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ENERGY PLANT SITING PROBLEMS OF THE PACIFIC NORTHWEST

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FOREWORD

The Idaho Water Resources Research Institute has provided the administrative coordination for this study and organized, with cooperation from the faculty of Washington State University, the team that conducted the seminar program. It is the Institute policy to make available the results of significant water-related research conducted at Idaho's universities and colleges. This has included the very close cooperation of Washington State University and extends beyond the boundaries of Idaho. The Institute neither endorses nor rejects the findings of the authors and participants. It does recommend careful consideration of the viewpoints put forth in the series of seminars that generated this proceedings.

ABSTRACT

This report is a proceedings of discussions and presentations that took place in an interdisciplinary graduate seminar that was conducted jointly on campuses of the University of Idaho and Washington State University during the second semester of 1974-75. The topic considered was a review and analysis of energy plant siting problems in the Pacific Northwest. Nine presentations were made by guest speakers and questions were entertained from participating graduate students and faculty. Students were required to submit at the conclusion of the seminar a list of questions from their own professional area that they considered needed to be answered. They also surveyed briefly current literature to identify the information that might help in solving energy siting problems in the region.

The statements or a written summary of the guest participants has been included in the proceedings along with a transcription of the questions and answers that were generated during the seminar.

Brief conclusions and recommendations have been made by the editors to give a basis for future efforts that might be addressed. This is part of a research effort of the Institute concerned with methodology for evaluating energy plant siting in the state of Idaho.

ACKNOWLEDGEMENTS

The editors acknowledge the cooperation of Washington State University through Dr. William H. Funk of the Department of Civil and Environmental Engineering and Dr. Gene T. Thompson of the Agricultural Engineering Department. They made possible the functioning of the joint nature of this seminar and arranged for several of the speakers. Thanks are extended to each of the guest speakers and their companies or agencies for taking the time and providing the necessary supporting funds to make possible the excellent presentations. Finally, sincere appreciation is expressed to each of the graduate students and participants for their interest and the questioning that enriched and made possible an atmosphere of inquiry that should be fostered both within the university and in public forums and planning efforts.

This effort has been supported in part by an allotment research project A-048-IDA of the Idaho Water Resources Research Institute entitled "Methodology and Criteria for Siting Energy Centers in Idaho", as funded by the United States Department of the Interior, Office of Water Research and Technology pursuant to the Water Resources Research Act of 1964 as amended.

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INTRODUCTION

In the fall of 1974 the Idaho Water Resources Research Institute initiated a research effort under the leadership of Professor C.C. Warnick entitled "Methodology and Criteria for Siting Energy Centers in Idaho". At the same time much interest in power plant siting was generated through announcement of the Idaho Power Company of its plans to locate a new steam power plant near Boise, Idaho. Legislation was also proposed prior to the convening of the 1975 Idaho State Legislature offering new regulations concerning power plant siting. In the state of Washington siting legislation has recently been passed and action on siting of power plants has been evolving. With this was the element of concern as to whether our energy planning was adequate and a skepticism in the public sector that has left many unsure as to directions that energy plant siting should go. Dr. Gladwell, in discussion with representatives from the faculties of the University of Idaho and Washington State University, decided a seminar on the problems concerned with siting power plants in the Pacific Northwest would serve to assist the new research effort, and in clarifying the status of needs for new actions within the states, and help educate students on a current pressing problem facing society.

The seminar follows a long established pattern of graduate students and faculty from the University of Idaho and Washington State University joining in discussing important topics related to water and related land resources. At the University of Idaho

the course is offered as an interdisciplinary course listed as Agriculture Engineering 589, Forestry 589, Geology 589, and Inter 589 to encourage participation from various disciplines. At Washington State University it is offered as CE 580 Environmental Engineering Seminar and Ag E 495 Water Resources Seminar.

The seminar was organized to bring guest speakers to address various aspects of the energy siting problem and to present viewpoints from respective states and groups concerned with the problem. The guest participants and their affiliation are listed below:

Guest Participant	Affiliation
Norman A. Gilchrist	Spokane Area Manager Bonneville Power Administration
Verl G. King	Projects Officer Idaho Dept. of Water Resources
Eugene Greenfield	Consultant to Power Companies and former Director of Engineering Research Division of Washing State University
Larry B. Bradley	Office of Nuclear Energy Development Dept. of Commerce & Economic Development State of Washington
William Wilson	Radiation Laboratory Washington State University
Robert J. O'Connor	Senior Vice President Idaho Power Company
Fred L. Rose	Department of Biology Idaho State University
Ward H. Swift	Water and Land Resources Dept. Pacific Northwest Laboratories Battelle

Wayne L. Kidwell	Attorney General State of Idaho

Faculty who participated from the respective schools were:

John S. Gladwell	Dept. of Civil Engineering and Water Resources Research Institute University of Idaho
C.C. Warnick	Dept. of Civil Engineering and Water Resources Research Institute University of Idaho
William H. Funk	Department of Civil and Environmental Engineering Washington State University
G.T. Thompson	Dept. of Agricultural Engineering Washington State University
Paul Mann	Dept. of Electrical Engineering University of Idaho
George G. Hespelt	Dept. of Electrical Engineering University of Idaho

Graduate students who participated in the seminar with their professional area of interest are listed below:

Robert L. Braun	Sanitary Engineering University of Idaho
David H. Fortier	Hydraulic Engineering University of Idaho
Steven R. Frazee	Hydraulic Engineering University of Idaho
Joseph C. Roetheli	Agricultural Economics University ofIdaho
Frederick M. Stowell	Fisheries University of Idaho
Phillip Rassier	Law University of Idaho
Steve Becken	Civil Engineering Washington State University

M.P. Chockalingam	Civil Engineering Washington State University
Dan S. Johnson	Environmental Engineering Washington State University
David Krogh	Environmental Science Washington State University
Don Nichols	Environmental Engineering Washington State University
Thomas Pack	Environmental Engineering Washington State University
Mathau Sathe	Civil Engineering Washington State University

INVITED PRESENTATIONS

WITH

DISCUSSION QUESTIONS AND ANSWERS

Presentation by

NORMAN A. GILCHRIST

Spokane Area Manager, Bonneville Power Administration

ENERGY DEVELOPMENT IN THE NORTHWEST - EFFECT OF INTERTIES

The Bonneville Power Administration, a bureau of the Department of the Interior, was created by Congress in 1937 to market surplus electric power from Bonneville Dam. Today, 38 years later, BPA is a major element of the Pacific Northwest's electric power supply. As the power marketing agent for Federal hydroelectric projects throughout the Pacific Northwest, BPA supplies about one-half of the electric power produced in the region. This power is generated at 27 Federal multipurpose water resource projects built and operated by the U.S. Army Corps of Engineers and Interior's Bureau of Reclamation. These generating facilities with peaking capacity of over 12,000 megawatts, together with BPA's 12,000 circuit-mile high-voltage transmission network, comprise the Federal Columbia River Power System (FCRPS).

In its role as the region's primary bulk power mover, BPA provides about four-fifths of the region's high-voltage transmission capacity. In addition to transmitting Federal power and wheeling non-Federal power, BPA participates in the marketing of electric power interregionally over the Pacific Northwest-Pacific Southwest Intertie and internationally over interconnections with Canadian utilities. BPA's wholesale power customers number 153 and include publicly, cooperatively, and investor-owned utilities, large electroprocess industrial installations, and Federal agencies. Of these 153 customers, 126 are utilities, more than three-fourths of which obtain their entire power supply from BPA.

BPA is required by the Bonneville Project Act (the legislation establishing BPA), as well as by the Federal Columbia River Transmission System Act, to have revenues sufficient to recover all costs of the Federal power program in the Northwest, plus irrigation repayment assistance. BPA establishes rates to meet these requirements which are approved by the Secretary of the Interior and the Federal Power Commission.

The Pacific Northwest has a unique combination of public and private interests cooperating with each other and with the Federal Government to facilitate the orderly development of an adequate, reliable regional power supply. About 7 years ago

POWER OPERATIONS

More than any other region of the United States, the Pacific Northwest is dependent upon hydroelectricity to supply its demand for electric energy. About 90% of the electricity generated in the region at present is hydro power. In the fiscal year ended June 30, 1974, the Federal Columbia River Power System generated approximately 67.2 billion kilowatt-hours of hydroelectricity, equivalent to about 112 million barrels of oil were the same amount of electric energy to be generated at oil-fired thermal powerplants.

Deviations from average normal operating patterns are taken for granted in a hydroelectric system and are a phenomenon for which the system is designed. That is why the firm power capability of power systems in the Pacific Northwest is based on the lowest streamflows of record and substantial amounts of energy are sold on a nonfirm basis. Even so, events of the 1973-74 operating year were unprecedented. The fall and winter of 1973-74 demonstrated dramatically the importance of energy conservation, the value of high-capacity interties and interregional cooperation, and the necessity of keeping hydroelectric generator installations on schedule.

As a result of the turnaround in water conditions in the Pacific Northwest from below critical streamflows to superabundant streamflows beginning in November of 1973, the region had surplus hydro power available after meeting regional load requirements. Consequently, during the period from December 1973 through September 1974 the Pacific Northwest shipped more than 10 billion kilowatt-hours of nonfirm electric energy to the Pacific Southwest, thereby making possible savings of almost 17 million barrels of scarce fuel oil.

Power operations during 1974-75 have been far less eventful than power operations last year, largely because abundant spring and summer runoff filled power reservoirs and favorable weather and streamflow conditions thereafter led to continued improvement in the power supply situation. Near the middle of September 1974, however, streamflows dropped below median levels. This, plus insufficient thermal generation required greater than normal releases of water from storage reservoirs. Consequently, on October 14, 1974, BPA curtailed direct service to the industries' interruptible loads and secondary energy deliveries to private utilities. Since curtailment, the industrial interruptible load has been served with energy purchased by the industries from non-Federal sources and provisional energy from BPA; the industries are required to replace the provisional energy if it is later required for BPA's firm loads. During the curtailment, private utilities obtained their requirements from their own

BPA joined with 108 utilities in the region to form the Pacific Northwest Joint Power Planning Council (JPPC). The JPPC developed the Pacific Northwest Hydro-Thermal Power Program as an overall approach to meet regional power requirements with minimum economic costs and environmental impacts. Phase I of the program was designed to provide generation and transmission facilities necessary to meet regional load growth through 1981. Phase II of the program, extending beyond 1981, is designed to provide the necessary facilities to meet the region's future power demands. The key to this model of cooperative problem solving is its regional approach which is based upon the overall collective needs of the entire region rather than upon the particular requirements of individual utilities. The program is characterized by coordinated planning, development, and operation of the regional power system coupled with joint sharing of the tremendous financial burdens between the region's utilities and the Federal Government.

Put simply, the program provides that capital for thermal power generation and power distribution to final consumers at load centers will be supplied exclusively by non-Federal utilities while the Federal Government will be responsible for constructing bulk transmission to move power from sources of generation to load centers throughout the region, hydroelectric peaking capacity, and generation reserves, most of which will be added to existing Federal hydroelectric projects. Economical and efficient implementation of the Hydro-Thermal Power Program for the Pacific Northwest relies to a major extent on the availability of transmission facilities for moving the power to load centers.

Because of the very long, and steadily increasing leadtime required to develop large generation resources and the difficulty in arranging suitable financing for these resources, the region is now formulating detailed plans for meeting power requirements beyond the middle 1980's when the last of the resources under Phase I of the Hydro-Thermal Power Program and all the resources now planned under Phase II become available. Over a year ago BPA, in cooperation with Northwest utilities, developed the broad outlines of an agreed-upon regional plan to assure that the long-range power needs of the Pacific Northwest would be met reliably, with due sensitivity to the protection of the environment, and as a result of self-financing for BPA.

thermal generation, supplemented with purchases of higher cost generation from other utilities.

On Tuesday, January 14, 1975, BPA again made limited amounts of secondary energy available to private utilities in the region and partially restored direct service to BPA industrial interruptible loads. This action was based upon BPA's assessment of January 1975 snow surveys made by the U.S. Soil Conservation Service and runoff forecasts for the period January through July made by the National Weather Service. The snowpack and forecasts of runoff indicated a high probability of sufficient energy in the Northwest for the remainder of the winter and a high assurance of timely reservoir refill. Based on further data available from the February 1 snow survey, it was announced on February 12, 1975, that all loads in the region, firm and interruptible could be met - that reservoirs would refill so that we again began selling surplus power to the Southwest.

POWER OUTLOOK

The region's load-resource balance for the next 6 years is tabulated below. Resources for Phase II of the Hydro-Thermal Power Program, which are under consideration in the region, are included in the tabulations and are described later. As these tables clearly show the power outlook is precarious. Current generator installation schedules indicate the addition of about 12,500 megawatts of peak capability to the West Group Area during the next 6 years through the winter of 1980-81 consisting of 7,020 megawatts of additional hydro resources and 5,520 megawatts of new thermal resources. Even with forecasted regional load growth rates less than historical experience and with significant additions to resources, nominal peak resource deficits are projected for the next 2 years, but large energy resource deficits are projected for each of the next 6 years.

Last year's load-resource forecast showed that during the 1974-75 operating year the Pacific Northwest region would confront the largest deficit ever projected. BPA forecasts are necessarily based upon critical streamflow assumptions. Since actual streamflows have been comparatively favorable, and weather has been relatively moderate, the forecasted worst-possible situation has not become reality so far. However, the future continues to look hazardous for power operations. Neither additional imports from outside the region nor additional generation within the region appear to be available to eliminate the projected deficits through 1976-77. Energy deficits could be even worse than depicted

LOAD-RESOURCE BALANCE
WEST GROUP AREA 1/
CRITICAL PERIOD HYDRO 2/

	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Peak - Megawatts						
Peakloads (Including Interruptible)	22,491	23,722	25,220	26,683	28,139	29,515
Peak Resources	22,487	23,720	26,098	28,107	30,083	30,466
Resource Surplus or (Deficit)	(4)	(2)	878	1,424	1,944	951
Energy - Average Megawatts						
Energy Loads (Including Interruptible)	14,625	15,418	16,396	17,370	18,196	19,002
Energy Resources	13,846	14,630	14,977	15,136	16,121	17,068
Resources Surplus or (Deficit)	(779)	(788)	(1,419)	(2,234)	(2,075)	(1,934)

1/ The West Group area includes Washington, Oregon, Idaho, and western Montana exclusive of the loads of Idaho Power Co., California-Pacific Utilities Co., Utah Power & Light and Montana Power Co.

2/ Critical period hydro conditions are based upon full reservoirs at the beginning of the storage drawdown period.

in the latter table above if some thermal plants now being investigated under Phase II of the Hydro-Thermal Power Program are not successfully completed. With better than critically low water runoff the peak surplus capacity shown in the first of the above tables for the period 1977-78 through 1980-81 would be a partial backup for possible delay of the eight new thermal powerplant units scheduled to be completed by that time. In addition, this hydro capacity would be available to generate energy to replace fossil-fuel consumption both within and outside the Pacific Northwest during months of high water flow that occur nearly every year.

ENVIRONMENT

Consideration of the environmental impact of its program has always been important to BPA. Some impact is inevitable despite the most rigorous efforts to protect and enhance the environment. For example, the construction and operation of a high-voltage transmission system requires transmission corridors which result in varying impacts on land use, scenic resources, vegetation and, to some extent, wildlife. As a result of implementation of the National Environmental Policy Act of 1969, environmental considerations have assumed even greater importance and require substantial program resources. BPA seeks to minimize the impacts of its program planning and to construct its transmission system in such a way that all environmental consequences are taken fully into account and ameliorated where possible. Maximum feasible use is made of existing rights-of-way before any new rights-of-way are developed.

Environmental concern is also manifested in BPA's maintenance activities. For example, vegetation management of rights-of-way is programed to minimize the introduction of herbicides into the environment and to develop compatible and beneficial uses of rights-of-way easements by land owners.

BPA annually prepares an Environmental Statement covering the construction and operation and maintenance of the transmission system for submission to the Council on Environmental Quality (CEQ) as a major component of its comprehensive environmental efforts. The Fiscal Year 1976 Environmental Statement, like its predecessors, details the impacts of BPA's proposed program on the physical and human environment of the Pacific Northwest.

Preparation of the Environmental Statement is a comprehensive process which includes substantial public participation.

A Draft Environmental Statement is prepared and circulated annually to Federal, State, and local agencies and to concerned individuals and organizations for review and comment. Public meetings are held in the locale of proposed new facilities to obtain the views of those most affected by BPA proposals. The information and comments received during the external review of the Draft Environmental Statement are carefully considered in shaping BPA's planning so as to appropriately balance the need for reliable power service and environmental concerns, and are reflected in the Final Environmental Statement that is transmitted to the CEQ. This process helps assure that alternatives which will minimize adverse environmental consequences, as well as meet load growth in a reliable manner, are fully considered in developing the proposed program of transmission system planning, engineering, construction, operation, and maintenance.

FUTURE PROGRAMS

BPA's fiscal year 1976 budget is the first to be submitted pursuant to P.L. 93-454, the Federal Columbia River Transmission System Act. This "self-financing" legislation provides the authority for BPA to use its operating receipts and $1.25 billion in borrowing authority to finance its programs. Heretofore the operation and maintenance and construction programs have been financed by appropriations from Congress. With self-financing, then, the budget requires no appropriations.

RATE INCREASE

On August 19, 1974, BPA submitted proposed new wholesale power rate schedules to the Federal Power Commission (FPC) for approval effective December 20, 1974. They were approved by an order of the FPC dated December 19, 1974, which recited that the approval was limited to a one-year period ending not later than December 20, 1975, or such shorter time period within which the Commission may take final action. These schedules represent the first substantial rate increase in BPA's 38-year history. While it is customary for BPA's rates to be approved for 5-year periods, accelerating cost increases dictate that BPA prepare to raise its rates on a more timely, and frequent basis. Present plans are to include new provisions in power contracts which will permit BPA to shorten rate adjustment intervals in steps over the next several years so that if necessary after July 1, 1980, rate adjustments could be made annually.

By law, BPA rates must be set to recover all the costs to the Government of generating, purchasing, and transmitting electric energy, including repayment of the Federal investment with interest, plus assistance to farmers in repaying the construction costs of Federal irrigation projects. The adequacy of the rates is determined by an annual power system repayment study which projects estimated revenues and costs over the remainder of the repayment period to determine if there will be enough revenue to cover all costs. The repayment study made last year showed a payout deficiency (i.e., projected revenues would fall short of repaying all power costs within the allowable 50-year repayment period), and indicated that rate levels then in effect were inadequate.

The reason for this result is that costs have been increasing, and are expected to continue to increase, at a much faster rate than the normal growth of revenues expected from increased sales. Several factors contribute directly to these cost increases. First, in order to meet preference customers' power requirements in its marketing area, BPA purchases power from non-Federal thermal generation and blends it with power produced at Federal hydroelectric dams. The cost of this thermal power is substantially higher (by a factor of 6 to 10 times) than present Federal hydropower costs. Second, current interest rates on new financing for both Federal and non-Federal power projects are substantially higher than the average of the past years. Interest is a very large element due to the capital intensity of power generation and transmission, and this factor will add substantially to the cost of new Federal hydroelectric facilities as well as the non-Federal thermal generating facilities from which BPA will acquire power. And, the higher interest rate BPA will pay hereafter for financing transmission system construction on a self-financing basis will also increase the cost of Federal power. Third, construction and operation and maintenance costs of power facilities have been steadily increasing due to general price inflation.

BPA's new rate schedules, which provide rate increases for individual BPA customers generally ranging between 25 and 35 percent, but which average 27 percent, were designed to meet several other objectives in addition to statutory repayment requirements. These other objectives established were: (1) a universal rate schedule for firm power sales to non-industrial customers, (2) a rate schedule for a new and lower grade of power for sale to industrial customers served directly by BPA, (3) rate schedules reflecting seasonal differences that exist between capacity and energy costs, (4) elimination of potential promotional aspects of existing rate schedules, (5) rate schedules that are consistent with future plans for regional resource development including a new

reserve power rate, (6) a new rate schedule for nonfirm energy which supersedes existing schedules for nonfirm energy and excess energy, and reflects the seasonal differential in energy costs, and, (7) rate increases distributed equitably to all customers.

These new rate schedules were extensively reviewed by BPA's customers, State and local officials, private interest groups, and the general public. Meetings with customer representatives began in early 1972; customers reviewed and commented upon several rate schedule drafts during the past year. BPA also reviewed the proposed rate schedules with the public utility commission of the States of Idaho, Oregon, and Washington. BPA issued a Draft Environmental Statement on the rate increase, solicited public comments, and held a series of eight meetings in BPA areas. And, a Final Environmental Statement on the proposed rate increase was submitted to the Department and to the Council on Environmental Quality.

HYDRO-THERMAL POWER PROGRAM - PHASE I

The region's publicly and investor-owned utilities will provide 10,520 MW of thermal generating capability for the Pacific Northwest during the 10-year period ending September 30, 1981, under the Hydro-Thermal Power Program. The program has been making fair progress, but as is characteristic with utilities' generating plants across the nation, there have been problems and delays. For example, various problems continue to limit the output from the two units of the 1,400-MW Centralia Project, a coal-fired powerplant located near Centralia, Washington, the first thermal component of the Hydro-Thermal Power Program. The assured output capability of the plant has been significantly less than the rated capacity since it began commercial operation in 1973 due to (1) performance shortcomings in the precipitators that have prevented it from meeting air quality standards when generating at full capacity, and (2) coal-handling problems. Major precipitator additions were completed during 1974. Modification of induced draft fans may be required to attain the plant's design rating.

The Trojan Nuclear Project, the first nuclear facility in the Northwest devoted exclusively to electric power production, is a 1,130 MW plant under construction by Portland General Electric Company (PGE) near Rainier, Oregon, 42 miles northwest of Portland. It is now scheduled to go into operation in November 1975, a 4-month delay beyond the

previous schedule which, in turn, was a 10-month delay from the original schedule. BPA will acquire the City of Eugene's 30% share of the output of Trojan through net-billing and will wheel an additional 2-1/2 percent of the output. PGE has installed more than 800 MW of combustion turbines in northwest Oregon to partially cover the delay of the Trojan Project. These resources consist of a 128-MW turbine generator installation at Salem, Oregon, a 258-MW installation at Harborton, an industrial area of Portland, and a 438-MW installation (that later will be increased to 614 MW) near Clatskanie, Oregon. When completed, these combustion turbines of PGE's will total 1,000 MW of generating capacity.

The Jim Bridger Project, near Rock Springs, Wyoming, will include three 500-MW coal-fired units owned jointly by Pacific Power & Light Company (PP&L) and Idaho Power Company. When the three units are completed PP&L will acquire two-thirds of the output for use in the Northwest under the Hydro-Thermal Power Program. The second and third generating units which will provide that output are scheduled for commercial operation in June 1976 and March 1977, respectively.

The Atomic Energy Commission's dual-purpose operation of the Hanford Nuclear Reactor (NPR) was scheduled to end June 30, 1974, in accordance with the provisions of the Hanford Restart Agreement which provided for dual-purpose operation from July 1, 1971, through June 30, 1974. As a result of the severe power shortage predicted in the region during 1974-75, arrangements were made by the Washington Public Power Supply System (WPPSS) with the AEC to extend the existing 3-year contract for an additional year, through June 30, 1975. Subsequently, in the face of a worsening resource situation brought about by delays in hydro and thermal generator installations and difficulties that have limited the output of Centralia to less than its rated capability, additional arrangements were made to continue operation of the AEC's Hanford NPR until at least November 1, 1977.

It was reported last year that when the AEC suspended operation of the Hanford NPR, WPPSS, would shut down its Hanford No. 1, generating plant and rebuild it as WPPSS Nuclear Project (WNP) No. 1, adding turbines onto a new Nuclear Steam Supply System (NSSS). Now, however, it has been decided to build WNP No. 1 as a completely new plant elsewhere on the AEC's Hanford Reservation near Richland in eastern Washington. This new plant will have a 1,250-MW capacity and is scheduled for Start-up September, 1980.

The Washington Public Power Supply System is also building a 1,100-MW nuclear plant (WNP No. 2) on the Hanford Reservation. This plant is now scheduled for start-up in September, 1978. All of the output of this plant will be acquired by BPA through net-billing arrangements.

WPPSS is also sponsoring a 1,240-MW nuclear plant, WNP No. 3 near Satsop, Grays Harbor County, in western Washington. It is scheduled for start-up in September, 1981. Four investor-owned utilities will own a 30% interest in the plant.

Scheduled for completion in 1982, is a 1,260-MW nuclear powerplant, Pebble Springs No. 1, in the Arlington area of eastern Oregon sponsored by Portland General Electric Company. BPA may acquire 10% of the plant's output, under net-billing arrangements.

These major thermal plants constitute the thermal component of what has been known as Phase I of the Hydro-Thermal Power Program. In addition to these new resources, various power entities are developing other thermal resources to help meet the power supply requirements of the Pacific Northwest.

Puget Sound Power & Light Company and Montana Power Company are building a coal-fired generating plant at Colstrip in eastern Montana. Colstrip Units No. 1 and No. 2, rated at 330 MW each, are scheduled for completion in September 1975 and July 1976, respectively. Although BPA will not acquire any of this power, one-half of the output of each unit will be used by Pacific Northwest utilities. BPA will wheel power for Northwest use on the existing Federal transmission system within the BPA service area.

In addition to Colstrip Units No. 1 and No. 2, Montana Power Company, Puget Sound Power & Light Company, Washington Water Power Company, Pacific Power & Light Company, and Portland General Electric Company are undertaking the development of two additional generating units at Colstrip. Units No. 3 and No. 4, rated at 700 MW each, are scheduled to be completed in July 1978, and July 1979, respectively. West Group Area utilities will acquire 70% of the output of these two units to serve loads in the Northwest. These units (3 & 4) are now under active discussion under Montana's Plant Siting Law.

Based upon the latest load estimates, arrangements for BPA to acquire power from the thermal generation to go

"on line" under Phase I of the Hydro-Thermal Program will enable BPA to meet preference customer requirements through June 1983, but only if the industrial load is curtailed during low water years. The peaking capacity available from these projects, together with scheduled capacity additions at Federal and non-Federal hydro projects, should be sufficient to meet the area firm peakloads during this period. It is essential, however, that all such generation additions be kept on schedule to ensure that peak requirements can be met.

HYDRO-THERMAL POWER PROGRAM - PHASE II

As was pointed out, BPA and the Pacific Northwest's publicly and investor-owned utilities, electric utility cooperatives, and BPA direct-service industrial customers have developed the framework of a plan to continue to meet the region's power requirements on a cooperative basis after Phase I of the Hydro-Thermal Power Program. Arrangements are being made for financing, constructing, and operating additional thermal generating resources totaling over 7,100 MW to come on line during the period between July 1, 1978, and July 1, 1985. These additional resources, which comprise the thermal resource portion of Phase II of the Hydro-Thermal Power Program, include about 800 MW of coal-fired generation, and about 6,300 MW of nuclear generation. The plan avoids dependence upon oil or gas in keeping with the national energy policy.

Phase II of the Hydro-Thermal Power Program will overlap Phase I from September 1, 1978, through September 30, 1981 - the end of Phase I - when new generating capacity totaling 800 MW over and above Phase I additions is planned to be added to the region's power resources. These resources are being added to help compensate for resource delays experienced during Phase I of the Hydro-Thermal Power Program, and to provide reserves for possible future delays.

The additional generation currently being investigated by the sponsoring power utilities for that portion of Phase II of the Hydro-Thermal Power Program which extends beyond the overlap period of the two phases includes:

Jim Bridger No. 4, a 500-MW coal-fired generating unit near Rock Springs, Whoming, which is scheduled for commercial operation September 1, 1979, 333-MW of which will be available to the West Group Area; Carty (Boardman) Coal No. 1, a 500-MW coal-fired generator in eastern Oregon, which

is scheduled for commercial operation on July 1, 1980; and Pacific Power & Light's and Idaho Power Company's two 500-MW plants, Coal No. 1 and No. 2, which are scheduled for July 1980 and July 1981, respectively, and which are to be built near Boise, Idaho.

Five nuclear generating units amounting to more than 6,300 MW are presently under investigation by three Pacific Northwest utility participants of the Hydro-Thermal Power Program. Tentatively these new resources include a 1,250-MW nuclear plant, WNP No. 4 on the Hanford Reservation in Washington, scheduled for commercial operation March 1, 1982; a 1,240-MW nuclear project, WNP No. 5 near Satsop, Washington, scheduled for commercial operation March 1, 1983; two 1,288-MW plants near Sedro Wooley, in western Washington (Skagit Nos. 1 & 2) scheduled for commercial operation July 1, 1982, and July 1, 1984; and a 1,260-MW Pebble Springs No. 2 plant in the Arlington area of eastern Oregon, which is scheduled for operation July 1, 1985.

BPA will not net-bill its preference customers' shares of output from these plants but may act as their agent in arranging power supply for them with plant owners. It will also provide transmission, reserves, load factoring and other services. BPA expects to acquire, principally through exchange of transmission and other services, small amounts of power from preference customers' shares of these plants to meet its limited obligations to small preference customers, to maintain load growth reserves, and to provide small amounts of power for pollution control equipment and permit technological improvement in the operations of its existing industrial customers.

No new legislative authority is needed to implement these generation plans for Phase II of the Hydro-Thermal Power Program which will enable the region to meet future electric power demands. The Pacific Northwest Utility Conference Committee (PNUCC), a utility planning organization which includes all electric generating utilities and agencies in the western part of the region, has organized task forces which are developing the analyses and contracts to implement the plan. Sponsoring utilities have undertaken the studies of the proposed new generation needed under the plan.

One must be concerned with these schedules and the possibility of delays for a variety of reasons.

The graph prepared in early 1974 shows "Present Schedule", "Thermal Plants Delayed One Year" and "Thermal Plants Delayed Two Years".

While the top graph shows we would have peaking surpluses and only a few years of energy deficiencies to meet firm loads under critical water conditions, this graph is not pertinent - one year later.

From a practical standpoint we are on the bottom graph. This is why I previously mentioned the coal-fired plants now scheduled to overlap Phase I. The utilities are endeavoring to recover from last year's happenings.

Yet this month, Montana Power Company has indicated it will no longer be possible to meet an on-line date of July 1978 for Colstrip No. 3 and July 1979 for Unit 4, if they are approved for construction.

One cannot speak of construction schedules of new power plants without asking "What about the forecast of loads?"

To respond, I have here available for you a November 1974 brochure issued by BPA which discusses in depth "The Electric Energy Picture in the Pacific Northwest".

REGIONAL INTERTIES

One could not discuss the electric energy loads and resources in the Pacific Northwest without discussing interregional transmission ties. Those we have with British Columbia and with California serve well for securing additional power into the Northwest and also providing market for energy surplus to the Northwest. In addition, we are often able to secure additional power for the region from the lighter regional tie with the Missouri River Basin.

These interregional ties are used for exchanging energy, for using the same peaking capacity in two regions at greater load times and for sale of surpluses between regions.

From July 1974 through January 1975 while our river systems were low and interruptible power therefore not available for our heavy industries, this region was able to secure in excess of 600 million kilowatt hours of electric energy from non-Federal sources to keep our industries operating. A great deal of this came from British Columbia and a lesser quantity from California. The price of this power varied with which power plants were operating. The price ranged from 3.5 mills per kilowatt hour to 16 mills per kilowatt hour.

We have again reached a position where we have a surplus of power in the region because the stream flows have risen and are now marketing power to California from the Federal hydro system. During the past week this has been running at the 300,000 kilowatt level each hour. In addition, non-Federal utilities are selling their surplus to the South and, of course, daily interchanges are still being transacted.

Last year is when a dramatic example occurred that demonstrates the value of interregional ties. When the Pacific Northwest became surplus in mid-December 1973 and on into July 1974, we shipped enough hydro power to the South to offset 16 million barrels of oil that would have otherwise been burned in the California steamplants.

Our ties to the East are light and therefore only limited quantities of power can be exchanged. However, as the coal deposits of the Dakotas, Montana, and Wyoming are developed, there is a strong likelihood that added interregional ties will become part of the package.

DISCUSSION QUESTIONS AND ANSWERS

Q. Will there be a major deficiency or brown out condition in the Pacific Northwest like has occurred at times in the East?

A. It is not likely because of the system of utility interties that exists in the Pacific Northwest. Since the east did not have a large hydro base to operate from, they are more susceptible to system troubles that would be characteristic of steam plants for example. One of the things that happened back there is they didn't have alternate station service to run the plant itself, so when the plant shut down they couldn't start it again. Frankly the biggest problem they had there was lack of inter-utility communication.

Q. I can't help but think of a corollary to that when those people were threatening the bombing of transmission works around Portland. How long will it be until we are affected by something like that? Apparently you just cannot isolate those things. Is there anything we can do to solve that kind of emergency?

A. I mentioned that Portland General Electric had to install combusion turbines within that population center to offset the delay of the Trojan plant; we fully recognize

now that after our experience with the bombs last June that you have another use for those plants. They become your emergency stand by just like the hospitals have. In case the power supply to the hospitals shut down, they have got a generator in the basement or the next building to take over the load. So these combustion turbines would serve that purpose, and we are constantly talking now in utility circles about how maybe what the major communities need is to put that kind of installation in there for a two-fold purpose 1) power supply when you need it and, more especially, 2) as emergency power supply if somebody pulls the fool stunt that was done last year.

Q. What can be done?

A. We have had numerous debates on this. You know, in reality there is no way you can protect that transmission system. This map here represents 12,000 miles. Say there is an average of 6 structures per mile; that is 70,000 towers that somebody can play with. The only way you are going to protect them is by the people that live close to them noticing something different in the neighborhood and reporting it. You would be amazed at how much of that we are getting, and all you can say is responsible citizens are concerned about damage to property and therefore do report it. But if you have somebody that is out to deliberately sabotage the power system, he can do it.

Q. I'd like to know if the BPA is an unusually powerful body in the U.S., and if there is an analagous administration in other areas of the country? Is the TVA analagous to the BPA?

A. No, the TVA is a federal corporation actually. They have stronger authorities in more fields than we have. Of course, you have to go back to the time in which they were created to solve a problem in the 1930's of an undeveloped or backward area, if you will. They even had the authority to build pilot plants to start industry for the area. We have never had that kind of authority. Our authority relates to marketing power of the federal power plants and in more subsequent years becoming involved in contractual arrangements with non-federal entities. But we have never had the kind of authority of the TVA. They have had the authority to issue bonds for quite a number of years. BPA does not seek the corporation status. Now in addition to BPA, within the Interior Department we have the Alaska Power Administration, the Southeastern, and Southwestern Power Administration. Each of those is related to marketing power

produced at federal hydro projects. They are much smaller in operations than Bonneville. They don't have a Columbia River system. Then, of course, the Bureau of Reclamation is the other one in the Interior Department. For example, in the Missouri River system they market the power from federal projects in the river basin. The difference is, I think, that the northwest has been a faster growing region than where these other power administrations are. Therefore, they are more stabilized operations. Also, you have to emphasize that the Columbia River has been developed in the past 30 years, and to a magnitude far greater than the other river systems have the capability to develop. The Missouri River power system, for example, is not very big compared to the Columbia River system.

Q. In all the readings I've done on this intertie or transmission out of the basin, it seems that it is more of a liability to us. According to your outlook in 1972, I believe the northward bound electricity was almost nil because the power plants in the L.A. area weren't able to meet the air quality. And so all the power was heading from our generation areas down that way. So it seems that all we are doing is supplying all those people with power and we are not getting anything out of it.

A. You mentioned air quality. Another point is oil. Two years ago, for example, the Japanese were willing to pay a higher price for low sulphur Mid-east oil than were the California utilities. Therefore they were short on oil supply and the only thing they had to burn was high sulfur oil. They were very reluctant to do it because the first thing it leads to is air quality problems. One example of the problem was the day the Southern California Edison Company wanted to run one plant and see what kind of stack emissions they'd get using the grade of oil they had. They hit an inversion problem that particular day. The way they learned about it was from a guy from a Marina who called up and screamed like mad about what was falling on the boats in his marina. And it wound up that Southern California Edison had to spend over $50,000 just to clean those boats up from the stack emissions. It was a weather problem and the high sulfur oil. So now they are extremely reluctant to burn that kind of fuel in an oil plant to serve our industries in Spokane. But if they have the capability and the right class of oil they will do it. At the same time let's look at the other side of the coin, if you even have that opportunity to export power in the first place. The only way you can sell power off the federal projects is if the region is surplus. In other words,

all your needs are being met. So if you didn't market that generation that you are able to produce you would spill it to the ocean and nobody would use it. Two years ago that was worth $8 million to this region to hold our rates down. In other words that is a net income to the region. Otherwise you wouldn't have a dime. You would just spill it out through the spillways you see. One of the things about this, I think you are aware of, is the nitrogen problem on the Snake River. They are going to put in additional machines here to solve that. In the spring and the summer of the year is when the high water in the Snake River occurs, and we can transmit power to California. That is going to solve the fish problem too. But the real key to it is in this area in which we are now in the oil business. I think you have to try to use the hydro because it is a renewable resource. Oil is not.

