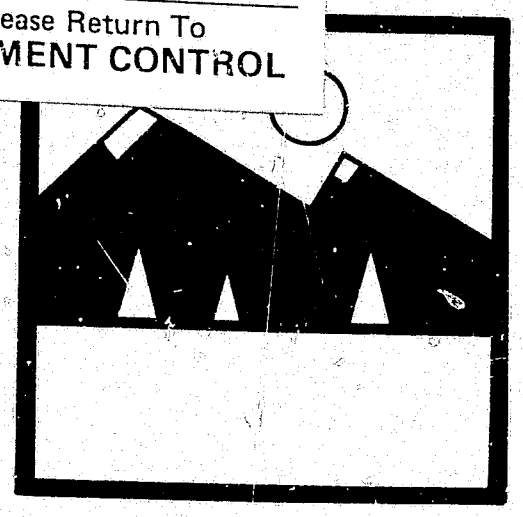
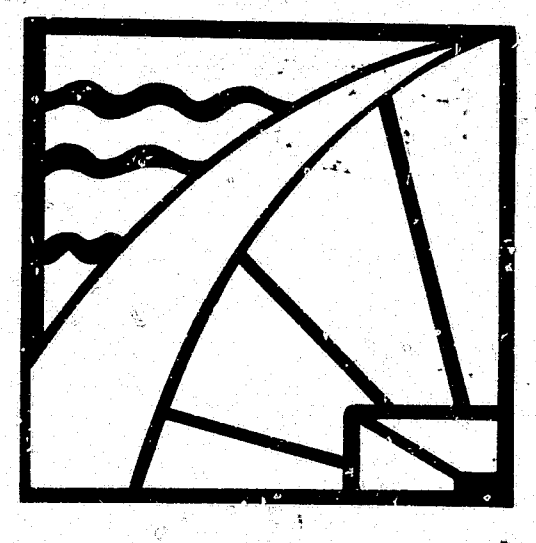
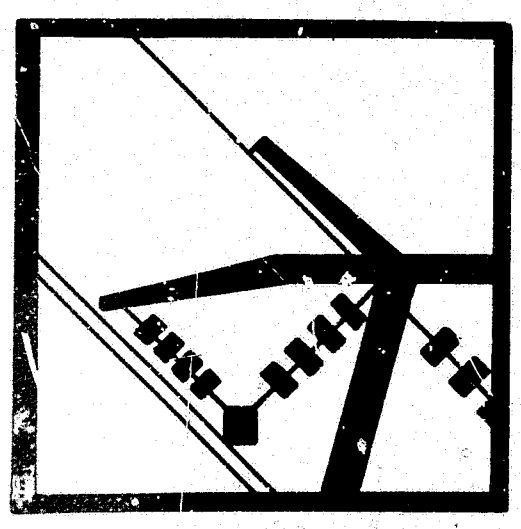


ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT





PROJECT OVERVIEW

MARCH 26, 1981

ACRES

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

PROJECT OVERVIEW

MARCH 26, 1981

BY

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ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

PROJECT OVERVIEW

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PROJECT OVERVIEW

SUSITNA HYDROELECTRIC PROJECT

1 - INTRODUCTION

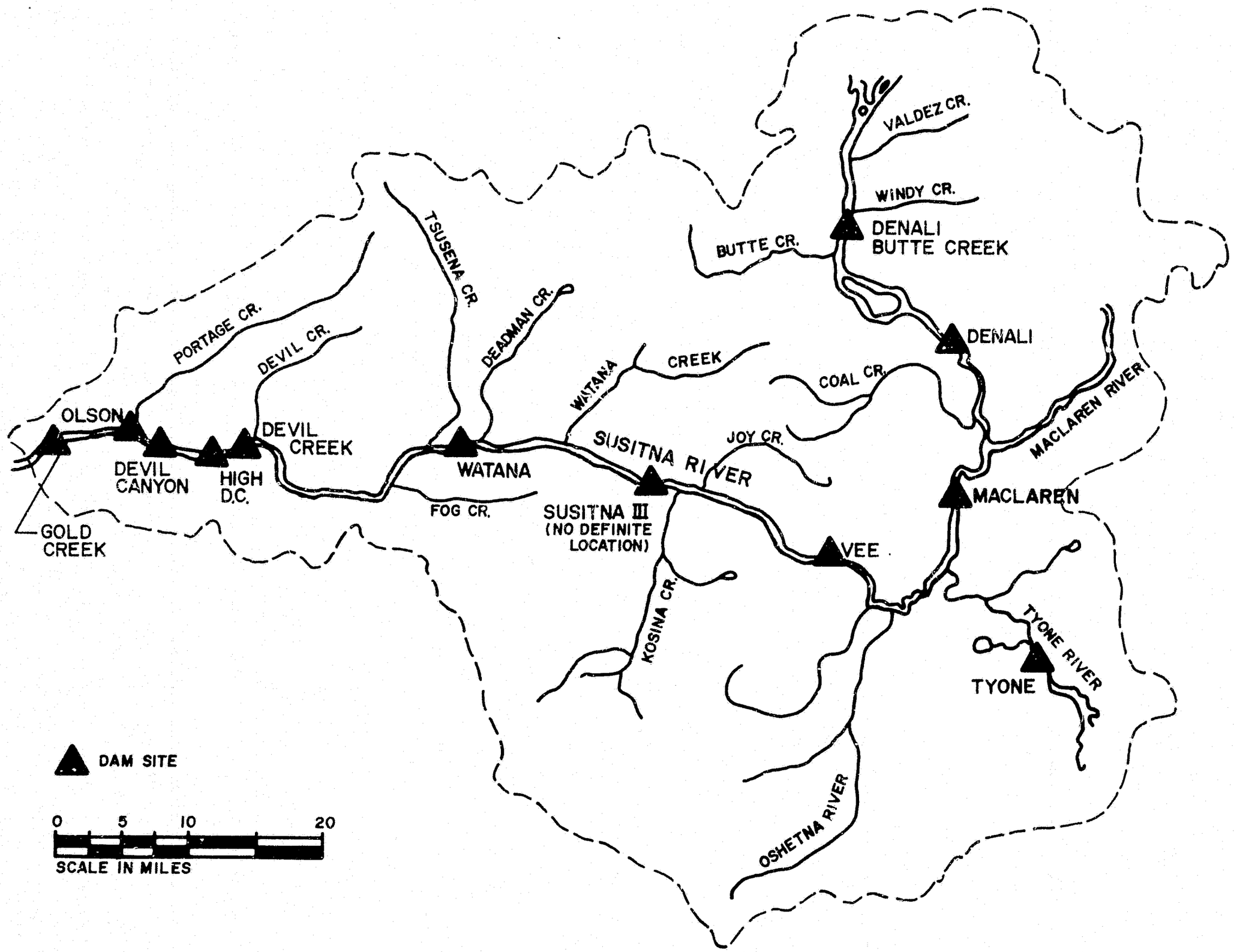
Acres American Incorporated (Acres) was commissioned by the Alaska Power Authority (Power Authority) on December 19, 1979, to conduct a detailed feasibility study of the Susitna Hydroelectric Project, evaluate the environmental consequences of any proposed development, and prepare a license application to be filed with the Federal Energy Regulatory Commission (FERC) in the event that the State of Alaska regards filing such an application as being in its best interests.

If development ever takes place in the Susitna River Basin (see Figure 1 for a basin map annotated to show potential dam sites), it is likely that extensive, costly and lengthy construction activity will occur there. Benefits of long-term and relatively low-cost electrical energy may be possible. Yet, permanent alteration of the environmental setting in the Basin will be inevitable.

The basis for a decision to proceed with the Susitna Hydroelectric Project requires that a variety of scientific, engineering, financial and economic disciplines be brought together. Investigations and analysis in each of these areas must necessarily be thorough and, further, should be consistent with state-of-the-art techniques. Documentation of these activities tends to be voluminous as well as highly technical in nature. The purpose of this Project Overview is to provide a review of all major aspects of the project and its objectives, determining in principle whether these can be met. In effect, it brings together complex issues and detailed technical results so that decision makers within the State of Alaska and interested members of the public can assess results achieved to date and determine what the future course of action should be with respect to the Susitna Hydroelectric Project.

