Kw</u> (6)
Fossil Plants:					
Jim Bridger Unit 4	1974	333	1978	\$137 225	\$ 412
Colstrip Units 3 and 4	1974	140	1979	35 730	255
Nuclear Plants:					
WPPSS No. 3	1974	125	1981	69 475	556
WPPSS No. 5	1976	124	1983	122 763	990
Skagit No. 1	1974	120	1982	63 777	531
Skagit No. 2	1975	258	1985	254 403	986
Pebble Springs No. 1	1973	330	1979	120 000	364
Pebble Springs No. 2	1975	315	1985	331 020	1,051

x 9B

PACIFIC POWER & LIGHT COMPANY

Production Plant Construction Expenditure Summary
(Thousands of Dollars)

<u>Description</u> (1)	<u>Location</u> (2)	<u>Company Share-Hw</u> (3)	<u>In Service</u> (4)	<u>Total Cost</u> (5)	<u>Cost Per Kw</u> (6)
Fossil Plants:					
Jim Bridger Unit 4	Rock Springs, Wyoming	333	1979	\$ 225 281	\$ 676
Colstrip Units 3 and 4	Colstrip, Montana	140	1984	130 300	931
Nuclear Plants:					
WPPSS No. 3	Satsop, Washington	124	1984	168 635	1 360
WPPSS No. 5	Satsop, Washington	124	1985	186 250	1 502
Skagit No. 1	Sedro Woolley, Wash.	258	1986	458 854	1 778
Skagit No. 2	Sedro Woolley, Wash.	258	1988	376 126	1 458
Pebble Springs No. 1	Arlington, Oregon	370	1987	549 258	1 484
Pebble Springs No. 2	Arlington, Oregon	370	1989	465 509	1 258

NOTE: The amounts shown exclude nuclear fuel

Summary of Project Construction
Amounts and AFUDC for Specified Thermal
Projects (In Thousands of Dollars)

Case No. W-78-05
Attachment No. 5

Exhibit _____

Period	Coldstrip Units 3 and 4		Petroleum Specimen Units 1 and 2		WHP No. 3 and 5		Nuclear Plant		Synthetic No. 1 and 2		Nuclear Plant Other
	Total	AFUDC	Total	AFUDC	Total	AFUDC	Total	AFUDC	Total	AFUDC	
1978	11,280	1,529	10,271	1,053	6,142	6,142	152,905	6,728	6,234	4,154	
1979	22,460	2,286	19,574	1,324	7,412	7,412	96,412	6,518	10,547	57,951	
1980	42,660	5,541	37,119	2,183	11,432	11,432	144,551	10,910	17,149	71,431	
1981	71,740	10,325	67,115	25,415	16,326	16,326	189,110	16,215	22,249	140,261	
1982	113,280	18,745	95,635	54,143	25,082	25,082	220,313	26,145	44,716	222,479	
1983	130,670	24,544	115,126	82,112	34,267	34,267	254,261	39,145	69,239	322,206	
1984	155,550	25,917	129,513	119,434	47,416	47,416	270,071	54,221	103,171	439,430	
1985				16,825	61,124	61,124	275,421	69,478	144,137	542,091	
1986				22,632	71,167	71,167	276,791	77,743	127,537	610,426	
1987				26,112	76,512	76,512		24,012	27,716	654,036	
1988				29,412	79,022	79,022		27,825	22,911	667,122	
1989				30,241	80,220	80,220		29,457	22,249	652,667	

Note: The amounts shown represent end of
period balances

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PROSPECTUS

900,000 Shares The Washington Water Power Company Common Stock (no par value)

Outstanding shares of Common Stock are listed, and the shares offered hereby will be listed, on the New York, Pacific and Spokane Stock Exchanges. The last reported sale price of the Common Stock on the New York Stock Exchange on September 20, 1978 was \$23 $\frac{1}{2}$ per share.

THESE SECURITIES HAVE NOT BEEN APPROVED OR DISAPPROVED BY THE SECURITIES AND EXCHANGE COMMISSION NOR HAS THE COMMISSION PASSED UPON THE ACCURACY OR ADEQUACY OF THIS PROSPECTUS. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

	Price to Public	Underwriting Discounts and Commissions(1)	Proceeds to Company(2)
Per Share	\$23.50	\$.64	\$22.86
Total	\$21,150,000	\$576,000	\$20,574,000

- (1) The Company has agreed to indemnify the several Underwriters against certain civil liabilities, including liabilities under the Securities Act of 1933.
- (2) Before deduction of expenses of the Company estimated at \$135,000.

The shares of Common Stock are offered by the several Underwriters when, as and if issued by the Company and accepted by the Underwriters and subject to their right to reject orders in whole or in part. It is expected that certificates for such shares will be available for delivery at the office of Kidder, Peabody & Co. Incorporated, 10 Hanover Square, New York, New York 10005, on or about September 28, 1978.

