

susitna hydroelectric project

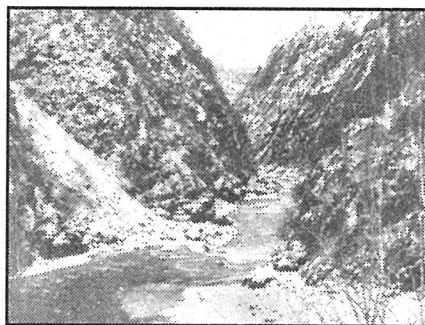
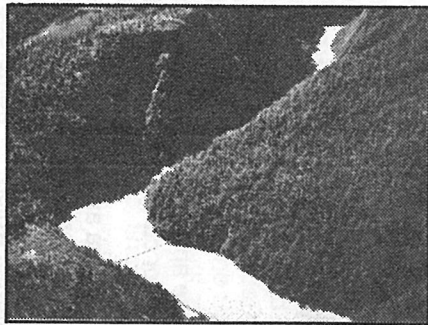
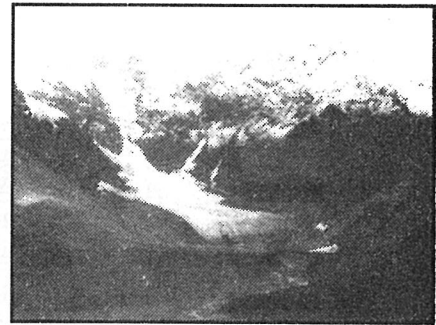
Newsletter

no. 3131

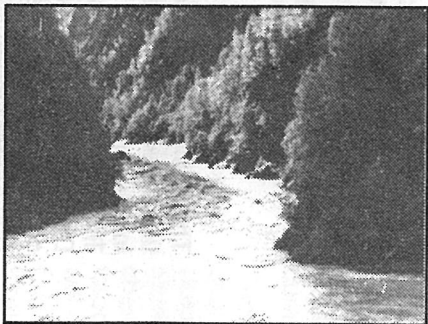
september 1983

The Susitna River System

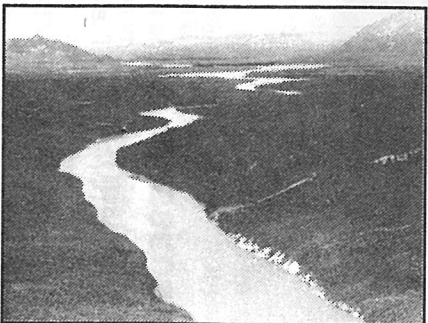
During its 318-mile journey to Cook Inlet from the Alaskan Range, the Susitna River changes "faces" several times. The Susitna originates about 90 miles south of Fairbanks, where summer runoff from three glaciers feeds forks of the river. These forks run about 18 miles south before joining to form the mainstream. Flowing out of its glacial headwaters, the Susitna



In the area of Devil Creek, the river cuts a deep gorge, known as Devil Canyon, and creates some of the most violent white-water rapids in the world. Below Devil Canyon, the river turns south again, becoming much less steep and confined. About 40 miles south of Gold Creek, the Susitna is joined by two of its major tributaries: the Talkeetna and Chulitna Rivers. From this confluence, the Susitna flows south through increasingly braided channels for 97 miles before it empties into Cook Inlet near Anchorage.



crosses a generally flat, broad valley for about 55 miles. It is in this meandering upper stretch that most of the coarse sediments from the glaciers settle out. Just below the confluence with the Tyone River, the Susitna turns westward, flowing for 96 miles through narrow valleys and deep canyons. The walls of these canyons are up to 1000 feet in height.



The Susitna is a typical northern glacial river with high, turbid summer flow and low, clearer winter flow. Runoff from snowmelt and from rain in the spring causes rapid increases in flow. At breakup, flows increase to over 13,000 cfs as the river freezes in November and December, and to a low of 1000 cfs in March and April.