Succeeding sections are arranged to present the framework within which the Susitna Study is conducted and the preliminary results achieved after the first full year of effort. Section 2 describes the decision process which requires two reports which the Power Authority must make to the Legislature. The nature and the role of the Power Authority are addressed in Section 3. After a brief history of the Susitna Project is presented at Section 4, Sections 5 through 13 consider technical, economic, environmental and marketing aspects. An introduction to the important public participation program follows at Section 14. Licensing and permitting is described in Section 15. Financial matters, including financial risks, are discussed in Sections 16 and 17. Section 18 describes the organizational arrangements necessary for effective project implementation. A final section (19) reviews the implications of proceeding with the work after the first decision point on March 31, 1981.

A detailed appendix to this overview has been prepared. It contains a complete chapter to correspond to each of the sections appearing herein. Copies of the detailed appendix have been furnished to the Power Authority and to its external review panel.



LOCATION OF DAM SITES PROPOSED BY OTHERS

FIGURE 1

In addition to this project overview, a second major document bears upon the March 31, 1981, decision process. The Development Selection Report (some of which is encapsulated in Sections 7, 8 and 9 below) provides the detailed basis upon which a recommendation has been made by Acres to APA regarding the proposed site on which the 1981 program will focus.

2 - THE DECISION PROCESS

Two important decision points have been designated by HCSSB 294. This legislation requires that the Power Authority, by March 30, 1981, submit a preliminary report to the Governor and to the State Legislature "recommending whether work should continue on the project." A second decision point, also explicitly legislated, occurs in April 1982, when the Power Authority must submit a second report recommending whether work should continue on the Susitna Hydroelectric Project and other viable alternatives. It is important to note that neither of these decision points is intended to produce a commitment to construct a project. Indeed, construction of dams and other facilities in the river channel is not possible until or unless an FERC license is awarded.

In addition to work being accomplished by the Acres team, several other ongoing activities bear upon the decision making process. A separate comprehensive study of alternative means of satisfying future Railbelt energy and load projections will be accomplished by an independent consulting firm under contract to the State of Alaska. The Susitna project will represent one of many possible alternatives considered in that effort. Other alternatives include, but are not necessarily limited to, thermal energy (particularly coal fired, since Alaska is richly endowed with significant undeveloped coal resources), wind, solar, non-Susitna hydropower, and tidal power (for which a preliminary assessment of potentials and constraints is now underway). In addition, the Power Authority has contracted with a major consulting firm specializing in electrical transmission to consider an intertie between Anchorage and Fairbanks. This latter project may be beneficial irrespective of whether the Susitna River Basin is ever developed, but the results of the study will necessarily be important to the analysis of transmission facilities required for a Susitna Project.

3 - ALASKA POWER AUTHORITY

The Power Authority was created in 1976, by action of the State Legislature, as an autonomous branch of the Alaska Department of Commerce and Economic Development. The basic mission of this agency is to develop energy generation projects (excluding nuclear) in an economical manner. Governed by a Board of Directors, the Power Authority employs an Executive Director and a staff which carry out day-to-day activities. Directors of Engineering, Finance, and Public Participation assist the Executive Director in performing his functions. The

staff also includes a full-time Native Inspector, an Administrative Assistant, and Project Engineers and other supporting personnel. An organization chart is provided as Figure 2.

As of the end of 1980, the Power Authority was engaged in six reconnaissance studies, four design projects, two license application submittals, five construction projects, and eleven feasibility studies (Susitna being the largest).

Procedures adopted by the Power Authority for the Susitna study include the formation of a Steering Committee to ensure that interested State and Federal Agencies are kept informed throughout the course of the work and to provide a vehicle whereby their concerns and recommendations can be taken into account as the study progresses. Heavy emphasis is also placed on the opinions and concerns of the public, and an aggressive Public Participation Program is conducted.

4 - HISTORY OF THE SUSITNA PROJECT

Because of its strategic location between Anchorage and Fairbanks, the Susitna River has long been regarded as worthy of consideration for development of its hydroelectric potential. Shortly after World War II, the U.S. Bureau of Reclamation (USBR) did an initial Territory-wide reconnaissance, noting the vast hydroelectric potential in Alaska, and placing particular emphasis upon the perceived advantages of a Susitna Hydroelectric Project.

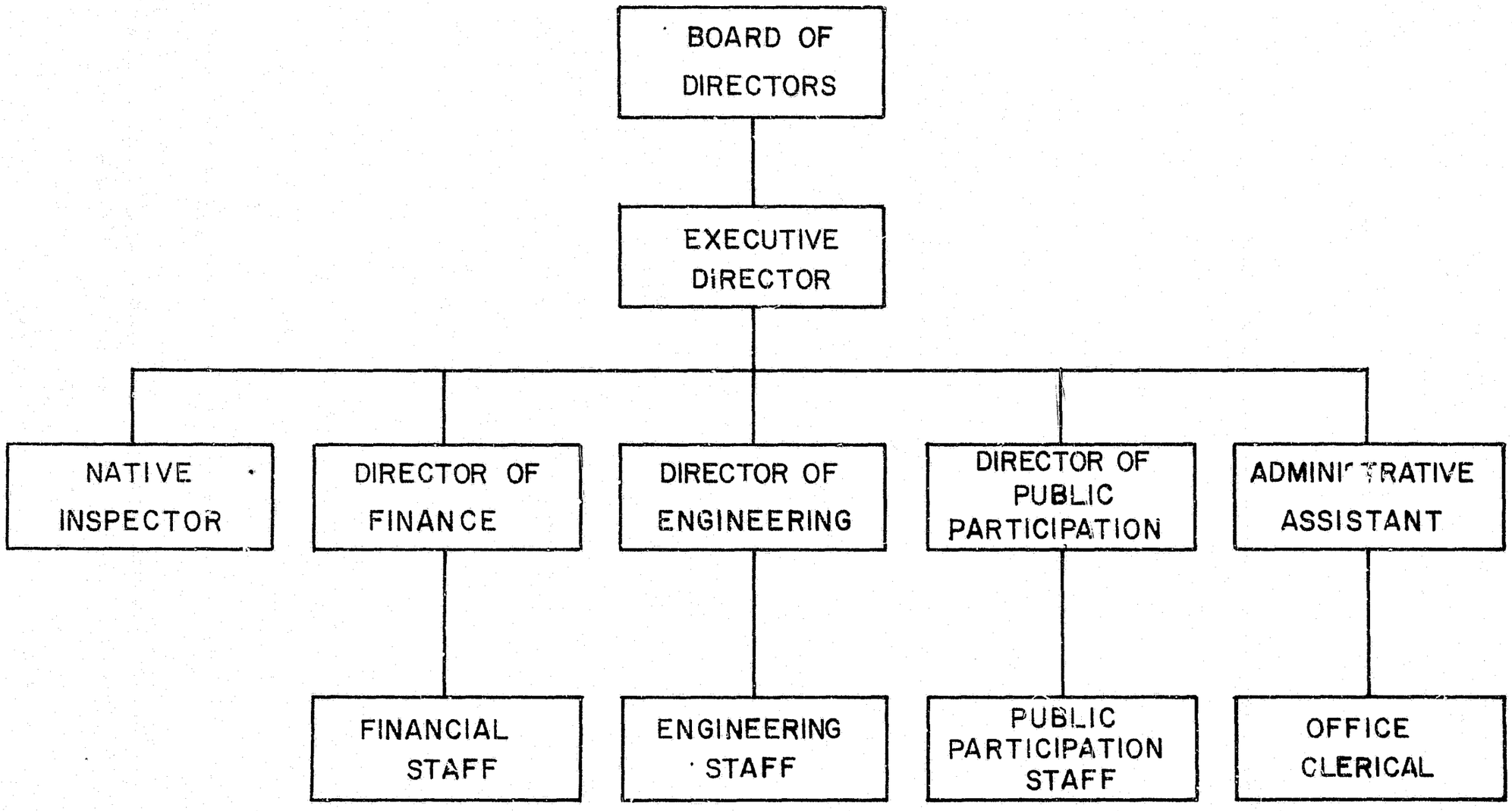
The U.S. Department of Interior (of which USBR was a part) undertook geotechnical and other field investigations and, in 1961, proposed authorization of a two-dam system on the Susitna River. This report was later updated in 1974 by the Alaska Power Administration (also then a part of DOI) and the desirability of proceeding with the project was reaffirmed.