Kidder, Peabody & Co.
Incorporated

Dean Witter Reynolds Inc.

The date of this Prospectus is September 21, 1978.

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The major portion of the Company's construction program relates to three projects comprising two coal-fired and three nuclear generating units scheduled for completion at various times from 1983 to 1988. The Company has agreed to participate in the construction and ownership of the WPPSS No. 3 project (sponsored by the Washington Public Power Supply System) and, subject to negotiation of formal contracts, the Colstrip project (sponsored by The Montana Power Company) and the Skagit project (sponsored by the Puget Sound Power & Light Company). Additional information with respect to these projects is set forth below.

<u>Project, Location and Sponsor</u>	<u>Kw of Installed Capacity</u>	<u>Fuel</u>	<u>Sponsor's Estimated Date of Operation (a)</u>	<u>% of Company's Interest</u>	<u>Company Cost to 6-30-78 (\$000) (b)</u>	<u>Estimated Cost of Company's Interest (\$000) (c)</u>	<u>Estimated Cost per Kw of Installed Capacity (c)</u>
Colstrip--Colstrip, Montana The Montana Power Company							
Production Plant--Unit No. 3 . . .	700,000	Coal	1983	15	\$12,384	\$140,143	\$667
Production Plant--Unit No. 4 . . .	700,000	Coal	1984				
Transmission Plant				15	1,365	48,168	
Skagit--Sedro Woolley, Wash. Puget Sound Power & Light Company							
Production Plant--Unit No. 1 . . .	1,288,000	Nuclear	1986	10	17,883	237,782	923
Production Plant--Unit No. 2 . . .	1,288,000	Nuclear	1988				
WPPSS No. 3--Satsop, Wash. Washington Public Power Supply System							
Production Plant	1,240,000	Nuclear	1984	5	9,487	57,691	931

(a) These dates represent the latest available estimates. As a result of environmental and licensing proceedings, delays have been experienced and additional delays are possible. See "Business--Electric System and Power Supply".

(b) Inclusive of AFDC.

(c) Exclusive of AFDC and, in the case of Skagit, the cost of nuclear fuel. Estimated construction costs are subject to review and may be further revised from time to time due to delays in regulatory action, environmental matters, changes in equipment delivery schedules, financing considerations and other factors which may affect the construction program. Data on plants are based on information supplied by the sponsors.

Upon completion of the Colstrip project, Skagit nuclear project, and WPPSS No. 3 nuclear project, the Company estimates it will have expended approximately \$66,000,000 for air and water pollution control facilities and for aesthetic purposes. This amount is included in the estimated cost of the Company's interest in the projects shown in the above tabulation.

If any of the above projects are delayed or cancelled, the amounts and timing of expenditures will be changed. See "Business--Electric System and Power Supply".

The Company has selected a site approximately 60 miles west of Spokane for a future coal-fired plant, but the size of the plant, participation by other utilities, and proposed dates for construction and commercial operation have not been determined.

The Company expects to finance the remainder of its construction program and debt maturing through the end of 1978 with internally generated funds, the New Common Stock and bank borrowings. In order to finance the Company's construction program thereafter, funds generated from internal sources will be used together with substantial additional amounts which the Company expects to raise by bank borrowings and the sale of securities. The types, amounts and time of issuance of such securities cannot now be determined.

Continuation of the Company's construction program depends upon the availability of outside capital. The Company will need adequate and timely rate increases if revenues and income are to reach and be maintained at levels which will result in sufficient internally generated funds to meet its operational requirements and permit external financing of its construction requirements at a reasonable cost. If adequate funds cannot be obtained from outside financing and internal sources, the Company, of necessity, will reduce its construction program.

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THE WASHINGTON WATER POWER COMPANY
CONSTRUCTION DOLLARS & AFUDC
COLSTRIP #3 & #4, SKAGIT #1 & #2, WNP #3

	Total As Of 12/31/77	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	Total
<u>Colstrip #3 -4/82</u>												
Construction Funds(\$000's)	11,346	7,341	44,058	40,534	25,722	10,400	--	--	--	--	--	139,401
FUDC (\$000's)	1,017	1,261	3,420	6,973	9,756	10,982	--	--	--	--	--	33,409
<u>Colstrip #4 -2/83</u>												
Construction Funds(\$000's)	5	177	13,307	13,683	12,024	10,647	4,019	--	--	--	--	53,862
FUDC (\$000's)	1	8	574	1,708	2,787	3,740	4,215	--	--	--	--	13,033
<u>Skagit #1 -7/85</u>												
Construction Funds(\$000's)	12,039	9,982	16,855	17,081	22,045	24,814	17,504	8,122	1,425	--	--	129,867
FUDC (\$000's)	1,363	1,431	2,558	3,983	5,626	7,594	9,372	10,448	10,824	--	--	53,199
<u>Skagit #2 -7/87</u>												
Construction Funds(\$000's)	--	--	197	1,208	8,184	17,088	33,277	26,978	17,384	6,527	1,074	111,917
FUDC (\$000's)	--	--	8	67	462	1,523	3,639	6,169	8,032	9,037	9,337	38,274
<u>WNP #3 -1/84</u>												
Construction Funds(\$000's)	6,171	8,776	10,847	10,094	9,461	6,613	3,662	1,644	--	--	--	57,268
FUDC (\$000's)	567	887	1,711	2,591	3,412	4,087	4,519	4,678	--	--	--	22,452