Q. All this excess energy, it would seem to me, if we kept it all up here all our rates would drop.

A. We don't have any place to put it. In other words the reservoirs are full. The water is going down the river. Either run it through the turbine or through the spillway. If you have a market for it you run it through the turbine, if you don't have a market you run it through the spillway. So it is revenue vs. no revenue. You are not surplus in a region, if you have a reservoir where you can store it then you are not surplus. Right now we know from the snow survey forecast information that Hungry Horse, Libby, Dworshak, Mica, Duncan, Arrow Lakes and Coulee will fill this spring. So we are in a state of surplus production capability.

Q. Why are you asking every year for all this money to keep up with the demand? I mean with all this extra energy, I don't see why you need all this extra money to build new plants.

A. Well this is seasonal in nature. Surplus water is not there in September, October, December. It happens to be there in late February and March this year. Two years ago it wasn't there. We chopped off the heavy industry that relied on this class of power; we chopped them off for 14 months just two years ago because our river system just didn't have the water to run the turbines. You can't rely on serving homes on that kind of a risk. Heavy industry can take the lumps for 25% of the load if you are willing to take that much reduction in production. And that is what we are doing. But when you say energy, the only other way you could do

that is to have another reservoir someplace to put it in, and that we don't have.

Q. What does heavy industry do then? Let's say it is an aluminum industry, do they make a lot of aluminum ingots and then store them, because I didn't see a lot of people get layed off with this 25% reduction?

A. No, they have to make trades for energy and buy power from other sources. You can't imagine the accounting that goes on in the course of the year.

Q. What I meant is you say they couldn't be using all that power to be producing aluminum at that particular time because they had been cut off.

A. This particular table, shows what we call the industrial replacement energy transactions during this current fiscal year. This means that we have cut them off the hydro so they have to go to other sources and buy at different prices. And that shows 22 different places they bought power from (July to January) to avoid shutting down. That totals up to over 6 million kwh that they bought in a 6-month period. The biggest price they ran into was 16 mills per kwh and the biggest piece of that came out of British Columbia. They also ran an old time steam plant over in Longview that produces at 16 mills a kwh, and tat is on wood waste. I believe that is the Burard Steam Plant that runs on either gas or oil. They ran that into Vancouver, British Columbia to serve northwest industry in December to the tune of 75 million kwh. But industry paid for it too; you see that is five times their regular price that they pay for electricity from hydro sources.

Q. On that point, is most of that power wheeled over BPA transmission lines?

A. Oh yes. We have a tie with B.C. Hydro North of Bellingham. For that kind of a deal, the industries buy from, say, British Columbia, and we charge the ½ mill kwh for wheeling it over the total system. They have got to get it to us. There may be a fee in British Columbia for transmitting to somewhere in California. They might be getting a purchase at Glendale or something like that but they deliver it to us here and we charge ½ mill per kwh to deliver it any place in the region. So there is a charge to use the transmission system.

Q. On your rate increases, is this raise also passed on to the L.A. area and all the areas that are utilizing BPA power?

A. One of the protests that was filed with the Federal Power Commission last fall on a rate raise was by the California utilities as being an inequitable rate raise because we were raising the cost of power to them a higher percentage than we were to the region. We raised it from 2 mills to 3 mills; that is a 50% boost. In this region it was 27%. And yet if you are buying their power, if you were buying from Glendale, you would pay 14 mills, Los Angeles 11 mills, based on 2 years ago. They are objecting to the 3. They were arguing about discrimination because the percentage increase was high, but that will never be approved by the FPC. The FPC is actually proposing that you share in the cost. In other words, if you are at 3 mills and they are at 14 mills you price in the middle.

Q. It all sounds as if somebody makes a little money down there if they are buying it for 3 here and selling it for 14 there.

A. No, I meant their cost of generation is 14. So if they buy from us at 3 they save a higher amount of producing power. All this gets real complicated on keeping track of who got what from what source, and it has to be done on an hourly basis. And this means 24 hours a day to keep track of who bought what from whom. It is a real computer exercise.

Q. On the surplus situation, hypothesize with me for a minute if you would. Say that Dworshak is surplus but your other regions, North Idaho, North Washington all look low at this time of the year. Can you sell them the energy there on a surplus basis?

A. When we look at surplus conditions we are talking about federal projects (27) as though they were one; they all have to be in good shape. See, under the law in which we are authorized to sell outside the region we have to be assured there is no need for the energy from any party within the region before we can declare a surplus. This is why it is a formal step that the administrator announces the federal system is surplus. The non-federal utilities don't like that for one reason. For example, there were some utilities such as Tacoma that were selling some of their own surpluses -- they have an old steam plant in Tacoma -- and they were selling power to the southwest, say on the 10th of February. We declared surplus on the 12th and that changed their price, cut them to 3½ mills. That shut the old steam plant off. Before that they were selling for the price they could get for it.

Other utilities were selling at 6 mills for hydro. The minute we declared the federal system surplus the price dropped to 3½ mills. Now they are on new rates and the first of April it will go to 3 mills. But sometimes these rates are in essence what the traffic will bear. And frankly this is what British Columbia did last year. They jacked up the price on that steam plant -- they said we will sell it to you for 16 mills. If you want it, we will run it. That same plant had run for half that price a year ago.

Q. So that theoretically at least there could be some water running over spillways to Washington?

A. Yes.

Q. I'd like to get an idea of your overall plan. The idea that I get is that you are planning on your firm or base load power being supplied generally from the thermal plants, and that peak power will be supplied by hydro. Is that right?

A. The book I gave you has a couple of diagrams that will show you a projection of time on how much hydro there is, and how much thermal is coming on line to meet energy needs. And it shows in essence your hydro, from an energy standpoint, remains almost constant. So your new energy running continuously has to come from steam. Of course, nuclear plants are steam plants also. What you ideally hope for is to shut them down once a year for maintenance and run them like an 8-day clock the rest of the year. That isn't quite true of Hanford I, but that wasn't built as a electrical reactor in the first place.

Q. If they are going to this trend of using a hydro turbine more for peaking, what effect will this have on the river? I know on the Columbia system the slack water runs to all the dams. What kind of effect does this have on some of the others like Dworshak, Hungry Horse, and some of these other ones more like them?

A. A real debate, that is what we are creating. Grand Coulee is the most dramatic example. You could talk about Dworshak the same way. At Grand Coulee we are talking about putting 6 units in the third power house, with the ultimate idea that there would be 12. There are some people that would say that if you put 12 peaking units in Grand Coulee that you are going to have to fence the river to keep people

out of there because of a tremendous fluctuation downstream. And, of course, you are going to have to then use Chief Joseph Dam as a re-regulating reservoir to flatten it out again just from the standpoint of public safety. I've heard one old timer in the business say that once you get all those units in Grand Coulee, you will have converted the Bureau of Reclamation into a flood creating agency and the Corp of Engineers into a flood control agency, because of the volume of water that would come out of that tide if it were running at 9 million kw. That is a tremendous surge of water. In a smaller scale, Dworshak has 3 units there now; it is built to take 6. If you run those for short term peaking a few hours each day, I think you will have quite a fluctuation on the Clearwater downstream. And this is why the Corp in the past proposed a dam at Lenore to flatten the river flow back out again. They are now studying it from the standpoint that maybe you could prolong the period of time you use Dworshak for peaking purposes. That way maybe your river would be more constant downstream. That is part of the review study that is underway on the whole Columbia River system.

Q. Is BPA tied in with any of the hydro-electric pumped storage projects? Are they taking an active part in trying to stimulate this idea?

A. No, the lead agency working on that kind of study is the Corp of Engineers. They have already identified 600 or more potential pumped-storage sites in the northwest. As they evaluate these and then talk to us about how could you use the power out of them, that is where we get into the picture. So in essence we do become a part of the planning. There are several places that are looked at as having really high possibilities. One is on the White Salmon River down near Bonneville Dam. There is an area that has been looked at a long time as a potential pumped-storage site. There is one up near Wenatchee. They are looking at one in the Goose Lake area on the Colville Indian Reservation. You always get to the point of economics. Is it the cheapest thing to do that? I think this region will ultimately hit the point, as many other parts of the world have, that you are going to pumped-storage. But how quick, I don't know. Of course we do have two little units running at Grand Coulee right now on the Banks Lake.

Q. Are they going to convert all those pumps to pump storage?

A. No, these are new units.

Q. Will they go back to some of their old units and make those into reversible units?

A. I don't think so. They could, but I don't know that they are planning to at the moment.

Q. Aren't they talking possibly two more units?

A. Yes, a total of four. Those are reversible pump-turbine units. But the trouble with pumped storage is that it costs you energy to get the water in there, so you have to measure the value of what you gain out of it. In some places you have to do that just to gain the daytime use of peak power. So it is a viable alternative and just a question of whether you can do it economically. At the moment we haven't reached that urgent a need in this region, because you can still build a base load thermal plant and put in the peaking in an existing structure on the river and there is water to run it with.

Q. Will you talk more about the coal strip plant in Montana? Did they look at a total requirement for the entire northwest, or were they looking at Montana by itself? What was their viewpoint when they said that they were not persuaded that there is a basis for need?

A. This is part of their document. Let me read how they stated it. It says, "The Department is not persuaded that there is a basis for the need of a 1,400,000 kw facility in Montana. Recent economic data demonstrates the nation, region and state are experiencing a decline of economic growth. While this may change, no responsible economists has predicted a rate of economic growth in the next decade as high as that experienced in the last. A slower economic growth, the rate of growth in the demand for electricity can be expected to decline, especially if capital for industrial expansion remains difficult to attain". So they are talking nationally, but for the most part of it they are obliged to concentrate on the state of Montana.

Now this happens to be a 12-page resume of the document, and one of the things they are recommending is that if those utilities outside Montana really need the source of energy they invite them to take the coal out and burn it outside Montana. But really as I read this thing they are also suggesting that it could be delayed and done later

now that the economic picture is so discouraging. Of course this is part of the reason for the debate in public hearings. The review board finally weighs this and acts, trying to reach a balance of opinion on it. Officially the Department of Interior used our material. We don't know if we agree with their estimate of load estimates which is the same number I have given here today. We think there is a demand for energy that must be met and perhaps that is the viable source that can be used today.

Q. What is BPA doing on studies of the effect of conservation?

A. I'm glad you brought that up. I wanted to talk a little bit about conservation, but maybe you had a different question.

Q. What I wanted to get at was, you said that the average northwest domestic electric user uses twice the national average of electrical consumption. How much of our power deficit can be met by a conservation program?

A. In 1973 when we were faced with a rough situation, everybody felt that it was essential to go into a voluntary conservation program "right now" and at the same time work toward the direction of a mandatory curtailment program if we had to use it. We started as early as July, I believe, in talking publicly about the need for voluntary conservation by individuals. Now some of the utility people didn't like this because they could see it was going to effect the gross and net revenue column on their profit and loss statement. A lot of people told us that you couldn't get anything done on a voluntary basis, and they quoted what Sweden tried to do when they were in a crisis situation, and what England tried to do when they were in a crisis situation where there was a coal strike in England. We finally tried to persuade the other utilities to go with us and put a common pleading in front of the public. And in this case the news media should get a great deal of credit for the type of news story they told the public. We are still getting results from our conservation program because in January 1975 the energy loads were 10% under estimates. Now some of that was weather, but a lot of that was that people are just more conscious of it. We got conservation responses quite readily in the fall of '73 that it would be averaged out at 8%.

Here today I've been saying that the river system is in good shape. If you've got lots of energy, go ahead and use it if you have a need for it, or curtail the use of oil someplace if you have got excess hydro because it is a renewable resource. But the idea is that if next year we are short in river system, we are going to come back and tell you to conserve because the rivers are low. And we hope that by telling you like it is, you will respond accordingly. There hasn't been a big push this winter on conservation. We have had plenty. But the people are concerned, and I think they believed us a year ago and they did literally respond tremendously. If you tell the truth in advertising it may pay off in the long run. But we are still fundamentally saying the utilities have to put to the public a conservation program where you use energy wisely. I like Pacific Power and Light Company's statement, "use what you need, but don't waste it". I like that. And this is the image we are trying to put out on conservation generally, and I don't care if you are talking gasoline, coal, petroleum, water. You name it and I think it fits. At the same time you have got to go into some of these programs because you are not going to solve the demand for energy by conservation. When you say the rate of growth of use of energy doubles every 9 or 10 years you are not going to make me go back 8% this year and then another 8% from that level next year. No, I might be able to keep my 8% or 5 or whatever it is. You are going to flatten that curve out, but you are not going to turn it down.

Sometimes you get into things that are really humorous. Do you mind if I use an Oregon State story? That is where I got this years ago. This is the way a professor from Oregon State put it in a seminar I was in. He said, if you look at the United States today you could serve electric needs using huge power plants of 1 million kw each and we would only need 300 plants. Since these large plants occupy pieces of land about 1,000 feet square, you would only need 10.7 square miles of land dedicated to power plants sites today in the U.S. But if our current rate of growth on use of electricity continues for the next 200 years we would need over 10 million square miles on which to locate the power plants. Now you can't do this because there are only 6 million square miles of land on the earth's surface. The whole point of this story is that 200 years ago man didn't even use electricity, now we do. Now we can't let this formula go forward.

You have got to get into research and find another source of energy for 200 years from now. It is a must, and the real challenge facing society today. When you talk about natural gas gone in 10-20 years, petroleum in whatever period that is, coal in this country will last us for a few hundred, and nuclear for something else, it still doesn't solve the problem. We can't fill up the whole landscape with power plants. So we haven't found the solution, and all I've been talking to you about today are stop gap measures that are going to take us 15 years into the future while we really solve the problem.

Presentation by

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DEMAND AND DEVELOPMENT FORECAST FOR ENERGY FOR IDAHO STATE VIEWPOINT IN POWER PLANT SITING

I appreciate being asked to appear in your seminar to discuss this subject as it pertains to the State of Idaho. It is a very timely matter and one needing attention so that proper solutions can be applied in solving the energy problems which lie ahead. Before discussing this matter as it pertains to the State of Idaho, I would like to review briefly the energy situation as it exists in the nation and the region and its relationship to the State of Idaho.

I. NATIONAL ENERGY BACKGROUND

Domestic energy demand in the nation has been growing 4 to 5 percent per year, while the electric energy demand has been doubling every decade, or growing at a rate of 7 percent per year. Because of its more rapid growth, electric energy is continuing to increase its role in energy use in the nation.

The United States was self-sufficient in energy through about 1950, but our situation has deteriorated rapidly since then. Our energy consumption has increased at a much more rapid rate than our production. For instance, coal production is still at about 1940's levels; crude oil production has declined since 1970; and natural gas consumption has been exceeding new discoveries since 1968. Our dependence on foreign oil has grown to 35 percent of domestic petroleum consumption in 1973 (See Attachment #1). The oil market is dominated by several middle east countries. They have 60 percent of the world reserves and produce 70 percent of the world oil exports. The 1973 embargo against the United States demonstrated how vulnerable we are to insecure exports. This embargo may have come at an opportune time as far as our nation is concerned since it affected only 14 percent of our U.S. petroleum consumption. However, this was great enough to make us feel the pinch, yet not so severe that it crippled our nation. The economic impact was a ten to twenty

billion dollar drop in our gross national product. During the peak of this embargo, 500,000 additional people were unemployed as a result of the embargo. Because of this experience, it is anticipated that many conversions will be made from the use of gas and oil to electricity generated from coal power. This may result in a surge in the increase in demand for electric energy.

As mentioned earlier, nationally the growth of electric energy use and peak demand on the average has doubled every decade for its entire history (See Attachment #2).

II. REGIONAL ENERGY BACKGROUND

The electric energy transmission systems in Idaho are tied into and interconnected with the regional transmission system. A considerable exchange of power occurs through this interconnected system (See Attachments #3 and #4).

The regional growth and demand for electric energy is similar to the nation's growth. However, one major difference in the load pattern is that the northwest has a winter peak load while the nation has a summer peak. During the past years, the northwest has had an abundant supply of electric energy and as a result a greater per capita electric energy use occurs in the northwest than in the nation. The growth which occurred during the decade of 1955 to 1965 and a map of the region is shown in Attachments #5 and #6. Population projections made by the Office of Business Economics of the U.S. Department of Commerce were used as the basis for projected electric energy requirements. Load projections for the region and some of the subareas of the region are shown in Attachments #7 and #8.

As well as having inter-ties among the various utilities within the region, the northwest has inter-ties with the southwest region and other western states.

III. DEMAND AND DEVELOPMENT FORECASTS FOR ENERGY FOR IDAHO

The growth of electric energy demand in Idaho has followed the same trend as the region and the nation. However, during the past Idaho's electric energy has been supplied from a hydropower base made available by the many streams and abundant flow of water in the State. As we look to the future, it is expected that increasing electric energy requirements will be provided mainly by thermal power. Even though we may still have considerable potential for development of hydroelectric energy, it is anticipated that because of environmental concerns and the desire for free-flowing rivers that most of these hydrosites will not be developed.

Since Idaho has an abundant water supply and coal supplies exist in our neighboring states of Wyoming and Montana, and because of the status of the present technology of coal-fired thermal plants versus nuclear, geothermal, solar, wind, etc., it is most likely that the immediate future demands for electric energy will be furnished with coal-fired thermal power plants. It appears that these thermal plants will be located near a water source in Idaho and fuel hauled to them from the coal fields in Montana and Wyoming.

The projected electric energy loads in Idaho are based on population projections for the State of Idaho which was prepared by the Bureau of Business Research at Idaho State University. Projections of this growth are shown in tabular and different graph forms (See Attachments #9, #10 and #11).

Idaho is unique in the northwest since it has a summer peak load. This comes as a result of irrigation pumping in southern Idaho. Because of this feature, Idaho Power Company is able to import power from the northwest system during the summer months when they experience their peak demands and export power during the winter months when their demands are low, but the demand in the rest of the northwest system is high. On an annual basis, Idaho imports power in excess of their exports (See Attachment #12). The amount of imported power has continued to grow over the years and at the present time the State is importing about 30 percent of the electric energy it uses.

The Idaho Water Resource Board is responsible in the State of Idaho for preparing a State Water Plan. One of the objectives which they have established is that water will be provided for future generation of electricity within the State so that the State can become self-sufficient as far as electric power generation is concerned. As mentioned earlier, Idaho does anticipate that future electric energy needs will be provided through development of thermal electric power plants. Attachment #13 shows how the expected relationship between hydropower generation and thermal power generation will occur.

To assist the Idaho Water Resource Board in their state water planning effort and to determine the amount of water required in the various river basins, the electric energy needs were broken down into service areas within the State and the period of time when this development would be required (See Attachment #14). As noted in the Panhandle-Clearwater area during the years 1980 to 2000, a name-plate capacity of 620,000 megawatts will need to be installed to meet expected needs. This would probably

result in a 650 megawatt fossil thermal plant located near a water supply, railroad connections to coal fields in Western Montana, and a tie into the regional transmission system.

During the year 2000 to 2020, a 700 megawatt fossil fuel or nuclear thermal power plant will need to be installed to meet the projected power needs for this period of time in the service area. During the years 2020 to 2070 growing needs will result in a 1,200 megawatt plant being constructed.

A look at the Salmon-southwest Idaho and Upper Snake #2 area which is the area mainly supplied by the Idaho Power Company shows that during the year 1980 tO 2000 a 1,500 megawatt fossil fuel plant will need to be installed in southeast or southcentral Idaho to meet projected needs. This plant would also be installed near a water source and fuel would need to be transported in from Wyoming. Idaho Power Company presently has 1,000 megawatt fossil fuel plant proposed for construction at the Orchard site southeast of Boise.

During the latter part of this period of time or early in the year 2000 to 2020, an additional 1,500 megawatt plant will need to be installed near the Snake River in this area. This could be either a nuclear plant or a fossil fuel plant also supplied from the Wyoming coal fields. During the year 2020 to 2070, the needs will require that three 1,650 megawatt plants be installed in the area near a good water supply.

In the Upper Snake River #1 and Bear River area which is mainly supplied by the Utah Power and Light Company, a 1,500 megawatt nuclear or fossil thermal plant will need to be constructed in the years 1980 to 2000. This will probably be in the Bear River Basin on the Bear River. If this is a fossil thermal plant, it could be supplied from coal fields in Wyoming. During the year 2000 to 2020, another 1,500 megawatt nuclear or a fossil thermal plant will need to be installed in the area. This plant should be installed close to the local load center, near a water supply, and the transmission grid system.

During the year 2020 to 2070, three additional 1,500 megawatt plants will need to be installed in this area somewhere near the Snake River.

IV. DEMAND AND DEVELOPMENT, IDAHO POWER COMPANY SERVICE AREA

Before looking at the Idaho Power Company service area, I would like to show you one curve giving the projected energy demands for the future for the Washington

Water Power Company service area. This is shown in Attachment #15.

Until the construction of the Jim Bridger plant, which came on line in November of 1974, the Idaho Power Company system was entirely hydropower. Their production was controlled by river flows modified by irrigation releases from the reservoirs during the summer months. As irrigation development continues to grow in southern Idaho, a loss of production occurs from these river plants.

The Idaho Power Company has experienced a rapid increase in demand for electric energy over the past number of years. This has resulted from irrigation pumping, increased electric heating, increased industrial use, increased per capita use, and requirements for pollution control. In order to get a clear picture of what is happening within this company service area, a review was made of the past records as they relate to the projected power demands for the company. Also as a comparison, the Federal Power Commission's power supply area 41, which includes all of the State of Idaho and the Idaho Power Company service area throughout southern Idaho, eastern Oregon, and northern Nevada were used as a comparison. A record of what has occurred as well as projections for the future are shown for both of these areas on Attachment #16. In studying these projections, it is noted that the peak month average power demand within the Idaho Power Company service area will exceed their total resources by 1976. To determine what might happen if the projected growth should change, two additional curves were plotted. One showing the present growth at a continued fixed rate, and another one which would cut the Idaho Power Company projections in half. It is noted that even with one-half the projected growth rate as indicated by the Idaho Power Company, that the Idaho Power Company resources would be exceeded by 1978. This would result in only a two-year delay when additional resources would be needed.

A plot was also made of the monthly exports and imports of energy for the Idaho Power Company. These are shown in Attachments #17 and #18. As noted, during the winter months Idaho Power exports considerable energy and during the summer months they import considerable energy. During the past two-year period, their imports and exports have nearly balanced.

V. STATE VIEWPOINT IN POWER PLANT SITING

Because of the expected growth in electric energy demand and the effects it may have on the water resources and environment within the State, the question is raised

as to what action the State should take in controlling this future growth. Our neighboring states of Washington, Oregon and Montana have established thermal power plant siting authorities to control and location and conditions under which these plants will be sited. This serves as a planning tool to help plan future activities so that energy requirements can be met in an orderly manner. This development must be coordinated with other activities which occur in the State. A comparison of the legislation of these states is shown in Attachment #19. Idaho has two bills which have been proposed to this year's Legislature concerning power plant siting in the State of Idaho. Attachment #20 shows a comparison of various features of these bills. The proposed Idaho legislation is similar to that of our neighboring states inasmuch as a thermal power plant siting authority would be established which would serve as a planning agency as well as a regulating agency for the construction of thermal power plants in the State of Idaho.

At this time, I would be happy to respond to questions you may have.

ATTACHMENT #1

U.S. ENERGY PRODUCTION AND CONSUMPTION
1947-1973

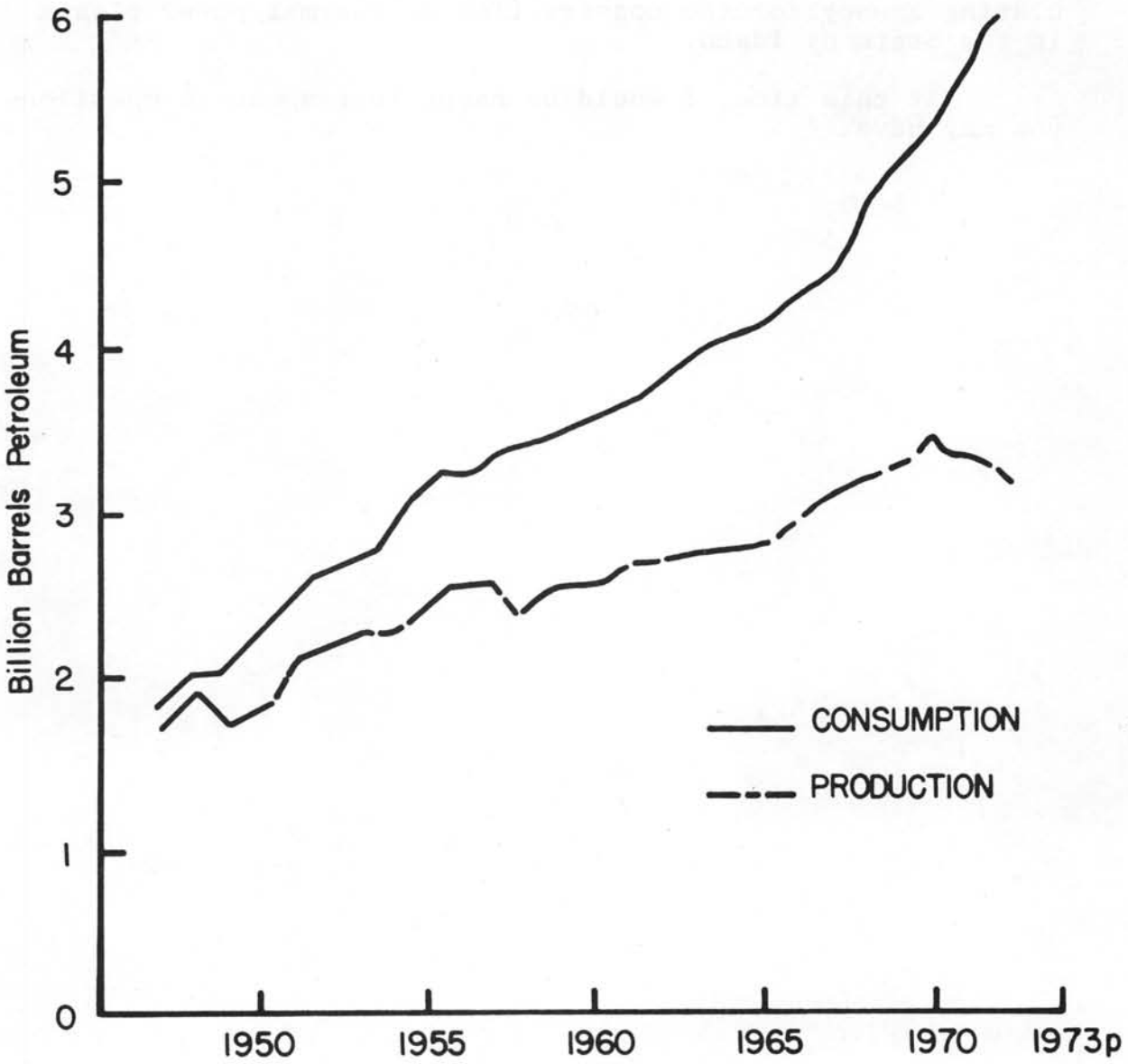
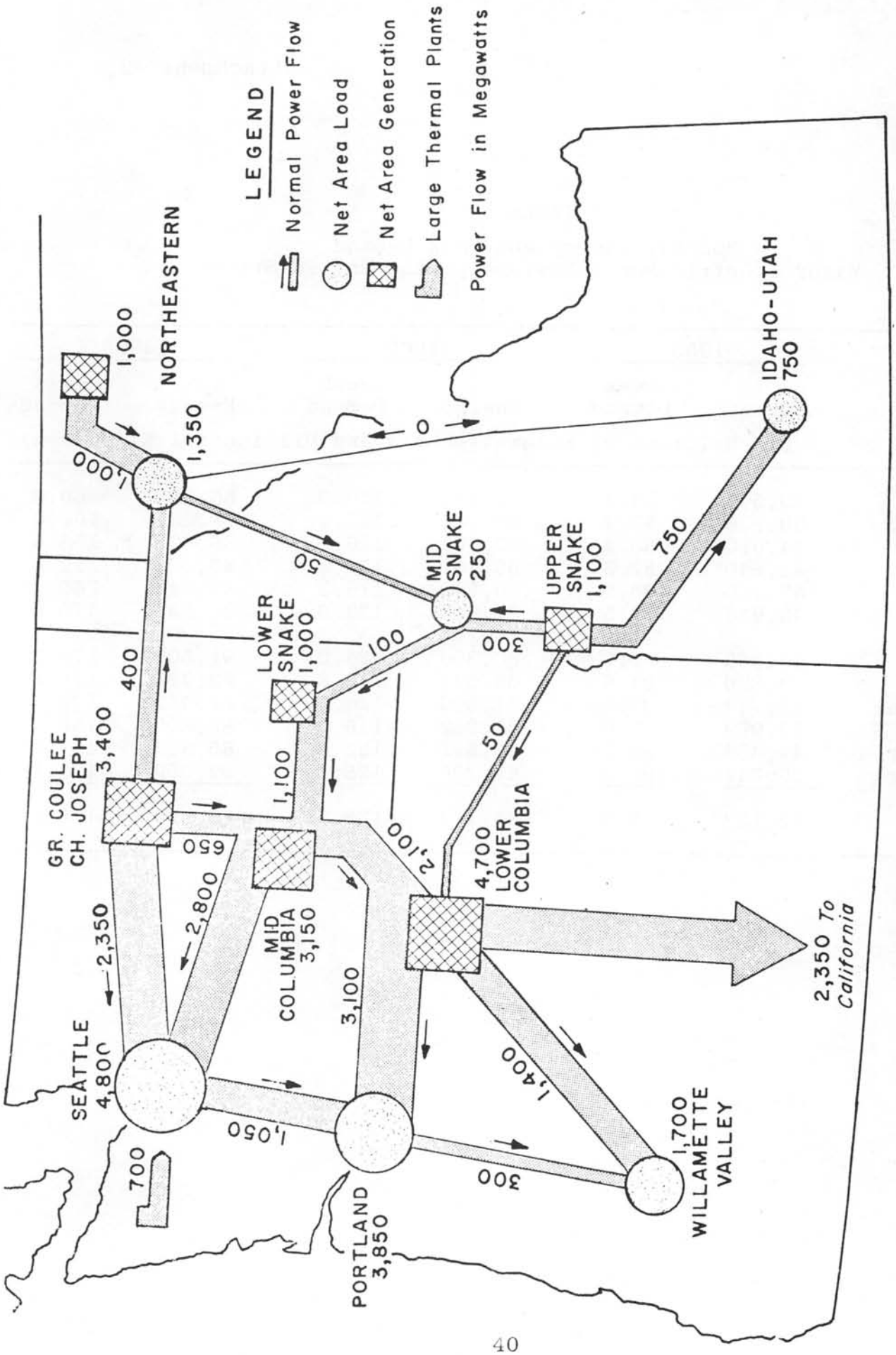


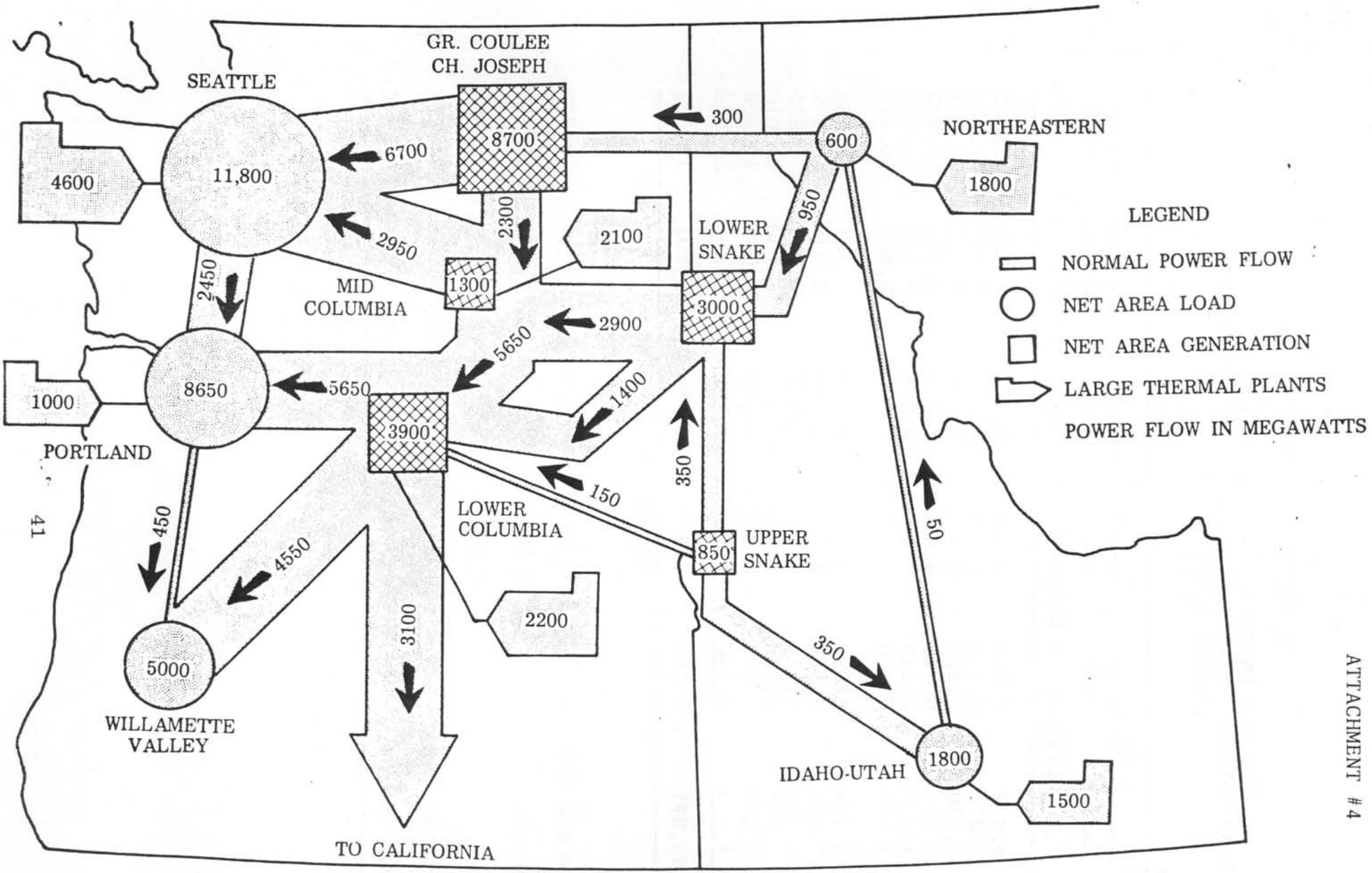
TABLE 1

Monthly Energy and Peak Demand
Major Electric Power Systems of the United States

Month	1955		1960		1965	
	Energy	Peak Demand	Energy	Peak Demand	Energy	Peak Demand
	(In Millions of Kilowatt-hours and Millions of Kilowatts)					
January	43,547	84.1	63,185	120.9	86,363	160.6
February	39,936	83.7	59,581	117.4	78,961	160.0
March	44,090	83.4	63,607	116.9	86,422	156.0
April	41,840	82.3	58,139	113.8	80,338	152.9
May	43,160	83.9	59,972	116.3	83,640	160.8
June	43,926	86.5	61,675	122.0	86,255	170.2
July	46,269	89.3	63,306	124.2	91,507	174.3
August	48,830	91.6	66,674	127.8	93,776	178.8
September	45,714	90.1	61,800	126.1	87,452	175.1
October	46,999	90.6	61,282	119.8	85,805	159.7
November	47,465	96.1	60,591	122.2	85,322	167.9
December	50,347	98.3	65,300	128.7	92,059	175.1
Year	542,123	98.3	745,112	128.7	1,037,900	178.8