The U.S. Army Corps of Engineers (COE) was also active in hydropower investigations in Alaska in the 1950's and 1960's. Focusing its initial attention on the Rampart Project on the Yukon River, the COE found by the early 1970's that the environmental consequences and limited market for Rampart power militated against its development. The 1973 energy crisis rekindled interest in hydropower development and the COE was commissioned by the U.S. Congress in 1974 to conduct a pre-feasibility study of the Susitna Project. The results of this effort were first referred to the Office of Management and Budget in 1976. Further geotechnical work followed and a new COE report was issued in 1979.

The State of Alaska itself commissioned an assessment of the Susitna Project by the Henry J. Kaiser Company in 1974.

Although differences appeared in the various proposed development schemes, all of the foregoing organizations were unanimous in recommending that Susitna hydroelectric potential be developed.

After the Power Authority was formed, the State of Alaska elected to proceed independently with a major feasibility study. A detailed Plan of Study was distributed widely in February 1980. Subsequent modifications, some of which



ALASKA POWER AUTHORITY ORGANIZATION

FIGURE 2

were occasioned by statements of public concerns, were directed by the Power Authority itself as well as by the State Legislature. Salient features of the Plan as it now stands are these:

- The development of electrical energy demand forecasts has been accomplished independently by the Institute for Social and Economic Research (ISER), University of Alaska.

- The study of alternatives, as noted earlier, is being accomplished separately from the Susitna Study.

- The Public Participation Program is handled by the Power Authority itself rather than by Acres as originally proposed.

- Major tasks have been designated to handle each facet of the work. These tasks include such activities as load forecasting, surveys and field support activities, hydrology, seismic studies, geotechnical investigations, design studies, environmental studies, transmission studies, development of cost estimates and schedules, licensing activities, finance and marketing studies, public participation and administration. Each task is further subdivided into subtasks so that more than 150 separately defined study activities will be completed prior to submitting a license application to FERC in June 1982--if affirmative decisions are made at the March 1981 and April 1982 milestones.

5 - ECONOMIC SCENARIOS AND PARAMETERS

The viability of a Susitna Hydroelectric Project depends to a great extent on the costs of generating electrical energy by alternative means. Thus, for example, if the cost of natural gas from the Cook Inlet area rises more rapidly in future years than the general inflation rate, it is likely that utilities will turn to sources other than gas for future expansion of generating systems. Hydropower might then enjoy a more favorable position. Conversely, if certain fuel prices rise less rapidly than the general inflation rate, hydropower may not necessarily represent an economical choice for future system expansion.

Other factors will also affect Susitna viability. For example, demographic variables, energy demand, unit labor costs, other commodity prices, overall price inflation, and interest and discount rates must be projected. An economic analysis was conducted so that, to the extent possible, logical and non-contradictory views of the world would emerge. No matter how carefully such an analysis is conducted, however, it is necessarily imprecise simply because it depends upon the prediction of an uncertain future. Thus a range of values bounding each selected parameter was selected as the basis for testing the sensitivity of a Susitna Project to possible deviations from most likely values.

Forecasts of world energy balances indicate a worldwide shortfall in oil supplies within ten years. By 1990, the United States is expected to be importing 16 percent of its energy needs (an improvement over the 22 percent level of 1978). It is likely that fossil fuel prices in the U.S. will continue

to escalate at rates on the order of two to four percent above the overall inflation rate. Gas and oil price escalation will be at the upper end of this range, with coal escalation somewhat less. Fuel prices in Alaska will generally reflect market prices in the United States and abroad, less the cost of getting Alaskan fuels to the market.

Insofar as prospects for economic growth in Alaska are concerned, three different economic scenarios were developed by ISER. The lowest assumes only modest population and employment growths at just over two percent. The highest forecasts these values at closer to four percent. If the volume of State government expenditures varies significantly from current levels, these ranges will be broadened.

Opportunity values and escalation rates in Alaska in dollars per million Btu (where a Btu is a unit of energy) were selected as follows:

	$/Million Btu Opportunity Value (1980 Dollars)	1980 - 2005 Escalation in Excess of Normal Inflation
Natural Gas	$2.00	3.98%
Coal	$1.15	2.93%
Oil	$4.00	3.58%

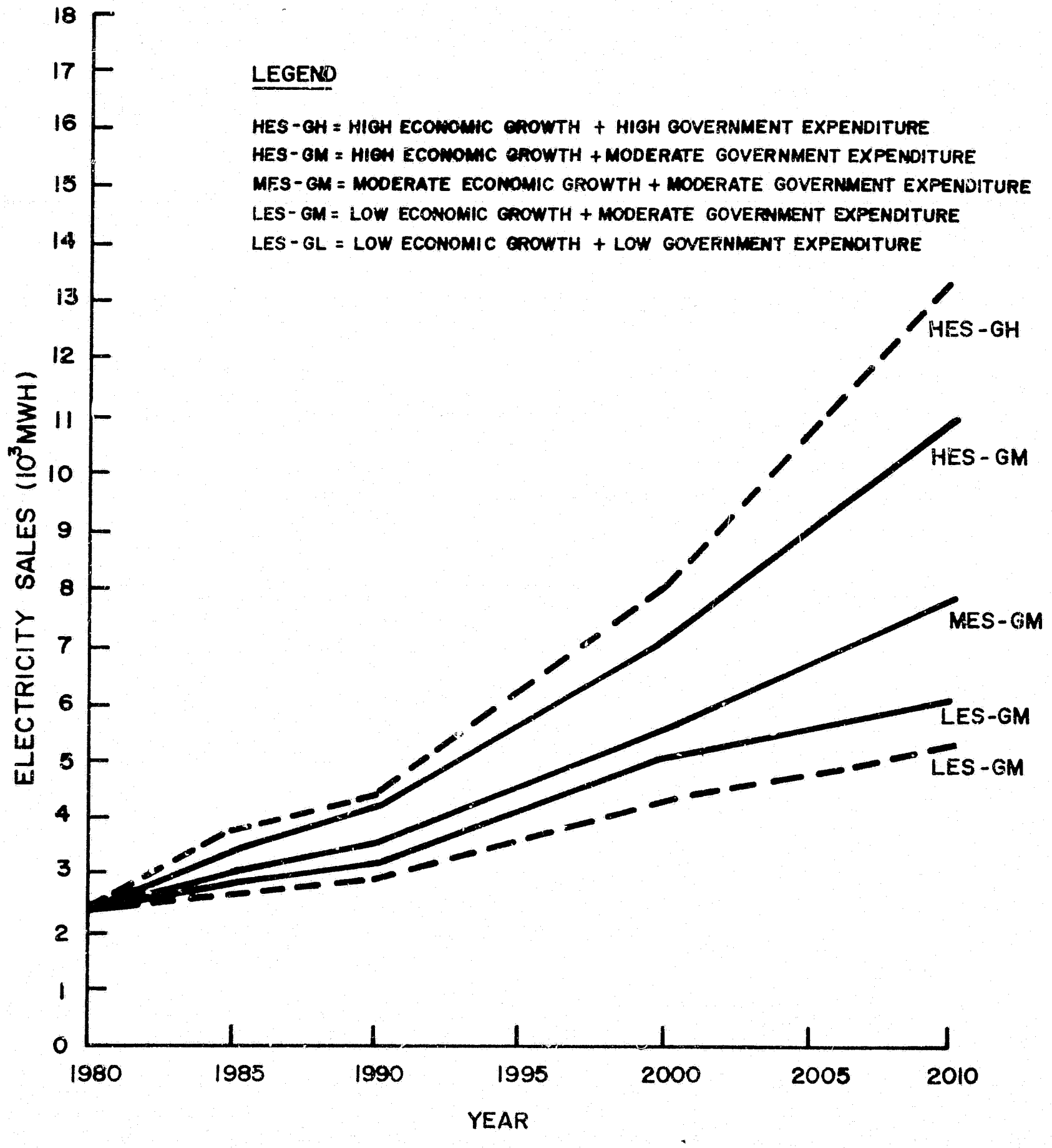
Exclusive of inflation, a real interest and discount rate of three percent was adopted as most likely.