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RESPONSE OF THE WASHINGTON WATER POWER COMPANY
CAUSE NO. U-78-05

FERN Request

Request 1: Please provide (1) the capital cost and cost per kilowatthour as estimated at the time of the original application, and (2) the most recent estimated capital cost per kilowatthour together with the dates of the estimates for each thermal generating facility in which you are a participant.

Response:

	<u>Capital Costs for Large Thermal Projects</u> ^{1/}			
	<u>(1) Original Estimate</u>		<u>(2) Most Recent Estimate</u> ^{2/}	
	<u>\$x10⁶</u>	<u>Mills/Kwh</u> ^{3/}	<u>\$x10⁶</u>	<u>Mills/Kwh</u> ^{3/}
WNP #3	29.1	11.0	79.7	30.1
Colstrip #3 & #4 ^{4/}	55.3	6.2	239.7	26.8
Skagit #1 & #2	172.2	15.6	333.3	30.3

1/ Estimates include property tax, owner's administrative and general expense, escalation and AFUDC. Fuel is excluded.

2/ Refer to the response to the WUTC staff's Request B-3 for the basis of the plant cost data.

3/ 75% Plant Factor.

4/ Includes transmission.

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PUGET SOUND POWER & LIGHT COMPANY

Part B, Item 4. Q. Please supply levelized fuel costs (Life of Plant) for above plants in which you are participating.

A. The levelized fuel cost for Plants Puget is participating in are listed below:

	<u>Notes</u>	<u>Fuel Costs Mills/KWH</u>
Colstrip 1 & 2	(1)	3.297
Colstrip 3 & 4	(2)	4.64
Skagit 1	(3)	6.28
Skagit 2	(3)	6.32
Pebble 1	(4)	7.39
Pebble 2	(5)	8.14
WPPSS 3	(6)	6.4

1. 1978 Actual Costs
2. Estimate \$7.06 / ton, 1978 Dollars (Fuel Agreement has not been completed)
3. 1978 Dollars 20 year levelized Costs
4. 1978 Dollars 15 year levelized Costs
5. 1978 Dollars 15 year levelized Costs
6. 1978 Dollars 15 year levelized Costs

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PACIFIC POWER & LIGHT COMPANY

Incremental Fuel, Operating and Maintenance Expense
(Thousands of 1977 Dollars)

Line No.	Resource	PP&L Share Output @ 75% P.F. 000 MWH (1)	Fuel Expense		Variable Operation & Maint. Exp.		Line No.
			Annual \$ (2)	Mills/KWH (3) (3=2+1)	Annual \$ (4)	Mills/KWH (5) (5=4+1)	
1	Colstrip	920	\$ 3,219	3.5	\$1,472	1.6	1
2	Jim Bridger #4	2,108	10,720	4.9	3,938	1.8	2
3	Pebble Springs #1 & 2	4,625	26,827	5.8	1,388	0.3	3
4	WPPSS #3	815	5,051	6.2	244	0.3	4
5	Skagit #1 & 2	3,384	20,302	6.0	1,015	0.3	5
6	WPPSS #5	815	5,051	6.2	244	0.3	6
7	Total	12,747	\$71,170		\$8,301		7
8	Fuel Expense = 5.58 Mills/KWH = \$71,170 ÷ 12,747 MWH						8
9	Operating and Maintenance Expense = 0.79 Mills/KWH = (\$8,301 ÷ 12,747 MWH) × 1.22*						9
10	Total Incremental Fuel and O&M Expense = 6.37 Mills/KWH = 5.58 + 0.79						10

6.37 Mills/KWH

Sources: 1978 Capital Budget
Economic Analysis
Power Resources

* Administrative and General Expense
Loading Factor as Shown on Table 8

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RESPONSE OF THE WASHINGTON WATER POWER COMPANY

Cause No. U-78-5
Exhibit B Request

Request B4:

Please supply levelized fuel costs (life of plant) for above plants in which you are participating.

Response:

Levelized fuel costs for plants in which our Company is a participant are as follows:

<u>Plant</u>	<u>Fuel Costs</u> <u>(Mills/kwh)</u>
Colstrip #3 & #4 (1)	4.64
WNP #3 (2)	4.71
Skagit #1 (3)	6.28
Skagit #2 (3)	6.32

- (1) Estimate is in 1978 dollars. The Fuel Agreement has not been completed.
- (2) Estimated in 1978 dollars. Fifteen-year levelized costs.
- (3) Estimated in 1978 dollars. Twenty-year levelized costs.