EXAMPLE OF POWER FLOW IN THE NORTHWEST
WINTER 1971-72



EXAMPLE OF POWER FLOW IN THE NORTHWEST
JANUARY 1986 PEAK LOADS

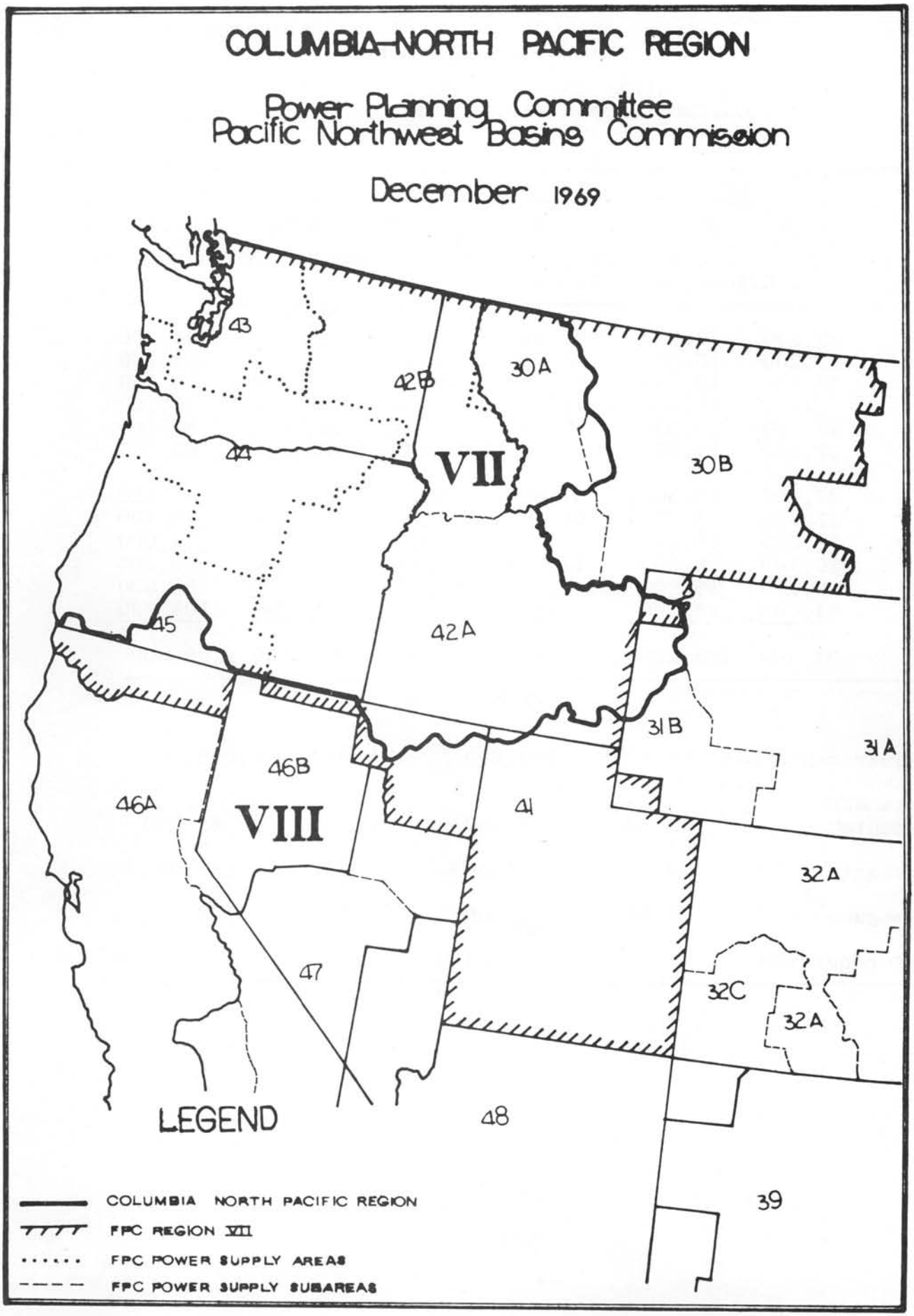
Attachment #5

TABLE 2

Monthly Energy and Peak Demand
Columbia-North Pacific Electric Power Systems,
Class I Utilities

Month	1955		1960		1965	
	Energy	Peak	Energy	Peak	Energy	Peak
	(In Millions of Kilowatt-hours and Thousands of Kilowatts)					
January	3,623	6,667	4,998	9,264	6,736	11,835
February	3,271	6,478	4,528	8,799	5,953	11,424
March	3,630	6,359	4,778	9.095	6,323	11,207
April	3,401	6,212	4,430	8,212	5,883	10,763
May	3,458	6.115	4,704	8,314	6,111	11,015
June	3,508	6,316	4,250	7,926	5,857	10,471
July	3,469	6,037	4,387	7,712	5,941	10,153
August	3,606	6,158	4,479	7,947	6.038	10,392
September	3,555	6,515	4,215	7,853	5,846	10,985
October	3,704	6,838	4,431	8,166	6,130	11,019
November	3,997	7,694	4,623	9,042	6,362	12,090
December	4,149	7,546	5,039	9,160	7,217	13,062
Year	43,371	7,694	54,862	9,264	74,397	13,062

Item			
Total Requirements-GWH	43,411	54,881	74,435
Per Capita Use-KWH	8,556	9,997	12,676
Peak Use-MW	7,694	9,264	13,062
Energy Use-Avg. MW	4,956	6,265	8,497
Load Factor-Percent	65.6	68.4	65.0


COLUMBIA-NORTH PACIFIC REGION
Power Planning Committee
Pacific Northwest Basins Commission
December 1969
43
42B
30A
44
VII
30B
45
42A
31B
31A
46B
46A
VIII
41
32A
47
32C
32A
48
39
LEGEND
COLUMBIA NORTH PACIFIC REGION
FPC REGION VII
FPC POWER SUPPLY AREAS
FPC POWER SUPPLY SUBAREAS

Attachment #7

TABLE 3

Monthly Load Patterns
Columbia-North Pacific Region

Month	1980		2000		2020	
	Peak	Energy	Peak	Energy	Peak	Energy
	(In Millions of Kilowatt Hours of Energy and Thousands of Kilowatts of Peak)					
January	33,100	17,900	81,500	44,300	184,200	101,500
February	31,200	15,500	76,900	38,500	173,900	88,100
March	30,100	16,500	74,100	41,100	167,500	94,000
April	29,100	15,400	71,800	37,900	162,400	86,700
May	28,300	15,300	69,800	38,200	157,900	87,400
June	27,400	14,700	67,500	36,600	152,600	83,300
July	27,400	15,500	67,600	38,200	152,700	87,500
August	27,800	15,600	68,600	38,600	155,100	88,400
September	28,600	15,200	70,600	37,600	159,500	86,000
October	30,100	16,300	74,100	40,400	167,500	92,300
November	32,900	16,800	81,800	41,700	183,200	95,600
December	34,400	18,500	84,800	45,900	191,700	105,200
Annual	34,400	193,200	84,800	479,000	191,700	1,096,000
Total Requirements GWH		74,435		193,200	479,000	1,096,000
Per Capita KWH Requirements		12,676		26,500	49,400	86,300
Peak-megawatts		13,068		34,400	84,800	191,700
Average-megawatts		8,497		22,000	54,660	125,060
Load factor-percent		65.0		64.0	64.4	65.0

Attachment #8

TABLE 4

Load Estimates for the Future
West Group Area 1/

Critical Hydro Conditions
(Megawatts)

Power Year	January Peak	Average Energy
1974-75	21,377	13,951
1975-76	22,678	14,772
1976-77	24,446	15,906
1977-78	25,969	16,798
1978-79	27,482	17,720
1979-80	28,949	18,622
1980-81	30,574	18,557
1981-82	32,236	20,559
1982-83	33,989	21,572
1983-84	35,765	22,632
1984-85	37,648	23,745
1985-86	39,631	24,925
1986-87	41,772	26,169
1987-88	43,996	27,467
1988-89	46,420	28,852
1989-90	48,944	30,326
1990-91	51,613	31,867
1991-92	54,447	33,493
1992-93	57,486	35,240
1993-94	60,655	37,089

1/ Loads do not include regional exports or reserves for unanticipated load growth.

Source: "West Group Area Loads and Resources", December 6, 1973

PACIFIC NORTHWEST AREA

Federal Power Commission Estimates to 2020
(Megawatts)

Power Year	January Peak	Average Energy
1994-95	86,400	55,400
1999-2000	115,000	73,700
2004-05	151,000	96,800
2009-10	196,500	126,000
2014-15	249,500	160,000
2010-20	312,000	200,800

Attachment #9

TABLE 5

Projected Electric Energy Loads by Sub-Areas 1/

Sub-area	1980	2000	2020	2070
Panhandle	176	391	623	990
Clearwater	185	434	712	1,200
Salmon	11	31	52	105
Southwest Idaho	339	892	1,632	3,759
Upper Snake No. 1	778	1,645	2,793	5,922
Upper Snake No. 2	262	599	1,072	2,603
Bear River	30	77	132	381
TOTALS	1,781	4,069	7,016	14,860

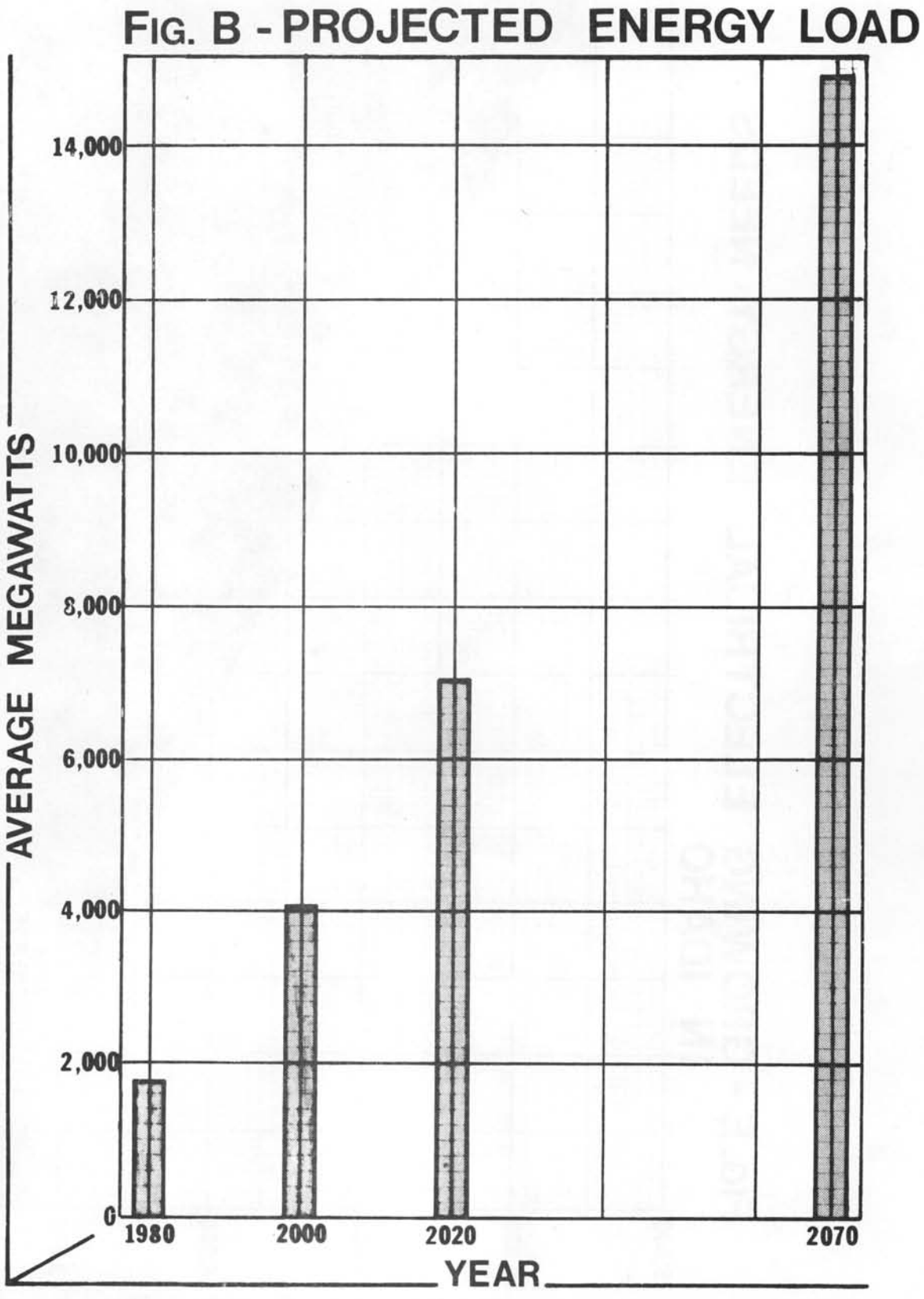


FIG. B - PROJECTED ENERGY LOAD
AVERAGE MEGAWATTS
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1980
2000
2020
2070
YEAR

FIG. E - GROWING ELECTRICAL ENERGY NEEDS IN IDAHO

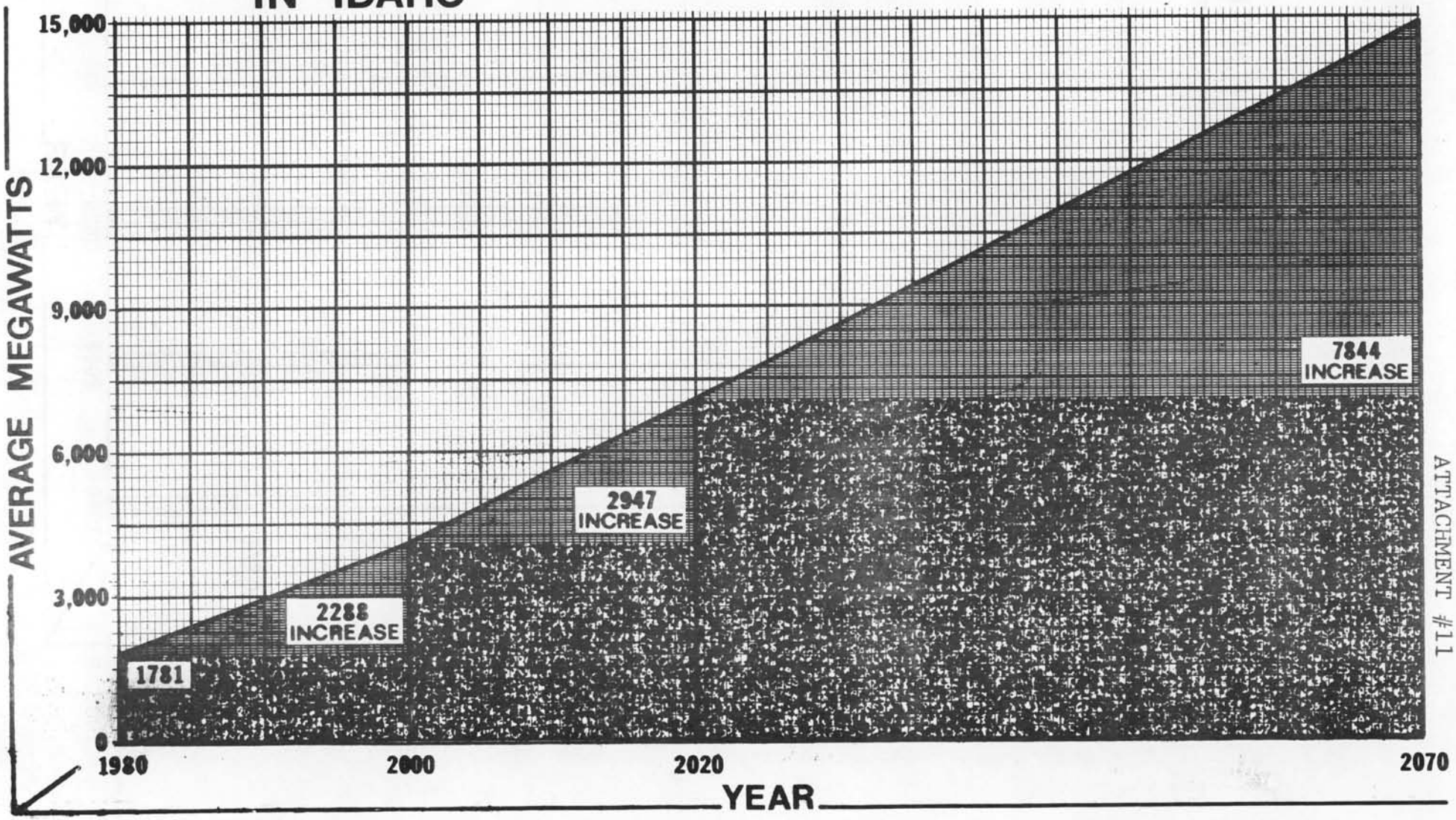
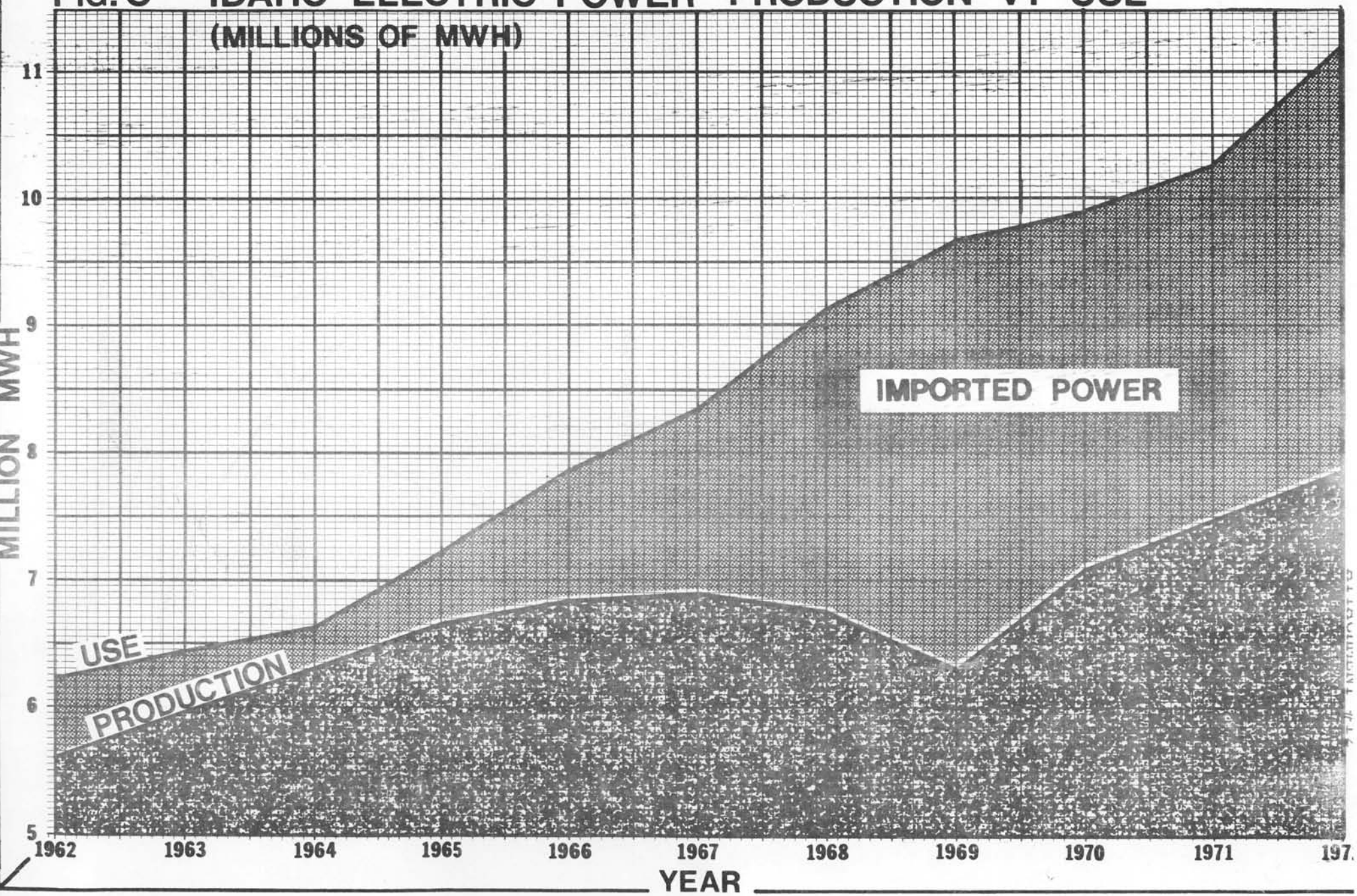


FIG. C - IDAHO ELECTRIC POWER PRODUCTION VS USE



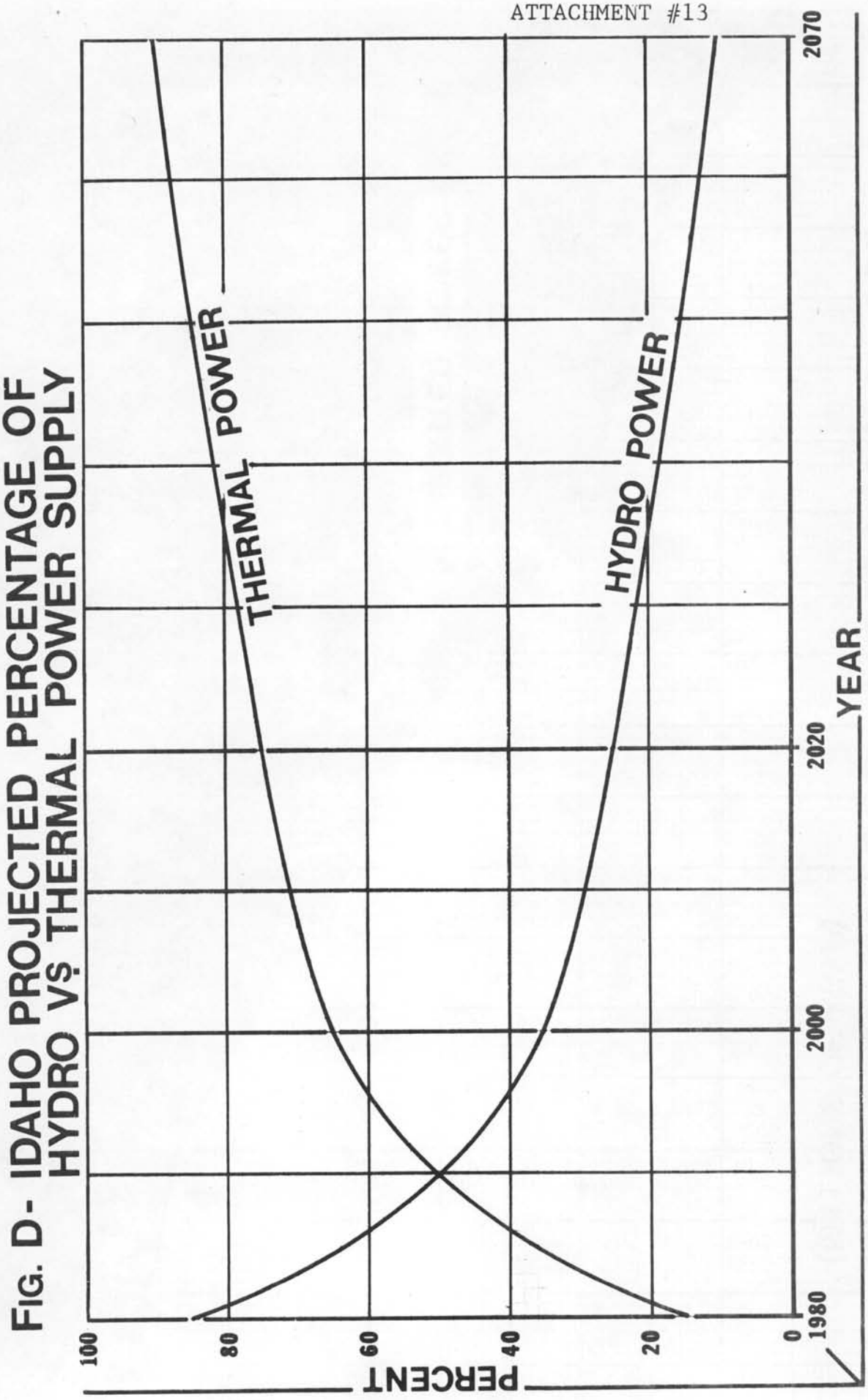


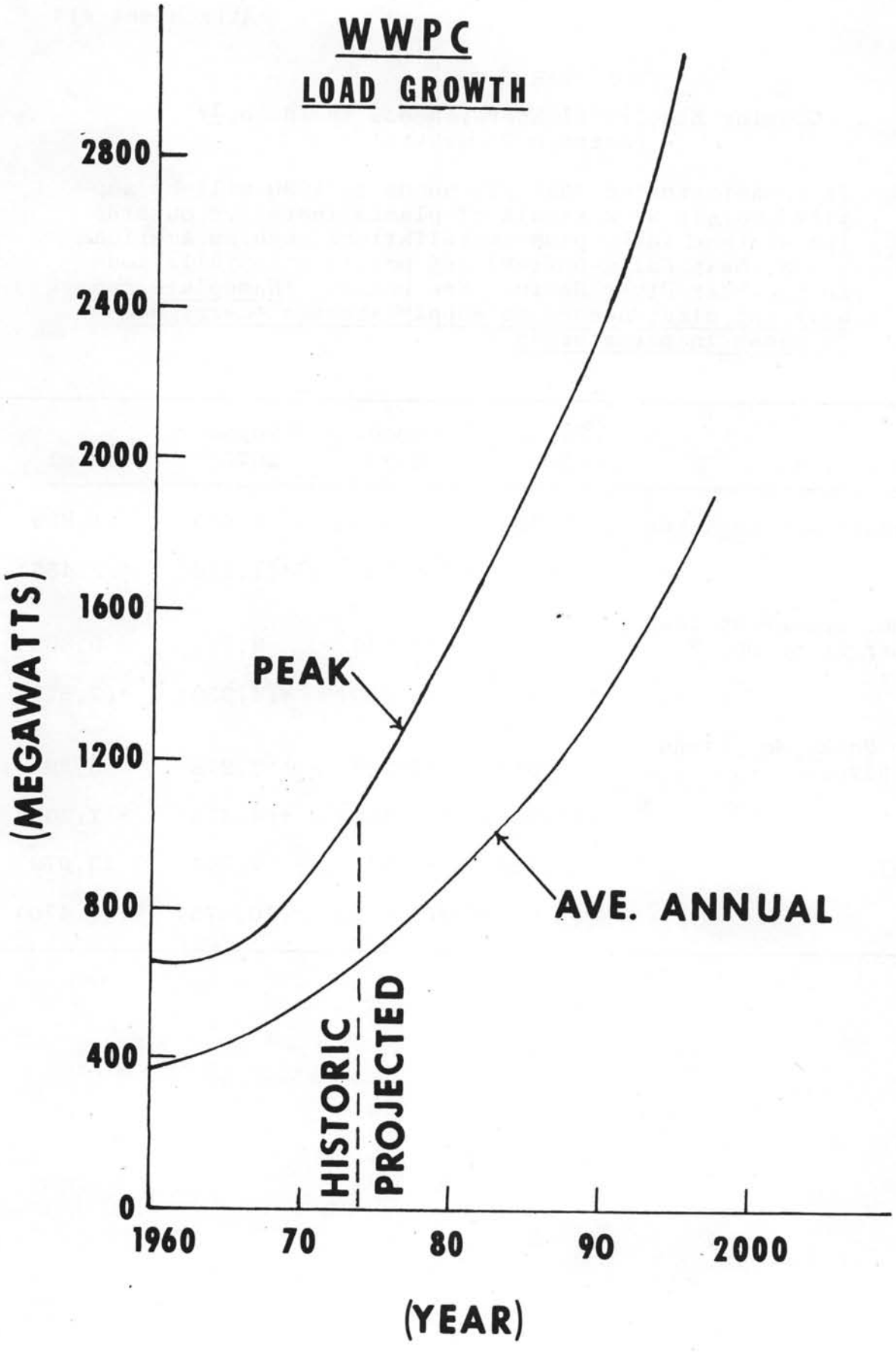
FIG. D- IDAHO PROJECTED PERCENTAGE OF HYDRO VS THERMAL POWER SUPPLY
THERMAL POWER
HYDRO POWER
PERCENT
100
80
60
40
20
0
1980
2000
2020
2070
YEAR

TABLE 6

Growing Electrical Energy Needs in Idaho 1/
(Average Megawatts)

(NOTE: It is anticipated that all needs to 1980 will be supplied mainly as a result of plants installed outside the state of Idaho plus installations such as American Falls, Swan Falls-Guffey, and possible installations in the Bear River Basin. See below. *Nameplate capacity of plant needed to supply average energy need is shown in parentheses.)

	Area	1980-2000	2000-2020	2020-2070	Total
1.	Panhandle & Clearwater	464	510	855	1,829
		*(620)	*(685)	*(1,150)	*(2,455)
2.	Salmon, Southwest Idaho, & Upper Snake No. 2	910	1,234	3,711	5,855
		*(1,215)	*(1,650)	*(4,950)	*(7,815)
3.	Upper Snake No. 1 and Bear River	914	1,203	3,278	5,395
		*(1,220)	*(1,610)	*(4,375)	*(7,200)
	Total	2,288	2,947	7,844	13,079
		*(3,055)	*(3,945)	*(10,475)	*(17,470)


WWPC
LOAD GROWTH
2800
2400
2000
1600
1200
800
400
0
(MEGAWATTS)
PEAK
AVE. ANNUAL
HISTORIC
PROJECTED
1960
70
80
90
2000
(YEAR)

ATTACHMENT #16

Figure 1. IDAHO POWER COMPANY AND FPC POWER SUPPLY AREA-41 LOAD GROWTH
ACTUAL & PROJECTED
(Excludes Dump Sales & Firm Sales)

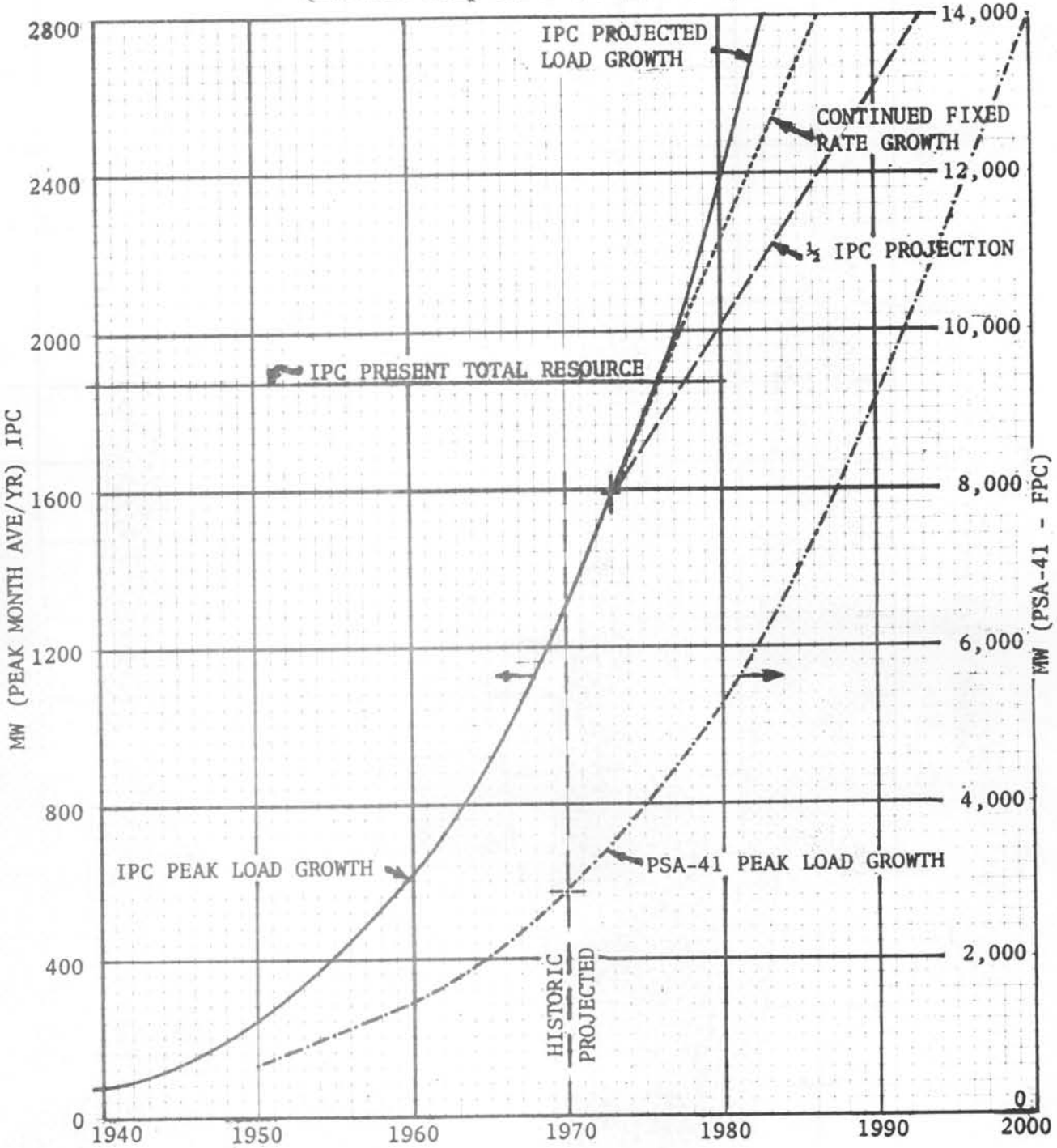


Figure 3. SEASONAL DISTRIBUTION OF POWER RECEIVED & DELIVERED OUTSIDE OF SYSTEM (IDAHO POWER COMPANY)

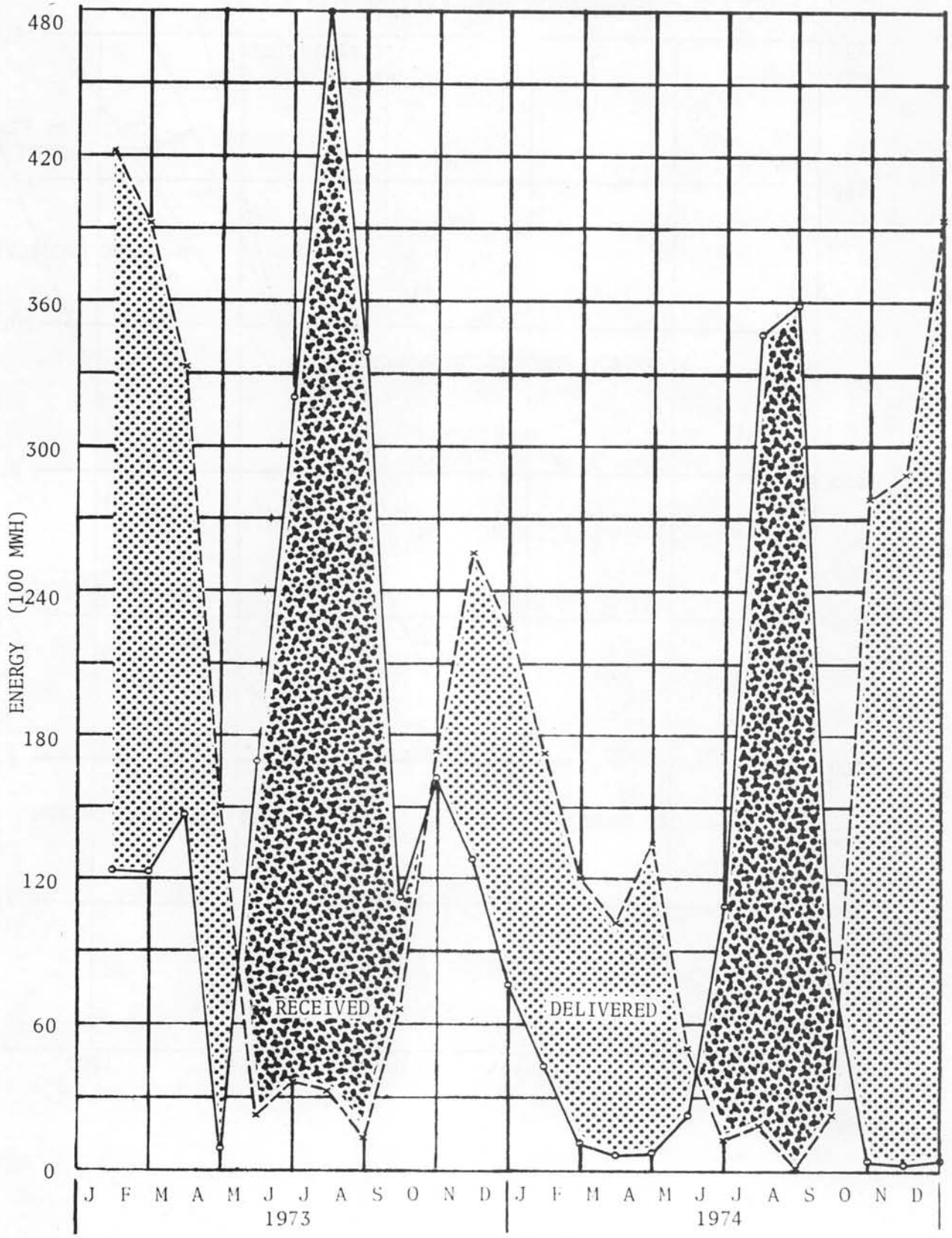


Figure 2. SEASONAL PROJECTIONS OF POWER RECEIVED & POWER DELIVERED OUTSIDE OF SYSTEM, AND DUMP POWER (IDAHO POWER COMPANY)