6 - MARKET AREA AND POWER DEMAND FORECASTS

The forecasting methodology employed by ISER relied upon an end-use model rather than on the extrapolation of past trends as the basis for projecting future demand. As its name implies, an end-use model considers electricity consumption in terms of end use in various sectors of the economy. In the residential sector, for example, electricity consumption is largely attributed to space heating, refrigerators, water heaters, lights, cooking ranges, and certain other major appliances. Knowledge of the number, type, and expected changes in households can lead to assessment of future residential demand for electricity.

The annual growth in total Railbelt Utility Sales ranged from 2.8 percent to 6.1 percent in the lowest and highest economic growth scenarios respectively. These values may be compared to an actual average annual rate of 15.2 percent for the period 1940 to 1978 and to 11.7 percent for the 1970's. Figure 3 illustrates alternate demand forecasts.

Peak load forecasts were derived by applying historical load patterns by sector to the ISER demand forecasts. Peak loads are expected to increase at approximately the same percentage as total electrical energy demand for each of the selected ranges.



ALTERNATIVE UTILITY SALES FORECASTS

FIGURE 3

If more extreme measures are taken (probably through legislative action rather than voluntary efforts), some potential for further energy conservation and for load management could lead to a lower forecast than the lowest noted above. An extreme low forecast was selected for sensitivity tests in later analysis.

7 - SUSITNA BASIN STUDIES

During the past year, a massive field data collection effort got underway. Operating primarily out of a base camp constructed at the Watana site, investigative teams were engaged in environmental data collection, survey activities, geotechnical exploration, geological mapping, seismological investigations and hydrological and climatological data collection.

7.1 - Hydrology

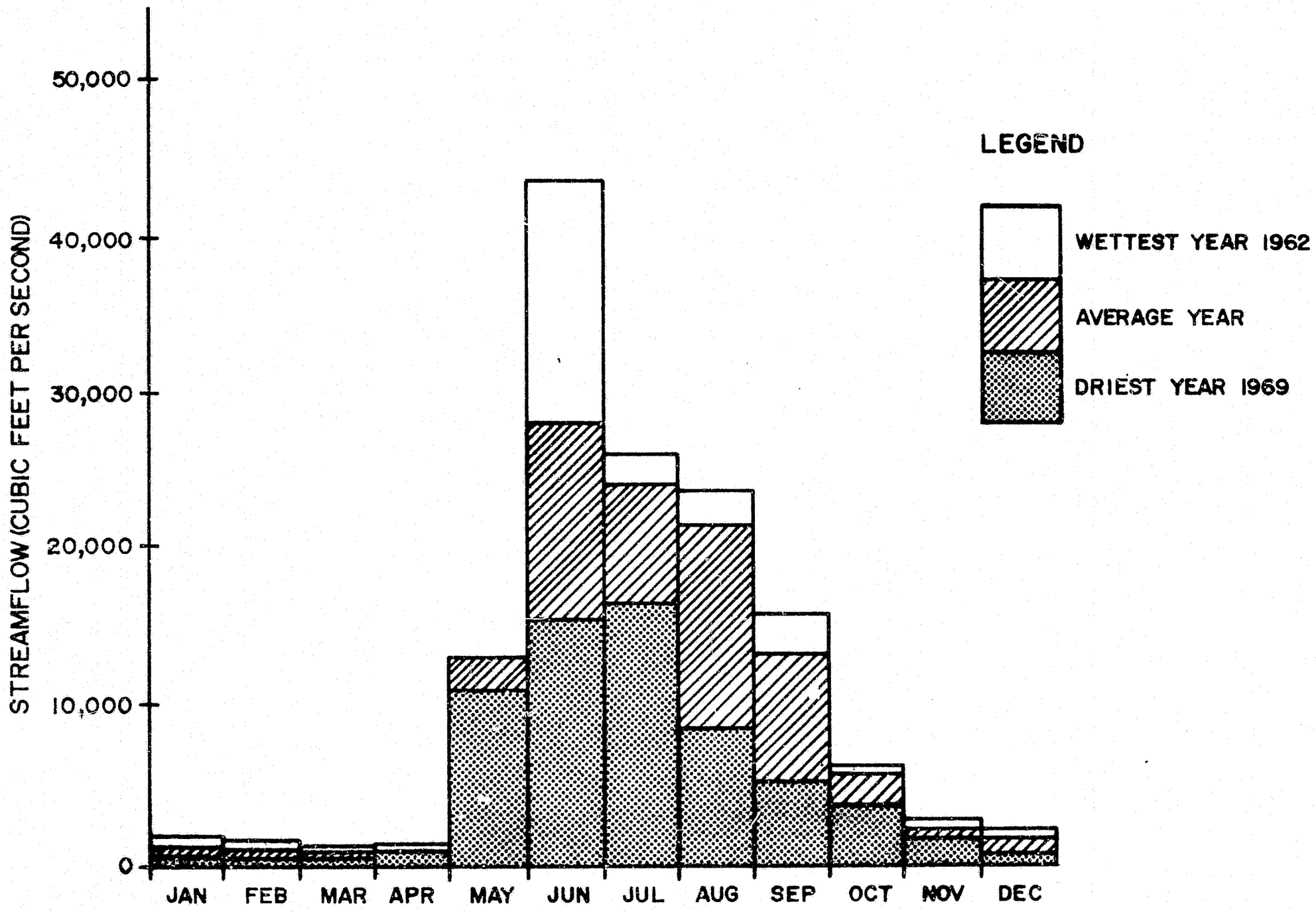
Gaging stations and weather monitoring stations were added to the network which had been installed and operated by State and Federal agencies in prior years. Information collected at new stations has been useful in correlating data obtained there with longer term records at older stations.

The Susitna River exhibits two distinct seasons of flow. High spring and summer flows (produced by snow and glacial melt and heavy rainfall) contribute about 90 percent of the annual total between May and October. The winter flow is relatively low and most of the smaller tributaries do not sustain flow during the coldest months. Figure 4 illustrates flow data at Gold Creek. Based on data collected to date, initial determinations have been made of probable maximum floods (the theoretical maximum which could be produced given the physical nature of the Susitna Basin) and design floods (1 in 10,000 year events) which must be safely passed by dams that might be constructed on the Susitna. In addition, of course, hydrological data was used to estimate probable average and firm energy outputs from potential developments. It is worth noting that less than 20 percent of the total Susitna River flow into Cook Inlet is contributed by the Susitna and its tributaries above Gold Creek. Significant contributions downstream occur from the Chulitna, Talkeetna, and Yentna Rivers. Figure 5 displays percentage composition of total flow by major tributary.

Ice formation, both in potential reservoirs and downstream of possible dams, continues to be studied, for it must be dealt with during construction and its impacts during operation must be determined.