Department of Energy
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

In reply refer to: PRT

MAY 10 1979

Ms. Sue Ellen Heflin
Fair Electric Rates Now (FERN)
7241 Commercial NE.
Olympia, Washington 98506

Dear Ms. Heflin:

In response to your letter of inquiry to Mr. Gene Tollefson, dated April 20, 1979, the data you requested is furnished.

The enclosed table lists the exports and imports between the Pacific Northwest (PNW) and the Pacific Southwest (PSW). These values are the total quantities over all three transmission lines. I believe this table has all the data you requested about imports and exports.

The data on Trojan refers only to the 30 percent share of Eugene Water and Electric Board (EWEB) which is net-billed with BPA. BPA's net receipt of power is as follows:

Sept. '76-Dec. '76	710,973,000 kWh
Jan. '77-Dec. '77	1,947,718,000 kWh
Jan. '78-Dec. '78	499,673,000 kWh

Please note that these values are net. When a nuclear plant is shut down, it still requires operating power, approximately 20,000 kW. These operating amounts have been subtracted from the power produced when the plant is running.

You also asked for the costs related to the 30 percent share. The values given will be for the same periods as for energy. Some explanation would be advisable first. The costs as broken down are the budgeted numbers. These are determined by the participants at the beginning of each fiscal year. The budgeted costs are then paid by BPA in a predetermined pattern over the year. At the end of the year an adjustment is made for actual expenses. This adjusted amount is shown as "actually paid." The budget is arranged in categories that are close to the questions that you asked. The category "other" includes capital additions such as more efficient pumps or offices, and expendibles such as supplies.

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Budgeted Costs of EWEB 30% Share of Trojan - \$

	<u>Budget Total</u>	<u>Debt Service Principal & Interest</u>	<u>Share of PGE O&M</u>	<u>Fuel</u>	<u>Other</u>
Sep. '76 - Dec. '76	7,811,416	3,572,478	920,071	1,945,700	1,373,167
	6,227,100 actually paid				
Jan. '77 - Dec. '77	31,966,240	10,757,676	6,083,520	7,748,070	7,376,974
	29,125,500 actually paid				
Jan. '78 - Dec. '78	31,751,700 <u>1/</u>	10,559,985	7,155,000	6,373,300	7,663,415
	29,755,000 actually paid				

1/ During the calendar year 1978, due to the Trojan plant not being allowed to operate, the annual budget was reduced from \$33,191,740 to \$31,751,700.

I believe this information answers your request. If you have any questions about it, feel free to contact me.

Sincerely Yours,

Richard E. Nyland

Richard Nyland
Special Assistant
to Power Manager

Attachment:
Table

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✓ 14A

PACIFIC POWER & LIGHT COMPANY
State of Washington
Application of LRIC to Load Classes

Line No.	Load Class	Delivery Voltage (1)	Losses		System Diversified Load Factor (4)	Demand-Related LRIC ¢/KWH (5)	Energy-Related LRIC ¢/KWH (6)	Commitment and Billing-Related LRIC ¢/KWH (7)	Total LRIC ¢/KWH (8) (8=5+6+7)	Line No.
			Peak (2)	Energy (3)						
1	Residential	Secondary	17%	14%	48.2%	1.42	2.78	0.83	5.03	1
	General Service:									
2	0-30 KW	Secondary	17	14	47.4	2.14	2.78	1.01	5.93	2
3	30-100 KW	Secondary	17	14	59.9	1.33	2.78	0.29	4.40	3
4	100-300 KW	Secondary	17	14	50.8	1.33	2.78	0.18	4.29	4
5	300-1,000 KW	Secondary	17	14	51.6	1.21	2.78	0.06	4.05	5
6	1,000-10,000 KW	Primary	13	11	71.0	0.79	2.69	0.02	3.50	6
7	10,000 KW and Over	Primary	13	11	98.7	0.52	2.69	**	3.21	7

$$\text{Demand-Related LRIC in ¢/KWH} = \frac{(\$ / \text{KW}) (100) (1 - \text{Peak Losses})}{(\text{System Diversified Load Factor}) (8760 \text{ Hours})}$$

$$\text{Energy-Related LRIC in ¢/KWH} = \frac{(\$ / \text{KWH})}{(1 - \text{Energy Losses})}$$

$$\text{Commitment-Related LRIC in ¢/KWH} = \frac{(\$ / \text{Customer}) (100)}{\text{Annual KWH/Customer}}$$

Load Class	Annual KWH/Customer
Residential	15,790*
G.S.	
0-30 KW	15,046
30-100 KW	127,935
100-300 KW	508,146
300-1,000 KW	1,698,762
1,000-10,000 KW	7,693,316
10,000 KW and Over (Pri.)	167,379,000

* Includes 14,979,000 kwh temperature adjustment applied to residential class.