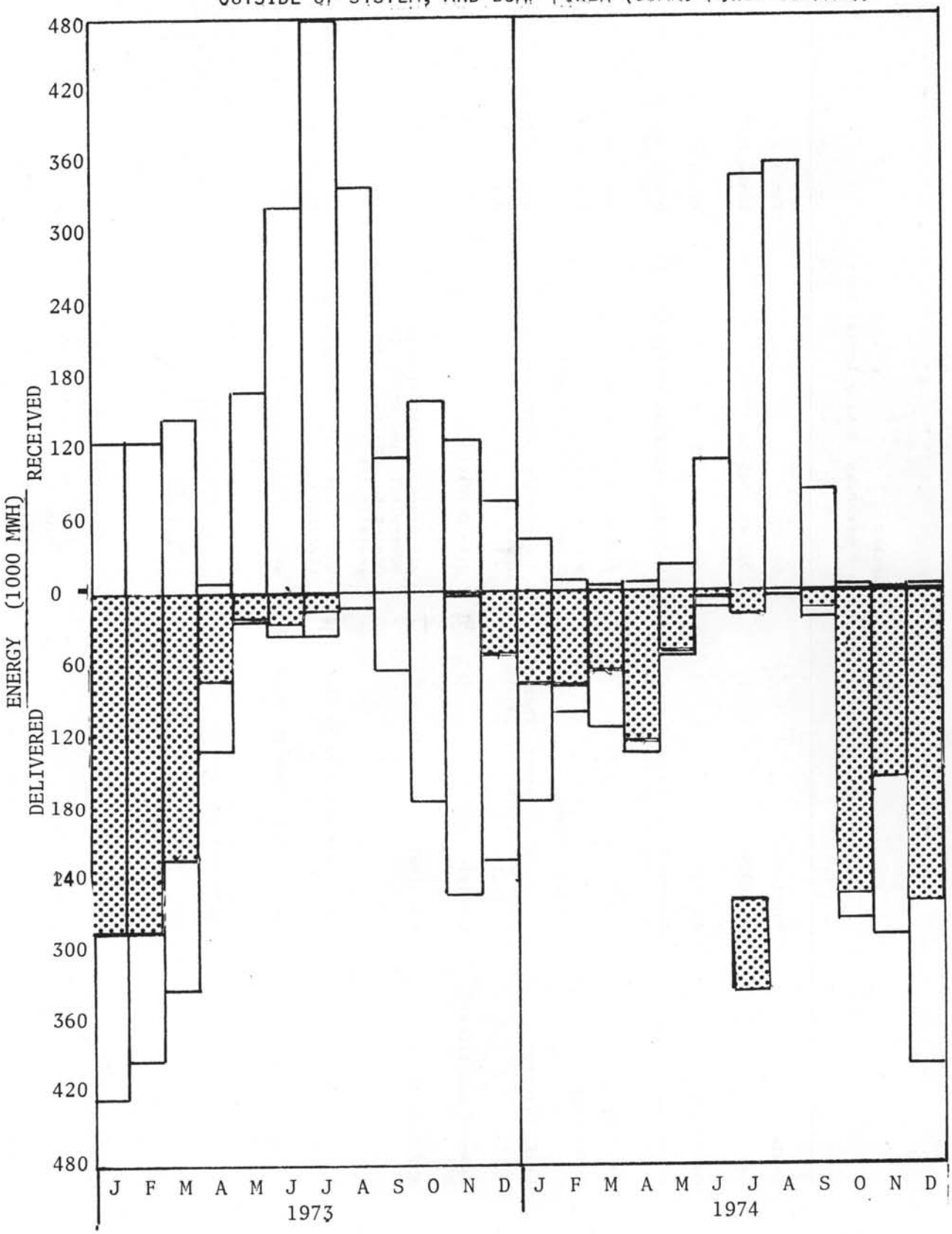


TABLE 7

Comparative Summary of State Power Plant Siting Legislation

State	Washington	Oregon	Montana
Law No.	80.50RCW	ORS 493.305 to 435.575 and 453.994	House Bill 0127
Date Passed	Feb. 23, 1970	June 30, 1971	March 7, 1973
Licensing Body	Thermal Power Plant Site Evaluation Council	Nuclear & Thermal Energy Council	Board of Natural Resources and Conservation
Chairman	Appointed by Governor	Elected from membership	Appointed by Governor
Membership	15 State agencies 1 County member	9 members total 5 public, 4 State officers	7 members, all public
Staff Director	Executive Secretary, Thermal Power Plant Site Evaluation Council	Coordinator, Oregon Nuclear & Thermal Energy Council	Administrator, Energy Planning Division, Dept. of Natural Resources & Conservation
Name of Certificate	Certification	Site Certificate	Cert. of Enviornmental Compatibility & Public Need
Who Must Apply	All electric utilities	All electric utilities for powerplants and anyone proposing to construct a nuclear installation	Any "person" (individual, group, corporation, or government entity) proposing to construct facility
Min. Plant Size	250 mw per site (50 mw floating)	200 mw per unit (excluding gas turbines)	50 mw per unit plus associated facilities[1/]
Transmission Lines (T-Lines)	Associated T-Lines in excess of 200 kv	Associated T-Lines in excess of 200 kv	All lines in excess of 34.5 kv[2/]
Application Fees	$25,000 per plant application Applicant must approve expenditures beyond $25,000	$5,000 for Notice of Intent to file. Power plant $.05 per kw Nuclear installation $1,000 per $ million. Applicant must approve expenditures beyond fee	3% of estimated facility cost up to $1,000,000 plus 1% of cost between $1 million and $20 million plus 0.25% of cost between $100 million plus 0.1 % of cost in excess of $300 million
Annual Fees	None	1-Powerplant $0.25 per installed kw Nuclear installation $300 million per $ million investment minimum $250 2-Share of $100,000 based on annual kwhr	None

Public Hearing Schedule	1-Information-Within 60 days in the County of the site 2-Formal-Before Council recommendation to Governor 3-More if necessary	After application is filed	1-By Department, prior to submitting recommendations (report) to Board 2-By Board, 60 days after report is received from Department
Time Limit for Approvals	Council has 12 months for disposition. Governor has 60 days for disposition.	1-File Notice of Intent 2-Application cannot be filed until 1 year after Notice of Intent 3-Council must act within 2 years after application 4-Certificate cannot be issued until 3 years after Notice of Intent (unless waived) 5-Void if not signed by Governor within 30 days	1-Application must be filed 2 years prior to commencement of construction, excpet 9 months for T-lines of 161 kv or less up to 30 miles in length. 2-Department has 600 days in which to prepare recommendations(report) for submission to Board
Unique Features	A Counsel for the Environment is appointed by the Attorney General	Council will designate suitable and unsuitable areas for sites	Requires submission of long-range (10-year) facility construction plans of the applicant
Independent Studies Required	Yes	Yes	Yes
Monitors After Approval	Yes	Yes	Yes
Need for Facility Considered	Yes	Yes	Yes

TABLE 8

	Onweiler Bill	Attorney General Bill
1. Licensing Body	Public Utilities Siting Board	Energy Facility Evaluation Council
2. Chairman	Chairman of Public Utilities Commission	Chairperson of Public Utilities Commission
3. Membership	Three members of Public Utilities Commission Director, Department of Water Resources Director, Department of Health and Welfare Two public members appointed by the Governor	Six public members appointed by the Governor Chairperson of the Public Utilities Commission serves as ex-officio member
4. Terms of Office	Six years	Six years
5. Executive Director		Director of the State Office of Energy
6. Staff	Public Utilities Commission Staff	
7. Name of Certificate	Certificate of environmental compatability and public need	Permit
8. Who must apply	All except federal agencies	All persons
9. Minimum Plant Size Requiring Certificate or Permit	50 megawatts 50,000 barrels of liquid, hydrocarbon product 100,000,000 cubic feet of gas per day	50 megawatts, additions in excess of $250,000 50,000 barrels of liquid hydrocarbon, additions in excess of $250,000 100,000,000 cubic feet of gas per day, additions in excess of $250,000 When storage of radioactive wastes are involved All geothermal resources Plants for enriching radioactive minerals
10. Transmission lines	115,000 volts Liquid of gas	In excess of 10 mi. or 34.5 kw or more capacity Liquid or gas for above capacities
11. Application fees	Sum of: 1. 3% of cost estimate up to $1,000,000 2. 1% of estimated cost over $1,000,000 and up to $20,000,000 3. 0.5% of estimated costs over $20,000,000 and up to $100,000,000 4. 0.25% of estimated costs over $100,000,000 and up to $300,000,000 5. 0.1% of estimated cost over $3000,000,000 Study costs exceeding this amount charged to applicant. All unexpended monies returned to applicant.	Sum of: 1. 3% of cost estimate up to $1,000,000 2. 1% of estimated cost over $1,000,000 and up to $20,000,000 3. 0.5% of estimated costs over $20,000,000 and up to $1000,000,000 4. 0.25% of estimted costs over $100,000,000 and up to $300,000,000 5. 0.1% of estimated cost over $300,000,000

12.	Annual Fees	None	None
13.	Public Hearing Schedule	Not less than 180 days from date application is filed	Within 9 months from date application is filed
14.	County Approval	Election on application held upon proper petitions being filed	
15.	Time Limit for Approval		Within 90 days after completion of the hearing
16.	Independent Studies Required	Yes	Yes
17.	Need for Facility Considered	Yes	Yes
18.	State Agency Review	Administration, Employment, Fish and Game, Health and Welfare, Transportation, Labor and Industry, Lands, Parks, Water Resources, Tax Commission, Industrial Commission, Public Utilities Commission	Administration, Employment, Fish and Game, Health and Welfare, Transportation, Lagor and Industry, Lands, Parks, Water Resources, Tax Commission
19.	Requires Review of Long Range Plans to Meet Power Needs	Yes	Yes

Discussion Questions and Answers

Q. What is the basis of the projections of increased energy demands in the future -- industrial demands or domestic demands?

A. It is based on both industrial and domestic demands. As was mentioned previously, both the universities and federal agencies have been involved in population projections for the United States. Energy demands are based on these projections. Population growth reflects the need for new industry to produce products needed, as well as identifying needs for individual use of electricity. Projected energy loads include all uses and needs for electric energy.

Q. What will happen if these needs are not met?

A. It would result in a lower standard of living here in the United States. A reduction would occur in many of the manufactured items we now enjoy having as a convenience. Much of the food would not be processed as it now is. There would not be the choice of clothing, automobiles, and other things that go to make up the good life we now experience.

Q. Would this be a reduction or a leveling off?

A. It is pretty difficult to reach a leveling off or stabilized economy. If the economy is not progressing, it seems to move backwards. For example, if we stopped right now and said there would be no additional power production over and above what is now produced, a major deficiency would occur in meeting future needs and our economy would receive a severe setback. Even without an increase in the birth rate, our population is going to grow during the next 50-year period, and our needs are going to increase also. In order to keep even, it is necessary that we have additional development of energy to meet the increased needs of growth that will occur as a result of the population in the world right now. As our children grow up and become adults, demands are created to meet their needs. A leveling off as you suggested really means continued development at a rate necessary to maintain our present standard of living.

Q. Why does Idaho feel it is necessary to generate all of its future power needs within the confines of the state? Why can't it be generated elsewhere and shuttled into the state over BPA or some other system?

A. I think that the people of Idaho would not object to this. They would be willing to accept this arrangement if other states were willing to generate electricity and import it to Idaho. However, this cannot be planned for. The Idaho Water Resource Board feels that in the State Water Plan allowance should be made for adequate water to meet future energy production needs in the state. There is some concern that if a real shortage of power occurs within the nation, the state of origin will have priority. With that thought in mind, the Idaho Water Resource Board feels that the state should consider having enough power generated within the boundaries of Idaho to meet the state needs.

Q. Are the future demands in Idaho as a result of industry or agricultural demands?

A. Both are anticipated in Idaho, however, the major demand is expected to be for irrigation pumping. There is, in the State of Idaho, a great resource of rich desert land. This includes over 3 million acres of class I and II land with water available that can be developed for agricultural use. This is nearly equal to what is being irrigated now. Nearly all of this water will require pumping. Water will need to be lifted out of the Snake River Canyon to reach these lands.

Industrial uses will result from increased phosphate manufacturing. In southeastern Idaho, large deposits of phosphate exist. Over the past ten years a large portion of the increase in electrical demand in Idaho has resulted from the development and processing of phosphate in southeastern Idaho.

It is also anticipated that there will be an increase in food production processing in Idaho. There are presently large processing manufacturers in Idaho such as Simplot and some of the major food chains. An expansion of this m manufacturing is expected.

Q. How great an increase of population is expected?

A. Several different projections have been used to establish a range of conditions that may occur. Agricultural production and growth have been related to population growth on the basis that Idaho would maintain its share of the national gross output. No attempt was made to capture more than we presently have. However, this could occur. Our present population in the State of Idaho is somewhere between 750,000 to 800,000 people. In the next fifty years it is expected to double and be nearly 1.5 million people.

Q. Could the Idaho Power Company, who prepared the Idaho need study for the Idaho Water Resource Board, have been somewhat biased in their projections.

A. The Idaho Water Resource Board contracted with the Idaho Power Company to do this study. They were given the basic data that projections would be made from. The data given came from studies made by universities and others for the Idaho Water Resource Board. The Idaho Power Company was asked to determine what would be needed in the way of energy or power to meet these projected needs. This served as the direction and guidance needed that would hopefully overcome any bias that would tend to develop. Intentions were to get as true a picture as possible on projected needs.

Q. What information on agriculture did you give the power company?

A. They were given the number of acres to be developed each year over the period of projections. Similar data on yearly growth was provided for increased industrial development.

Q. For irrigation needs, did you assume that all the new land coming in would require pumping type lifts?

A. From previous studies made, all the potential irrigable land in the state had been identified, also the available water resources. From these studies, it has been determined that nearly all of the land developed in the future will require pumping. This is also true when present irrigated land converts from gravity irrigation to sprinkler irrigation.

Q. In the Orchard plant that the Idaho Power Company proposed, it has been said in reports that 1,000 megawatts will be produced. Will all of the cooling water be consumptively used or will there be some return to the Snake River?

A. It is presently undecided. Plans are for a disposal pond which will allow the water to evaporate and seep into the ground. Abour 30 cubic feet per second will be pumped from the Snake River. Of this amount, about two-thirds is consumptively used. There has been some thought given to letting the return flow go back into the Snake River by flowing down natural drainage ways. The thought being that this would benefit wildlife.

Q. In relation to the Orchard plant, they filed for 30 cubic feet per second. It has been in the newspaper that the actual expected water use will be 60 cubic feet per second. Are they trying to cut down the impact of the local opposition by filing for 30 cubic feet per second now, and 30 cubic feet per second later?

A. Time requirements dictate this. It is correct -- they have now filed for 30 cubic feet per second. This filing

is for the first 500 megawatt unit. They are going to complete this plant in two different stages. The first stage is a 500 megawatt unit. When they file for water, they have to prove up on it within five years or the filing will lapse. They plan to have their first unit in operation somewhere around 1980. The next unit would be a year or two later. Therefore, it is expected that they will file sometime in the next year or two for the water needed for their second unit.

Q. What would be temperature and quality of the return water?

A. There would be some increase in temperature. I can not tell you the exact amount. However, the amount of water that would return to the Snake River, if it is allowed to return, compared to the flow in the Snake River is a pretty minimal amount.

As a result of return flow, there would not be any more minerals returned than they take out of the river. However, the concentration in the return water is greater due to the fact that they have evaporated part of the water and the minerals stay there.

Q. The intent is not to get any water back. I think what they are intending in this particular case with blowdown water is to completely use it or let it be eventually evaporated. It is a relatively minor percent of the blowdown water that they cannot recycle back through the plant because it gets too concentrated for their cooling units. My understanding is that they are going to try and not allow any of it to get back to the Snake.

A. This is probably true. Their original plan is that they won't allow any of it back into the river. As mentioned, there has been some discussion that there might be some beneficial results from letting it drain down watercourses back to the river. Their present plans, however, are not to allow any of it back into the river unless there are benefits otherwise.

Q. What is your opinion of what the role of the Idaho Department of Water Resources in power plant siting should be?

A. The Department is involved with power plant siting from a number of standpoints. They are involved and concerned with the planning and development of the water resources of the state. Any form of energy that is developed uses water. The Department plays a major role in planning that would affect power plant siting. Another major role is that all water users must obtain a permit for water use from the Department.

The Department also has responsibility for geothermal development in the State of Idaho. Hopefully, this will become a significant source of power generation in Idaho.

There is presently power plant siting legislation proposed that would further involve the Department of Water Resources. One particular bill prepared by Bill Onweiler involves the head of our Department as a member of a general power plant siting council. He would serve on this council with the heads of other resource departments in the state. There may be some advantages to such a council existing; however, if this law is passed, our Department will have an additional major role to play in power plant siting.

Q. Don't you think that since this does constitute a diversion of water that the Department of Water Resources should have at least some control over it?

A. Very definitely. I think there are situations where an adverse decision by the Department of Water Resources should stop the siting of a project at a particular site. An adverse decision by the Department may occur if it is apparent that public harm might result as it relates to the state water resources or existing water rights.

Q. I think there is apt to someday be a very distinct need for it. That is, there is going to be irrigation sometimes competing with power. Then it needs some decision to say which they will develop, which will we allocated the water to. Should we allocate it to power, or should we allocate it to irrigation. From some of the work now underway at the Institute, I can see it is an obvious thing in the future if you develop 13 power plants, I think you are going to find that it is probably low even though it sounds like that is a lot of power and we don't need it. But, 100 years from now we may say that we have 20 power plants that we need water for; and if we see the accuracy of our predictions today, 13 or 20 is not that good. I am sure that the Department of Water Resources is going to be plagued with that very problem.

A. In fact they are concerned with it now. In substantiation with what you say, our studies show that there are future conflicting interests in and conflicting needs for water. Even though we talk about having a fairly abundant supply of water in the state of Idaho now, as we look ahead we can see that there are conflicting demands that will be placed on our water. Decisions are going to have to be made. At the present time the Board has made the decision that they will allocate enough water to meet projected needs for energy production. This could change. There is now a very extensive public information program underway. Public

hearings are being held in the state of Idaho that discuss these findings and the conflicting future uses of our water in the state of Idaho. The Idaho Water Resource Board is asking for public input and help in developing the State Water Plan. One of the issues that is being presented to the people of the state is whether or not water should be allocated for future energy production.

Q. What restraints are the Department of Water Resources placing on future geothermal power plant development in the state of Idaho?

A. At the present time, there has not been a lot done on this. Our big effort right now is to try and determine just what our resource is. There is a drilling program going on under the Department's direction in the southern part of the state to try and identify more fully what resources we have in the way of geothermal energy and where it is located. Requests are being received from various industries for drilling in the state and for permits for geothermal development. These are not being encouraged yet. The state needs more legal structure to control what actually happens in the future. There are a lot of problems yet to be worked out.

Q. Is the only geothermal drilling in progress that on state land or that sanctioned by the Idaho Department of Water Resources?

A. I wish I was better informed on that and could help you more. As I understand the federal government has not yet issued any leases on the federal land for geothermal development in the state of Idaho, and as far as I know there hasn't been any drilling on private land.

Q. From reading some newspaper articles, I understand in the Twin Falls area they are compensating farmers for drilling in the Raft River Valley.

A. Yes, there is to be one well drilled there next summer. There has apparently been a lot of leasing or rights sold on private property. Permits from our Department to drill those wells will have to be obtained.

Q. What is the status? Do you think the Department will issue those permits?

A. Yes, I think so. There has to be legislation passed and some is being proposed to help control and regulate this. There is legislation passed now that will allow issuing permits. However, this doesn't provide the control needed. When drilling permits are issued, it is important that the

information gathered from all drilling operations be made available to our Department. The Department can then monitor very closely the geothermal resources encountered. This will help the Department in further identifying the extend of the geothermal resource in Idaho.

Q. Do you know where the status of the work is and what they expect to do with the water once they get it on the surface? What will be done with the discharge once the geothermal resource is brought to the surface?

A. I'm not aware of any regulations established yet by the state, but I expect there will be. There will need to be very close control on this discharge from an environmental concern. There are undoubtedly some controls now established by E.P.A. and under the Water Quality Act which would control discharge into streams or the groundwater. However, the state will in the future set up their own standards and guidelines for controlling geothermal discharges.

Q. Right now I do not know of any E.P.A. rules that control groundwater recharge resulting from surface water seeping into the ground.

A. The state has control of recharge wells. However, if the water is ponded on the surface and allowed to seep into the ground, there is nothing to control this. If the flow was great enough in the Raft River area, it could run back to the Snake River. It seems unlikely that this flow will ever be great enough to reach that far before seeping back into the ground.

Q. I presume then that if some of it is going to go back into the Snake River, it is going to have to come by E.P.A. and state quality standards, then you say about the groundwater. Are you introducing it back into the hydrologic system or are you introducing it into something that is back down into some water that is not a part of the hydrologic system. I don't think anybody knows yet.

A. I don't think so either, and I think it will take some studying. In fact, you are way ahead of us on that. We haven't reached the point in our geothermal development where these kinds of problems have been encountered. As a result, no real controls have been developed.

Q. What percent of our energy will geothermal energy provide?

A. That is difficult to determine at this point in time. From the information we now have it appears that there is a large geothermal resource in the state of Idaho. The amount developed will depend on the quality of that geothermal resource

and on the technology that can be developed to put it to use. You are probably aware that the deep well being drilled in the Raft River area now is being developed as a research project to see if a high energy water resource can be utilized in electric energy development. Apparently hot dry steam is not expected to be found as a geothermal resource in Idaho.

Q. About what do you need to make the geothermal work?

A. I am going to have to go on memory. As I recall it would require about 300° temperature to provide what they need for their test program. The flow they have encountered is a little under this. However, the temperature seems to increase as the well flows. The hot water was encountered sooner than they had expected. They were originally anticipating drilling the well as deep as 8,000 feet. It is questionable if they will go that deep now. This well is a research well, and the intent is to see if they can come up with some technology to use in generating electricity from high temperature water.

Q. When you refer to thermal coal-fired or nuclear plants, would there be a preference in respect to water diversion or consumptive use or does it make any difference.

A. It would make no major difference. Actually both are steam generators. The difference being the fuel used to heat the water and develop the steam. The difference in use results from the cooling system used whether coal-fired or nuclear. As far as the water resource is concerned, the fuel used to make steam would make no difference.

Q. Has the Water Resource Board done any work with the possible reversible pump storage units as they have at Grand Coulee?

A. No, we haven't done any work on this although we have done some work with pump storage. On second thought, pump storage as we have considered it does involve reversible turbines. When you first asked this, I was thinking only of the river system as it now exists. What we have done is to look at some of the pump storage sites in southwestern Idaho. We catalogued 26 potential sites in that part of the state. There is considerable potential for pump storage development in Idaho. The Power Planning Committee of the Pacific Northwest River Basins Commission has published one report on pump storage resources within the western coastal area and along the Columbia River up to about Walla Walla. This report identifies the various sites in those areas that have potential for pump storage. There is also a study going on now which covers the rest of the Pacific Northwest area. The information our Department gathered on southwestern Idaho will be used in this study.

Q. How long do you think it will be before we see either Utah Power Company or Idaho Power Company come up with gumption to try to build a nuclear plant.

A. I think once we get the fusion process tied down, they will be ready to utilize nuclear energy. Discussions with the Idaho Power Company people indicate that they are reluctant to develop nuclear power generation using present technology. The reason for this is because there appears to be only a hundred year supply of nuclear energy resources to supply the present systems in use. If they get the fusion process developed, then the nuclear resources would provide several thousand year's supply. It's my understanding that they are holding off to see if this technology is developed. Once it is developed, they will be ready to move in that direction.

Q. Your statistics show increasing shifts to thermal. One of the questions your organization is asking as you run around discussing the state water plan is would you have a thermal or coal fired or nuclear plant in your county. I would be very surprised if the answer was statistically different from "no" in each case. At the Idaho Tomorrow Conference there was a concurrence as to energy self sufficiency. As I look at energy self sufficiency, it doesn't seem to make any sense economically -- either way it is inefficient to be self sufficient and not use the excess from other areas at a given time means you've got to build more plants, bigger plants, and so environmentally it is not very acceptable.

Q. Has there ever been a study done to justify the conclusion of the State Water Board that we should be going toward energy self sufficiency?

A. No, there hasn't.

I would like to wrap this session with a little philosophical thought:

"There are two ways of being happy: We can either diminish our wants or augment our means - either will do - the result is the same; and it is for each man to decide for himself, and do that which happens to be the easiest. If you are idle or sick or poor, however hard it may be to diminish your wants, it will be harder to augment your means. If you are active or prosperous or young or in good health, it may be easier for you to augment your means than to diminish your wants. But if you are wise, you will do both and at the same time, young or old, rich or poor, sick or well; and if you are very wise you will do both in such a way as to augment the general happiness with society." This is a quotation from Benjamin Franklin.

Now let me read a paraphrase entitled "An Energy Paraphrase":

"There are two ways of being energy sufficient: A region, area, or state may either conserve on energy use or augment the energy production - either will do - the result tends to give the same results; and it is for each region, area or state to decide what to do, whichever is the easiest. If a region, area or state is deficient of resources, has a depressed economic condition, or lacks advanced technology, however hard it may be to conserve energy use, it will be harder to increase the energy production. If a region, area or state is rich with resources, has a healthy economy and an advanced technology it may be easier to augment energy production than to conserve on energy use. But if a region, area or state is wise, they will do both at the same time, deficient or rich in resources, depressed or healthy in economic well being, or lacking advanced technology or strong in advanced technology; and if the region, area or state is very wise, they will do both, conserve on energy use and increase energy production in such a way as to augment the general energy sufficiency of all surrounding society."

This paraphrase was made by Professor Warnick. There is a lot of wisdom in this.

Presentation by

DR. EUGENE GREENFIELD
Consultant to Electric Utilities
and former Director of Research for
Engineering Research Division
Washington State University

THE ENERGY SITUATION IN THE STATE OF WASHINGTON

Dr. Greenfield explained how the state of Washington has two energy groups (1) the State Energy Policy Council on which he participated which sought to set broad guidelines for all energy problems, (2) the Thermal Power Plant Site Evaluation Council, a regulatory body for recommending site location of power plants in the state.

Dr. Greenfield referred several important documents bearing on the energy situation as it impacts on the state of Washington. These are listed for reference below:

1. Energy Profile in the State of Washington, Institute of Environmental Sciences and Institute for Governmental Research, University of Washington, July, 1973.

2. Energy in the State of Washington, a map of use and source of Energy, January, 1974.

3. Exploring Energy Choices - The Energy Policy Project of the Ford Foundation, P. O. Box 23212, Washington, DC, 1974.

4. 1974 Business and Economic Charts, Ebasco Services Incorporated, Research Department, New York, NY 1974.

5. Understanding the National Energy Dilem, Joint Committee on Atomic Energy, Stock No. 5270-01947, Washington, D.C., August 17, 1973.

6. Final Report of Energy Policy Council, State of Washington, Energy Policy Council, 312 First Ave. North, Seattle, Washington, January, 1975.

7. Energy Environment Productivity, Proceedings of the First Symposium on RANN: Research Applied to National Needs, National Science Foundation, Washington, D.C., November, 1973.

8. West Group Forecast of Power Loads and Resources, Pacific Northwest Utilities Conference Committee, July 1974 - June 1986, February 1, 1975, Wenatchee, Washington.

A question and answer period followed, but no transcription of the questions was made. A brief summary of the questions asked is reported below:

Discussion Questions and Answers

Q. When will fusion research result in a practical power system?

A. That is hard to answer, but he questioned it coming about before the year 2000 at least in a real practical system.

Q. How do we know what is right for a national policy?

A. The best answer is with technical society and professional groups having independent affiliation.

Q. Why isn't Congress asking for that knowledge?

A. Dr. Greenfield was critical of Congress indicating it was more interested in political patronage and certain special interests than in developing an energy policy.

Q. The public is confused about the question of an energy crisis, how do we know who to believe?

A. The petroleum companies are likely to push more use of higher priced fuels and the answer to organize unbiased agencies or organizations to make studies.

Q. What about conserving or reducing waste in energy use?

A. There is obviously some chance to conserve, but it may be very difficult to implement.

Presentation by

LAWRENCE B. BRADLEY

Supervisor,

Office of Nuclear Energy Development
State of Washington

SOME PROBLEMS IN DEVELOPING POWER PLANT SITING - THE THING IS THE SOCIETAL IMPACTS

Today's governmental responsibilities, in the matter of meeting society's almost insatiable demand for adequate electrical energy, ranges from that of the county planner to that of the governors of most of our states. Such a gamut of reactive interest as to the proper siting of thermal power plants is in need of not only precise definition in respect to the functional responsibilities of each participant but, most particularly, the identification of the proper and timely sequence of onstage presence in the plant siting scenario if the entire performance is to make public sense.

This paper will attempt to delineate the traditional sequence of the salient consideration features of power plant program planning in the Northwest. It makes no attempt to suggest a way to short circuit what has become the established phases of bringing a power plant on line. Hopefully, what it does do is to show what has happened over a very few years as each player in the drama attempts to identify his stellar role in the performance and play it to the hilt! The result obviously has been to cause inordinate delay in the plant siting process and to confuse the public still more as each character vocally reads his own interpretation of how the lines should be delivered.

In short, while it was never the intention of anyone in government or the utility industry to lengthen the plant siting process, it has happened. In many instances, prudency has given way to capriciousness on the part of some self annointed environmental groups -- good planning to devious actions by some utilities.

Somewhere, somehow, a common ground or a balanced approach to the situation had to evolve, and I believe one has. The initiatory action was taken by state government -- the State of Washington to be exact -- the reduction to practice or finessing action was taken by county government -- Skagit County in northwest Washington State in particular.

It had always seemed to me that at least the realistic parameters of power plant site evaluation analyses were definable. Evidently my colleagues in 13 other state agencies agreed and our siting guidelines, promulgated in 1968 by an ad hoc council acting under executive order from Governor Evans, became part of the same State Law (RCW 80.50) which created the Thermal Power Plant Site Evaluation Council. These guidelines are used now under that law in evaluating the efficacy of four utility-selected sites which are on both sides of the Cascades and involve seven reactor units. All sites represent a wide diversity of indigenous environmental consideration factors and even a wider range of societal concerns.

Exhibit I

Considering that these guidelines were put together six years ago, it sometimes seems remarkable to the Council that the Johnny-come-latelys in federal government and those organized environmental groups who preach that government is or has been insensitive to public concerns, have taken so long to discover that a mere state was sagacious enough to set an environmental concern pathway for others to follow.

I think that, considering such an early start, the 15 evaluation subjects listed here which include 54 subtopics thereunder, still cover the main areas of concern in the matter of site analysis of utilities, government and now, what has become, an aroused public.

Exhibit II

To put the significance of our guidelines into proper perspective, this exhibit shows what I believe to be the five most important parts of the law itself.

Since the law was designed to first provide a means to evaluate the wealth of data supplied by the utilities pursuant to the 15 topical guidelines shown earlier, it should be interesting to see how the state agencies on the Council line up to enable a balanced approach and ultimately a balanced decision on the utility's choice of a site for a thermal power plant.

Please note the absence of any lay members on the Council, a fact under current scrutiny by some environmental groups in Washington who seem to want a piece of the site evaluation decision action but who have difficulty in figuring

out how to attain freedom from any moral or legal responsibility for their part in the decision making process.

The agencies shown have had such a responsibility and were willing to take it by establishing, with the meaningful help of environmentalists and environmental groups, suitable guidelines for plant siting. The legislature then provided the legal cloak for Council actions by enacting Senate Bill 49 in January of 1971. This is the bill that became RCW 80.50.

Exhibit III

Of late there have been public expressions of interest in the veracity of future northwest energy demand projections, usually industry-correlated and published by industry. The governmental role in Washington State, in relation to plant siting, has always been prompted by the very real analysis question of whether society's interest in an adequate electric energy supply can be balanced satisfactorily with its real or fancied concern for protecting and maybe even enhancing the environment.

Thus the accuracy of demand projections and the range of assumptions upon which such projections are based is a subject of vital interest to all concerned. As for public concern for the environment which might be more fancied than real in relation to thermal power plants, the test is yet to be made as to whether the availability or presence of a man's job is less important than preserving the nest of a muskrat or the warmth of a man's house and the comfort of his children less important than Periwinkles in a creek.

Obviously, any movement by government, the utilities or environmental protectionists toward the situation requiring such a choice of values must be restrained to the fullest even when understanding that such a decision may be inevitable sometime by someone somewhere.

The figures you see here are for the next ten years as envisioned by the West Group forecasters and were issued in April of this year. Peak demand figures have been shown since peaking energy, in my opinion, more nearly expresses the magnitude needs of plant capabilities and capacities.

The West Group forecast is made on a 20-year estimate basis of demand and resource projections. Please note the last row of figures.

My purpose of showing these numbers to you is not only to provide an insight as to the predicted continued power

deficit situation for the next 20 years, as far as peak energy requirements are concerned, but also to point out that northwesterners may, as I, have had some difficulty in reconciling such gross energy needs with population growth forecasts for the same area.

For example, note how the deficiency numbers jump between 1983 and 1985. If the predictions are anywhere near accurate, then I think we can first assume that; with all the present planning in place and considering normal plant development lead times, last year we knew the area was already three 1,000 megawatt plants short and by 1985 there will be at least five.

Again, if one looks at the predicted peaking deficit for the 1993-4 period, the expected shortage equates the actual peaking energy needed in 1980, a year that also indicates a peaking deficit of only 112 megawatts. Please note that in the period immediately following, 1980, we show an energy surplus period for the area of 896 megawatts.

Now, and what may be a sharp contrast to these numbers and at least one of the reasons why this forecast raises many questions in the public's mind would be the "SURVEY OF CURRENT BUSINESS REPORT" published by the U.S. Department of Commerce in April, the same month noted for publishing the West Group forecast.

This well respected forecasting source on page 32 indicates a net population prediction increase for Oregon, Idaho, Washington, Montana, Wyoming (essentially the same west group area) of slightly less than a million people or around 8.9%.

During the same period, however, the increase in energy requirements according to the West Group is for a jump to 50,556 megawatts from the 1969 base of 23,548 megawatts or about a 41% increase.

Since the 23,548 megawatts is now serving more than 8 million people in our northwest area, one naturally wonders why it will take twice as much energy to serve a 9% population increase in the same area.

Also the question comes immediately to mind whether this leaves us with another assumption and that is whether the West Group forecast has not, in fact, allowed for a generous portion of the total expected power yield on and up to 1990 to be exported, and in particular to California, and to serve its 6,216,000 increase in population over the same period.

If so, why not say so since the West Group forecast shows only 1,494 megawatts of energy and 207 megawatts of average energy has been allocated for export in 1990.

Hence, it seems very reasonable to me that the veracity of energy forecasts in terms of demand is open to question by the general public.

Exhibit IV

I think we can reasonably assume that the result of the poll taken at EXPO '74 from visitors to the Washington State Pavilion who were asked certain questions in respect to environmental control were sincere. In that context, I thought these three points would be of some interest to you. They apparently represent public reactions that relate to various significant decision making processes -- decisions that are made in respect to the proliforation of energy production centers in the state and the kinds of industry that would best serve the economic welfare of our citizenry while providing a good balance to their concern for environmental protection.

Exhibit V

A recent publication provided me with this planning stage breakdown which, at the time, delineated the 102 months of steps to be taken before a thermal power plant can be considered in "on line" status.

The various steps listed for the three phases in the process appear to be a reasonable estimate of what is or would be involved.

I am unable to give you time elements or even the back up data for each of the steps since many are outside my area of expertise. However, if one looks at item A in each of the three stages and then attempts to evaluate what coinciding and concurrent actions might take place, it seems that the 18 months for Stages I and II are very conservative and that the 66-month allotment for Stage II is a very tight schedule indeed.

You'll recall my mentioning at the outset that this was the breakdown that would apparently cover the gamut of stage by thermal power plant planning and the execution of such plans. I must now say that this whole array of time consuming restraints and constraints on the plant realization

process is strictly BS! "BEFORE SKAGIT" I mean, for there is now a new time element added to the site evaluation process.

This is the expected "grass roots" movement that has come into full flower. It is the first to be satisfied regardless of state and federal requirements or their related importance to the total subject. I submit that if the interests of local area residents are not first accomodated and adjudicated by agreement between county government and an aspiring utility, any site evaluation by a state or the pertinent federal agencies will be an exercise in futility.

There is now a new phrase to be added to our thermal power plant siting lexicon. It is identified as CONTRACT ZONING and may well set the stage for future siting agreements between counties and industry for all industrial disciplines -- especially those, like power plants -- that have a visible environmental and societal impact on the community in which they wish to locate.

Exhibit VI

For those of us in the society who are nuclear plant discipline oriented, it is easy to isolate some of the design engineering subjects that must now become a part of the plant engineering concept. The first two under Nuclear Affects seem to fit us as flow diagram admonishments.

The Economic Aspects, of course, stand out by themselves and will unquestionably add to final plant construction and operating costs.

Exhibit VII

Design consideration admonishments are apparent in A, B, H and J in Section III. Again there are some requirements duplicating those of the state, but I think the desire here is that the county believes it has a right to know and understand such things on a first hand basis rather than through the Thermal Council. I also would suspect that the county has reserved the right to comment unilaterally on the sufficiency of the technical information supplied or the sufficiency of the particulars of any mitigation agreement that are worked out.

Section IV plainly shows the pronounced provincial interest this county has in the ancillary structures that are a part of a power plant. Items H and I are interesting

in that the control of plant construction activity may well be held by the county in respect to its issuance of or not issuing road haul permits unless other conditions of the zone agreement are being met.

Item I is strange but none the less understandable. I think it clearly shows the county or people mood of today in that any plans that industry has for construction and product manufacture will be subject to county approval in the matter of seeking a fit with county land use plans. Since construction and other permits are first of all issued by the county, until acquiescence is achieved between industry and the county, it seems useless for the state or even the federal government to spend much time analyzing the propriety of any industry selected plant siting plan.