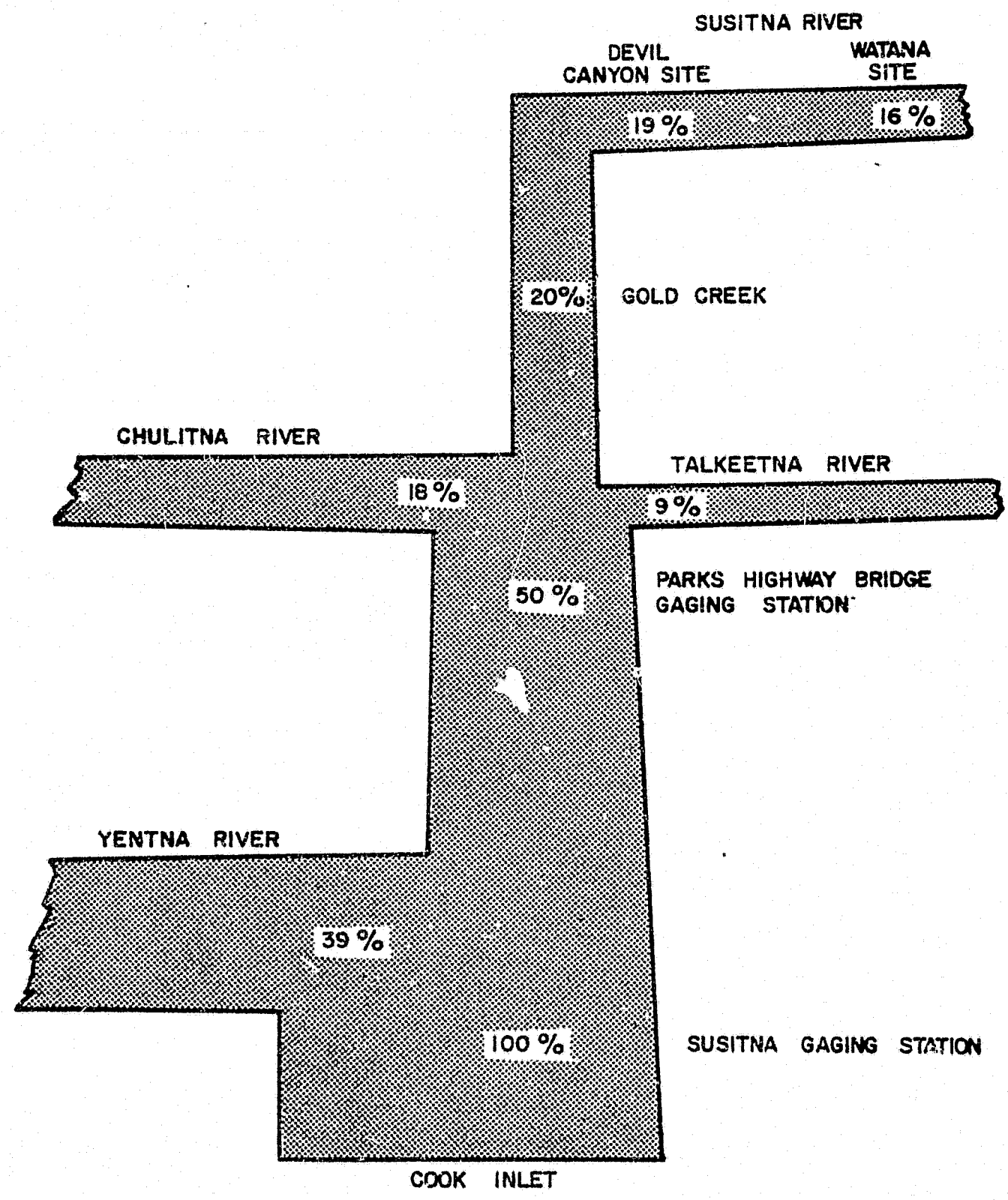
7.2 - Site Exploration and Geology

The Susitna Basin has a complex geology. Studies have been made of the region in general and detailed information was collected at particular dam sites and potential sites (borrow areas) for materials with which to construct the project. Three core holes per site were drilled at Watana and Devil Canyon during 1980; 15 auger holes were placed to explore borrow



SEASONAL DISTRIBUTIONS OF FLOW IN THE SUSITNA RIVER AT GOLD CREEK

FIGURE 4



AVERAGE ANNUAL FLOW DISTRIBUTION
WITHIN THE SUSITNA RIVER BASIN

FIGURE 5

areas; and approximately 28,000 feet of seismic lines were run. While geotechnical data gathered to date has generally confirmed the suitability of Watana and Devil Canyon sites for dam construction, a geotechnical program has been designed for 1981 further to define the nature of the sites and to answer questions about certain subsurface features which could influence the type and precise location of dams and other project features.

7.3 - Seismic Considerations

The Upper Susitna River Basin is a seismically active area. Thus, a major seismic program was started in 1980. A microseismic network of 10 stations was installed and operated to collect microearthquake data for the region. Potential faults and lineaments were identified by air and ground reconnaissance, satellite imagery, airborne remote sensing and aerial photography. A detailed screening of all identified features resulted in the selection of 13 for further study in 1981.

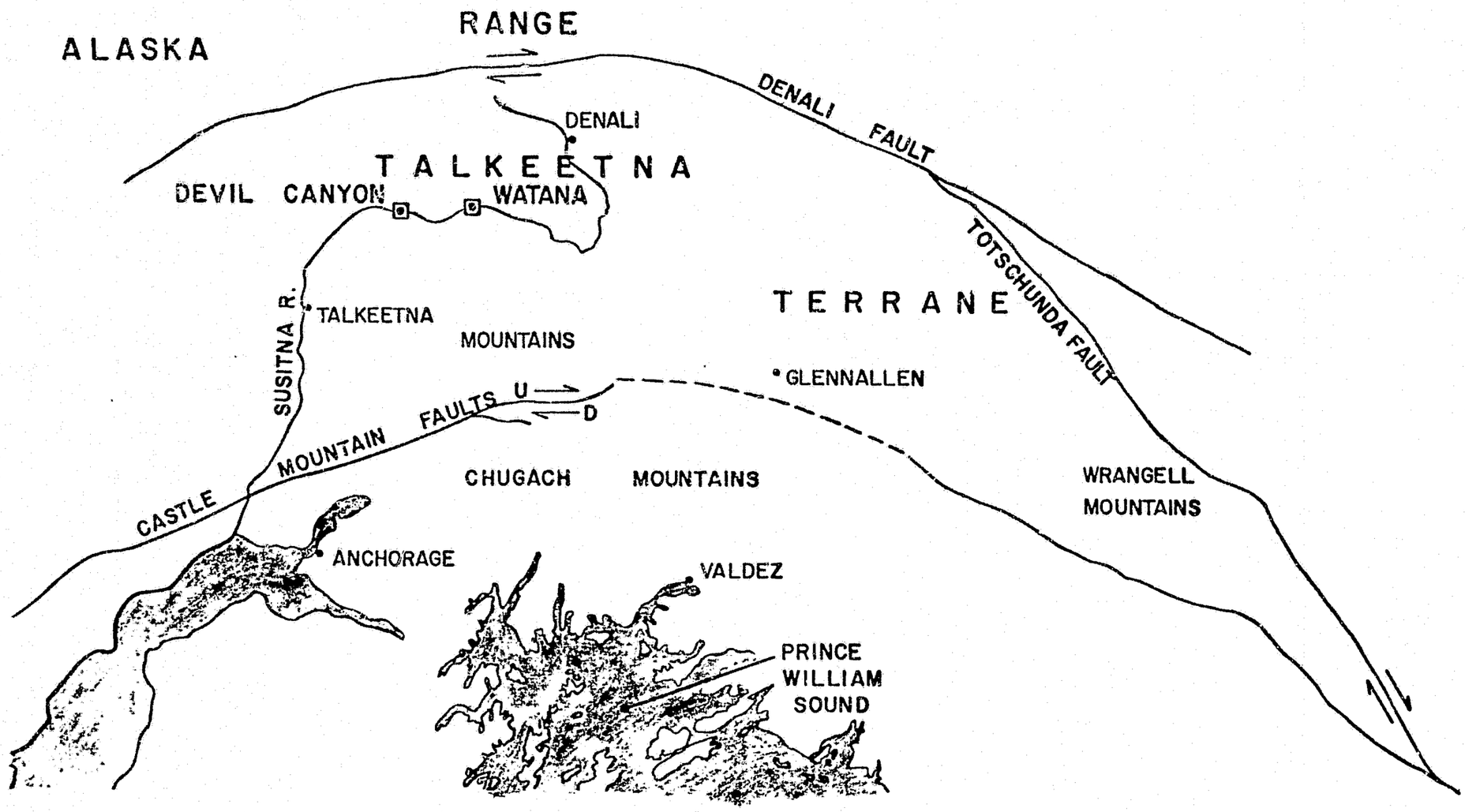
On the basis of the current state of knowledge, the Denali Fault (65 km north of the sites) and the Benioff Zone (60 km underground below the sites) are regarded as the most likely severe seismic hazards. Figure 6 illustrates the seismic setting. Initial estimates of maximum credible earthquakes from these features suggest a magnitude of 8.5 on the Richter Scale. Dam design to safely withstand ground accelerations associated with such an event is within the state of the art.