** Amount less than 0.005¢/KWH

Sources: Engineering
Load Research

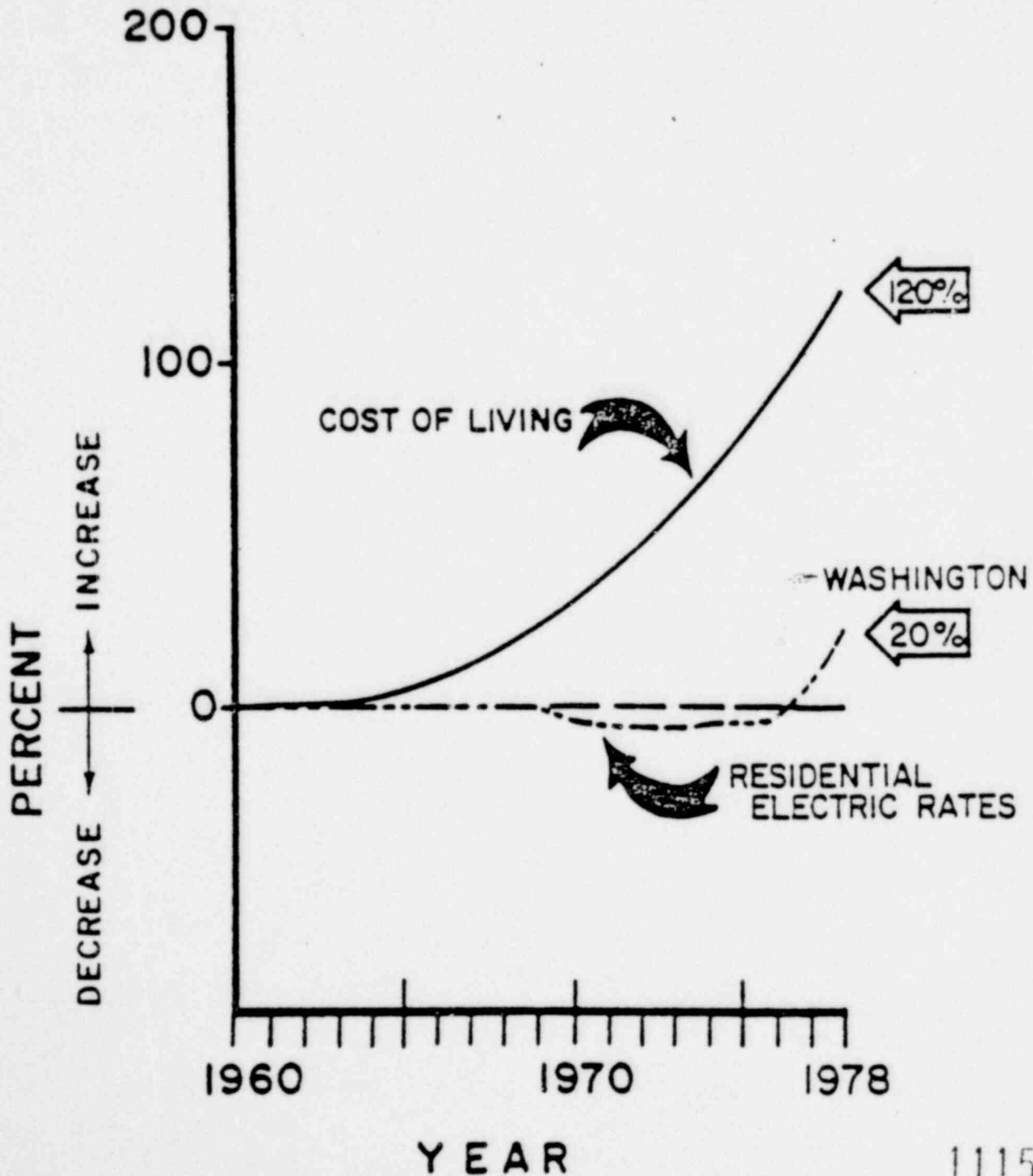
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Table S-11

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THE WASHINGTON WATER POWER CO.
RESIDENTIAL ELECTRIC RATES
1200 KWH PER MONTH
COMPARISON WITH COST OF LIVING



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PUGET SOUND POWER & LIGHT COMPANY

Part C. Item 7. Q. List all price elasticity studies, performed by you or for you by others, which estimate price elasticity for energy or capacity, by customer class, either annually, seasonally or diurnally.