Exhibit VIII

Section VI relates to WAC 463-12-125(3) of the State Law which requires a utility applicant to "show evidence of consideration of multi-purpose use of cooling water". As you can see in this case, the multi-use of cooling water is for a fish facility or perhaps a better description is a fish rearing facility.

Essentially, such effort by the utility is multi-beneficial in that the exercise is a proper fit to this particular area which is heavy sports fishing oriented, thus the utility image is improved. The county and the state both benefit from the economic value of such a project which is usually quite an expensive undertaking. The technical knowledge is incalculable in the matter of finding a beneficial use for the wasted BTUs trapped in the condenser cooling water.

The general provisions are not necessarily startling except perhaps they evident some lack of trust by people in utility and government performance.

Exhibit IX

These eight conclusions made by the Environmental Planning Committee of Grays Harbor County seem to be reflective of today's mood and attitude of people all across our nation.

Certainly the conclusions provide a mission guide to follow for the engineers and scientists in our profession.

If these are the things that people want to know about the plant you want to design, build and operate, then our professional attention must be directed to and concentrated on the means and methods of achieving a better understanding of engineering planning between ourselves and the public.

While there is probably an excellent factual refutation for each one of these conclusions, I must insist that our comprehensive answers have not gotten across to the opponents of nuclear power. These have become our adversaries possibly through inadvertancies on our part, but more probably because of a cavalier-like attitude on the part of many of us connected with the industry -- a sort of benevolent public-be-damned attitude that has now spawned avenues to the public who, for a $15 dollar filing fee, can halt the progress of a $700 million plant or, at a rather sizable expense in both time and money, engender the terms and conditions for such a thing called -- "contract zoning" or, in the case of Skagit County, Washington, "a contract re-zoning agreement".

During the drafting of the Washington siting law, we were dealing mainly with theoretical, but mostly hypothetical postulations of the expected reactions to the law from state agencies, the utility industry, and the environmentalists. All three groups at the time were loosely-knit aggregation, but somewhat united as to the same objectives and goals.

Accordingly, since we also knew that we were dealing with a moving target, the following section was included:

> *"80.50.040 (1). To adopt, promulgate, amend or rescind suitable rules and regulations to carry out the provision of this chapter, and the policies and practices of the council in connection therewith."*

Now, as the fourth year of activity under the law nears its end, while there have been some slight changes to the Rules of Practice, the first substantial addition to the Washington State guidelines for power plant siting has been made.

Exhibit X

I think it goes without saying that the text was largely responsive to the actions at the county level mentioned before.

I am convinced that societal impacts, in respect to power plants, are more provincial than national in nature,

and they should be. They are intertwined with local public and local governmental reaction to all the other development phases that result in county or statewide growth. Whether that growth be orderly or not is largely dependent on such laws as Washington's thermal siting law and contract zoning agreements like the one between Skagit County and Puget Sound Power and Light Company. Yes -- the societal impact is the thing these days and we all better believe it.

I thank you for the opportunity to discuss this important aspect of power plant siting with you.

Significant Parts of RCW 80.50

A. County Official on Council
B. Guidelines as Part of the Law
C. Public Hearings as Adversarial or Contested Cases
D. A Counsel for the Environment
E. One-Stop Concept

Thermal Power Plant Site Evaluation Council Roster
(RCW 80.50.030)

Regulatory Agencies	Concerned Agencies
Department of Ecology	Interagency Committee for Outdoor Recreation
Department of Fisheries	Washington State Parks & Recreation Commission
Department of Game	
Department of Social & Health Services	Department of Commerce & Economic Development
Washington Utilities & Transportation Commission	Office of Program Planning & Fiscal Management
Department of Natural Resources	Planning & Community Affairs Agency
Department of Agriculture	Department of Emergency Services

Summary of Peakloads and Resources in Megawatts

Year	Peak	Net Resource	Surplus (Deficit)
1974-5	23,548	21,915	(1,633)
1975-6	24,490	24,262	(228)
1976-7	26,642	25,735	(907)
1977-8	28,255	27,880	(375)
1978-9	29,613	31,533	(1,920)
1979-0	31,083	31,553	470
1980-1	32,756	32,644	(112)
1981-2	34,001	34,897	896
1982-3	35,754	34,500	(1,254)
1983-4	37,372	34,239	(3,133)
1984-5	39,246	33,786	(5,460)
1993-4	62,269	29,179	(33,090)

West Group Forecast
4/5/74

Planning Stages to Build a Power Plant in Washington

I. Planning Phase (18 months)

A. Utility Decides on Type of Plant
B. Evaluates Alternative Sites and Selects One
C. Selects an A-E to Design and Build
D. Collects Needed Site Information Particulars
E. If Nuclear, Selects the Steam Supply System and Turbine Generators
F. Prepares Preliminary Design Studies for EIS
G. Prepares and Submits Site Application to State (TPPSEC)

II. Construction Permit Review & Hearings (18 months)

A. State Review of Application with Necessary Hearings
B. Anti-Trust Review by U.S. Department of Justice

C. Environmental Impact Review by EPA

D. Review of PSAR by AEC

E. Review of Plant Safety Matters by ACRS

F. If State Approves, Review by AEC Regulatory Staff

G. Construction Permit with Required Public Hearings

III. Construction & Pre-Operational Testing
(66 months)

A. Construction and Testing of Each Phase

B. Submit Final Safety Analysis Report and Final Environment Impact Report

C. AEC Updates Analysis of Safety and Environmental Review, ACRS Updates Safety Review

D. Public Hearings on Operating License

E. Fuel Loaded. Power Level Build Up on Gradual Basis

Total: 102 months

Washington State Guidelines for Applicants Seeking Thermal Power Plant Site Certification (WAC 463-12)

WAC 463-12-100	Project Description
WAC 463-12-105	Site Characteristics
WAC 463-12-110	Transmission Lines
WAC 463-12-115	Health and Safety
WAC 463-12-120	Environmental Impact - Land
WAC 463-12-125	Environmental Impact - Water
WAC 463-12-130	Environmental Impact - Air
WAC 463-12-135	Environmental Impact - Vegetation, Fish, Animal Life
WAC 463-12-140	Environmental Impact - Aesthetics
WAC 463-12-145	Environmental Impact - Recreation and Heritage
WAC 463-12-150	Environmental Impact - Monitoring and Future Studies
WAC 463-12-155	Socio-Economic Impact

WAC 463-12-155. Social Economic Impact

"The applicant shall provide the description of the primary and secondary impacts on the socio-economic environment which reasonably may occur in the proposed power plant's area of influence and which are related to activities involved in plant construction and operation."

RESOLUTION NO. 6279

Skagit County Zoning Amendment to Ordinance No. 4081

March 26, 1974

Contract Re-Zoning Agreement

Between

Skagit County - Puget Sound Power and Light

Article IV

I. Nuclear Affects

A. No Fuel Reprocessing

B. No Permanent Radioactive Waste Storage

*C. Radiological Monitoring Plans and Reports to County

*D. Submit Evacuation Plan Required by TPPSEC and AEC

II. Economic Affects

A. Sale of Plant to Third Party will not Prejudice County Tax Payment

B. Make Construction Impact Payments to School Districts in Excess of 50 Workers For,

1. School Maintenance and Operation Costs
2. Portable Classrooms as Required
3. Transportation
4. Reopen Area of Existing Buildings

C. Make Construction Impact Payments for Law Enforcement

III. Environmental Aspects

A. Direct Skagit River Water Withdrawal Discouraged

B. Offstream Cooling Only

C. County Maintains Right to Sample and Test Effluents

*D. An Archeological Inventory Must be Made

*E. Submit Meteorological and Air Monitoring Plan

F. Provide Evidence of Adequate Insurance Coverage (Non-Nuclear Hazards)

*G. Conform with all Air Quality Regulations

H. Agree to Eco-System Replacement

I. Provide Additional Mitigation as Found Necessary by County

J. Assist in Regulation of Skagit River Flow

IV. Design, Construction, and Land Use

A. Approve Design for Public Use Buildings

B. Approve Fire Protection Plans

C. Approve Solid Waste Disposal Plan

D. Approve Railway and Highway Intersection Design

E. Review Railroad and Transmission Corridor Plans

*F. Employ all Industry Standards to Avoid Soil Erosion

G. Dispose of Temporary Structures and Land Clearance Refuse

H. Road Haul Agreements Required of all Contractors

I. Site Used by Utility for No Other Purpose

V. Investigations and Reports

A. In Addition to Fish Facility, Investigate Warm Water Application to Agriculture

B. Submit Quarterly County Resident Work Force Reports by Craft Designations

*C. Submit all Reports as Required by TPPSEC and AEC

VI. Fish Facility

A. Design, Construct, Operate and Maintain Fish Culture Facility Throughout Project Life

B. Fish Facility Design Objective to Provide Annually 1.2 Million Coho, .4 Million Steelhead

C. Employ Reasonable Effort to Maintain Designed Capacity

D. Fish Release in the Skagit River Drainage Basin as Approved by Government Agencies

E. Fish Facility Must Start Within One Year After First Unit on Line

F. Operation for Public Benefit; No Commercial Purposes

VII. General Provisions

*A. Plant Constructed and Operated in Compliance with State Siting Law

B. Plant Constructed and Operated in Compliance with All Federal Requirements

C. Agreement Binding on All Successors or Assigns

D. Amendments Only by Written Consent of Utility but in Accordance with All Applicable County Land Reclassification Laws

E. Severability Clause is Applicable

F. Planning Department Assigned as County Implementing Agent

G. Planning Director, Employees, and Consultant May Inspect at Reasonable Times

H. Court Pre-Emption Declaration Respected for Any One Provision - Remaining Provisions Remain in Full Force and Effect

I. Construction Start by 12/31/79 or Agreement Terminated and Land Area Reverts to Original Classification. Second Unit to Start Within Five Years of AEC Construction Permit or Need Will Be Subject to County Review

J. Title Established as to Utility Responsibilities

K. County Can Bring Action for Specific Performance

* Topic is Covered by State Thermal Siting Law.

Grays Harbor Environmental Planning Committee
Nuclear Power Plant Conclusions*

1. Continued Increase in Power Generation and Consumption is not in the Best Interest of the Nation.
2. The Impact on Land . . . Will Be Severe. Impact is Aggravated by Lack of Concern . . . On the Part of Present County Government.
3. Influx of Construction Personnel Will Strain the Capacity of Schools and Social Services.
4. Plant Safety Controversy Remains Unresolved.
5. Radioactive Waste Transport and Disposal and Security Matters Have Not Been Resolved.
6. Emergency Procedures Have Not Been Established -- Requirements Are Not Understood.
7. Plant and Transmission Line Visual Impact Will Be Severe.
8. Consumptive Use in Relation to Prior Water Rights Has Not Been Evaluated.

* Paraphrased

Discussion Questions and Answers

Q. Where do you get information on siting and power needs for the Pacific Northwest, particularly nuclear power?

A. I won't say most, but a good deal of the information that the BPA has that covers the nuclear power plant in particular are directly taken from the Washington State Law. This may come as somewhat of a surprise to you, but that is a fact. The law is here, I have it and I'll give it to you. It is actually W80.50 Thermal Power Plant Site Evaluation Council in which we established the measurement factors for measuring a site as far as this state is concerned. I'd like to pass some view graphs and I'd like to run through them somewhat clearly because they all have to do with what we are talking about. I mentioned earlier the West Group forecast on which we base our power needs in the state. But you

must recognize that power needs in the State of Washington is a regional problem. What we do here affects Idaho, Oregon, Utah, Montana, and vice versa. Our whole economy is based on an exchange of power between 5 states. And that is because of the BPA system and we are married to that whether we like it or not. And we should like it.

Q. Who compiles this West Group forecast?

A. Utilities and engineers in the electrical utilities . . Northwest Power Pool that consists of Bonneville Power Administration, public utility districts and private companies, so we are a little bit different than the other states, but we are also distributors of power and producers of power in a public utility sense, so we make a noise like we are a public utility district, but we act like a company in many respects.

The West Group forecast is a publication. It is the only one that we have any reliance on. Most of them are so weak we do not rely on them and they are self-serving especially when they are put out by some company. Especially when the backers are financed from some faraway shareholders. As a matter of fact, the State of Washington last year predicted a commercial and industrial rate of growth to be 5 to 6 percent and it was less than 3 percent. As a result a forecast that was made a year ago against what is the actuality of today has had to be reduced and downgraded. But that is one of the good things about the West Group forecast, it is updated each year. I'm not defending it, I'm just saying it is the best we have. We have some reliance on it, but when we dig into it and find some errors we are willing to listen.

Q. What is the nature of the Washington siting law?

A. Now the Washington state law that I mentioned - I felt there are 5 important parts of it. There is a county official who sits on the council and liberates them in the evaluation process. Without him - if he's not there we just go home. That means the state is not pontificating in this sense, we are sitting along with the county man who is representing his people in the county. He has to sign the same document I do. So he is held perfectly responsible for the (tenure character?) of the people from where he lives. The guidelines or criteria were very simple. In contrast to the AEC we have public hearings conducted as contested cases. That means all having status in the hearing have the right to cross examine as is accorded all participants and members of the council. This includes the counsel for the environment who represents

the people - free as legal counsel. And we just finished 4½ days of public hearings in respect to a site we have surveyed for 25-30 years. We got hung up on the need for power. The last one is the one stop process that I'm proud of because other states have attempted to copy that, but have not been successful. You have to depend on the council member to devote his best practical effort to making the decision. Now the reason for that is we look at that as an investment now of over $700 million in a given plant. This is what he meant when he said we are all overlooking the issue. Now, in connection with the guidelines, that is how simple they are. You notice the numbers on the side - these are the topics, safety functions, characteristics of the site, transmission line has to be spelled out, environmental impact on land, water, air and vegetation, fish and animal life.

Mr. Bradley then gave examples of some of the problems in the cases of Skagit proposed site, Grays Harbor site, and sites along the Columbia River.

Presentation by

W. E. WILSON

Assistant Director, Radiation Laboratory
Washington State University

LICENSING AND REGULATION OF NUCLEAR POWER PLANTS

Introduction

In order to build and to operate a nuclear power plant in the United States, the owner of a proposed plant must first obtain a construction permit and then obtain an operating license from the federal government. The licensing process involves a searching analysis of the safety of the proposed plant, not only by federal agencies and the applicant but also by expert advisors. The licensing process also provides opportunity for state and local authorities and the public to keep fully informed on the progress of the license application and to participate in the hearings held before action is taken to grant or deny the license. The documents developed during the licensing process not only specify the details of the design, safety and construction aspects of a nuclear power plant but they also specify details on the operation and maintenance of the plant. Thus the licensing process is of vital importance to the entire nuclear power plant organization including the plant operating staff.

Federal Agencies

Prior to October 11, 1974, the entire atomic program in the United States was under the direction of the U.S. Atomic Energy Commission. On October 11, 1974, the "Energy Reorganization Act of 1974", Public Law 93-436, dissolved the AEC and established the Energy Research and Development Administration and the Nuclear Regulation Commission. The basic federal law relating to atomic energy, however, is the Atomic Energy Act of 1954, Public Law 83-703, as amended. This act states that:

> *" . . . regulation by the United States of production and utilization of atomic energy and of the facilities used in connection therewith is necessary in the national interest to assure the common defense and security and to protect the health and safety of the public."*

A. ERDA

The Energy Research and Development Administration under PL 93-438 was established to:

1. bring together and direct all federal activities relating to research and development at various sources of energy,
2. increase the efficiency and reliability in the use of energy,
3. carry out the performance of other functions, including but not limited to the AEC's military and production activities and the AEC's basic research activities.

Thus the nuclear energy research and production activities formerly under the AEC are now under ERDA.

Erda is an independent executive agency of the federal government which is under the direction of an "administrator" and an "assistant administrator", both of whom are appointed from civilian life by the President with the advice and consent of the Senate. In addition, ERDA has six assistant administrators, each of whom is responsible for one of the following: 1) fossil energy, 2) nuclear energy, 3) the environment and safety, 4) conservation, 5) solar, geothermal and advanced energy systems and 6) national security. Furthermore, the ERDA Administration may appoint up to eight additional officers and a general counsel to supervise and direct the activities of this agency.

B. NRC

The Nuclear Regulation Commission, NRC, is an independent regulatory commission composed of a chairman and four commissioners appointed by the President with the advice and consent of the Senate. No member of the NRC may engage in any business, vocation or employment other than that of serving as a member of the Commission. The responsibilities of the NRC include all the licensing and regulating functions previously performed by the AEC as well as the functions of the Atomic Safety and Licensing Appeal Board. In addition, the following AEC facilities are under the direction of the Commission:

1) LMFBR demonstration nuclear power plant
2) All future demonstration nuclear power plants
3) High-level radioactive waste storage facilities
4) Long-term radioactive waste storage facilities

An organization chart for the NRC is shown in Figure 1 and includes the three main "offices" specifically set forth in PL 93-438. These offices are as follows: 1) the Office of Nuclear Reactor Regulation, 2) The Office of Nuclear Material Safety and Safeguards and 3) The Office of Nuclear Regulatory Research. The Office of Nuclear Reactor Regulation performs the following functions:

1. The licensing and regulation of all facilities and materials covered by the Atomic Energy Act of 1954, as amended, associated with the construction and operation of nuclear reactors licensed under this act.

2. The review of safety and safeguards of all licensed materials and facilities with respect to:

   a. monitoring, testing and recommended upgrading of systems design to prevent substantial health and safety hazards,

   b. evaluation of methods of transporting special and other nuclear materials and of transporting and storing high level radioactive wastes to prevent radiation hazard to employees and the general public.

3. The recommendation of research necessary for the discharge of the functions of the commission.

The Office of Nuclear Material Safety and Regulation performs the following functions:

1. The licensing and regulation of all facilities and materials licensed under the Atomic Energy Act of 1954, as amended, associated with the processing, transport and handling of nuclear materials, including the provision and maintenance of safeguards against threats, thefts and sabotage of such licensed facilities and materials.

2. The review of safety and safeguards of all such facilities and materials licensed under the Atomic Energy Act of 1954, as amended, and such review shall include, but not be limited to,

   a. monitoring, testing and recommending upgrading of internal accounting systems for special nuclear and other nuclear materials licensed under the Atomic Energy Act of 1954, as amended;

   b. developing, in consultation and coordination with the Administration, contingency plans for dealing with threats, thefts and sabotage

NUCLEAR REGULATORY COMMISSION - TRANSITION ORGANIZATION

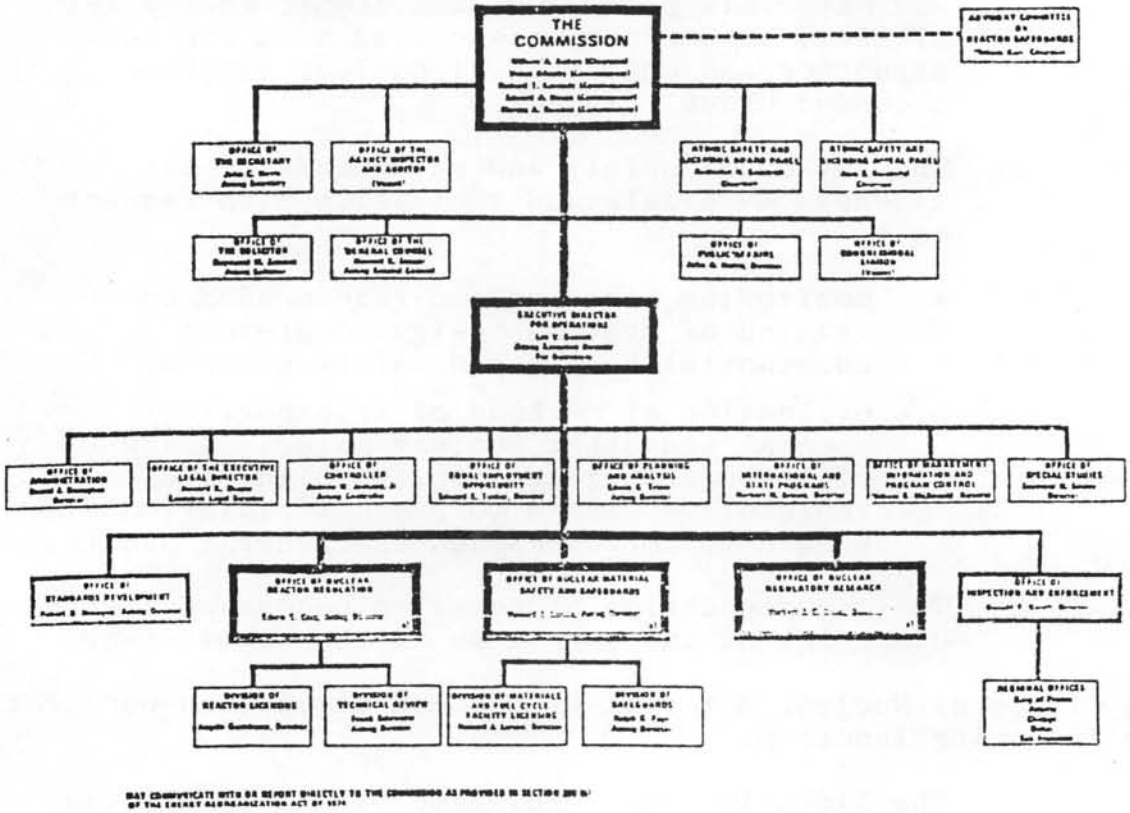


FIGURE 1

relating to special nuclear materials, high-level radioactive wastes and nuclear facilities resulting from all activities licensed under the Atomic Energy Act of 1954, as amended;

c. assessing the need for, and the feasibility of, establishing a security agency within the office for the performance of the safeguards functions, and a report with recommendations on this matter shall be prepared within one year of the effective date of this Act and promptly transmitted to the Congress by the Commission.

3. The recommending of research to enable the Commission to more effectively perform its functions.

The Office of Nuclear Regulatory Research performs the following functions:

1. Developing recommendations for research deemed necessary for performance by the Commission of its licensing and related regulatory functions.

2. Engaging in or contracting for research which the Commission deems necessary for the performance of its licensing and related regulatory functions.

C. ARCS

The Atomic Energy Act of 1954, as amended, in sections 29 and 182.5 specifies:

> *" . . . There is hereby established an Advisory Committee on Reactor Safeguards (ARCS) consisting of a maximum of fifteen members appointed by the Commission for terms of four years each. The Committee shall review safety studies and facility license applications referred to it and shall make reports thereon, shall advise the Commission with regard to the hazards of proposed or existing reactor facilities and the adequacy of proposed reactor safety standards, and shall perform such other duties as the Commission may request."*

Thus the functions of the ARCS are to:

1. Review safety studies,
2. Advise the Commission with regard to the hazards of proposed or existing reactor facilities,

3. Review the adequacy of proposed reactor standards,
4. Perform other duties as requested.

The Code of Federal Regulations

The Code of Federal Regulations, referred to as CFR, is a codification of the general and permanent rules (federal laws) published in the Federal Register by the executive department and agencies of the federal government. The Code is divided into 50 titles which represent broad subject areas covered by federal regulation. All of the atomic-energy-related regulations are contained in Title 10, or simply 10 CFR, and all of the regulations relating to transportation are contained in Title 49, or simply 49 CFR.

Each title is further subdivided into chapters, which usually bear the name of the issuing agency. Title 10, consisting of only one chapter, bears the name of the Atomic Energy Commission, the issuing agency that has now been replaced by the Nuclear Regulation Commission. Each chapter is further subdivided into parts covering specific regulatory areas. Part 20 of Title 10, or 10CFR 20, is entitled "Standards For Protection Against Radiation". Part 50 of Title 10, or 10 CFR 50, is entitled "Licensing of Production and Utilization Facilities". Each part is further subdivided into sections. Section 20.3 of Part 20 of Title 10, or simply 10 CFR 20.3, for example, is entitled "Definitions" and defines the terms used in that part of the CFR.

Each title of the Code is revised at least once each year on a quarterly basis--Titles 1 through 16 as of January 1, Titles 17 through 27 as of April 1, Titles 28 through 41 as of July 1 and Titles 42 through 50 as of October 1. In order to insure that the reader has the latest revision, he should check the date given at the bottom of each page of the Code.

Regulatory Guides

Regulatory Guides are a series of publications written by the Commission used to describe solutions to safety issues in facility licensing where it has not yet been determined that a particular solution to a specific question should be made a requirement and included in the regulations. The uides are not regulations nor are they intended as a substitute for the regulations; therefore, compliance with the guides is not necessarily mandatory. In other words, the safety guides serve to identify safety issues that should be considered in the design and in the evaluation of nuclear power plants. The safety guides also serve to describe a set

of principles and specifications which, if satisfied, represent a solution of these issues acceptable to both the Regulatory Staff and the Advisory Committee on Reactor Safeguards. Solutions other than those set out in the guides will be acceptable if they provide a sufficient basis for the findings requisite to the issuance of a construction permit or an operating license by the Commission.

Reactor Licensing

A. Prerequisites for a Construction Permit

In order to obtain a construction permit from the Commission, the applicant must establish his technical qualifications and financial responsibility and must satisfy the Commission that the proposed plant will be built and operated safely.

One of the requirements of financial responsibility is that the applicant must arrange for a specified amount of insurance coverage (or equivalent financial protection) against possible public liability. The amount of coverage required is related to the power rating of the proposed plant up to a maximum figure, currently set at $125 million. In addition, the applicant is required to enter into an agreement with the Commission under which the federal government assumes responsibility for any additional public liability claims up to a maximum, currently set at $435 million (10 CFR 140). It should be stressed that these are legal requirements. The specified amounts of insurance and indemnification are essentially arbitrary inasmuch as there is as yet no actuarial basis for defining the financial risk. The purpose of the Congress in writing these provisions into the law (Price Anderson Act) was to make certain that the development and use of atomic power would not be held back by an absence of national policy on financial responsibility, and, at the same time, to provide formal assurance to the public that its interests would be protected.

Satisfying the Commission that the proposed plant will be safe is the chief prerequisite for obtaining a construction permit. As will be seen, this entails voluminous technical correspondence and a lengthy process of examination and cross-examination in which all aspects of the project are probed. But, at some risk of over-simplification, the general approach taken in the Commission's analysis can be stated as follows:

> Taking into account (A) the size and design of the proposed plant and (B) the nature and characteristics of the proposed location, there must be convincing evidence (C) that, under all circumstances up to and including the hypothesized "design basis accident", the release of radioactive material to the environ-

ment will be consistent with limits described by the federal radiation protection regulation and reactor siting criteria.

We have deliberately lumped together three separate thoughts (A, B and C) in this statement because they are interdependent. For example, there is no absolute rule defining the permissible location of a nuclear power plant. Whether or not a given location is acceptable depends on the safeguards built into the plant as well as on locational factors. The only thing that is absolute and inflexible is that all factors having any relevance to the problem must be taken into account. This point will become quite evident as we trace the procedure that is followed.

B. Getting Ready to Apply for a Construction Permit

By the time a utility is ready to prepare an application for a permit to construct a nuclear power plant, the following steps, not necessarily in this order, will usually already have been taken:

1. The conclusion has been reached, usually based on a detailed study of various possible alternatives, that an atomic power plant of a given size should be constructed and ready for service by a given date.

2. A location for the plant has been tentatively selected and data on various characteristics of the proposed site have been compiled.

3. Detailed proposals have been obtained from competing reactor suppliers and, after evaluation and negotiation, a selection has been made.

4. Where required, application has been made to the State Public Utilities Commission for its approval of the proposed addition to the utility's electric generating system.

5. Interested state and local authorities have been notified of the proposed project. If the site selected did not already have the appropriate zoning classification, a petition has been made for a zoning change and has been granted.

6. Provisional arrangements have been made for the financing of the proposed project.

7. A public announcement has been made, usually via a news release, of the utility's intent to build the proposed plant.

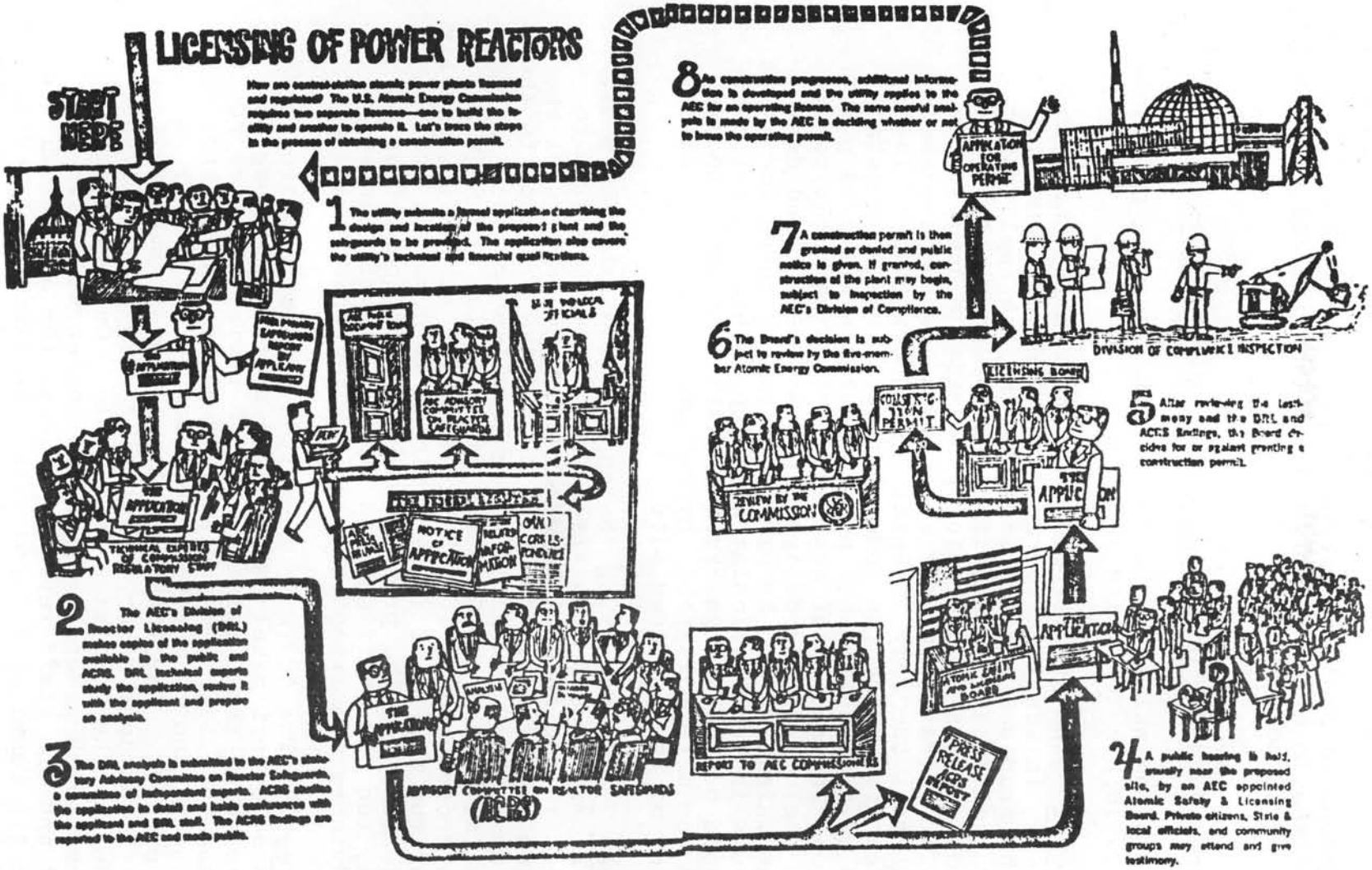

LICENSING OF POWER REACTORS
How are central-station atomic power plants licensed and regulated? The U.S. Atomic Energy Commission requires two separate licenses—one to build the facility and another to operate it. Let's trace the steps in the process of obtaining a construction permit.
START HERE
1 The utility submits a formal application describing the site, design and location of the proposed plant and the safeguards to be provided. The application also covers the utility's technical and financial qualifications.
2 The AEC's Division of Reactor Licensing (DRL) makes copies of the application available to the public and ACRS. DRL technical experts study the application, review it with the applicant and prepare an analysis.
3 The DRL analysis is submitted to the AEC's statutory Advisory Committee on Reactor Safeguards, a committee of independent experts. ACRS studies the application in detail and holds conferences with the applicant and DRL staff. The ACRS findings are reported to the AEC and made public.
4 A public hearing is held, usually near the proposed site, by an AEC appointed Atomic Safety & Licensing Board. Private citizens, State & local officials, and community groups may attend and give testimony.
5 After reviewing the testimony and the DRL and ACRS findings, the Board decides for or against granting a construction permit.
6 The Board's decision is subject to review by the five-member Atomic Energy Commission.
7 A construction permit is then granted or denied and public notice is given. If granted, construction of the plant may begin, subject to inspection by the AEC's Division of Compliance.
8 As construction progresses, additional information is developed and the utility applies to the AEC for an operating license. The same careful analysis is made by the AEC in deciding whether or not to issue the operating permit.
APPLICATION FOR OPERATING PERMIT
DIVISION OF COMPLIANCE INSPECTION
LICENSING BOARD
CONSTRUCTION PERMIT
REVIEW BY THE COMMISSION
NOTICE OF APPLICATION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)
REPORT TO AEC COMMISSIONERS
PRESS RELEASE ACRS REPORT
ATOMIC SAFETY AND LICENSING BOARD

FIGURE 2

Thus the proposed project already has a considerable history before the wheels of the Commission's licensing and regulatory machinery begin to turn.

C. The Procedure for Obtaining a Construction Permit

The principal steps in the formal licensing procedure, as depicted in Figure 2, are as follows:

Step 1: The utility prepares and submits the formal application. In addition to providing a detailed description of the proposed project and covering the applicant's technical qualifications and financial responsibility, the application contains a Preliminary Safeguards Analysis Report (PSAR). First, the applicant shows how the proposed plant will meet the many "General Design Criteria". These are the features which the federal regulations have established as being requirements of a properly engineered plant. In addition, the applicant analyzes various accident possibilities, including the "design basis accident", and describes the safeguards to be provided against these accidents. The analysis includes calculations of possible radiation exposure based on the design characteristics of the proposed plant and the meteorological, hydrological and other characteristics of the proposed site.

Step 2: On receiving the application, the NRC's Division of Licensing and Regulation (DLR) files a notice to this effect in the Federal Register and makes copies of the application available to the public. Copies are sent to the Advisory Committee on Reactor Safeguards (see below). Technical specialists in the Division of Licensing and Regulation then proceed to review the application in detail, usually contacting the applicant for additional information or to discuss features of the proposed design. On completion of this work, the DLR staff submits the results of its review to the Advisory Committee on Reactor Safeguards.

Step 3: The Advisory Committee on Reactor Safeguards (ACRS) is an expert panel established by the U.S. Congress and appointed by the Commission. ACRS review of power reactor license applications is mandatory under the law and provides an independent and objective assessment of the safety of the proposed project. The ACRS usually appoints a subcommittee to study the project prior to formal review of the license application by the Committee as a whole. On completion of its review, which generally includes conferences with the applicant and DLR staff representatives, the ACRS submits a letter to the Commission summarizing its findings. Copies of this letter, together with the DLR staff review and other pertinent documents, are made available to the public, and a news release summarizing the ACRS action is issued.

Step 4: A formal public hearing is then held on the license application, usually in the locale of the proposed plant site. The hearing is conducted by a Commission-appointed Atomic Safety and Licensing Board consisting of two technically qualified individuals plus an attorney experienced in administrative proceedings of this nature. The purpose of the hearing is to provide an opportunity for interested state and local authorities, community groups, private organizations and individual citizens to submit testimony on any point deemed relevant to the license application. Testimony is also submitted by the applicant and the NRC's regulatory staff. Advance notification of the hearing is given by means of a news release.

Step 5: Following the public hearing, the Atomic Safety and Licensing Board makes a detailed review of the license application file along with the testimony given at the hearing and then reaches a decision for or against the granting of a construction permit.

Step 6: The Board's decision is subject to review by the five NRC Commissioners. The commissioners may approve or reverse the decision by majority vote.

Step 7: A construction permit is then formally granted or denied and public notification of the action is made. The permit is usually issued on a provisional basis, i.e., subject to resolution of specific points as the detailed design of the plant proceeds.

How long does this procedure take? There is no fixed timetable. Depending on the problems encountered, the total elapsed time may range from several months to a year or longer. A flow sheet indicating an approximate timetable is shown in Figure 3.

D. Operating License

We will not trace the steps followed in obtaining an operating license, since the procedure involves the same review apparatus just described. Two points of difference should be noted, however. One is that the application for an operating license is based on the plant as built. Hence the review, and especially the safeguards analysis, can be and is even more rigorous. The other point of difference is that a public hearing is not a fixed requirement for award of an operating license. In this instance, after receiving the report of the Advisory Committee on Reactor Safeguards, a decision may be reached and the Commission may give public notification of the action it proposes to take. Then, after a 30-day waiting period and assuming no one has filed a petition of intervention, the operating license is granted or denied. Full-term operating licenses are valid for up to 40 years.