A study of Reservoir Induced Seismicity (RIS) was also initiated in 1980. RIS may be caused by the increased weight of water in a new reservoir or by lubrication and hydraulic action upon highly stressed rock. Based on evidence gathered to date, an RIS event will not exceed the maximum credible earthquake that could be associated with a fault. Thus, RIS is not likely to affect the determination of design earthquakes.

7.4 - Dam Site Selection

A total of 12 dam sites was considered in the site selection process (See Figure 1). By combination of two or more sites as a system, the total basin potential can be developed in a variety of ways. A detailed screening of individual sites and logical combinations of sites permitted elimination of those whose relative costs were high or whose obvious environmental disadvantages were large. Preliminary layouts were developed for each of the most promising sites.

Candidates selected for further analysis in generation planning and for more thorough environmental consideration included (1) the Watana and Devil Canyon dam sites (the combination found most suitable by the COE in the 1976 and 1979 studies); (2) High Devil Canyon (favored by Kaiser in 1974) and Vee; and (3) a combination of a Watana dam, a relatively low re-regulation dam midway between Watana and Devil Canyon and a tunnel from the low dam with a downstream portal near Devil Canyon. Within these groups, further



SUSITNA PROJECT SEISMIC SETTING

FIGURE 6

variations were studied in terms of alternative dam types and heights and possible schedule variations.

8 - GENERATION EXPANSION PLAN

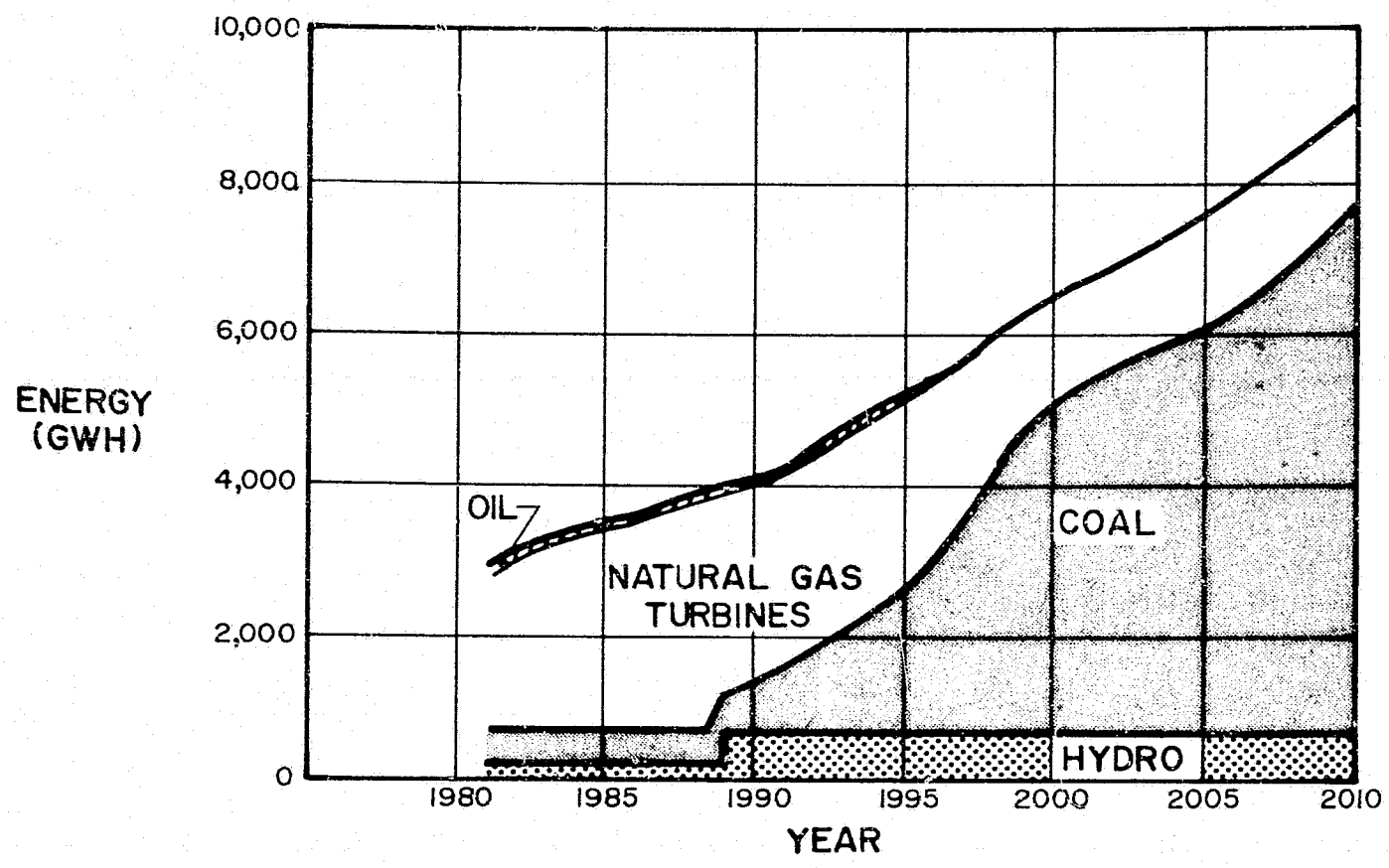
The current generation system in the Railbelt is primarily based upon thermal power. Natural gas is used heavily in the Anchorage area, oil fired units predominate in Fairbanks, and several small coal-fired plants operate at Healy and in the Fairbanks area. Hydroelectric energy, primarily from the Eklutna project, also contributes a small portion of the current Railbelt electric generation.

The present system will evolve in future years as demand increases and as old units reach the end of their useful lives. Regardless of whether or not a Susitna Project is ever developed, new system additions will be needed. For planning purposes, it was assumed that the Bradley Lake Project (now being pursued by the COE) and certain thermal units now under construction will be on line by the early 1990's. New capacity is necessary after 1992, but the amount and type to be added in any particular year will vary as a function of the demand and peak load forecasts.