A. Estimations of price elasticities were conducted by the Corporate Economist in conjunction with the estimation of the econometric model. Below are the final results of these estimations. (Industrial elasticities are those estimated by K. Anderson for the PNUCC)

	Short Run	Long Run
<u>Residential</u>		
Saturations *		
Ranges	- .25	- .93
Dryers	- .22	- .63
Water Heaters	- .17	- .61
Space Heaters	- .30	-3.00
Residual	- .18	- .37
<u>Commercial</u>	- .15	- .50
<u>Industrial</u> (by SIC)		
SIC 20	- .06	- .41
24	- .15	- .97
26	- .11	- .71
28	- .21	-1.39
29	0 .32	-2.14
37	0 .06	- .43

* Elasticity of Saturation

$$\frac{S_i}{1-S_i}$$

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Residential sector does not have one constant price elasticity.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

February 28, 1978

Honorable Dixy Lee Ray
Governor
State of Washington
Legislative Building
Olympia, Washington 98504

In re: Puget Sound Power & Light Co., et al.
(Skagit Project, Units 1 and 2)
Docket Nos. 50-522, 50-523

Dear Dr. Ray:

Thank you for your letter of the 17th (received on February 27), and your expression of interest in and concern for the progress of the Skagit proceeding.

The Atomic Safety and Licensing Board is likewise concerned about the progress of the case. The Board has been ready to proceed as soon as the parties have completed the preparation of their evidence. Despite the endeavors made to devise a schedule for the exchange of data intended to be presented for evidence, the most recent submittal arrived on February 27th, just about a week before the scheduled March 7th hearing, and possibly too late for adequate review and preparation for complete cross-examination by the recipient parties.

Seismic and geologic hearings have an unhappy attribute of taking more time than once anticipated. For instance, the AEC-NRC formed an ad hoc hearing group out of the Appeal Board Panel, who are composed of attorneys holding assignments as Staff personnel, but not as administrative law judges provided by the Administrative Procedure Act, and technical personnel, in order, as stated, to expedite a hearing on seismic matters placed in contention in the Con Edison Indian Point proceedings. That hearing group was formed about three years ago, the case is not over yet, and there is no indication of when it will be. The Skagit ASLB will certainly better that record on seismic matters.

Equally important to the Licensing Board, as important to you as you have stated, is the interest of the consumers, both as to need for power and the costs involved. To digress a moment, I must congratulate you on your prescient anticipation expressed in 1977 that electricity conservation in the Pacific Northwest would probably not be an

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insurmountable problem in view of your large water resources for hydroelectric dams and the abundance of low cost electricity. Your anticipation certainly has been confirmed with the water supply available to your region today; in fact, the Portland General Electric (Trojan) nuclear plant is not operating today. And interestingly enough, the Wall Street Journal reported the other day that Pacific Gas and Electric Company (PG&E) has filed for a rate decrease of some \$89,000,000 for the stated reason that its water supply will permit greater use of the hydroelectric dams available to PG&E.

Your mention of costs to the consumers is within our concern as those costs bear upon ability to finance and likely revenues from rates to pay for operations during the life of the proposed plant. In passing, I might comment that if the Washington Public Service Commission has adopted the current but fleeting fashion of "construction-work-in-progress" rate making, the consumers have had their rates raised to pay for a plant not yet constructed nor authorized. It would be interesting to know how many thousands or possibly millions of dollars have been collected so far. As you know, of course, the fundamental and standard principle for utility charges is to permit rates to be sufficient to pay the prudent costs of a utility plant and operations used and useful in the rendition of service. This principle encourages careful and accurate planning before building a plant, and prompt construction when designs and sites are found adequate. Under the presently fashionable theory of construction-work-in-progress rates, the dollars collected in advance from consumers might well be a basis for a utility to pay interest to consumers whose money is not providing service at the time of collection of the added rate amounts.

I think it fortunate that you have read or have been informed about the references to the Diablo Canyon proceeding at the January 24th pre-hearing conference in the Skagit case. I am sure that the Pacific Gas and Electric Company concluded that adequate data had been collected to warrant a construction permit. Unfortunately, the PG&E consultants failed in their investigation, and even rejected as "speculative" a suggestion that any earthquake fault was sufficiently adjacent to be a problem. Those consultants appeared to take the view that a lone intervenor witness should be required to "prove" his suggestion of the existence of a fault. Fortunately for that witness, an oil company in an investigation of the area nearby to the PG&E nuclear plant, found a fault, and the tragedy of incomplete investigation must now be weighing heavily on PG&E, and may be one of the reasons for the proposed reduction of \$89,000,000 in rates. If the rate payers are paying for construction-work-in-progress rates, the weight must be nigh unto unbearable.