All operating licenses specify the maximum power level at which the plant may be operated and define through a set of "technical specifications" the basic operating limitations that must be observed. (In some circumstances an interim operating license may be granted, authorizing operation of the plant at a low power level for a specified period). Before any change may be made in the basic operating specifications which might affect the safety of the plant, Commission approval must be obtained. Any licensing action may be appealed by petition to the Commission and/or through the U.S. Court of Appeals.

E. Compliance

The NRC's regulatory organization includes the Office of Inspection and Enforcement, which makes periodic inspections of the licensee's plant during construction and operation to see that all conditions of the license are being met. Depending on their nature and the corrective action taken, violations reported by this group may result in the revocation of the license.

F. Reporting of Incidents

The Federal Code and the operating licenses require that the licensee report any incidents affecting the safety of the plant and any accidents involving radiation or radioactivity that result in injury to persons or damage to property. These reports are made available to the public.

G. Operator's Licenses

Part 55.2 of Title 10 of the Code of Federal Regulations states that "no person may perform the function of an operator . . . except as authorized by a license issued by the Commission". There are two types of licenses: the Operator's License and the Senior Operator's License. An operator is defined as any individual who manipulates the controls at a facility. A senior operator is an individual who directs the activities of licensed operators.

In order to obtain a license, the applicant must pass a medical examination, a written examination and an oral demonstration test. The written examination for an Operator's License ordinarily is about eight hours long and covers such topics as reactor theory, instrumentation, plant design and operating characteristics, radiation protection and emergency procedures. A candidate for a Senior Operator's License would take the previous test plus an additional eight-hour test which covers the same type of information in greater

depth. The oral examination is usually about four or five hours long and always includes a practical demonstration of the applicant's ability to perform such tasks as to bring the reactor critical, raise and lower power, etc. In addition, the examiner will tour the plant with the applicant and question him about the things they see. Finally, the applicant may be quizzed orally about any of the topics which appeared on the written test.

Presentation by

R.J. O'CONNOR
Senior Vice President
Idaho Power Company

TRANSITION FROM HYDRO TO THERMAL POWER PLANTS, THE EXPERIENCE OF A PRIVATE UTILITY IN IDAHO

In the early settlement of the west, individual electric power companies sprang up to meet the power needs of specific applications. One such application in southern Idaho was the Silver City mining boom. In that instance the Trade Dollar Consolidated Mining Company went to Swan Falls and constructed a rock crib dam and power plant. They erected a transmission line to Silver City and used electricity for the mining operations. That took place in 1911 and that company became the Southern Idaho Light, Heat & Power Company which became the Idaho Railway, Light & Power Company which went into receivership in 1913 which was acquired by the Electric Investment Company in 1915 and subsequently a part of the Idaho Power Company that same year.

As you follow that one example, there were consolidations, sales, and receiverships. This happened over and over again to the other forty-nine predecessor companies, which finally became five major companies, then became the Idaho Power Company. Idaho Power Company, Utah Power & Light, The Washington Water Power Company and The Montana Power Company, and others, were all part of a holding company which was the one way, at that point in history, that the necessary capital could be raised to make the many small companies into an economic unit. This same consolidation has taken place throughout the western states and among the companies which I have just mentioned. The Idaho Power Company was then required by federal law, as were the other companies, to be separated from the holding company and become a complete and independent company. That was accomplished in 1940.

During those early years of the development of western power companies, the companies turned to the easiest and lowest cost method of developing electrical energy, which was hydroelectric energy. As a result, our Company has developed a system of 14 dams with a capacity of 1,494,700 kilowatts. There are more hydroelectric sites that could be

developed within the State of Idaho but environmental considerations and political activity keep us from that type of development today. It is the most dependable and lowest cost electrical energy available to us and our customers but is set aside for other considerations now.

You might be interested in some of the large investments that are required when building a hydroelectric system. For example, there was invested by Idaho Power Company at the end of 1973 about $690 million. For that investment, we received total operating revenues of about $90 million. Simple division will tell you that our all hydro system then caused us to invest $7.66 in order to earn $1.00 in gross revenue. This is in sharp contrast to other manufacturers who more commonly invest $0.50 in plant in order to earn $1.00 in revenue. In other words, the electric power business was in the hydroelectric era a very capital intensive business, and it was necessary to travel to the money markets of the east in order to raise the large sums for the development of the west -- and it still is.

Some other figures that may be of interest to you are that the development of our last large hydroelectric developments - that is, Brownlee, Oxbow and Hells Canyon dams - cost approximately $189 per kilowatt to construct. That includes the whole facility, including transmission requirements. The point is that a hydroelectric facility is expensive to construct but very low cost to operate. You should be aware of the fact that this low cost operating benefit does not only accrue to the Company, but also to the customer it serves. In the case of Idaho Power and the northwest power companies generally, hydroelectric energy has meant much below average cost to the consumer for electricity as compared to the remainder of the nation. I have a chart of national electricity costs for 1,000 kilowatt hours of power sold to residences. This demonstrates dramatically that hydroelectric generated energy is of great benefit to the consumer because of its low cost. (Give examples.) In the case of Idaho Power, our power rates to the homeowner are about 40% below the national average cost.

In those early years of growth for the electric utility industry, a great deal of effort was applied to build electric load. It was apparent then, as it is today, a higher load factor which resulted from greater utilization of plant investment would reduce costs per kilowatt hour and per customer, therefore, power could be supplied at a cheaper rate. Because of our promotional program, this happened over the hydroelectric years and there were several rate decreases in our Company during that time. The cost of power became cheaper. We finished our last hydroelectric development in 1968 with the completion of the Hells Canyon Dam. Our forecasters told us that we had to

build more plants, otherwise, we would be unable to serve the rapidly developing irrigation, residential as well as business and industry load. We studied carefully the alternatives for power production. It was clear to us that we could deliver 1 kilowatt hour of energy to downtown Boise for substantially less cost per kilowatt hour by using Wyoming coal rather than building a nuclear plant. The same thing has been true in the states of Utah, Montana and Washington.

So, in the late 1960's, we elected to enter into a joint venture with Pacific Power & Light Company which would construct our first coal-fired thermal electric plant near Rock Springs, Wyoming, called the Jim Bridger plant. This was to be a 1,500,000 kilowatt plant with Idaho Power Company receiving one-third or 500,000 kilowatts. You might be interested in knowing why we decided to go into partnership with Pacific Power for this plant.

First, we needed the electricity as did Pacific.

Second, it was the lowest cost energy source for both of us.

Third, Pacific's need for energy was on the West Coast.

Fourth, Idaho Power's transmission system would aid Pacific because we are in between the coal mine and their load.

Fifth, it would diminish the risk of outage for both of us, and

Sixth, it was a good way for Idaho Power to get into the steam electric business.

As you probably know, the plant is still under construction, yet the first unit is complete and has been operating since last August and was declared commercial in December 1974. It is now planned that the plant be 2,000,000 kilowatts, if we can obtain the necessary permits. We have spent over $203 million on that plant which means that the plant will cost approximately $406 per kilowatt to construct, including the coal mine. We were fortunate inasmuch as Pacific Power & Light owned the coal mine which would supply the plant, and part of our joint venture includes one-third ownership of the coal mine by Idaho Power Company. This means that we have control of our coal prices but still the kilowatt hours are considerably more costly than those being developed by our hydroelectric base. The price per kilowatt hour coming from our Jim Bridger plant today is about 16 mills while that of our hydro base is about 6 mills.

Over a year ago we were forced into the decision of building still more generation. We would prefer to build more hydroelectric facilities because the cost of developing alternative energy just keeps accelerating at a very rapid rate. We did not think more hydro plants were available to us and made the decision to construct another coal-fired plant called the Pioneer Plant. I can assure you no utility management in its right mind would proceed with any capital expenditure, such as a power plant, at this point in time, if it were not essential to fulfilling its legal and moral responsibilities to its customers.

Certainly it would be much easier for management, and in the short term interest of its stockholders, to delay any capital expenditure, but, if needed, it could be disastrous to our customers.

Let's look at a few facts. At the end of 1973, we were serving a total of 189,224 customers -- up from 154,349 in 1968 -- when the accelerated rate of increase in new customers started. That is an increase of 23% in total customers. In that period of time, residential customers increased 24% and the average use per residential customer increased from 9,171 kilowatt hours to 11,515 kilowatt hours -- or 26%. Combining the increases in customers and use per customer, the total demand in average kilowatt hours increased 53%. Our rate of growth in new customers is more than two times the national average. For the full year of 1974, we have seen an increase of 9.2% in residential kilowatt hour usage over the same period last year. Irrigation kilowatt hours were up 22.1%.

I want to point out that the increase in average use per residential customers is not because of increased use of electric toothbrushes and other small gadgets, but primarily because of the rapid switch to electric heat.

As the price of gas and oil increases, as it is now doing, and their availability over the long term becomes more uncertain, the trend to electric heating will increase. This move to electric heat is in line with today's federal energy policy where the electricity is generated by water, coal or nuclear energy because it results in conserving our dwindling oil and gas reserves.

Now let's look at the increases in the needs of just a few of our major commercial, industrial and governmental customers. In the past five years --

the Capital Mall and associated state buildings have increased their use . . . . . 6.9 times

Idaho State University at Pocatello . . . . 1.7 times

Boise State University . . . . . 3.46 times

Statesman newspaper over . . . . . 3 times

Boise Cascade . . . . . 4.9 times

Morrison-Knudsen Company . . . . . 11.96 times

and bear in mind this has all been in the last five years.

Our irrigation load continues to grow. In 1949, only 132,259 acres were irrigated with 1,903 pumps. Today we have 11,854 irrigation pumps operating, totaling 865,225 horsepower and watering 1,390,565 acres. Let's look at the additional acres watered by electric pumps in the last four years.

In	1971	46,707 acres were added
	1972	53,164 acres were added
	1973	74,212 acres were added
	1974	121,029 acres were added

and we already are swamped with new service requests for the 1975 season which would indicate another record year.

It has been suggested that through energy conservation and the curtailment of economic growth, we do not need additional electric generating plants. That statement is easy to make for those having neither knowledge of, nor responsibility for, the disaster they would create for thousands of people in the likely event their lack of knowledge led them to a wrong conclusion.

We who have the responsibility cannot afford to make that mistake. Idaho Power Company for the past 50 years has been making load and resource projections for 5, 10, 15, and 20 years in advance. We update them each year.

Recently we have had a few "instant experts" who have questioned our need for additional generating facilities and suggesting that we are building facilities to export power to out-of-state utilities. Nothing could be further from the truth. A little bit of information and knowledge, and without the burden of responsibility, can, of course, lead to some grossly erroneous conclusions.

It appears that in determining our generating capability and load requirements, our instant experts -- due to lack of experience and knowledge -- make several erroneous assumptions. Like the fellow who drowned in the stream that averaged only one foot deep, they base some conclusions on

yearly average figures, which in any one day or hour might be 100% off from requirements. They also assume generating capability equals actual generation -- it, of course, does not. For example, during the irrigating season last summer, when we normally experience our highest demand, I picked one day -- August 5th -- and find that we only had water enough to generate 725,000 kilowatts of power, which is about half of our generating capability. That was in one of our best water years in history. In July of 1973, we only averaged 562,000 kilowatts of generation which was only 37% of our 1,494,700 kilowatts of installed capacity.

Let's look at another example. In July of 1973 -- about an average water year -- we were only able to generate an average of 562,000 kilowatts. In July of 1974 -- an excellent water year -- we were able to generate 962,000 kilowatts. That is a difference in actual generation of 400 megawatts utilizing an identical generating capability -- the only difference being water supplies for that period of time.

Even with fossil fuel plants, you cannot take their maximum capability and translate it to production capability. For example, in the United States last year, the average fossil fuel plant had an availability factor of only 72%. That means, on the average, they were not available for any generation 28% of the time.

Some analyses I have seen evidently erroneously assume that a power system can operate on a 100% load factor. The fact is the average power system operates on about 62% load factor.

If, through lack of knowledge and without the burden of responsibility, we ignore all of the variable factors that can materially affect load and resource studies, it is relatively easy to come to the conclusion we will not need additional generation.

I would, however, suggest to you that if our power supply in the future is to be based on the projections of these instant experts that the reliability of our service will approximate the reliability of their stories.

In the United States and including Idaho, we have essentially reached a birthrate that, if continued, will result in a zero population growth -- in about 30 years. As General Electric's Dr. Thomas Paine points out, "Even though the U.S. birthrate has leveled off, the number of children already born will dictate between now and 1985 a 34% increase in the number of new households; a 25% rise in the labor force and a 61% climb in the number of consumers in the 25-34 age bracket. Unless we legislate that our children may not live as well as we, there is already in existence a wave of demand for electricity".

In Idaho, we not only will receive our share of the national population growth, but in the past few years we have had a significant influx of families from other areas -- and that is why our customer growth rate is about double the national average for electric utilities. There isn't a question of a doubt but what the need and the demand will require additional power resources.

In addition to our own projections which clearin indicate the need for increased generating facilities, we will have to demonstrate the need first to our Idaho Public Utilities Commission, the Federal Power Commission and likely various other governmental agencies. And finally, as a practical matter, to raise the huge sums of capital necessary to construct a steam power plant, we must prove to the financial community that the plant is needed. There simply is no way capital could be raised for an unneeded plant.

If a plant is needed -- and we are certain it is -- what kind of a generating plant is in the best interest of our customers and the area we serve?

To put this question in its proper perspective, I think it would be helpful to examine, for a moment, the total energy picture in the United States.

The plain facts of the matter are, we in the United States, are rapidly depleting our oil and gas reserves. The fact is that gas only represents about 1½% of our total proven energy reserves, but represents 32% of our use and oil represents about 2% of our proven energy reserves, but 44% of our use. The two combined represent only 3½% of our energy, but 76% of our use -- obviously that ratio of supply to demand cannot last very long.

With respect to coal, let me quote from a fact sheet issued by the Federal Energy Office and dated August, 1974. "The success of Project Independence requires that the United States develop sources of energy within its own borders. Coal, our most abundant fossil fuel, is one of the keys to making the nation energy independent. Resources are estimated at more than 1.5 trillion tons -- enough to last, at present production rates, about 2,300 years. Yet today coal, which makes up 93% of our fuel reserves, supplies only 17% of our total energy".

Just the other day we received a letter from the Federal Energy Office and on the envelope it had this statement, "It is estimated that only a 40-year reserve of oil remains in the earth".

Today, with over 76% of our total energy needs supplied by oil and gas, which are rapidly being depleted, it

should be evident to anyone that for the immediate future, we must utilize our abundant coal supplies, our undeveloped water resources and nuclear fuel. It is time we recognize the facts of life with respect to our energy resources.

At this point in time, coal, water and nuclear energy can best be utilized by converting them to electricity and then deliver the energy by wire to the ultimate consumer.

Much work is -- and should be done -- on coal gasification, but with the technology available today, and the tremendous water requirements in the gasification process, the fact is that it is more economical to utilize the coal and water to generate electricity and deliver the energy to the customer by wire.

In my judgment, most of the coal used in the next 20 years will be utilized in the form of electric energy and the only practical way to utilize water power and nuclear energy is in the form of electric energy.

The plain facts of the matter are we are going to convert to a predominantly electric economy regardless of whether anyone likes the idea or not, simply because we have no other way to go. The move to greater use of electric energy and away from oil and gas will be accelerated in the Northwest because of our strong hydro base and nearby supplies of the nation's abundant low sulfur coal reserves. Fortunately, the western coal available for power generation in the Northwest is low in sulfur, which minimizes air quality problems.

Nuclear energy converted to electricity will, of course, become more and more significant in our total Northwest energy supply.

The more exotic forms of energy, such as solar and geothermal, will no doubt make some contribution to our future energy resources but there is no evidence that they can make any significant contribution to the electric power resources in the foreseeable future. Most of the benefits from solar energy can, should and will be obtained by designing buildings to utilize the direct rays of the sun to heat water and for supplemental spaceheating and cooling.

With most of the major hydro power sites developed and the undeveloped ones in controversy, we must turn to coal and nuclear power. There are no other choices.

There are many compelling reasons why we have made the decision to build our next two 500-megawatt thermal units, fired with coal.

First, there is the long lead time to get a nuclear plant in service. In the past three years, lead time has lengthened to 12 to 14 years. We simply cannot wait that long.

Second, for reasons of economy, today's nuclear plant should be over one million kilowatts in size. From a reliability of service standpoint, a system the size of Idaho Power Company would be extremely vulnerable if we were to depend on a million kilowatts of capacity in one unit.

Third, the cost of a nuclear plant has doubled in the last three years, and the cost of energy from a nuclear plant would be substantially higher than from the coal-fired plant we propose to build, utilizing low sulfur Wyoming coal, which we have under firm contract.

The next question, of course, becomes - can we build a coal-fired plant that will meet the state and federal standards with respect to air and water quality -- is that problem insurmountable? No, it need not be -- especially with the low sulfur coal available to Idaho Power Company and the fact we will use cooling towers to recover and recycle the cooling water.

I am sure many of you have been reading about the horrendous stories with respect to potential sulfur dioxide fallout -- acid rains, etc. Let's look at a few facts.

1. The sulfur content of the coal is about ½% -- less than one-sixth of many eastern coals. The coal we are using has approximately the same fulfur content as that being shipped and used in metropolitan areas of the east -- meeting federal standards -- without further treatment.

2. Bear in mind that two-thirds of the sulfur compounds falling on the earth is natural and absolutely essential to our plant and animal life. Furthermore, much of the United States -- particularly in the arid west -- is deficient in natural sulfur.

3. We confidently expect that sulfur dioxide measurements -- at ground level, at any point in the fallout area of either our Jim Bridger plant or our proposed Pioneer Plant -- will be less than the natural background level of sulfur in many areas of the United States.

Let's look at another example. A 500-megawatt coal-fired unit -- if all devoted to home heating -- would heat approximately 85,000 homes in our service area. If the same homes were heated with the same coal, there would be over 260 tons of effluent -- other than air -- discharged at ground level -- 2.84 times the amount discharged from a power

plant hundreds of feet above the ground. If heated with wood, there would be approximately 633 tons of effluent at ground level -- 6.78 times the amount of effluent from a power plant stack.

And this might surprise you -- if the 85,000 homes were heated with oil, approximately 20% more sulfur dioxide would be put into the air over Idaho at ground level than will be discharged from a Pioneer Plant boiler hundreds of feet above the ground.

Now what about the problems of nitrogen oxide. Again, I think we better put that subject in its proper perspective. We do not expect to have any problem whatsoever with nitrogen oxides from our proposed coal-fired plant. The boilers are especially designed to minimize the production of nitrogen compounds.

John McKetta, Professor of Chemical Engineering, University of Texas and Chairman of the Advisory Committee on Energy to the Secretary of Interior, in the AIDC Journal of July, 1974, makes this statement, quote "But we've all known for many years that nature, in addition to man, also produced oxides of nitrogen. You may be surprised and shocked to learn that most of the oxides of nitrogen come from nature. If we consider only (NO) (nitrogen oxide), the best estimates are 97% is natural and only 3% is manmade. If we consider (N_2O), (NO), (NO_2) and NH_3), it turns out that 99+% is natural and less than one percent is man-made".

We are completely confident that the nitrogen oxide from our proposed Pioneer power plant will have no adverse effect on the quality of air over Idaho.

Now with respect to particulate matter -- the proposed Pioneer Plant is designed to remove over 99% of all particulate matter from the flue gases. Again, getting back to home heating -- one unit is capable of heating 85,000 homes. If the same homes were heated with the same coal in stoves and coal furnaces, there would be 55 times the particulate matter discharged at ground level from the chimneys of those homes as will be discharged from one Pioneer generating unit.

Another fact to put particulate discharges into proper perspective -- just one dust storm over an area with a 20-mile radius picking up just 1/32" of dust will put into the air as much particulate matter as 1,518 of our proposed power units will discharge in a year.

I can assure you the power plant we will build will not result in acid rains or darkened skies. Long before our Pioneer Plant will be ready for operation, we will have definite documented proof that coal-fired power plants can be good neighbors.

Our Jim Bridger plant has now been up to full load and operating with a clear stack. Although tests at this time are very preliminary, monitoring equipment at many stations surrounding that plant have not detected any increase in natural background sulfur or the oxides of nitrogen.

Our Jim Bridger plant and many other coal-fired plants now being built utilizing low sulfur coal, will demonstrate that with modern technology available to us today, we can run a clean coal-fired plant.

Very frankly our greatest concern today is the unbelievable increase in cost for new generating facilities of all kinds.

We now estimate that the Pioneer Plant will cost in excess of $600 million. That is $600 per kilowatt - up almost $200 per kilowatt from the Jim Bridger cost.

I would be less than honest and candid if I did not tell you that the cost of power is going to be substantially increased in the years ahead. There is simply no way that capital can be raised today for power plant construction on yesterday's cheap hydro rates. That, of course, is not limited to Idaho Power Company, but is true not only of all other electric utilities, but of all other forms of energy.

In conclusion then, we do have the resources, the knowledge and proven technology today to provide unlimited energy for thousands of years, and beyond that, with a very real potential of fusion, the world can have unlimited energy -- out to infinity. We are not about to run out of our energy resources, but it appears we may run out of common sense to develop that which a divine providence has provided for us.

Discussion Questions and Answers

Q. What is the relationship of sulfur dioxide and nitrogen oxide compared with the background level?

A. In the talk I said that the monitoring stations around the Jim Bridger Plant have not been able to measure any increase in the background level of both nitrogen oxide and sulfur dioxide. And more than all the studies in the world I think that ought to prove the point.

Q. What are the present capabilities of Idaho Power as far as kilowatt hours? How much are they able to make?

A. There is a two-part answer to your question, and this is what gets the unknowledgeable members of our society so worked up because they take our installed name plate rating of about 1,500,000 kilowatts of hydro and they add the name plate rating of our Jim Bridger Plant share which is 500,000 kilowatts and conclude we have 2,000 MWe of capacity. They say, now your load last summer at your peak was 1,700 MWe; therefore, you don't need any more generation. What's wrong with this conclusion is that you don't get 100% utilization of any plant; 72% for a coal fired plant is a good record. You could use all of the hydro if the water was always there, but it is not because the flow decreases and the farmers increase their diversion in the summer when our peak load occurs. We can generate from that 1,500 MWe hydro base maybe 700 MWe. So you have a peak condition a company must build for so that it can serve the peak load. We have been really spoiled as consumers of electricity to the point that when you walk over and flick the light switch, how many times have you ever thought that the lights wouldn't come on because the power wasn't there? So we have to provide that kind of service because you have been accustomed to it always being there. Now the way it is always there is by having enough generating ability in back of that switch to make it always there. And so we have to build to supply the peaks as well as provide the energy total quantity. What happens is the load of a company like ours starts rising for various reasons. This is summer-winter-summer-winter and it generally is an accelerating, increasing load. You can not build power plants on the same basis as an accelerating load. You've got to bring them on in blocks. And sometimes the generating ability is more than the load and so you have an excess - which Idaho Power has at the moment. We are exporting power to other states. As this load goes up, that block will be absorbed and we will be below our ability to provide our own customers needs. And so you import power. This exchange represents a savings to the customers of all companies. Washington Water Power, Idaho Power, Montana Power -- northwest companies in 1942 formed the Northwest Power Pool where we have exchanged power for our benefit and our customers. And on balance last year we imported more than we exported; this year we will export more than we import. Although in total our generating ability will not be able to meet our summer time demands.

Q. Even with Bridger?

A. That's right, even with Bridger.

Q. Has Idaho Power made any attempt to educate the public and the legislature, and what kind of success are you having?

A. Yes, we have. We have carried on a public information program. That booklet which I quoted from about power rates is one of those attempts, so that we can put in proper perspective for the people we serve what our power supply is so they will understand the facts as I am presenting them to you today. We sponsor newspaper advertisements about what the energy availabilities to you are, so that you realize these matters. I'm here today for that very reason, so that you would understand, so that you in your sphere of influence wherever you go can say with authority, 'Yes, I heard this fellow and he is supposed to know what he is talking about, and this is what he told me. I didn't hear it from a newspaper story or some editor or some women's league; I heard it from somebody in the business'. And so we do this, we take all the speaking engagements we can and we are trying our level best to present the facts as we see them to our consuming public whether they are legislators or not. And part of that program was that we took people from Idaho to our Jim Bridger plant, before the Public Utilities Commission hearings were held, so they could see the Jim Bridger plant operate. If I could, I would like to take everyone in this room over to see that plant. Once you saw it, you would say to yourself 'What is all the controversy about? That's a very nice plant, it is a good neighbor, and we need the electricity'.

Q. What level of influence should the environmental concern have in locating a particular plant - say Pioneer - in this state?

A. I believe that not only the environmental concern but the concern for the industrial developer or the concern for the residential developer or the concern for the parents with children who are just married and want to form their own household, I think are all important. I don't think any one concern should peak out over the others. I think the case in point in history of the methods of concern that the power companies do have about the environment should be pointed out. For example, in our hydroelectric developments, long before anyone knew what ecology meant - or restfulness of the soul - and so on about getting away from it all, we developed extensive parks around our facilities where people could come and enjoy these great reservoirs. For example, the Hells Canyon Reservoirs in an average year will attract 250,000 visitors who go down and play on those reservoirs. If the total was 25 people before it was built, I would be surprised. And we have built three magnificant parks, overnight camping and so on. So there is a concern by the private company itself - whatever company, Washington Water Power or whoever. But should <u>one</u> interest predominate? I don't think so. I think

this is why they have the Public Utility hearings, so that all interests can be heard. Everyone should be heard and have a chance regardless of whether I like their opinion or not. And then someone should be responsibly charged to sift all that and then conclude. This is the Utility Commissions' charge today.

Q. Has Idaho Power pursued or asked for the idea of a change in rate structure linked with peak power demand?

A. This is called peak load pricing and it is being tried in some utility areas who have terrible winter peak and no summer peak and their peaks are way out of proportion. Will Peak load pricing work? I don't know, and I don't think anyone else does. It is just being looked into now. I can think of a great many problems associated with it. It may or may not be the proper thing to do. For years utilities worked with load shaping. Peak load pricing is a negative approach to a problem. There are two ways to approach the problem 1) push it down or 2) push it up over here. We have always approached the problem to build it up over here. We actively sold electric heating to offset summer irrigation and summer air conditioning. We have now stopped selling electric heating, but I'm not so sure that we should. We have stopped for a variety of other reasons. Still electric heating would create a more effective load factor for the company. In the case of Washington Water Power, for example, greater irrigation in the summertime would help offset the high winter peak that their company experiences. But will peak load pricing work? I don't know, it is complicated.

Q. What this, in essence might do, is say - 'O.K. you irrigators pay a higher price than you are paying now', wouldn't it?

A. Or, all irrigators shut down your pumps from 10 a.m. to 4 p.m. and then you can irrigate all night at the same price, but if you turn them on any time between 10 and 4 you have to pay a surcharge of $50 a month; something like this.

Q. How much effect does the rate denial of BPA have on Idaho Power?

A. None at this time because although the rate increases asked are substantial (25%), I think it is just a question of time that they will be granted. I don't believe they are going to be denied forever. I think that as soon as all necessary mechanical procedures are followed, the Federal Power Commission will then approve those rate increases and they will be changing. It is obvious

to us and I'm sure to anyone who examined the balance sheets that they have got to have an increase in their rates to pay for the many things that they are doing. In addition, federal agencies are putting in many additional units in the dams. Most people feel this is going to generate a great deal more energy. It will not. It will generate a great deal more peak but not much energy, because most of the energy in the river is already being utilized by the present generation. The energy is going to Bonneville Power to market - they are a marketing agency you know - and they have to recover those costs from their rates instead of appropriations from Congress. And while they still get appropriations from Congress, this is a good hard attempt to increase their rates more to compensate for these additional expenditures. We think it is right.

Q. All their loans from Congress are allocated so they have about 50 years to pay a loan back. It seems that after 50 years they would be able to pay back a loan. If all the money is borrowed at a rate of interest, then after 50 years why isn't it paid off?

A. There are different things that have happened to Bonneville Power. For example, they do construct transmission facilities and substations which cost higher than they used to. There has been a change in the accounting procedures of our national government. The Office of Management and Budget has said that the cost of money now to the government is not 3%, but 5% or higher. And Bonneville has to pay back costs at a higher rate than they used to. And the wages are going up for their 2500 employees. They have to be compensated for that. All these are operation and maintenance costs which weren't billed into the original costs for the facility itself. So even if they didn't build one new speck of plant, they are faced with the same exact problem that a private power company is faced with, and that is that their costs are going up for everything they do. Like a truck that wears out, you have got to replace it. You bought it for $25,000 -- 5 years ago -- now this one costs $50,000. So this increases your cost of doing business which you have to recover through rates.

Q. It seems the only increasing cost would be the transmission lines because it takes only the initial investment in the dam itself. After it is in, how much of a cost is it to operate a dam? The cost isn't high, is it? A majority of this is profit then, right?

A. Not at the rates that Bonneville charges. They are very low rates as you probably know.

Q. What is the BPA rate?

A. Maybe 2½ mills a kwh. It is tough, even increasing it to 3 and 4 mills a kwh. It is hard to get a return at those rates. They have got to increase their rates to cover their ongoing costs. If you had a balance sheet from Bonneville here, you would see that their investment is principally in transmission lines and substations; however, the investment they have to recover includes the Army Engineers-Bureau of Reclamation plants as well. And while it is true the initial investment is being amortized there are things like windings going up that you have to replace, and that kind of thing. So my only comment is that I am surprised they have asked for so little an increase based on the rapidly escalating cost of doing business today.

Q. Several of Idaho's neighboring states have siting legislations which set up certain criteria and guidelines for the placement of plants. In the recent Idaho legislature such a bill was unsuccessful. I wonder what Idaho Power's position was and what you would see as the advantages and disadvantages of such legislation?

A. The attitude of Idaho Power on the legislation that was proposed at the last session of the legislature was that we didn't think it was necessary. We felt that it would proliferate another agency of state government that was not needed. In fact, four years ago power plant siting legislation was passed in the state of Idaho giving the Public Utilities Commission the authority to determine power plant siting. If the present Public Utilities Commission needs more money for studies to determine whether or not what is correct, then the state should reasonably give them that money to make those determinations. If they need an engineer or whatever to adequately pursue power plant siting so that the citizens would be protected and they could verify what power plant companies like us said was factual, then that should be embodied within the present already organized Public Utilities Commission. We weren't against them having an adequate base to judge what we are doing. We are simply opposed to the creation of another agency.

Q. Was the present Utilities Commission going to be the lead agency?

A. No, it was not as originally proposed. There was a whole new agency to be created.

Q. Would you favor new legislation that would define PUC powers and guidelines?

A. One of the things that I've learned over the years is when I say something, I better say it so I won't have to eat it tomorrow. The answer to your question is absolutely, 'I don't know until I see it'. I can't give you a positive answer to your question, because I don't know what the legislation would encompass. Let me try it again. I would really like to see a clear definition of what the Public Utilities Commission charge was, for example. Professor Warnick and I were talking this morning about the time frame. Should the Commission hear us, take the public testimony, have a technical hearing of what is the air quality, water quality and all of these matters to be resolved, and then say we are going to study it for two years? Under the present circumstances they could do just that. Now that is not necessarily good. A decision should be rendered. As a matter of fact, legislation passed this last session so that the Utilities Commission would be required to act within six months on a rate application by a company like ours. The last rate case lasted 11 months and the prior one over 15 months before any decision was made. With today's rapidly escalating prices we can't survive such long periods of waiting for a decision on a rate case. It has become that critical. That same kind of criticality can be applied to power plant siting which is the point you are bringing out. And I certainly wouldn't object to some housekeeping in that regard to have things more clearly set out. I think that would be beneficial to the people whom we serve and the Commission and us.

Q. In reference to the situation in Hells Canyon, is Idaho Power in agreement with Washington Water Power or are they in agreement with Governors of Oregon and Idaho?

A. Idaho Power's position has been that this was a development filed upon by another power company -- not just WWP. It was Pacific Northwest Power Company comprised of WWP, Puget Sound, Portland General Electric, Montana Power and Pacific Power and Light. These companies formed a company which applied for the right to build those dams in the Middle Snake. Then they were joined by the public power companies of the state of Washington -- WPPSS. Now these two are in joint application and sit before the Federal Power Commission for license to build those dams. Idaho Power Company agrees with the premise that the Middle Snake should be developed. Currently before our National Congress is the National Hells Canyon Recreation Area Development legislation which would preclude that development from ever taking place. I think it is naive to think if this legislation passes, that it would be rescinded when the need for energy gets so great. I just don't believe that would

happen. So it would be forever precluded from being developed. And to refer to it as a wild river, which this legislation does, is almost humorous to me because it is anything but a wild river. The amount of water flowing in that river is absolutely controlled by Idaho Power Company's Hells Canyon Dam and by the Federal Power Commission's license under which we built that dam. We can fluctuate the river up and down a great deal more than we are now permitted to do. And our opinion is that that reach of the river should be developed. You might be interested to know that Idaho Power Company at the time of designing and constructing the Hells Canyon Dam, designed it on the basis of putting water into the backwaters of High Mountain Sheep Dam Reservoir, which project was then authorized by the Federal Power Commission. They later rescinded it. Like somebody said, someone moved the goal posts. The Federal Power Commission took the license away and there we stand with a power plant designed specifically to peak and to dump into another pool which is not now there. And now every time we fluctuate the river, it becomes difficult to live with if you are a boater in Lewiston. And so we have a very economic problem on our hands and a natural resources problem with the National Recreation Area legislation. So, I can't say that Idaho Power's position is exactly the same as Pacific Northwest Power Company. Our position as to whether it should be developed is 'yes' -- by whom, I can't tell you. Senator Jordan said the Snake River is a working river. This is entirely unlike the Salmon River, uncontrolled, flooding, rushing down as compared to the Snake River. The Snake River has been a working river. It is a more constant flowing river because of the development that has taken place on the river. I think that more people would enjoy the Middle Snake River, and there would be more enjoyment to mankind, developed than undeveloped.

Q. What is the impact of the decision of the Idaho Department of Health and Welfare and the Oregon Department of Health and Welfare to not allow a certification of the water quality for Hells Canyon dams.

A. First, I'm not an expert in that field. Second, it is my understanding that the determination of these two state agencies are based on a study made by the U.S. Fish and Wildlife Service whose study was made possible because of the cooperation of the Idaho Power Company. We regulated the flow of the river to determine the question of how much water should be in the Middle Snake for whatever fish and wildlife are there. And, as a result of a one week study, the determination was made that according to the fish and wildlife service that 13,000

second feet should flow down the Middle Snake all the time. Well, the water just isn't there. Somebody is going to have to provide it upstream. This is the basis, as I understand it, for the denial of this kind of permit on the part of the two state agencies. This is not the overriding consideration at the moment. That would need to be achieved by whoever developed the Middle Snake, if in fact it is done, after the Federal Power Commission would act. The Federal Power Commission has not acted yet as to saying, 'yes, you can have the permit to develop', or 'no, you cannot'. The fish agencies are not stopping anything because nothing is going forward anyway.

Q. If the Federal Power Commission were to say yes, would these two states still have the right to say no?

A. The Federal Power Commission hears the arguments from the individual states. If the Department of Water Resources issues a water permit then that is one of the other requirements in addition to the water quality. I think that the water quality argument could be resolved by whoever developed that, and the requirements would be put in a state permit. But it is a necessary permit to be issued. It could stop it, yes.

Q. Would it be necessary for Idaho Power to receive a permit from the Federal Power Commission for their Pioneer Plant?

A. No, the Federal Power Commission regulates us on the basis of interstate waters and interstate transfer of electricity, but if we were to sell electricity to Utah from our Pioneer Plant at specified rates, that contract for the sale of electricity wo-ld be regulated by the Federal Power Commission. But in the case of a steam electric plant, the Federal Power Commission does not have jurisdiction on that.

Q. Is there a similarity between the Jim Bridger Plant and the Centralia Plant in Washington?

A. Not as much as there would appear to be. In the first place the coal in the Centralia Plant is far, far different from the Wyoming coal with which we are working. Therefore, the plants are designed appreciably different and we have the advantage of time over the constructors of the Centralia Plant. By that I mean, each plant we build we learn from the past plants. We learned some things from the Centralia Plant to make the Jim Bridger Plant cleaner in exhaust stacks for example. They were having a difficult time. I was talking to Harold Harding of WWP, their chief electrical engineer, and he said the amount of clay mixed in with the coal would just

surprise you. The coal beds are faulted and jointed to such a degree that in the process they wiped lots of clay into the coal seam. It was a tremendous problem trying to get that out of the coal so they could burn it more efficiently. Getting foreign matter into the burner makes more residue, visible and nonvisible, come out of the stack which you don't want. I would say that they are really not the same because of the difference of the raw product going into the burner.