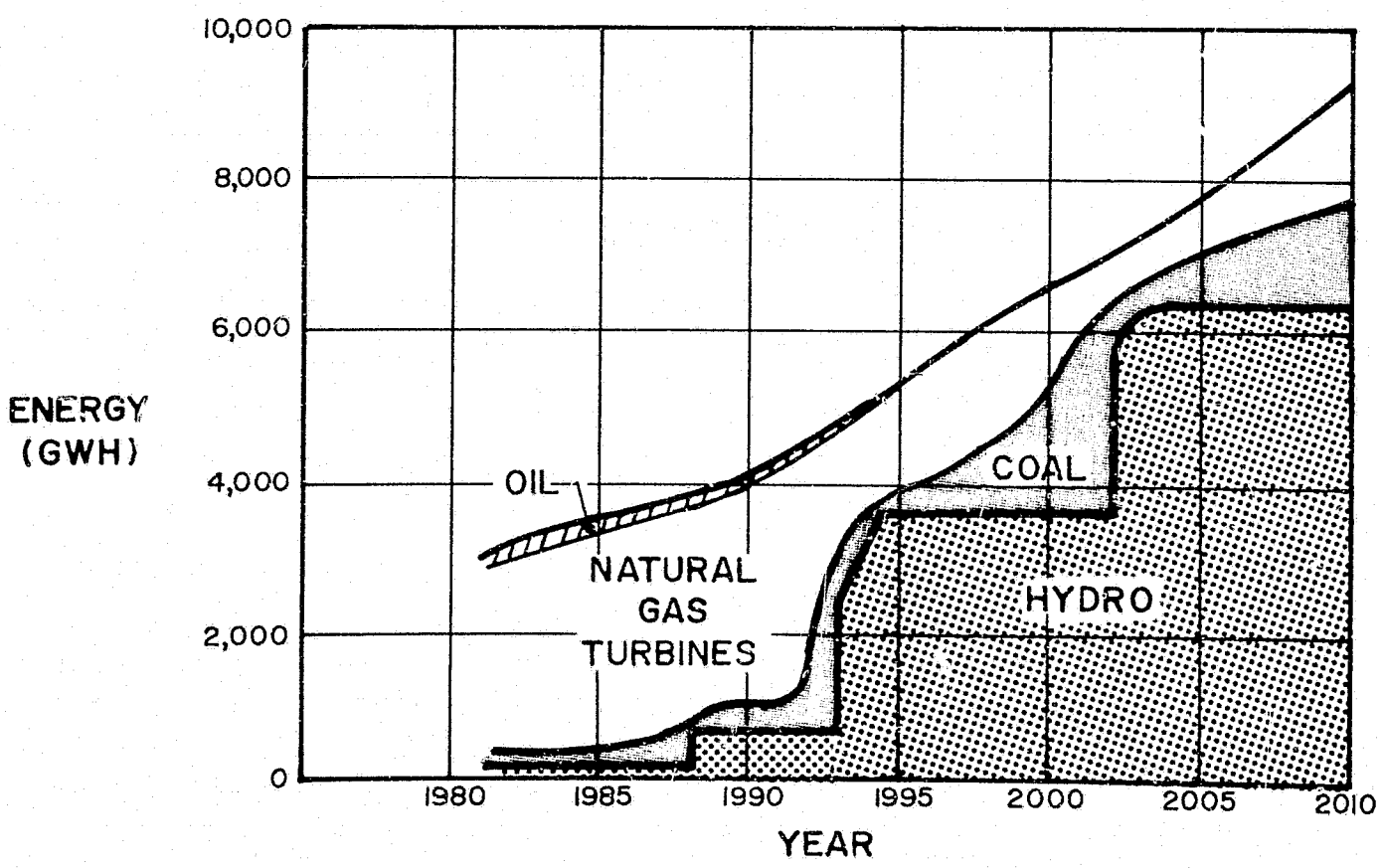
A generation planning exercise was conducted to determine how each of the potential Susitna developments might fit into future Railbelt generation systems. The General Electric Optimized Generation Program (OGP) was the primary tool used for this purpose. In addition to Susitna and present and planned capacity, major alternatives including coal-fired plants, gas turbines, gas-fired combined-cycle plants, and the ten best non-Susitna hydroelectric sites were considered as candidates for future expansion. On an economic basis, it was determined that Watana/Devil Canyon, High Devil Canyon/Vee, and Watana/Tunnel all produced total generation system present worth costs which were less than the least cost system without Susitna. Of the total sets considered, the Watana-Devil Canyon combination was favored economically. In the case of the most likely ISER forecast, the most appropriate time to bring an initial 400 MW Watana project on line was found to be 1993. Figure 7 provides a system energy comparison for the mid-load forecast for a base case thermal system and for a Watana/Devil Canyon development (Susitna 3AE).

Although somewhat higher in cost and lower in total energy production, the Watana-Tunnel combination was found to be a viable option in comparison to the best non-Susitna system. Some environmental advantages may be ascribable to the tunnel project, particularly since it offers an opportunity to preserve the Devil Canyon gorge essentially in its natural state. It is important to note, however, that the Watana dam project is a necessary first stage in the tunnel concept just as it is in the Watana-Devil Canyon combination.

Preliminary studies of tidal power potential have commenced. Tidal power development, if found feasible, would necessarily lag the earliest possible Susitna development simply because time-consuming detailed environmental and engineering investigations would have to be undertaken before a license application could be submitted to the FERC. Tidal power characteristics and



THERMAL



SUSITNA 3AE

SYSTEM ENERGY COMPARISON
MID LOAD FORECAST

FIGURE 7

costs will be available by mid-1981 as an input to the independently conducted Railbelt Alternatives Study. For generation planning purposes in the Susitna study, it has been assumed that tidal power generation is not available in 1993 when Watana could be brought on line economically.

A series of sensitivity tests was run to determine how variations in key parameters would affect the choice of favored plans. These tests generally demonstrated that the Watana-Devil Canyon development is the most cost effective alternative among Susitna Basin plans through a reasonable range of fuel costs, fuel escalation rates, real interest rates, and the like.

9 - SUSITNA HYDROELECTRIC DEVELOPMENT

Based on the generation planning studies and preliminary environmental analysis, the developments selected for primary study and design activities during 1981 are at Watana and Devil Canyon. Should continuing analysis of the tunnel, particularly in the environmental area, confirm clear advantages which in the opinion of the State of Alaska offset the higher costs and lower energy associated with that scheme, a shift to that plan can be accommodated because the Watana development is a common first stage for both plans.

The conceptual design for Watana presently consists of a rockfill dam with maximum height of 870 feet and with upstream and downstream slopes sufficiently flat to withstand the maximum credible earthquake. The spillway arrangement must be such as to discharge design floods (1 in 10,000 year events) without damage. It must also permit safe discharge of the maximum probable flood. In addition, spillway design must be such that nitrogen entrainment downstream is kept within acceptable limits for fish survival.

The conceptual design for Devil Canyon currently includes a thin-arch concrete dam approximately 650 feet high. Spillways at Devil Canyon must meet the same criteria as noted above for Watana.

Alternative arrangements for the major dams and spillway structures remain to be studied further to optimize the design of each development.

Intake structures at both dams will be designed with multi-level draw-off arrangements to facilitate selection of desired downstream water quality. Underground powerhouses are currently planned at both dams, though surface facilities can be accommodated if geotechnical and economic investigations indicate that such facilities are preferable to underground caverns. As currently conceived, the initial installation at Watana will develop about 400 MW of power and the facility will be planned to permit installation of an additional 400 MW after downstream regulation is provided (either by a Devil Canyon reservoir or by construction of a somewhat smaller dam midway between Watana and Devil Canyon, as is required in the tunnel concept).

Alternative access routes have been defined and public workshops were held in March, 1981, to solicit comments. One of the routes under consideration would

offer controlled access since its terminus would be at the Alaska Railroad rather than at an existing highway.

Current studies indicate that it is possible to complete the Watana dam by 1993 if both an FERC license to construct the dam and access roads are available by 1985. Alternatively, construction equipment may be brought into the site overland from the Denali highway in the winter of 1985 and access road work may parallel on-site construction with some cost penalty.

The Devil Canyon dam can be brought on-line within about 6 1/2 years after the start of construction if access routes exist at that time.

A transmission line study is currently underway. This work is being coordinated with the study team involved in the ongoing intertie study. As currently envisaged, transmission facilities would parallel the Susitna River from the dam sites to Gold Creek, at which point lines would extend north and south to Fairbanks and Anchorage, respectively.

10 - ENVIRONMENTAL PROGRAM

A major environmental investigation program got underway in 1980. In addition to necessary exhaustive field data collection, effort was devoted in particular to two other major components: (1) addressing major environmental concerns including those expressed by government agencies (at Federal, State, and local level) and the general public, and (2) environmental participation in the design process with a view toward avoiding or minimizing impacts by making design decisions which account for environmental concerns from the start.

The environmental studies are divided into nine specific study components:

- Fisheries
- Wildlife
- Land Use
- Archaeological (Cultural Resources)
- Recreation
- Plant Ecology
- Corridor Selection
- Socioeconomic (See paragraph 11 below)
- Management and Coordination

At least one more year of data must be collected in each area before detailed impact statements can be prepared and proposals developed as appropriate for mitigative measures. Even so, no evidence has been discovered to date to indicate environmental impacts which are so severe as to conclusively rule out the possibility of developing the Susitna River for hydroelectric power production.

Certain environmental impacts on fisheries experienced at other major hydroelectric projects will be absent from or less severe at the Susitna Project if it is ever constructed. These include:

(a) No direct blockage of fish migration or escape will result from the dam itself.

(b) No significant river diversions resulting in low flows in the diverted river will occur for the Watana-Devil Canyon combination.

(c) Regulation is being factored into design to eliminate significant daily fluctuations in flow.

(d) Nitrogen entrainment will not be increased by numerous sequential reservoirs such as are found on the Columbia River. In addition, design studies will incorporate the latest available technology to reduce the occurrence of such phenomena.

11 - ANALYSIS OF SOCIOECONOMIC IMPACTS

A major socioeconomic study program was launched in 1980 with the objectives of describing existing socioeconomic conditions, forecasting future conditions if no Susitna Project is built, and determining which conditions are most likely to be impacted by a Susitna development.