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As you perhaps noted in the January 24th Skagit prehearing, some intervenors have made some similar suggestions of earthquake faults as were made in the Diablo Canyon case. While other proceedings, both at the state level, and also at perhaps incomplete Advisory Committee on Reactor Safeguards meetings have considered seismic and geologic matters, the NRC Licensing Board proceeding is the only one governed by the federal Administrative Procedure Act, which provides for cross-examination and full exploration of the issues before a federal agency. Neither the state nor ACRS determinations are compelling to the federal proceeding. To be sure, the Skagit case will be decided on its merits and the facts related solely to it, but I would expect the Licensing Board to note that the Director of the consultants for the Applicants is the same for both the Diablo Canyon and Skagit cases. ✓

In conclusion, the Licensing Board will expedite the Skagit case in every way possible. As indicated, delays in preparation and exchange of intended evidence have accounted for late submittals in this proceeding. As previously indicated, the Board has been ready as soon as the parties have been. The Applicants, despite their entreaties in November for an early (December 5) hearing after the ACRS meetings, filed on December 12 a substantial re-working of their seismic and geologic data. The Regulatory Staff, through no fault of its own, nor that of its consultants, the U. S. Geological Survey, which has many priorities, was only able to file its final seismic report on February 27th. The Licensing Board will endeavor to accommodate these late filings but the caution must be expressed that possibly the cross-examination beginning on March 7th may not be completed at that session, and the Licensing Board schedules will require the next session to be in April.

Your patience with us will be appreciated. Your letter having been sent by copies to the parties to the proceeding, they will no doubt take heed of your interest in seeing that the evidence is promptly prepared and presented. Please be assured that there is not any "... across-the-board disinclination to process this case with due dispatch."

Respectfully yours,

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Samuel W. Jensch
Samuel W. Jensch, Chairman
Atomic Safety and Licensing Board

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X 17B

Utility to Reduce Stake in Seabrook Nuclear Project

PS of New Hampshire's Plan To Sell Part of Holding Could Cause New Delays

By WALL STREET JOURNAL Staff Reporter

MANCHESTER, N.H.—The fate of the on-again, off-again Seabrook nuclear power station became even more blurred over the weekend.

Citing a "financial crisis," caused by a rate dispute, Public Service Co. of New Hampshire said it plans to reduce its 50% holding in the \$2.6 billion electricity-generating facility to 20%. This would mean that PS of New Hampshire wouldn't any longer hold controlling interest in the power station, under construction since 1976.

Furthermore, PS of New Hampshire, in a short press release, hinted that construction of the project, delayed two times already could be suspended again. This would happen if some of the 13 other utilities with holdings in the project don't move in quickly to buy up the chunk of Seabrook that PS of New Hampshire wants to sell.

"We're just plain getting tired of all this," a PS of New Hampshire source said. "We've been pressed to our breaking point several times, and this time it's beyond our breaking point."

The latest dispute is over a 9% surcharge PS of New Hampshire has been tacking onto customers' electricity bills for construction works in progress, or CWIP.

Governor's Vow

This surcharge, aimed at generating \$17 million in added revenue a year, was jeopardized last November with the election of governor of Hugh J. Gallen, who has vowed to do away with the CWIP.

PS of New Hampshire has said that without these additional funds it wouldn't have the financial ability to retain its 50% interest in the nuclear project. This would support the contention by some securities analysts and utility-industry experts that PS of New Hampshire has neither the financial resources nor political savvy to steer the massive two-generator project through its troubled course.

Construction of the project, in the sea-coast village of Seabrook, was suspended for seven months in 1977 after the federal Environmental Protection Administration ruled that the sea water-cooled facility would endanger nearby marine life. Construction was halted again, for three weeks in 1978, by the federal Nuclear Regulatory Commission. Through all this, antinuclear organizations have been holding demonstrations at the Seabrook site.

Surprised Utility

These delays and the stiff opposition always seem to have caught PS of New Hampshire by surprise. The latest surprise came last November with the election of Mr. Gallen, whom the utility opposed, over incumbent Gov. Meldrim Thomson, who supported the nuclear project and vowed to keep the surcharge. In its announcement over the weekend, the utility said its board, after a two-day session, "reluctantly directed management" to cut the utility's holding in the project to 20% from 50%. Another utility, United Illuminating Co., which supplies electricity to the New Haven and Bridgeport areas of Connecticut, owns 20% of the project.

The PS of New Hampshire announcement said the board told the management to sell 22% of the project to utilities outside New Hampshire and 8% to companies in the state.

The utility wouldn't name potential purchasers nor terms of the sale, but it is known that at least five utilities and associations are interested in increasing their holdings. They are Massachusetts Municipal Wholesale Electric Co., an association of several western Massachusetts municipal companies; New England Gas & Electric Co.; Eastern Utility Associates, a holding company; Bangor Hydro Co. of Maine, and Maine Public Service Co.

In addition, the PS of New Hampshire board ordered the utility to sell its 3% interest in Pilgrim II, a Massachusetts nuclear power plant, and its 3% holding of Millstone III in Connecticut.

"These steps have been taken by the board in the face of the financial crisis created by the adverse political atmosphere related to CWIP which has developed in New Hampshire and the total failure to date of efforts to reach a solution," PS of New Hampshire said.

Of its plan to sell part of its Seabrook interest, the company said, "prompt favorable responses and action from the other participants will be necessary if suspension of construction of the Seabrook project is to be avoided."

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BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION,

Complainant,

vs.