Q. I have heard there are a couple of train loads a day of coal leaving Montana that is heading to Centralia.

A. That could be, I have no way of knowing.

Q. Is Idaho Power giving any serious consideration to the thought of a nuclear power plant in the future?

A. Most of the power companies in the U.S. are looking toward a nuclear future. I tried to make the point in my remark "America doesn't have a choice". We have got to dig the coal while we are developing the liquid metal fast breeder reactor. Today's nuclear power plants utilize about 3% of the energy contained in uranium 235. If we do nothing but construct more of our present day power plants using U 235, we have an energy supply for about 40 or 50 years. But the fast breeder reactor which, in fact, breeds more fuel than it consumes, can take the present known supply of U 238 coupled with our precious supply of U 235 and develop enough electricity to last this nation thousands of years. So with a liquid metal fast breeder reactor, we feel absolutely confident that we have enough energy to develop the fusion from which you can get energy from sea water. Then we will have an unlimited energy supply from the fusion process. G.E. claims that the known uranium supply with the fast breeder will last us 64,000 years -- and I don't care if they are off 10,000 years. So we have got to develop our nuclear resource. It is the way we can truly make mankind independent from back breaking labor and poverty. We can take those energy resources and create a world the like of which you can't even dream about right now. As a result of that, companies like mine are putting millions of dollars a year into the Electric Power Research Institute. That coupled with government funding is developing our first pilot plant of the liquid metal fast breeder reactor in Tennessee, plus many other things such as the transmission of energy under supercool conditions and how the electrons flow more freely under that condition, and many other research projects. For the first time the power companies are now spending research and development dollars that we never did

before, directly. We always claimed we did indirectly when we bought a new generator or transformer because I'll bet you the price of the R & D was included in the price we paid for it. But now in addition to that we are sponsoring this kind of development because it is our opinion, and I think we have a good basis for it, that we don't have a choice. We must develop our coal resources today to carry us to the fast breeder reactor of tomorrow. And we still will have plenty of coal left for those things that only coal can do. That will carry us through this energy crisis to where we can then have abundant energy from the nuclear reactor.

Q. How far off is this fast breeder?

A. We would hope that the fast breeder experimental reactor is on line and operating in the neighborhood of 1983. There are on-line operating fast breeder reactors in Russia, France and Germany today. We know they will work. They took all our research and development we did in southeast Idaho and built them over there. And we are still writing our environmental impact statement. There is a court suit pending to the effect that the Atomic Energy Commission, now called ERDA, must write an environmental impact statement on what the fast breeder reactor is going to do for as long as we are going to use them. Think about that.

Q. Is the fuel produced in a fast breeder to be used within the fast breeder reactor or is it part of the fusion process?

A. It is for additional fast breeder reactors plus present day nuclear reactors. There is an exchange of these fuels between the present day fuels to the fast breeder reactor and back to present day. We actually need both types of them to utilize more efficiently the fuel that is going to be both consumed and produced. And they make a happy marriage.

Q. What will the cost of these new nuclear power plants be?

A. I asked our chief engineer what that was and he said he didn't know. The reason is it is difficult to get a quote. You can't get a contractor to say 'I'll build that for you for so much money'. There aren't any contractors around who will. He will tell you, 'I will build it at cost plus 10% or 15% or whatever', but he won't give you a firm bid cost. They don't know. Then all you can do is go back to the manufacturer and say what does the reactor itself cost? And they will give you a fixed price plus escalation so you still don't have an answer.

And so I guess the answer is, relatively speaking, the nuclear plants have been from 10-30% higher in cost depending upon what time they are asked the question. If you asked the question last year, they were about 50% higher. The cost of the nuclear plant is more approaching the cost of the fossil fuel plant. And everyone was delighted because they thought in about another two years they will be well below a coal plant and everyone knows nuclear fuel is cheaper than coal. All of a sudden everyone else who had the nuclear supplies figured out the same answer. And the cost of nuclear fuel in the last two years has doubled. There was an article in one of the trade journals where uranium oxide went from $8.00 a pound to $26.00 a pound in two years. So everything is just jumping all over the place so fast economically that you can't tell what a facility is going to cost you if you go out and order it today.

Q. How do the power companies remain solvent with these escalating prices and the rate increases not always being kept in line?

A. That is one of the most perplexing problems that we have at Idaho Power Company today. And here we are faced with the expenditure of $600 million dollars for the coal plant when we have $770 million invested in the company today. We are going to double the investment for a 1/3 more increase in generation. Now while we have that money invested in the construction of a plant it is not a part of the rate base. We are not under Idaho law permitted to earn on that money until the construction is completed. So we put the money out. Now let's say we are in the fourth year and we have invested $500 million. The interest charge on that money today is in the neighborhood of 10-12%. Let's say 10%. On $500 million that is $50 million. Idaho Power's gross income in 1974 was $100 million. And there was left over to put back in the business maybe $10 million, I don't know but it wasn't $50 million. We can't go out and find $50 million in new revenue in the next 5 years to pay that interest cost alone. Now what are we going to do? This problem faces every other major electric utility in the nation today. And the current legislation is being sponsored by the Federal Power Commission to enable the Commission to take work in progress and put it into the rate base so you can earn on it. NARUC is a national regulators group which is opposing this concept. They feel they are quickly enough adapted to meet that problem and get the necessary rate relief without being forced to do so by law. And the controversy goes on - and those of us responsible for spending those kinds of dollars without a direct and positive assurance that we can earn on them,

don't sleep so well at night. And that is the truth. It is one of the most perplexing problems that the utility industry has ever faced. I was told by a vice president of Kidder Peabody in New York City about three months ago that there are 10 power companies in this nation who are in financial difficulty. Here is the problem. They started these enormous capital expenditure projects and did not get the kind of rate relief they needed, and they are in serious financial trouble today. This is the comment that Idaho Power Company has made and is making. Unless we get some reasonable assurance on the part of those who are regulating us that we can in fact afford to build this new plant, we are not going to build it. And if we don't build it, what is Idaho going to do for energy production? It is the most serious of problems.

Q. How much do you foresee the power rates going up when Pioneer comes?

A. Our hydro base produces energy for about 7 mills per kwh -- the final unit of our Jim Bridger Plant is about 12 and our share of the fourth unit will be over 16. Pioneer may be 28 or nearly 3¢ per kwh generation cost. All these are amalgamated into one base cost and it comes out to one charge. The answer is, I don't know. But you can't expect just because one increment comes on at four times another increment that the price you pay for electricity is going up four times. That is an erroneous assumption. I would point out that we now have Jim Bridger on the line at 12 mills and our hydro base is 7 mills but the cost hasn't gone up 2 times to our customers. It went up 8.9% in the last rate increase and we are going to apply for an additional rate increase within a month which will be substantial. Yet it won't be anything like doubling the power cost. The power cost will have to go up based on whatever it costs you to do business. There is nothing very secret about our business because all of our records are kept in conformance with Federal Power Commission regulations which records are completely open to the Utilities Commission and their accounting staff.

Presentation by

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ENVIRONMENTAL CRITERIA IN SITING ENERGY FACILITIES

A discussion of environmental criteria for siting energy facilities is not complete without a brief historical consideration dealing with the need to assess or evaluate environmental effects of such actions. In the late fifties and early sixties there developed an awareness of growing population and increasing demand for all the things which contribute to our high standard of living. We realized we were using resources at an ever accelerating rate and, further, that most of the resources upon which this growth was based were available in finite amounts. Still another aspect involved the effects that using or processing these resources had on environmental quality. There were abundant signs of an increasingly sick environment. This awareness culminated in 1969 with the enactment of the National Environmental Policy Act.

NEPA is regarded as landmark legislation because one of the provisions of the act required an assessment of the environmental effects and the preparation of an environmental impact statement (EIS) on all actions using federal funds, federal lands or affecting the public welfare. Preparation of and review of an EIS is both time consuming and expensive and this has become an issue of considerable controversy. One outgrowth of this kind of objection has been the attempt to simplify the overall procedure by the enumeration of environmental criteria to be used in site selection. In so doing it is hoped that some significant detrimental environmental effects and the accompanying controversy might be avoided.

I should like to include two examples of the kinds of environmental problems which might have been avoided has there been siting criteria in existence at the time two installations were planned. Both examples I have selected involve nuclear power plants on the east coast. The first relates to Pilgrim I, a "nuke" built in the vicinity of Cape Cod, Mass. After construction it was discovered that

failure to determine direction of current flow was resulting in the thermal effluent from the plant being drawn into the cooling water intake. This intolerable situation necessitated modification involving the construction of a dike to deflect the thermal effluent away from the water intake area. At first this seemed to be a simple and readily attainable goal until geologists pointed out that the dike would also present increased possibility for beach erosion in the last beach area of the cape open to the public. In spite of these objections, and over public outcry, the utility was faced with the necessity of modifying current flow to allow for operation of the plant and so the action was undertaken. Results were as predicted and the utility suffered the predictable condemnation by the public.

The second situation is similar to the first in that another nuke and the problem of thermal discharge getting back into the cooling water intake was involved. This time the site was at Turkey Point on Biscayne Bay in Florida. a complicating feature accrued to the location of the facility adjacent to the southern boundary of Biscayne Bay National Marine Monument. The utility requested permission to alter its release point thus preventing or at least reducing the possibility of drawing the warm water into the intake port. They met solid resistence from EPA on the basis that release of the warm water could significantly alter conditions in the marine habitat of the monument. The company was forced to construct, at considerable expense, a series of canals through which the thermal effluent was directed before cooling enough to be recycled. Both situations could have been avoided or the effects at least minimized had siting criteria existed or environmental effects assessed prior to construction.

In enumerating some criteria to be followed in siting energy facilities I have restricted consideration to thermal methods of generating electrical energy, therefore, limiting our attention to coal-fired and nuclear stations. In such installations an overriding factor involves problems of dealing with waste heat. In addition, I will largely ignore problems dealing with efficiencies of transmission and the related consideration of locating sites near population centers and/or areas of intensive use.

As indicated above the first major criteria for site selection involves the cooling system to be used, the water requirements and the possibilities for dissipation of waste heat. From strictly an engineering standpoint there appear to be numerous alternatives in design of a facility. At the present this is not matched in so far as environmental choices are concerned. In spite of the obvious differences accruing to geographical location we regularly encounter the situation where a choice based on one environmental

consideration regularly compounds some other environmental aspect. (This seems to be in keeping with a law of ecology which has been paraphrased as "Everything is related to everything else").

Water requirements for thermal stations may range from only a few cfs to replace lost coolant in a recycling system to upwards of 4000 cfs needed in one-pass systems. Site suitability must include water availability and the type of source, i.e., surface waters including fresh water and marine or subsurface supplies. Assuming that problems of water availability can be satisfactorily resolved one is still faced with dissipating waste heat. Returning heated effluents to surface waters may invoke a whole host of biological problems in the receiving waters. Special consideration must be given to organisms which are stenothermal or those which may be endemic or rare and endangered. Moreover, the net increase in temperature which may occur must be evaluated in terms of stages in the life cycle of the various organisms which inhabit the receiving waters. It has been well documented that numerous aquatic animals have reduced tolerance to warm temperatures during critical stages such as spawning. In Idaho standards for thermal additions disallow any release of heat if the temperature of the receiving waters is 68°F or higher. At temperatures of 66°F or lower a maximum change of 2° is allowed for the receiving water body.

If the selection of cooling systems involves ponding then we must consider both the increased land area required as well as the amount of evaporative losses to be incurred. On the other hand if the choice is that of cooling towers and the process employed is one of a "dripalator" then added consideration must be given to the possibility of fog formation especially in those areas having high humidity. This factor was an item of concern in the construction of the Trojan Plant on the Columbia River below Portland, Oregon. Should such a system be used on a station located on the coast then salt drift may pose a problem if salt or brackish water is used as a coolant.

Biological effects of thermal discharges constitute some unique problems. Lethal effects are well known for most of the aquatic biota, but this situation does not hold for sublethal effects. Temperature is one of the cardinal environmental factors affecting aquatic life and as such influences growth, reproduction, and metabolism of most aquatic organisms. A major shortcoming here is the relatively poor understanding we have concerning added increments of heat to their surroundings. Another, and perhaps more serious, circumstance is our even poorer understanding of the effects of temperature increases on whole communities.

The possibilities for promoting beneficial uses of waste heat are still being explored but include such things as the use of "spent coolant" as irrigation water to extend the length of the growing season, introducing the heated effluent into enclosed areas as sources of heat in greenhouse situations and lastly, the direct utilization of hot water for space heating in residences and other buildings.

A second major criteria involves land requirements for facilities. The objective here is to avoid conflict with existing land use patterns. Ideally, plants should be located on sites having low utility for other uses. Generally, thermal sites require considerable area for buffer zones even though the facility itself occupies only a few acres. Total size of the area may range from approximately 50 acres up to several hundred acres. Consideration of land requirements also must include the use of lands by creatures other than man. If, for example, the land provides valuable habitat for rare and endangered species then certain controversy will ensue should a generating station be proposed.

Another major criteria involves air quality considerations. Coal fired stations have routine problems with the release of sulfur dioxide. This substance is associated with a variety of complaints related to the upper respiratory tract in man and also produces adverse effects on vegetation. Moreover, this material through adsorption to particulate matter and in combination with moisture in the air can have deleterious effects on a variety of other organisms at distances remote from the site of release. Nuclear plants and their operation release small quantities of radon gas which may or may not constitute a radiation hazard to the surrounding populace. It is this kind of problem that demands consideration be given to an analysis of meteorological data including such information as prediction of size and volume of the wind plume from the facility, direction of the prevailing winds and the frequency of inversions.

One example of conflict that deserves special comment is related to the proximity of a potential energy site to established recreation area, wildlife sanctuaries, historical sites, scenic and wild rivers, national parks and other areas having special designation or aesthetic beauty. The example included earlier (Turkey Point) is a good one. Resolving the thermal problem which developed in this case was made more difficult by the immediate juxtaposition to Biscayne Bay National Marine Monument. Perhaps this clearly indicates the need for comprehensive land use planning.

A final major criterion in site selection should include an evaluation of the potential for growth. With projections such as we hear for the state of Idaho any site

selected must include this provision for growth. Although we may hope that these projections prove to be erroneous it would be sheer folly not to plan for the eventuality of a several fold increase in the electrical generating capacity in this state. It seems only reasonable, therefore, to anticipate the addition of generating plants, either nuclear or coal fired, in the immediate vicinity of the first installations actually constructed. This has been a point of contention in the arguments revolving around Idaho Power's proposed Pioneer Plant at Orchard. Although environmentalists have called attention to a variety of problems which they foresee as outweighing benefits from the initial units, the situation certainly would be much more serious if additional units were constructed at the same location at some time in the future. These problems would only be aggravated by the anticipated growth in the Boise Valley.

If all of the criteria indicated above are to receive serious consideration one might legitimately ask the question: What would constitute an ideal site? What characteristics do we prefer? In attempting to answer this question let me pose the hypothetical situation in which we are most interested in air quality. With this factor in mind the characteristics we would look for include:

1. A location where no significant air quality problem already exists.
2. A location remote from population.
3. A location remote from land use areas that are susceptible to air quality effects.
4. A location free of much relief or meteorological features which might inhibit rapid dispersion of emissions.

These characteristics could be evaluated collectively to provide the following kind of description: From an air quality standpoint an ideal location would be a mine-mouth plant in remote, undeveloped, flat terrain. Obviously such areas are in short supply or nonexistent where power is in great demand. However, you should be able to clearly perceive the problem for it is one of never finding the ideal location.

If we superimpose on this the desirability of finding an "ideal" location based on the other major criteria we get an even more complicated picture. Just as there is no perfect site in terms of a single criterion then there certainly can be none if all are taken into account. However, in establishing criteria for site selection we should strive to evaluate all aspects and, therefore, hopefully minimize the conflicts which are sure to arise. Site selection and the evaluations which are a necessary part of that selection are time consuming, expensive and require great effort but both the utility companies and the consuming public will be the beneficiaries.

problems of similar magnitude--different kinds of problems, but problems of similar magnitude--if you try to do it with the expertise of one discipline or a limited number of disciplines. If you do that you are asking for trouble. Particularly nowadays, you have to take other kinds of things into consideration. I hope that my coming here today and the remarks that I have made do not turn out simply to be academic arguments on a moot question. I made that statement because the present national administration is considering and perhaps even by this time has introduced legislation--I'm sure they found someone to sponsor it--which would eliminate the need for environmental impact statements or environmental considerations in site selections for any energy related project. In other words it would be a suspension or repealing of the National Environment Policy act as far as energy installations are concerned.

There are all kinds of explanations that can be offered for the displeasure of the utility companies that, to be sure, has meant for them that they have to meet more kinds of regulations; and it has increased the cost to a certain extent. But as I pointed out at the outset here, we must continually ask what are the costs if we do not take these kinds of things into consideration. And it is my position that if we were to do away with all of these kinds of considerations and just said "damn the torpedos, full speed ahead" as far as trying to meet our energy demands that we would pay a terrible price at some point in the future as a result of environmental deterioration.

Q: What is your feeling on the approach that Maryland has taken? Their state has taken initiative and gone ahead and looked for sites; and is reserving sites now. They are now saying to the power companies, here are the sites you can build on later. Do you think this would be a better approach than letting the power companies just keep it in their back pocket until they have decided to develop an area?

A: It depends, I am not familiar with the sites that they have set aside in Maryland. But it can be just as much in error if the state did it as if you left it solely up to the power company, assuming of course that it was an arbitrary kind of selection. If in fact the areas that have been set aside have undergone an evaluation from an environmental standpoint, from a proximity of generating site to the area of usage, then I submit that is an ideal or a very good way to go.

Q: In line with this, I think it Southern Edison in the San Diego area that has taken a different approach.

Q: Is a recycling type cooling system like Turkey Point really possible? What is its opportunity for meeting the needs?

A: First of all there are several restrictions involved. One of these is again a land requirement. The terrain, the topography has to be such that this kind of construction is feasible. But even if there are no constraints from the standpoint of the lay of the land, you must also consider the availability of the land; what kind of ownership patterns exist. If this is going to involve federal lands or state lands there may be certain kinds of constraints in terms of policies of one agency or another that will have to be weighted and given consideration. In terms of strictly economic constraints, ponding or a series of canals like those at Turkey Point encompass a wide range in the cost. It is dependent in part upon soil conditions, whether or not you are going to have to line the ponds. You see as it turned out this station, Turkey Point, was built right at sea level and one of the things that they worried about was invasion of sea water if they altered the groundwater situation. This was one of the major considerations that they had to investigate to see whether or not the installation of this facility was going to result in intrusion of sea water underground, inland, and whether or not that would effect their operation. So there are all kinds of considerations which dramatize the point that I made: you rarely ever get into a situation in which you can focus attention on a single kind of aspect--even something as simple as cooling ponds.

Q: Do they use sea water for cooling?

A: They use sea water but they augment it with pumped groundwater to reduce the salinity. The problem, of course, is if you use straight sea water you have all kinds of addition corrosion problems. They try to get around those.

Q: Is there any easy was of integrating the ideas of biologists, limnologists or the engineers, what have you, on the impact of a power site on the environment? Everybody has their own ideas. How do you get this all integrated into a meaningful thing?

A: That is right. The interdisciplinary approach is the only way. It would be just as ridiculous to put total planning and site selection in the hands of a biologist as it would in the hands of a mathematician, or someone who was a civil engineer. You would invariably run into

They have pointed out where they are talking about potential sites. They are trying to get the public to accept the sites many years in advance. Do you think this can be integrated in?

A: I'm sure it can be. And again, I am assuming that some kind of logical evaluation on a variety of bases was carried out. In the past, one of the arguments that came up almost invariably and was offerred in defense by utility companies was this: "If we say where we are going to build a major installation, land values will increase and it will end up costing us a good deal more because people see it as an industrial area. They will want to have area around it, assuming it is private land, made available for industrial uses, and it drives up our land acquisition costs." This was one of the routine kinds of arguments that you formerly heard. However, sometimes they get just exactly the opposite. For instance, if a power company announced that they were going to build a nuclear power plant, very often we got just the opposite reaction. You get a crowd of people saying "my gosh, if you build an 'atom bomb' like that in the back yard, my property won't be worth a plugged nickel." That seems to be a paradox and yet both kinds of arguments have been advanced.

Q: I might interject there that sometimes when you look at the cost of acquisition of land by the utility itself even in the case of 1,000 acres that really is a pretty minor cost even if it is double the cost that the going price of land is in that area. So I take a rather negative view to some of their arguments that land appreciation is a problem. I can see that it certainly increases the cost but I don't think it is as big an increase as we are sometimes led to believe, and I think the receptiveness of the public may be worth more to them than that extra cost.

A: Hopefully they are beginning to come to that point of view. It is largely apparently dependent on the corporate directorship of the individual company as to what kind of an image they decide they want to display or present to the public. The Turkey Point case was a classic example of how the president of the company had the attitude,"the public needs the power and if they don't like what I have to do to get power, to hell with them." That attitude has no place in today's society. Somebody will ding you for it in a hurry. So the idea suggested here, in terms of well-being and community relations between the people and the local population, is becoming much more important.

Q: Do you think that the utilities are a little too apt to consider economy rather than some of the other criteria you mentioned before?

A: By nature, yes. I think there is still considerable ground to be gained as far as convincing the corporate structure, the power structure, of the necessity or the advantages of not always going strictly on the dollar basis. The answer that I would get if you were all directors of power companies is, "OK, you tell me what is better than the economic basis."

Q: They are entities that have to make money because it is important to declare a dividend. I agree, on the other hand it is too bad that we have to get in these arguments just for argument's sake and overstate the case. They certainly overstate their case all the time. If you were listening to the programs on Friday night, the language used there . . . "obstruvtiveness" and "people that don't know anything about power production and power use", are typical. It is interesting, I heard the same thing 15 or 20 years ago and it was the same kind of stuff here last week from our previous speaker. Earlier the big bugaboo was not the environmentalist nor was it the guys that were interested in protecting the environment, but at the time it was the federal government because they dared to have some kind of regulation on them. And I think this is unfortunate, I think they need to grow up too. I like your idea of trying to present some kind of cooperative image with the public and trying to cooperate with them. It is something like a pulp mill president, I won't name what plant or where, but he says fish are expendible. You know, that grates on a lot of fishermen's nerves, recreationists too. Maybe they are expendible, maybe they are not.

Getting to a specific point, I hear Utah Power and Light talking about possibly locating a plant somewhere down in the Soda Springs area. What is your reaction on one like that?

A: Well, I really don't know enough about it, and one of the things that bothers me is that apparently Utah Power is adopting a similar posture to that which Idaho Power has used, at least in some of the early discussions about the Pioneer Plant. That was essentially that they haven't made up their minds. This was a statement that was attributed to Albert Carlson: they hadn't made up their mind exactly what kind of plant would go in there: that they were exploring the possibilities of putting a plant there. At one of the public meetings that was held in Boise someone got up and challenged Mr. Carlson with the idea that if they didn't know what kind of plant

the they were going to put in there why had they entered into a 25 year contract with Union Pacific Railroad to haul coal from Wyoming to the vicinity of Boise. He really got mad when he was confronted with that because apparently that was something that had supposedly not been released. But here he was saying that they had not solidified their plans to the point where they knew what kind of installation was going to be there. Well, that is the story that we are getting from Utah Power at the present time in so far as the proposed station in Soda Springs is concerned. They have bought water rights and that is about all they will admit to. My guess is it will be a coal fired station, and there is a serious question to be raised on the advisability of locating a coal fired station, even if it is only one 500 MWe station, in the vicinity of Soda Springs. The reasons are mostly those that I brought up and enumerated here. It happens to be an area in which there is a high frequency of inversion, it is bounded on almost all sides by moderately high mountains. Furthermore, it is projected to be the site for six phosphate processing mills. There is already a sulphur dioxide problem and a fluoride problem to the extent that there have been lawsuits against the existing phosphate mills from the accumulation of fluorides in the vegetation. These are passed on to cattle and the cattle get a fluorosis disease and it weakens their bones and teeth and so on. I think a very strong argument could be built against locating a plant right there, and yet apparently that is where Utah Power is going to want to put their plant.

Q: On that point, if they are going to put a plant in there I'm sure they will have public hearings and whatever-- I'm sure that when they have these hearings that the power company will have all of their team there saying everything is O.K. Well then there is the people's side, and they will have others there saying it is not O.K. Now who says whether it is "go" or "no go"?

A: At the present time it is the PUC.

Q: In Idaho it is the Public Utilities Commission, but that is even being questioned. In the legislature there were some bills to try and get a more broadly based council. Who makes up the commission? Are they government people or are they private people?

A: The three commissioners are government people; they are state employees in the case of Idaho. I think the question is even just looking at numbers--three--is three enough and are they qualified to be all so broadly informed that they can answer the thing. I think that is the question that is being raised right now in our state. Now in the

state of Washington they have a nuclear power plant siting commission. I don't think their code really applied to all thermal plants.

Presentation by

WARD H. SWIFT

Program Manager
Energy Related Regional Assessment Program
Battelle Pacific Northwest Laboratories

PROGRESS IN DEALING WITH POWER PLANT SITING CRITERIA

Mr. Swift appeared on April 23 on the campus of the University of Idaho before the seminar and presented an excellent illustrated presentation on the energy picture and the criteria that their organization was using in regional energy assessment. He mentioned an extensive project being prepared by Atomic Industrial Forum, Inc. This was preparation of a source book entitled "Environmental Impact Monitoring of Nuclear Power Plants". He left a draft copy of this, which is a 947 page compilation in which Battelle had a very active part in the preparation.

Mr. Swift later responded to questions and the resultant dialogue is presented below:

I would mention that we are doing some siting work over at Richland. I did bring along this print of (ERTS) resources technology satellite. We are doing some work on computer analyzing and multispectral scanning tapes and that just happens to be the Pacific Northwest states. And that goes as far east as Pocatello. This is proving to be a pretty interesting tool.

Discussion Questions and Answers

Q. Are you at the present time measuring any air and water quality around the existing plants that are now operational?

A. We are for the Hanford area.

Q. Only for the Hanford area?

A. Yes. Well, let me take it back. We are also doing some - one of our groups is involved in measuring the atmospheric

discharges downstream of the Centralia coal fired plant in western Washington looking for deposition of various materials on vegetation and also sampling the atmosphere downstream of that plant. Other work is involved in the east on precipitation scavenging of SO_2 from coal fired plant emissions.

Q. Are you doing any work on any change of regulations dealing with the transport of the oil from Alaska into Washington ports?

A. Not as far as regulations are concerned. We looked into the problem of deep water ports on the west coast. We did this for the Corps of Engineers, actually to try and assess if by the year 2000 you don't have deep water ports, what would it mean from an environmental standpoint. On the other hand, what does it mean if you do have deep water ports by the year 2000? We did the environmental assessment of that and our conclusion was that from the standpoint of both spillage and the acute disaster type problem, that we would be better off with deep water ports, because you have fewer ships involved and when you reduce traffic you come out ahead. People don't like super tankers by any means. It is a very emotional thing. But actually you would be safer with them. Of course when you do have an accident you have got a whopper, and the damages could be immense.

Q. All these surveys that you are talking about, are they groups under you or are you contracting out to private firms to have all the work done and then have them submit a report?

A. We do most of it ourselves in-house. We do subcontract the routine work.

Q. Have you done anything along the lines of coming up with a model of criteria that communities could use in determining whether they wanted to allow a plant to come in; and if so, what were the costs involved to bring it in, in terms of more people?

A. We have done a number of studies, and I suspect these are available. We could get them to you on the socio-economic effects of facility siting on the community -- what are the changes in the requirements for social services or governmental service and things of that nature. And what are the economic consequences, the multiplier effects that get involved, including the effects of having a pulse of the construction force go through that system? It distorts everything for awhile, and raises cain with school boards, housing, and things of that nature. There are some fairly standardized models for that type of thing, but those are more the economic side of the socio-economic thing and not

the more fundamental societal quality of life type of consideration. That is something else again.

Q. As I saw your presentation on coal in Alaska, I realized some of our previous speakers haven't thought too much about coal in western Washington. We have been talking a little bit about Centralia. It looks like to me that maybe coal coming from Alaska into some place near the coast might be a lot better maybe than coal coming from, say Wyoming into Idaho or coal coming from Montana into Washington.

Q. Is there any coal being shipped in from Montana to Centralia was asked before. I guess there isn't, but they had shipped some to experiment with at Centralia.

A. Some of it has been shipped from Montana and Wyoming as far as Japan, I believe, but so far as an experimental type of thing. You raise a good point. There is a possibility that the coal fired plant that Portland General Electric plans at Boardman on the Columbia River will get its coal from Alaska rather than Montana or Wyoming. It will all depend on coal quality and washability and all these things, and also the availability of transportation, rolling stock. That is one of the big shortages right now.

Q. What type of qualities does coal from Alaska have with respect to sulphur content?

A. I really don't know. We haven't gotten this information yet. It will be very interesting to see. If there is as much as they say there is, and it is good quality coal, it will be something. It is bound to effect the way we look at things for development of Montana-Wyoming coal.

Q. Is it the Bureau of Mines that is doing these surveys? Do you know who is doing these coal surveys in Alaska?

A. The coal survey that I am particularly interested in seeing is actually being done by the state of Alaska. I presume they don't do all of the field work by any means. A lot of that is done by USGS, Bureau of Mines and so on. The Alaska State Department of Natural Resources is trying to put together a complete picture of Alaska coal. Much of it is presently inaccessible, but deposits in south central Alaska might be something else.

Q. Are you doing anything at Hanford to reduce the hazard of leakage of waste materials that are buried in the ground?

A. Yes, the wastes that are in tank storage in there are being solidified now -- evaporated into a salt cake. The idea is that this will make them several levels of magnitude

less mobile. That is the main program of trying to upgrade the old, essentially war-time, inherited disposal techniques. We are also engaged in studying the groundwater aspects of the transport through the unsaturated zone. If you do have a leak, the liquid moves at a certain rate; the radionuclide move at different rates depending on their chemistry and the soil chemistry and so on, and some may finally get down a couple hundred feet to the water table and enter the aquifers. There has been a lot of work on computer models of these transport porcesses trying to predict if it were to leak, if you were suddenly to take the bottom off the tank, how long would it take these things to migrate down. How would they interact with the soils and how far would it get transported horizontally to the Columbia River. I believe that the groundwater system and the transport characteristics of contaminants in the Hanford reservation is the most thoroughly investigated region in the world. Millions have been spent on this question.

Q. How have these cracks that have been occurring all over the country in cooling systems of a lot of the reactors been caused?

A. Cracks in the cooling system piping, yes. I don't know a great deal about that other than what I read in the technical journals from time to time, but I gather it is stress-corrosion cracking.

Q. I must add something to that. They found cracks in one, but they shut 22 or 23 down. They found presence of cracks, but no significant cracking in any of the others, so this was a typical safety precaution. The results were never publicized like the incidents. It was a separate incident; they checked about 22 or 23 others and found no more.

A. I think it was just in the last couple of weeks or so that they went through inspection of all the other plants and didn't find any of the symptoms.

Q. Just how effective is such a large scale "McHarg" study like an energy park?

A. I don't know.

Q. Along that line may I interrupt you to question a bit because that case as you look at what they are doing; they are doing in Oregon, a sort of exclusion process. And I can see that you can do a hundred different things. I don't know how many overlays they prepared, but I can visualize there may be a hundred different ones. These are the obvious things, the resource ones and the size of facilities but when you get into the social ones I have got a feeling that Oregon did some things on social pref-

erence too, didn't they? I think they made some inquiries as to whether people wanted -- I think it is obvious -- that you ought to consider whether people want a plant at a particular site. Now certainly as you look at the people down around Trojan site I take it that they don't want any more around there. So I think what we have been looking at a little more in the Institute's study is a more positive approach to say maybe not exclusion, but what is the best site. What are the parameters that you should have? I am curious to some of your reactions in your studies, which in the process can be quantified? But I am curious about your approach and some of your studies.

A. I wish we had been able to pursue this thing further than we did. The social problems I know did come in strongly later on in Oregon's approach. I don't know that they actually went out and polled people, but there was a lot of political input to the system. It wasn't just hard technology types of things, it was public views and attitudes, and those of their Land Conservation and Development Commission. It is never black and white.

Q. You are saying that the northwest is going to have to become a major energy exporter for the rest of the country. We are already having problems with siting and licensing of generating plants now on the question of whether or not the power is necessary for the northwest. How is the northwest going to be able to do this? What is going to have to happen to turn that attitude around?

A. The northwest does not have to be a major exporter of energy, but there are lots of pressures on it to fill this role. I think the attitude in Montana is a good example. The people there feel that they will let you export the coal, you can take it out on unit-trains, but don't build power plants there. If the people in Montana want to do that, I think they can make it stick.

Q. So then the northwest may have this large energy base, but if we are not willing to develop our energy production capacity, then what is going to happen to that resource? Are they going to have to build it elsewhere?

A. Yes, but do not underestimate economic incentives.

Q. Hydroelectric base?

A. I don't know that the hydroelectric production will go up a great deal more than double what it is right now. We may have seen the last big dam. I don't know how you feel.

Q. I think there is a lot of truth to that. As we discuss that philosophically I think you can all recognize that in looking at those graphs today it is pretty convincing that there will be a pressure from the rest of the country to have us help produce the energy. I think you look at that and it is almost obvious that there will be that. I think the first pressures are economic. There will be economic gain that will be offered this region to do so. And I think that is why Montana says the way they are going to do it is ship out their coal. Here again it will be interesting to see if they prepare to ship out their coal and lo and behold the Alaska coal is cheaper. Their resource won't be developed then. And it will sit there for awhile and maybe eventually they would say maybe it is cheaper for them to do it on site. Maybe then they will start to relinquish their idea of doing it by their own plans. Have you heard what happened in those coal hearings? That is obviously the s state of mind the Department of Natural Resources that said "no". They don't want to accept the Coal Strip plant, which is a rather major plant that is proposed for on site development. I can see that those pressures and those graphs you brought along convey pictorally the idea that we are a potential resource exporting area. I wish we had this on our own state basis. We have discussed a bit in our class and had presentations earlier in the semester that Idaho is non-exporting. We don't have the coal and the oil, but certainly nuclear energy could be exported.

Q. How much of an impact would there be if, as the years go on, the regions -- the haves and have nots -- are having problems with energy, and the federal government were to come in and take over the whole situation?

A. That is a political question. I personally think it would be a disaster.

Q. I think that is what happened in England. I don't think many people in the U.S. would consider it right now. Our political situation is not such that I think it is very realistic, but it may come. In order to supply the energy, some might very well say one way is to nationalize our energy program.

A. One of the things that I see as creating a real awkward situation is the fact that there is a generating plant here, transmission system to another area, and a consuming region. You are having cost and benefits, depending on what you regard as costs and what you regard as benefits, accruing from these activities. And the cost may be one place and the benefits may be someplace else.

I think this is a problem that Bonneville Power Administration is getting into right now. They are talking about new transmission system from dams on the Lower Snake over to the Hanford Reservation and from there across the Columbia to supply the Willamette Valley. There would be cost and benefits occurring at all these different places.

Q. Don't you think that with the energy situation as it is, and with states like Montana ruling out the possibility of putting plants in their own locality, that they perhaps are inviting population growth instead?

A. Possibly, I think they are trying to avoid population growth. You may have a point there, though, It might go the other way.

Q. We came from Florida 1½ years ago, and our apartment here is just a little smaller, but similarly equipped. But our electricity dropped by 1/3; $10 here, $30 there. So that is an incentive to some people.

A. Montana, best as I can tell from attitudes reflected in the legislature and so on, wishes to remain in a rural, very low population area. They are really not objecting to putting in coal-fired power plants and exporting electricity. They are objecting more to the influx of people required to construct and operate these plants. You can operate a coal mine with relatively small numbers of people per BTU of energy output. As soon as you put in a power plant or a gassification plant, that involves many more people and becomes more labor intensive. They are resisting that. They don't want their lifestyle changed.

Q. Well, I was at a hearing in Spokane and one of the people expressed a concern with respect to quality of life. The people in the Spokane area, a lot of them are moving over toward Rathdrum Prairie in Idaho. The quality of life apparently looks better over there than it does in the city. With the Pacific Northwest keeping its energy cost low and our quality of life high, aren't we asking for a situation like California experienced 20 years ago? You have a high quality of life, you have a relatively high economic level -- you are going to get people. I think they are already seeing it in the Boise area. They are getting an influx of professional people that are coming in because of the quality of life there even though they are taking jobs that are very much lower-level than what they have in the bigger cities. They are starting to see this influx. How are the states going to be able to prevent it if they keep taking this attitude?

A. I don't know. That is a good question. The states right now have a very difficult time controlling their own destiny in the energy business except through siting activities. That is about the only leverage they have. They can get it to some extent through utility rate structure, but they can do other kinds of funny things -- they will push down on one thing and something else will pop up. For example, there is very little they can do about natural gas. They can play with the electric rate structures, for example. But a lot of things they think they can achieve, in actuality force a substitution to take place and result in something else.

Q. Do you foresee that the approach Maryland is taking might be a better way when it comes to energy siting? Do you think this might become a common thing?