Major efforts have been devoted to development of socioeconomic profiles during 1980. The 1981 work will focus upon preliminary assessments of impacts which implementation of the recommended development plan could cause.

12 - ECONOMIC FEASIBILITY AND NET ECONOMIC BENEFITS

The analysis of the net economic benefits of the recommended development plan is being developed within the framework of traditional methodology. The general procedure considers the total costs associated with the project (construction, operation, maintenance, transmission, etc.). Benefits are the avoided costs of providing the equivalent power and energy from the next best alternative generating source.

A preliminary life-cycle cost analysis has been conducted for the recommended development plan as well as for other alternatives surviving the initial site screening process. This economic analysis assumed a three percent discount rate in real terms (i.e., the cost of money is assumed to be three percent higher than actual inflation rates during the planning period). In 1980 dollars, the present value costs of the recommended hydroelectric development (operated in the Railbelt System during a 60 year period for economic analysis) were less than the costs of the best thermal generation alternative.

More precise values for life-cycle net benefits will be determined as cost estimates are developed in detail for the optimized development plan in 1981.

13 - POWER AND ENERGY MARKETING

Whereas it can be shown that the Susitna Hydroelectric Project would be economical in the long term, it is nonetheless true that the relatively high capital cost of a major hydroelectric power development can lead to difficulties in financing the project or in marketing power and energy during the first few years of operation.

Preliminary financial studies have been conducted to determine the probable nature and extent of the problem of high front-end loading as well as to identify potential strategies for alleviating this. These studies will continue in 1981. Insofar as marketing is concerned, it must be assumed that the maximum price which Railbelt Utilites would pay at any given time for Susitna power and energy is equal to or less than the avoided cost of producing power and energy by the best available alternate means.

In the initial year of operation deliveries from Susitna will replace power and energy generated by existing thermal power plant and the avoided cost will be related to fuel, operating and maintenance expense. Only when the existing capacity reaches the point of needing replacement or new demand emerges, with which this existing capacity cannot cope, will it be possible to edge the Susitna price of energy up to the full cost.

The ongoing studies will deal with practical arrangements which can be made with the Railbelt Utilities to achieve equitable marketing terms under which Susitna energy can be introduced to meet a substantial portion of future system needs.

14 - PUBLIC PARTICIPATION PROGRAM

An aggressive public participation program was initiated for the Susitna Hydroelectric Project. Conducted directly by the Power Authority, major objectives are:

- To distribute information to the public,
- To solicit information from the public, and
- To ensure that public input is fully considered in the decision-making process.

Community meetings, workshops, an action system to ensure that response is provided to every comment or question written by the public, newsletters and mailing lists are vehicles by which these objectives are satisfied.

Of particular note is the fact that public comment and concern has directly influenced the course of the Susitna study. Such major changes from original study plans as the commissioning of a separate and independent alternatives study, the addition of a sociocultural study and an increased level of study for alternative developments in the Susitna Basin were largely prompted by public concerns.

The high level of activity in the Public Participation Program is expected to continue throughout the course of the study.

15 - LICENSING AND PERMITTING PROCEDURES

Regulatory requirements at Federal, State and local levels tend to be voluminous, complex, and time-consuming for any major power development. For the first several years, satisfaction of regulatory requirements will be the controlling factor on the schedule for final completion of a Susitna project.

The most significant initial regulatory requirement is the necessity to obtain a license from the Federal Energy Regulatory Commission (FERC). Should project feasibility be established and a decision made to proceed with the work, current plans call for submittal of an application in mid-1982 and for receipt of a license by 1985.

A detailed analysis of licensing and permitting requirements was conducted early in the course of the work in 1980 and a blueprint was drawn up to ensure that critical regulatory schedules can be met.

16 - FINANCIAL FEASIBILITY ANALYSIS

Financial analysis and risk assessment has been initiated but only carried forward to a limited extent pending the selection of the preferred development plan and the availability of appropriate capital costs of construction. One purpose of the preliminary financial feasibility analysis has been to establish the "envelope" within which the staging, design and operating configurations of Susitna are amenable to market financing based upon reasonable assumptions concerning financial markets and the inclinations of investors over the next 20 to 30 years.

A computer model, developed earlier for financial analysis of major capital intensive projects, has been tailored specifically to meet the unique requirements of Susitna. Using this model, it is possible to analyze the effect on financial feasibility resulting from variations in input assumptions. These inputs include phasing of major project stages, scheduling of construction outlays, energy and power production during initial years, pricing and revenues, returns on investment, contingency provisions, debt requirements, taxes, and financial market conditions. There has been close correlation with work carried out on generation planning, employing the OGP-5 modeling capability (as described in Paragraph 8).

Preliminary financial analysis indicates that viable options do exist for funding the project with various levels of involvement of the State of Alaska. Work during 1981/82 will focus on financial feasibility of the optimized development selection and will proceed in close collaboration with the financial consultants selected by the Power Authority at the end of 1980.

17 - SECURITY OF PROJECT COST AND REVENUE STRUCTURE

Decision makers responsible for public policy and for action within the financial and credit markets, as well as those at regulatory agencies, must be confident that the probability of unforeseen events seriously distorting the objectives of the Power Authority and its planners is sufficiently remote that government and private investors should commit substantial financial resources to the Susitna Project. A detailed risk analysis will be made of the various influences and possibilities, no matter how remote, that might impact the security of the project cost structure and its revenue flow. In particular, consideration will be given to risks, and to the formulation of contingency plans, applicable to:

- Potential variations in capital costs
- Cost escalation
- Cost overruns
- Delays
- Events leading to noncompletion
- Serious outages during operation
- Failure of revenue from power resources
- Regulatory issues

Arising from the study of project cost and revenue structure will be consideration of the need for completion and/or other guarantees and revenue assurance requirements. The aim will be to develop strategies and procedures which will minimize risk in each category and provide for an acceptable balance of residual exposure and benefit for the financing entities which might be involved in the Project.

18 - ORGANIZATION AND MANAGEMENT

Project control structures, policies and procedures have been developed and put in place to ensure that continuing project activities are in the best interests of the State of Alaska and its populace. The Executive Director of the Power Authority serves as Project Manager for the State of Alaska. He is assisted in turn by a project staff which includes Assistant Project Managers for Technical Output and Schedule and for Budget and Finance. A Project Engineer within the Power Authority devotes his full-time attention to monitoring and coordinating project work.

Within the Acres organization, a Project Manager is responsible for direction of the activities of a large group of technical personnel. He is assisted by a Deputy Project Manager, a Technical Study Director, and a Resident Manager (in Anchorage).

External Review Panels have been established both at the Power Authority's level and at Acres' level to provide an independent check on the adequacy and accuracy of completed and proposed study activities.

Major subcontractors assisting Acres in the performance of its work include:

- R&M Consultants, Incorporated
- Cook Inlet Region Incorporated in association with Holmes and Narver
- Terrestrial Environmental Specialists
- Woodward Clyde Consultants
- Frank Moolin and Associates
- Robert W. Retherford Associates
- Other Alaskan firms providing transportation, supplies, and logistical support

19 - IMPLICATIONS OF PROCEEDING

The Governor of Alaska and the State Legislature will receive a report on or before March 30, 1981, wherein the Power Authority must recommend whether work should continue on the Susitna Hydroelectric Project. The Power Authority has selected four particular issues for detailed consideration. Conclusive proof that any one of these issues presents an insurmountable barrier would lead to a recommendation by the Power Authority to terminate the study. Briefly summarized, the issues are as follows:

- Are the forecasts too low to require any major generation additions over the next 30 years?

- Are seismic risks so great that safe development cannot occur?

- Are anticipated environmental losses unacceptable?

- Is there a significantly lower-cost set of alternatives which will satisfy demand forecasts through the year 2010?

No barriers have been discovered during the initial year of study which would lead to an affirmative answer to any of the listed questions. Even so, definitive answers have not yet been developed for all of the issues. Continuing the study would provide the State with an opportunity to make sound decisions in the future as to whether Susitna hydroelectric potential should ultimately be developed. Terminating study efforts at this time would result in avoiding the significant costs of further investigation and analysis on Susitna.