PUGET SOUND POWER & LIGHT
COMPANY,

Respondent.

CAUSE NO. U-78-21

VOLUME XXIV

PAGES 3710 - 3877, inc.

ORAL ARGUMENT

A continued hearing in the above matter was held on
Wednesday, January 24, 1979, at the hour of 1:00 PM in
the Hearing Room, Highways-License Building, Olympia,
Washington, before Chairman ROBERT BAILEY, Commissioner
ELMER HUNTLEY and Administrative Law Judge JOHN VON REIS.

The parties were present as follows:

(AS PREVIOUSLY NOTED)

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1 projects of 33.76 million dollars. (This is the equiva-
2 lent of putting the entire average amount of major proj-
3 ects CWIP in the rate base but with the 7% AFDC offset.)
4 The importance of the Company's proposal is dramatically
5 demonstrated by line 9 of Exhibit 115. As can be seen,
6 the Staff proposal will not provide adequate coverage. It
7 is only with the Company proposal and rate relief effec-
8 tive before April 1 that adequate coverages are maintained
9 for 1979. It is for this very purpose - to maintain the
10 credit of the utility so it can adequately finance - that
11 the Commission initially decided to include major projects
12 CWIP in rate base. In addition, line 2 of the Exhibit
13 demonstrates that adequate financial flexibility provided
14 by internal cash flow is available only under the Company
15 case. The Staff case with rate relief effective April 1
16 provides less than 6% internal cash flow - well below the
17 15% which is the absolute minimum that the Company must
18 have to preserve any type of financial flexibility in 1979
19 in meeting its construction program.

20 Issues have been raised with respect to whether major
21 projects CWIP should be included in rate base, suggesting
22 that it should only be done under certain conditions. Mr.
23 King, in his rebuttal testimony, clearly outlines the fact
24 that the Company has met all of the ~~tests~~ suggested by the
25 witnesses as follows:

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JUDGE VON REIS: Mr. Beighle.

MR. BEIGHLE: First I want to talk a little bit about CWIP in rate base. The Staff position in response to Puget's position with respect to increased revenue requirement from construction work indicated that there is no evidence that we cannot finance in 1979. What the Staff does is they ignore the fact that we sit at year-end 1979 with \$75 million in short term debt and no coverages and nowhere to go. And that just is not facing up to the problem.

Mr. Adams, commenting on CWIP, points out that he thinks it is unusual to include it. I can supply the jurisdictions. There are over 20 jurisdictions that include some part of construction work in progress in rate base. ~~It~~ is nothing unusual in the United States. There have been other utilities that have had this problem with their major generation construction program and they have had to ask for some relief in the cash flow area in coverages in order to carry out the construction program.

What we have really heard up and down the bench, as Bill Weaver has mentioned, is a back door attack on the Siting Council. I think everything we have heard today on load forecasting, resource

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1 that in that case it was significant in the quotation
2 that they pointed out that every year this account
3 is going to increase. Let me point out that our
4 accelerated deferred tax account is production
5 plant only. And ours has been increasing because
6 we brought two units in at Colstrip in 1975 and
7 1976. But we do not have any new units coming in
8 until Colstrip in 1983.

9 So whatever arguments there are for fooling
10 around with that account and putting it in year end
11 just do not exist because we are not building
12 transmission plant every year or, like the telephone
13 company, putting in new phones or new wires and
14 everything. This is production plant only. And we
15 do not have a new plant until Colstrip 3.

16 I would like to take the last couple of minutes
17 that I have and make a couple kind of general
18 observations. This company, Puget Power, is in the
19 spotlight nationally. In Mr. King's opening testimony
20 he cited two Wall Street Journal articles, one of
21 which pointed out that it has the largest construction
22 program for its size of any electric utility in the
23 United States out of the hundred plus utilities.

24 A second article pointed out that it had the
25 largest forecast increase in its common stock. It

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1 had more common stock to sell than any utility in
2 the United States. This company has done everything
3 it can do to get itself in financial position by
4 way of planning, by way of financial forecasting,
5 so that it can built a plant that it thinks is
6 vital to the economic well being of this area. But
7 it cannot do it alone. It needs the understanding
8 and the assistance and the blessing of this Commission.

9 I spent yesterday on Wall Street meeting with
10 bond rating agencies in connection with Puget's
11 preferred stock offering. As this Commission is
12 aware, we have to get a bond rating on not only
13 our bonds but on our preferred stock. The failure
14 to get that rating would be the kiss of death on
15 any of the securities issues because they would
16 not be legal investments. We would be in real
17 problems.

18 We do have the bottom of the barrel rating as
19 it is. We are rated BAA on both our bonds and
20 preferred stock. And we are on the bottom step
21 to nowhere.

22 But anyway I think it is clear that not only
23 is the company in the spotlight; I think this
24 Commission is. I think every word in this rate
25 order will be read by Wall Street and will be reread

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