A. Yes. People have been talking about land use planning for a long time and it is coming slowly.

Q. Who at the present time is really using most of the information that is available?

A. Not many right at the moment. The program was just started. I think that your question is a good one because it points up a real problem, and that is that most state and regional agencies tend to have a rather short time horizon in terms of how far ahead they look. Being political entities they worry about the brush fires and the problems of a few years ahead. Not too many organizations, particularly in the public sector, are trying to plan starting from 10 years from now. We in the Northwest are perhaps a little unique with the Pacific Northwest River Basins Commission, because it is one entity that we have encountered that looks further ahead than most. The time framework they're using is more comfortable to work with on this type of thing.

Q. Have there been any criteria developed to make your information appeal to whomever might be using it so that they will use it? Are there criteria for the development of the information?

A. Not criteria per se. What we want to do is get the potential users involved in the development of the material, get them involved at the outset.

Q. So you go down to the planning council level in each individual area?

A. No. We won't be working in that fine a geographic detail. Not down at the county level. We are more concerned at the more aggregated level.

Q. You would be more apt to go to state agencies? Have you done very much about that? You have, I guess, for the Oregon people?

A. We have for Oregon and Washington so far. We hope this coming year to spread out further, and I'd like to keep in touch with the Institute.

Q. I would like to keep in touch. We have some problems along that line. We sense the same thing; that is, to get involved with the users of the information so that we are realistic in our approach. Along that line one of your comments, you talked about 40,000 MWe types of centers that the Nuclear Regulatory Commission has been concerned about. But is this a realistic approach, huge energy parks? I get the idea that we may be heading in that direction, but on a relatively modest scale.

A. Modest in comparison to the idea of 40,000 MWe. Problems of exporting that large a block of power are not going to be small. Problems of reliability of such an energy center are real tough. Suppose you have 40 plants in an area and one of them has a mild accident. Then all of the plants, all 40,000 MWe might have to be shut down. The reliability implications of that are significant to say the least.

Q. I'd like to go back and comment on the previous question about who uses this information. I think the potential users are just becoming aware of the long range implications of planning, and are just beginning to look for data bases. I think the real benchmark, the first thing that was ever done like that was in 1947, or something like that, where all at once everybody could see the potential hydroelectric future. There was a tremendous response by the states and by utilities, and even the big industries took a look. I expect more of them wish now that they had committed some fixed capital asset to energy resources. So I see these things becoming very heavily used as soon as they are available. I don't think people in the local areas have the perception yet to know how they are relative yet captive of the major systems.

Q. Has Battelle done the power projections for say 20 or 30 years, and if they have, how do they compare with say the West Group Forecast?

A. No, we haven't. We have been approached by the utilities conference committee about this. We have been approached by the Pacific Northwest Regional Commission about doing this type of thing. But we have not done it. It is one of the things we are thinking about and we ought to

do it because the West Group Forecast is one of the big debates these days. Is it real or not? We have a group saying it is only half of that.

Q. We have to accept it at present, but I agree a lot of people are saying it is too high. And yet will some group or independent agency come in and look at it the same way?

A. It is going to be a darn difficult one to do because I don't think anybody really understands the elasticity of electric power. None of the time series data that we have on prices of electricity are worth a darn in terms of generating forecasts as a function of price; supply curves and so on. I don't think cross section elasticity data does it for us either. Our feeling is that in order to do it one has to really figure out what the decision making process is that the consumer or the person who is making decisions about electric power uses. How does he make his decisions? How does a contractor decide whether he is going to build a house all-electricity heated or all natural gas? What makes him make his decision that way? That may be the only way we will ever get a handle on this.

Q. I don't know if you can do it with the parametric type of modeling. You sure can't do it with the normal techniques.

A. Most of the work has been pretty much trend projection up to now. I would think it looks like trend type of projections that they are working with, and I agree. I don't know how many of you understand the idea of the elasticity of profits, but that is one of the things that has been pretty constant for quite awhile in the Northwest. But we know it is going to change. Everybody knows that the price of electricity is going to go up as we switch to more and more thermal power. But how much it is, and how much that will effect our demand is difficult to know, because that gets away from the trend analysis.

Presentation by

WAYNE KIDWELL
Attorney General, State of Idaho

LEGISLATIVE PROBLEMS FOR POWER PLANT SITING IN IDAHO

with a
Preface and Introduction
by C. C. Warnick

Warnick

It would appear wise to introduce the presentation by Attorney General Kidwell with background information to set the stage for the remarks that were given and recorded at the seminar.

The state of Idaho during the fall of 1974 had an expressed interested in additional power plant legislation in a draft bill prepared by the former Attorney General Anthony Park on which there was a hearing conducted during December before the legislature met and before the departure of Mr. Park from office. Later H.B. 50 entitled "Idaho Utility Siting Act of 1975" was introduced by Representatives Onweiler and Twilegar which was a revision in the Park draft legislation. A complete analyses of this legislation was prepared by myself and Mr. P.J. Rassier, a senior law student at the University of Idaho. This was published as Information Circular No. 9 under the title "Energy Plant Siting Legislation - A Current Appraisal for Idaho", and was part of testimony presented to the House State Affairs Committee at a hearing on H.B. 50. We were in hopes that Mr. Conley Ward who helped draft the earlier legislation could come to campus to discuss the evolution of legislation, but he was unable to make a presentation.

However, Attorney General Kidwell was on campus giving a seminar to a environmental studies group the day the topic was considered and agreed to make a presentation. He had earlier been asked by the Idaho House of Representatives to give legal guidance relative to power plant legislation. This was done through a letter dated March 20, 1975. The letter is reproduced below as background and reference for understanding points discussed in the seminar by Mr. Kidwell.

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March 20, 1975

J. Vard Chatburn
House of Representatives
State of Idaho

THIS IS NOT AN OFFICIAL ATTORNEY GENERAL OPINION, AND IS SUBMITTED SOLELY TO PROVIDE LEGAL GUIDANCE.

Re: Power Plant Legislation--House Bill 50

Dear Mr. Chatburn:

By letter of March 4, 1975, you have requested the Office of the Attorney General to answer the following question: Do §§61-526 and 61-515 adequately empower the Public Utilities Commission of the State of Idaho to regulate power plant siting within the State of Idaho?

In essence, your question is whether or not the existing enabling legislation for the Public Utilites Commission gives that body sufficient power and authority to properly regulate the siting of nuclear and thermal power plants within the State of Idaho in such a way as to protect the public. Yes, however there are some additional points you might like to be made aware of that the legislation concerns itself with.

Section 61-526 and §61-515 of the Idaho Code require that a certificate of convenience and necessity be issued by the Public Utilities Commission for any construction by a public utility to maintain and operate any of its plants, systems, equipment or apparatus, in such a manner as to promote and safeguard the health and safety of its employees from passengers, customers and the public. Technically speaking these sections enable the Public Utilities Commission to safeguard the public health and to rule on proposed sites for power plants.

The enabling legislation is concentrated and aimed mainly toward the regulation of railroads rather than energy producing facilities. Historically its use has been in the field of railroads and other common carrier regulation.

The legislation on the books at the present time regarding the power of the Public Utilities Commission to regulate power plant siting is more of a practical problem than a legal problem. The Public Utilities Commission presently has the discretionary authority and power to explore the entire realm of factors involved in power plant siting, however, they are neither required to do so nor are guidelines established by the present legislation to direct them in their investigation of the various important elements that go into proper power siting decision making. In other words, although the existing legislation does empower the PUC to explore all of the factors relevant to power siting it is not mandated to do so nor is it given any mandatory guidelines or a procedure to insure any specific type or direction of consideration.

The most significant aspect of House Bill 50 would appear to be that it broadens the range of input which the Public Utilities Commission must consider with an attempt at "streamlining" the procedure. The bill, first of all, provides that the requesting utility shall itself finance all investigations and studies which must be made by the Public Utility Commission for the Commission to apprise themselves fully of the relative merits of the proposal. The present Public Utilities Commission, as it is established, has no power to require that the utility itself pay for these pre-construction studies and investigations. Thus, the Public Utilities Commission is presently required to finance investigations from its own funds to determine whether a public utility project would be for the benefit and general welfare of the public. The PUC would, thus, not be hindered in its deliberations by the apprehension or fear of not having an adequate budget which can cope with the problems, though it could impose a substantial financial burden on the requesting utility.

House Bill 50 would make extensive studies mandatory rather than permissive and provide for extensive input from state agencies.

Within six months of any public hearings under House Bill 50, a power siting council must make known its complete findings and render its decision on the application based on the results of its investigations and studies. These findings must be based on the specific issues spelled out by House Bill 50 concerning such diverse matters as energy needs, land use impacts, water

resource impacts, air quality impacts, solid waste impacts, radiation impacts, and noise impacts. The council is directed and mandated to anticipate any major problems that might result from the construction of a power plant and to arrive at tentative or possible solutions to such problems prior to the building of the plant. House Bill 50 contemplates an applicant-financed investigation to prevent potential problems instead of a state-financed approach.

The council under House Bill 50 consists of the three members of the Public Utilities Commission, the Director of the Department of Water Resources and the Director of the Department of Health & Welfare, plus two additional members appointed by the Governor to represent the interests of the consuming public. The council would have input from the investigative and monetary resources of two major state departments as well as consumer input to condider in its decision-making, based on the concepts of "necessity" and "public convenience". In addition the council will have access to a detailed annual report which would have to be submitted by the utilities which would contain energy information to keep the council cognizant of Idaho's energy needs and proposed solutions.

Each utility would be placed under a very heavy burden in the initial pre-permit process. Once a permit has been granted under the proposed "council" process the necessary state approval of all the relevant state authorities rather than merely the approval of one state agency which might otherwise require approval of several other agencies before a permit could be issued. One potential problem in House Bill 50, however, is the fact that it provides a utility no real protection from being further harrassed by yet another state agency.

It can be simply stated that this proposed legislation is geared for a detailed consideration of an application for a permit to construct an energy plant, particularly any plant that has a potential of having tremendous impact on the state and its environment. Jurisdictionally House Bill 50's differences from the present law are very little. Practically, however, House Bill 50 provides for change in that the utilities will be required to finance a very extensive investigation into the state's energy needs and each proposed solution will be closely scrutinized according to guidelines set by law. Administratively the bill poses a major deviation from the present application procedures, schedules, and format.

However in conclusion, with regard to your specific inquiry the Public Utilities Commission does have general authority to regulate power plant siting as explained herein.

Very truly yours,

WAYNE L. KIDWELL
Attorney General

WLK:lm

It is pertinent to the discussion that very little input was made by other state agencies than the PUC to the hearings on H.B. 50. The PUC did testify in opposition to the bill contending no further legislation was needed. In observing what has happened since the hearings it should be pointed out the bill was held in committee and thus no additional legislation was enacted on power plant siting.

Attorney General Kidwell

Now you can recognize that I am not very well prepared for this. I was teaching a class on another matter and I understood the dilemma so I agreed to pinch hit. I can answer the questions but I may have to wing it a little bit. Let me set the stage, however, on this thing a little. Actually Governor Andrus did not ask for power plant siting legislation. Mr. Park, my predecessor, asked the Governor to ask him for it. I will tell you why that happened. I just wanted to set the stage so that you can tell how the human drama is involved as well as the merits of the legislation. The Public Utilities Commission doesn't want power plant siting legislation for obvious reasons. In the Public Utilities Commission (PUC) right now there are three commissioners, two of them are very close to Governor Andrus. The chairman of the PUC, Mr. Robert Lenaghen, has been a long-time supporter of the Governor and very powerful in the Governors organization. The second member is Mr. Shurtliff who has been a long time supporter of the Governor. So the governor did not want to get in a fight is what I am really saying, because the PUC felt one way and some member of the public felt another way; he kind of got sandwiched in between it and that is why you did not see the Governor say anything or very little about power plant siting legislation during the session. Not that all that matters but it is interesting to see when we talk truth, right and justice that sometimes personalities, politics and everything else gets involved in it. So it is kind of interesting. Now the PUC's primary thrust is that we now have three levels of approval needed before you can build a power plant. You have federal legislation, the Environmental Protection Agency has partial jurisdiction, you have state environmental legislation under the control of the Health and Welfare Department and then you have the PUC which must give a certificate of "convenience and necessity". Their point is, and I am somewhat inclined to agree, that we have three layers of government now and if they can't correct a bad situation, I doubt that adding one more layer of government is going to put the final check into the law that is needed. Now, one thing that I mentioned to this other class I was talking to and I consider it one of the major problems with the legal system or the legal-judicial system is that we can pass all these laws

and these great provisions in them but it doesn't do any good if we don't have some way of enforcing them. The thing that bothers me on the power plant siting legislation is that there are an awful lot of speeches given on how this is going to eliminate this problem. But the fact is if we have three levels of government now -- the federal, the state health agency, the PUC -- if they can't check things, I am not really sure that all the political checking in the world is going to make much difference in weeding it out. So in passing the new legislation I think the question first has to be asked - Is there an area of the law that is not covered that would allow them to do something that should be regulated by law and is not in one of the other areas? People are split on this. I am somewhat of the opinion that the definition of certificate of "convenience and necessity" today if applied in the Supreme Court would be very broad and would cover virtually any criteria that you would want to set forth. Now there is 1970 legislation - Section 61-528 that considers new wording regarding the issuance of the certificate of convenience and necessity. The PUC takes a position now that they can control site and type of facility. That is the area they say they can have anything to do with. PUC is taking the position that they can. Maybe the need or additional legislation would be if there was any finding that they could not. I believe, from a legal standpoint, that they can control site and type of facility. I think that would have to fit in the overall type of language that is being used -- when is it "convenient and necessary"? Otherwise their work would have very little meaning. So I feel that a court would uphold it and if that is the case, is additional power plant siting legislation going to gain anything or going to add any additional check? I think at least a reasonable argument can be you have got quite a bit of government focusing in there now and another statute might not add anything to it. On this legislation, generally, as is almost always the case there are an awful lot of words that throw up roadblocks that could be used to check, control, provide the safety that is wanted. But it doesn't do one bit of good if the people responsible behind administering the law don't do anything about it. The mere fact that it is there in the Idaho code doesn't mean it is going to happen that way unless the people administer it. So I think, my own view, is rather than jump on the bandwagon and say we are going to pass another law to solve this problem I wonder if maybe the problem is in taking the laws that we already have and implementing them realistically and as they were written at one point in time. Now the letter that I wrote to Representative Ward Chatburn, this was toward the end of the session, was in essence the position I just set forth. The bill does concern itself with some brand new areas and they say they are streamlining it and doing all these good things. The legislation in my opinion probably is not harmful and may provide

a check but I am not persuaded that there is ever enough reason to pass a new law because maybe there is something that could be covered by the new law which is already covered in another law.

Q. One of the concerns expressed was the lack of anything in the existing statute that indicates when does the PUC have to respond to request for this certificate. The thought was expressed that at some point it has to be in there or does the PUC have 2 years or 1 year or something else for time to respond. Another thought was the question may come up and has been discussed before - some environmental group comes along and says the PUC has not handled the environmental impact adequately.

A. They may, or what is more likely is that the PUC may not act and the power company will say the statute doesn't set a time therefore you have had a reasonable time and that time has just passed.

Q. Would they then come to the Attorney General's office?

A. Not so much through me. They go to the courts through their own legal counsel and file an extraordinary legal writ of mandemus saying "PUC, say yes or no". Then if they say no then they say you are arbitrary and litigate it that way. It is probably the way the litigation will come about. Why don't you toss out some specific questions and we can get into some of these areas or anything related to this.

Q. Is the problem with all the politics involved hindering the upkeep of the environment? It seems like the politics is getting in the way.

A. Yes, or I suppose one point can be made maybe that is the way the system is supposed to work so that things don't happen too fast. The very strength of a government can be that it isn't very rapid, that we don't get a good idea today and put it into law next week and carry it out. Some of the strength can be that we grind it very slowly and when we get to a conclusion we live with it rather than being fast. We can eliminate politics if we have Plato's benevolent approach or any good strong dictator can get rid of politics and all of the talking that goes back and forth. But by the same token, at least you or I have a chance to put our input into it through our representatives and any other viewpoints have their chance to put into it so that before a new law is passed we do what we are doing here; we chew on it, kick it around so that if it does pass it has been

looked at pretty closely. So in that sense I am not sure that politics gets in the way of it, but it is frustrating, believe me. The legislative process is very frustrating, two houses, I served in the legislature. I was a state senator and majority leader of the senate. Having two houses, the House and the Senate, where everything has to pass both houses is very frustrating. But we get quite a bit of bad legislation though as it is, and think how much would go through if we had one house or if we had one house and it was cut down. Now their views would go through, but if I didn't happen to agree with their views I woudn't like the system very well. So I think the strength in the system is that it doesn't move fast sometimes and that it is tough to get laws changed even though it is very frustrating.

Q. If a predominant number of people want a particular action, how representative can a group be and yet that side does not necessarily say they represent the state.

A. That is right, they would not represent the state. That is the problem in a representative type government. What size is representative? Now we have 105 legislators, 70 members in the House, 35 in the Senate. Is that representative? You can argue it. But you can make a stronger argument that 5 is not. And so great popular tide right now of being very critical of our system and I can appreciate that, but I also wonder if we want to change, if we want to go to one of the more "efficient" types of government.

Q. Is your office in agreement with the Governor as far as his idea on the development of Hells Canyon?

A. Yes, pretty much. We don't have any hard fast disagreements there. However, that is primarily neither the Governor's problem nor mine in that it is before the federal Congress now. What either one of us says isn't going to have bearing now.

Q. Could you roughly outline how the PUC goes about approval of a certificate? Do they have set guidelines as to how they go about issuing a certificate? Do they have any set procedures?

A. There are rules and regulations and as I said I don't have copies. They are fairly elaborate rules and regulations and have established procedures they do go through in issuing certificates. However, each commission is almost like a court in that they can change the procedures, they can change the definition of words and that is what is happening now. So what would go through the PUC ten years ago might not today or very

likely would not today in many instances. And it also involves personalities. It is quasi-judicial in nature by the decisions they make, but the qualifications are political rather than judicial and consequently you get a shifting from state to state.

Q. Now, the PUC is just three members. And they are the three in effect who make the final decision?

A. Yes, they make the decision and it is appealable to the courts. They make the decision, they vote. Two of them can decide. There are three commissioners and then if a person wants to he can take it directly into the court system.

Q. What are the backgrounds of these members?

A. They are appointed for a term of years. Ralph Wickberg is from north Idaho. He was appointed by Governor Samuelson, and I think he was a county commissioner. Karl Shurtliff worked on Senator Church's staff and I think he is a lawyer. Robert Lenaghen, the chairman of the PUC, was involved in organized labor for years and then worked very hard on the Governor's campaign and has been with Governor Andrus since he has been in office.

Q. Do you consider that the present legislation considers the pollution and environmental consideration of power plant siting?

A. My point was that right now we have a federal check through the EPA, Health and Welfare environmental legislation, and the PUC.

Q. Would new legislation introduce a new level, and who would decide which level is to act?

A. The state legislature depending on the type of legislation passed.

Q. What is the order of importance of the three levels of jurisdiction?

A. It is like the three groups -- who is above who? You don't know. The fact is assuming for purposes of whether they are going to build the power plant assuming they are equal, because if one says no, they can't go ahead. So in that sense they are equal. One cannot overrule the other until it gets into the court system.

Q. The fourth level you speak of, is that the court level?

A. Well, the fourth would be assuming the legislature is set up for a licensing, an additional licensing procedure. Maybe they set up a new administrative body to review it or set up legislative committees to overview what they do. It would be a fourth check level, before they would get the certificate issued and construct the plant.

Q. Are you familiar with Washington's siting?

A. Not very, just general.

Q. Do you feel that possibly there should be a better definition of what should be refused as such. It sounds like the regulations are very flexible.

A. They are. In essence, I think we may be headed into an age where we need a little better guidelines. Yes, I agree with that. I think they can do this by rules and regulations. If they did it by legislation that would not pose any problem and there are a lot of mushy areas as we say, and we can put the time requirements -- when you put it in and also when you need to get your answer back. But, that is not what we are talking about now, but that wouldn't bother me if we wanted to take an existing statute and make it more workable. Heaven knows we need to do that in a lot of instances.

Q. Does the PUC cooperate very much with other state agencies?

A. It depends on the issue.

Q. In reference to this power siting as such, are they going to the other agencies?

A. There is kind of a battle going on with Health and Welfare. They bring up the idea that this gentleman did. One says we are over you, and the other one says no, you are not, we are over you. It doesn't matter which one is staying in power, you have to get permission from both of them. Yes, there is a lot of jealousy between state agencies when you get into something like this.

Q. You said that one of the bills that was going through the state legislature died in the committee. Does that reflect the general feeling of the legislature that they really aren't interested in it, or are there a lot of people down there that want to put something through?

A. The majority sentiment is (my guess is) that the power plant siting legislation that was talked about had extremely stiff filing fee requirements which is a percentage of the cost of the plant that most of the legislature felt was punitive in nature. If you have to pay $1 million to be able to build a $50 million plant you probably won't file. And so that kind of legislation I would say could not pass. That is my guess having served up there. The sentiment is quite a bit the feeling that we have an awful lot of government now that can control this, and passing another statute would not add much to it.

Q. Are any of the utilities pushing siting legislation?

A. They are pushing against it. They don't want new legislation I don't think. They would like, you know when you say the utilities that is like all of these code words we have in big business or whatever, they are different. Some utilities could care less about power plant siting legislation; they have telephones. So, it depends on which one, but the power companies have pretty much their hands full right now dealing with the PUC and they resist additional legislation.

Q. Basically, they feel that any misinterpretation of these laws could be to their benefit?

A. No, I don't think so. I think they are worried about a fourth level of approval. They have three now; the federal, state, and PUC. And they don't know whether they can get through that and they just don't want a fourth one.

All of you heard Mr. O'Connor of Idaho Power Company. Though I would not necessarily say they are representative of utilities. As talks ensued with Mr. O'Connor, after his session here, it was noticed that he was sensitive to a few things. May I elaborate on one point that was brought up about cost of filing in new legislation. I agree that this part -- if you were to read the act and find that it was going to cost so much of percentage was a very negative thing for power plant legislation. It has frightened the utilities from applying. They don't want to apply. Another part of it that was very annoying to me in the legislation was that they had to submit their plans for 10 years and they had to list in there where their plants were going to be, and what were the sizes and various things. And you can see that is exactly what the power companies don't want is to have to be obligated to say we

are going to locate a power plant here and then if they want to change their minds they can't. I think there are elements of that in the act that were very negative towards good planning.

A. But the whole thing boils down, it is a public policy thing. I don't think anyone says do away with power and obviously the public doesn't want bad air to pollute the air in the area. And there is still a lot of dispute as to what the facts actually are. Will there be a pollution problem or not? I can surely see both sides, and they both have good facts and figures to back them up. So it is a little bit hard right now to know exactly how you do feel. Another thing, what does the public want which these legislators are attempting in all their ways to reflect, what is the policy? Is energy to the crisis stage where we need to bend a little or not?

Q. I haven't seen the land use planning law that just went through, but right now what can the local communities have to say about a site coming in like the Orchard site?

A. They could potentially eliminate it if they have adopted a local or county zoning plan. This is another level of government I did not talk about. It also could be an effective instrument against it also.

Q. Well, won't this actually add a fourth level?

A. Well, that is another level actually, but I think that the zoning out there (Orchard site) would allow this kind of industrial use, that may be compliance, you know zoning could be a check in another area.

Q. Can they like the state of Washington in the local areas have another way to check siting, I think it is in the road system, isn't it, a hauling permit system in effect that they can control what is going on within the county? They can limit what is going on by way of the transportation?

A. This would take certain permits from the ICC too.

Q. More what I am interested in is - Are there things existing other than the land use planning laws that the local community can have a say? Like the proposed Pioneer Plant at the Orchards, it is in Ada County, but it looks to me that Mountain Home will receive more of an impact from it, and I presume also the way

the taxes are set up, Ada is going to be the one that will benefit; Mountain Home is not going to get the benefit although they are going to get the impact of the people and such.

A. They are asking for it to come in, at least the Chamber of Commerce in Mountain Home is.

Q. But the local people, how can they put input into things of this nature?

A. How could Elmore County residents in Mountain Home -- as to local zoning -- practically they cannot. Then they would have to go back through the state or federal regulatory agencies. They wouldn't be able to do it at that level through zoning unless it was in their county. You are right you know, a large county and you can miss the opportunity to have any input on it simply because of geography. Then they would have to go to another level of government?

Q. So their only recourse then is to go to the PUC or the other state agencies?

A. You know when I say only recourse, obviously these local officials in Elmore County have a certain amount of impact on the local officials in Ada County so they do have that recourse, but it is not a direct thing.

Q. What is the term of office of PUC members?

A. I think it is 6 years, and it is staggered.

I was critical of the legislation, and status of power plant siting in Idaho in the sense that it seems to me that Idaho Power Company came along and kind of surprised the state by requesting this certificate and it caught people somewhat unaware. In another way of looking at it, I would say it was not totally unaware, because if you look at Idaho Power Company's actions they have had two rather discouraging experiences with getting hydropower plants going in the last two or three years. They had Swan Falls-Guffey which is still in limbo. They had American Falls which is still having trouble being authorized, and I can appreciate that they are not in a very good position to say well what should we do? So, I am sometimes critical and I hope I didn't expose it too much to Mr. O'Connor when he was here, but I think ten years ago Idaho Power Company should have looked at a nuclear power plant. But my concern is who is going to do the planning. I get the feeling that that is what is going to disturb me a little bit when

you described the situation in the Utility Commission they are up there as a judicial board and it seemed like to me the evidence is there that there has not been much planning. There has got to be some entity starting to look at where should we be siting our plants, and that seems to me a state function.

A. They have pretty extensive staffs backing them up and I don't know whether they are putting them to use. I assume they may be, but they are all involved in some other business. Idaho has a constitutional board called the Board of Examiners, it reviews financial claims of the state. It is the Governor, the Attorney General, and the Secretary of State, a three-member board. One of our more exciting duties is to set the amount of per diem when somebody is traveling, for food, how much they are going to be reimbursed. And the legislation says you can spend $7.50 a day when you are traveling, so we had the big job, the last board meeting, of dividing this up as to if you are gone just for the evening meal, do you get more than if you are gone just for breakfast, as dinners cost more than breakfast. We solved that crisis by saying, yes, if you are gone for the evening meal you get more. PUC, building up to where our confrontation is, did not like what the Board Examiners did with the per diem pay schedule. So they set out as a court, all three of them, and they promulgated an order, an order of the PUC and they changed it, we ordered the state employees to do so, and that worked for us. So we had kind of an interesting confrontation because the Governor, myself, the Secretary of State are a Constitutional Board. We feel that whether it is a big issue or not, that the Board Examiners should be making this decision. PUC doesn't like it, but I think that may be indicative. I don't necessarily mean it critically, but it may be indicative that they are getting themselves into some power politics a little bit. The era of being a judge -- carried away. It reminds me of kind of a corny joke. Up in heaven, St. Peter came in and said God needs psychoanalysis. What do you mean? He said yes, he is beginning to think he is a federal district judge.

Q. I was reading Saturday's morning paper and the Governor had now come out with an administrative order indicating he is now absorbing the office of Energy into the PUC. I am curious -- by this executive order he has now made the PUC take over the office of energy. I am curious as to your reaction to this.

A. Legally he could to it. He could have just had another executive order. Legally he can do that. The Governor

has authority of executive orders. Mr. Lenaghen will be the man carrying it out.

Q. I can see some wisdom in that in a sense. Because there certainly needs to be a broader energy policy.

A. It would be fine if somebody were going to do something, but it is like these statutes that nobody carries out. It doesn't do any good to create a fancy title if nothing happens. We have so many titles in state government, this office, this special commission to do that and if they don't do anything -- I think that is why people are disgusted with the responsiveness of government because it gets to be pretty mushy. And so, it remains to be seen, I am not saying they won't do it. We will see. If they have the time, staff, expertise to do something on energy, yes, it is a good idea. But if we are doing it for political cosmetics, then it doesn't do anything.

Q. But in that case, I noticed from the federal government when executive orders like that are made at least some are possible to be overturned by the Senate, but is there a similar requirement in Idaho?

A. No, and they do not have the same footing, a federal executive order has a binding effect as law. Whereas a state executive order does not unless there is specific authority saying the Governor can create X, Y or Z. Then the state executive order is more in the nature of a proclamation.

Q. If Pioneer is turned down for certification by PUC, what kind of weight do you see the decision having?

A. A great one. Very frankly, it would have -- it would be almost conclusive. In other words, you would have to virtually show capricious action, completely arbitrary on their part. If there is virtually anything to back up their decision the court usually will not over turn it. So it has an awful lot of impact.

Q. Do they have any set things that they have to base their decisions on?

A. Yes. And of course they are operating with very strict legal guidelines too. But it is like a reasonable prudent man, what is a reasonable prudent man, one of the age old questions in the law. You can have that good strict guideline, reasonable prudent man, and come up with some awfully strange variations.

Q. Could they eliminate it on environmental effects or would that have to be done by the Health and Welfare people?

A. Yes, I feel that they could take environmental concerns into account and eliminate it on that basis.

Q. On these environmental concerns, where do they get their expertise from, the Department of Health and Welfare?

A. It can be. I will say this, they do not need in the legal sense, expertise to make environmental decisions. In fact, that is one of the things I didn't get into in the last class. But I was talking about some environmental statutes and the courts traditionally are getting into environmental areas, and one of the criticisms is that they don't have any expertise. Some of the studies that have been done show that they are coming up with pretty good results in a lot of instances without the expertise, because the expertise comes in by the technical experts presenting it. If you have two engineers testifying this will do this, and the other one says no, it won't, a layman or trier of facts, whether it is a jury or a judge or whoever is going to try the facts, usually you can reach a pretty good result by credibility, you know which one sounds like he knows what he is talking about, which ones seems to have the best data, this type of thing. And it is a very subjective thing, however, deciding which expert is right. But I have had a lot of trials where I get good doctors and they sure don't agree on things, and the same way with engineers. I just tried a case before I was elected as to the breakage of the Ridenbaugh Canal in Boise. You should have seen the engineering testimony we had on both sides of that as to why that canal broke. And the fact is, the truth is nobody is really sure, but each one has investigated and come up with their own conclusion. But it is not susceptible of knowing for sure why the canal broke. What is kind of interesting is you get into expertise it would be nice if we lived in a world where we could go out and hire the expert to tell us what X, Y, and Z is, but as you know, it doesn't work that way. You can hire experts this way and that way, and you know they will all lean in one direction pretty soon and the truth maybe will emerge. But it isn't possible just to hire somebody and decide the right way to do it.

SELECTED SUMMARY OF PREPARED QUESTIONS SUBMITTED

by Participating Graduate Students

At the conclusion of the Seminar, the students were required to submit a list of questions they thought needed to be answered. Some of these were asked during the question and answer period and some occurred to them afterward, so this summary is a compilation of questions that were stimulated by the study and are recorded for researchers and decision makers to pursue as worthy ideas that need more attention in solving the energy siting problems in the Pacific Northwest.

Questions

1. What is the feasibility of constructing nuclear power plants in abandoned mines or other underground ways to seal off possible radiation and avoid having facilities above ground?

2. Analyze the electrical use of irrigation systems and determine what rate farmers would be willing to irrigate during "off-load" hours and implement with peak load pricing.

3. What are the implications of using electricity in industry versus agriculture if a situation occurs where there must be allocation by methods other than a price system? Who will benefit most under each alternative? Which alternative will be most beneficial to society?

4. What are the price elasticity coefficients for energy for various users: families, industries, retail stores, farms and irrigation?

5. Determine the economic criteria and political atmosphere which existed when the present rate structure was formulated so that high energy using plants were granted lower rates. Are these conditions still practical in terms of energy conservation? Should rates be restructured?

6. Since many areas of California, Nevada, and Utah are not suitable for constructing generating plants, and their energy use is increasing, what are the trade-offs

between locating power plants in Idaho versus having people from these areas come to live in Idaho? Idaho apparently does have potential sites with suitable environment and water.

7. Since nuclear power generating plants appear to be the answer in the future, why hasn't Idaho taken advantage of the Idaho Nuclear Testing site near Arco similar to what Washington state has at Richland?

8. Do most of the forecasts take into account the fact that the birth rate for U.S. has dropped?

9. If the federal government owns the land that a power plant is to be sited on, what say does the state government have on the project?

10. Where is a plant to be located with relation to load centers and existing transmission networks? To what extent will new facilities be needed?

11. What are required distances from population centers or areas to be projected when siting power plants?

12. Could a power plant be located such that it could utilize all solid wastes from a densely populated area?

13. Could a thermal power plant be located such thaq it could be used in combination with a pumped storage plant to provide for peaking requirements?

14. Could cloud seeding be used in upper elevations to help guarantee a low flow component of runoff for hydro plants and help the energy situation?

15. Are environmental groups over dramatizing the possible effects of nuclear power plants?

16. Do we need more laws and legislation or just better implementation and enforcement of existing ones?

17. How much effort by the private utilities has been put into implementation of different power rates during peak loadings? Have any pilot studies been made in the Northwest?

18. Do you think production of more energy will make mankind happier?

19. Do public information programs help change public opinion?

20. Can a specific site be obtained and the proposed plant constructed without excessive delays and opposition from the public?

21. What sort of extra environmental assessment criteria (if any) does Idaho require?

22. Are there any limitations to the public utilities right of condemnation?

23. There is at present a tendency in the west to locate power facilities in remote areas. Are these sites necessarily the best locations just because they would have less impact on the public eye?

24. The oxygen balance in natural waters is an important factor in regards to the self-purification capacity of the aquatic system. It has been reported that thermal discharges reduce this balance and impair the purification mechanisms. How might this factor relate to an increase of other aquatic pollutants such as chemicals and domestic organics not related to power production?

25. With the development of the Snake and Columbia Rivers for hydroelectric power generation, a large, valuable salmon resource was placed in grave danger. This fishery has been maintained only through substantial capital outlay and drastic emergency measures. With the advent of continued power pollution and the loss of additional salmon habitat, why not say, "the hell with salmon", and concentrate on those species that can tolerate this new man-made habitat?

26. Does each state have enough muscle in its statutes to give adequate protection to its water resources? If so, are the administrations of these laws so tied up in bureaucratic hassles that it becomes a nightmare to enforce them?

OBSERVATIONS AND RECOMMENDATIONS OF FACULTY

This sampling of the knowledge from various agencies, companies and officials concerned with power plant siting, resource planning and energy production has resulted in a better informed academic community. It is hoped that this record will be studied by others to put a focus on the problems that need to be solved.

From the presentations it appears no real program for conservation of electrical energy has been organized in the Pacific Northwest. A short water year in 1973 revealed that a reduction in load can be effected when there is a crisis. From a regional viewpoint it appears a definitive program for an organized effort to conserve on energy use would be desirable. This might well need an intense study of where efficiency in use of energy could be improved, say in such large users as irrigation pumping, and aluminum production. Needed also, as brought out in the questioning, is a study of energy pricing, particularly peak load pricing which might help in reducing the rate of power load growth.

Certainly experience is lacking in thermal power production because of the earlier reliance and advantage of using cheap hydroelectric power. It appears the cost of production will increase rapidly as new fossil fuel and nuclear power plants are built in the Pacific Northwest.

Siting policies and practices between states appear to lack uniformity and will deter a coordinated effort to plan for siting on a regional basis.

The state of Idaho appears to need a more definitive program of siting regulation and planning to meet the needs of its people. The difficult problem is forecasting the power demand and especially as it is integrated with neighboring states that may have placed restraints on power plant siting. A great need is a more expeditious system of planning and approving the siting of new power plants such that it provides protection for the environment, assures reliability and safety in production, and meets the load requirements.

The presentations did not reveal any way for involving local entities such as cities and counties in the process of deciding where power plants should be sited. This has much to do with land use planning which is now receiving great emphasis in the public forums. Certainly there is an aroused public that through various interest groups expresses a desire to be heard and to have greater say in the decisions that

are made with regard to power plant siting and energy use. This would imply that utilities should make a greater effort to involve the public in their planning and decision making.

It is evident that the Pacific Northwest has had groups like the Pacific Northwest Utilities Conference Committee, the Northwest Power Pool, and the Power Planning Committee of the Pacific Northwest River Basins Commission that are working hard on these problems. A question might be raided as to how much impact do they have and do they represent a strong enough effort and have enough influence to meet the present need. A likely advantage would be gained by making the efforts of such bodies more widely known and bring about a more knowledgeable public of the power problems.

Most of the emphasis in this seminar centered on electrical energy problems and recognized that the threat of running out of gas and oil reserves will make a change in demand. This indicates that the total energy problem has to be studied and brought to the fore in order to really solve the entire issue. This awaits action on a national scale and yet a national energy policy appears to be long in coming.

Training and educating young people in the various aspects of engineering and physical problem solving, economic problem solving, social decision making and especially wise environmental concern is one way of assuring that the energy problem will be solved. It is to that end that this seminar and the efforts of the University of Idaho and Washington State University have been directed. An expansion of this education process is needed that reaches out to the public, the various government agencies, and the decision makers such as legislators. Perhaps an organized continuing forum on energy in each state would help focus more constructive approaches to solving the energy problems of the Pacific Northwest. The Thermal Power Conference at Washington State University appears to approach this public forum idea. Needed is a means of reaching more people and this will likely need to be developed on state or even local scale.

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