In terms of physical configuration, the east-west stretch of the river is ideal for a hydroelectric project. Various projects have been suggested since the early 1960s. The present concept, developed by the Alaska Power Authority, is the subject of this newsletter.

susitna hydroelectric project

Newsletter

no. 3131

september 1983

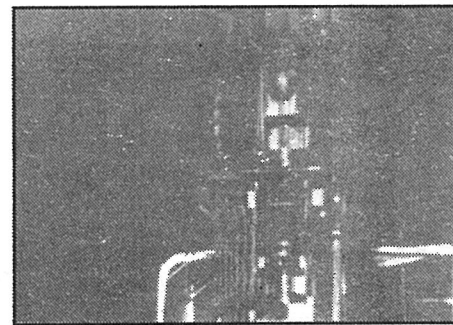
Susitna Project History



1975

• Corps of Engineers

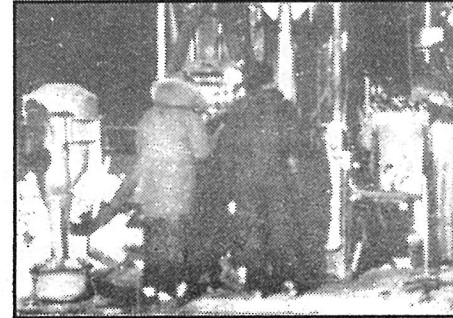
complete project study and Draft EIS on proposed federal Susitna Project



1976

• Alaska Power Authority

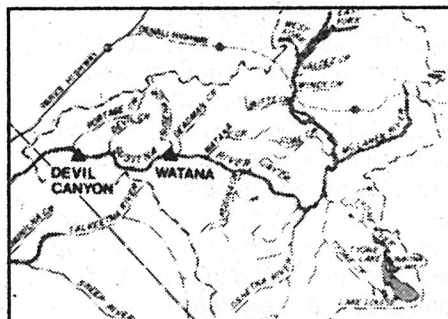
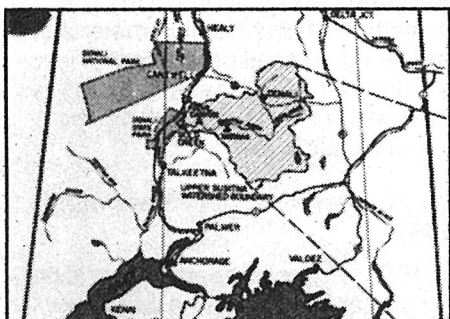
established to provide project financing



1979

• Corps studied alternatives, proposed study program

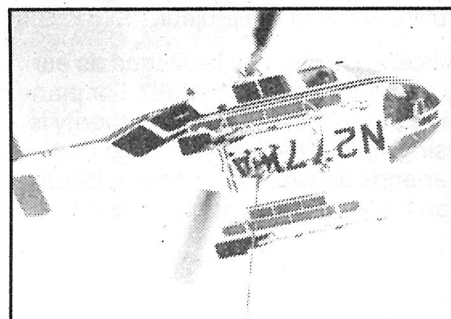
• Federal funds unavailable; State assumes project
• Power Authority selects Acres to conduct feasibility study rather than the Corps



1977

• Corps continues

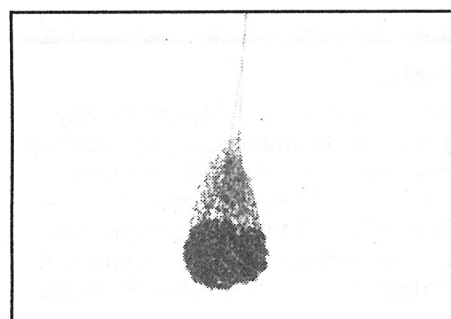
engineering and environmental studies
• State financing of Corps project considered



1980

• Plan of study for feasibility approved

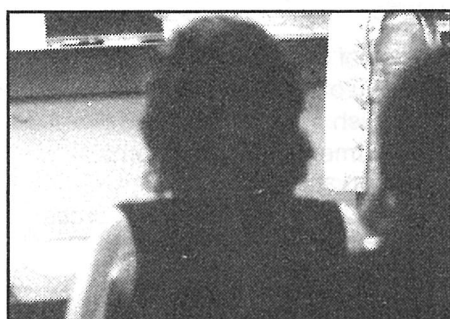
• Battelle begins separate alternatives analysis
• Public participation program begins



1982

• Feasibility study complete;

project judged feasible
• Power Authority Board recommends submitting license application, continuing design/environmental work



1983

• License application submitted

to Federal Energy Regulatory Commission (FERC)
• FERC formally accepts application
• Environmental and engineering studies continue

The Susitna Project Today—Where Does It Stand?

This newsletter's purpose is to provide a general update on the Susitna Project. The Susitna Hydroelectric Project has passed several important milestones since 1980. A two-year feasibility study, conducted by Acres American, concluded that the project was technically, environmentally and economically practical. The Alaska Power Authority Board of Directors acted on those results to recommend in early 1982 that preconstruction efforts continue and a license application be submitted to the Federal Energy Regulatory Commission (FERC). That application contained a great deal of information on the engineering, environmental, and economic features of the project. It was submitted to FERC on February 28, 1983. Copies of the application were placed at that time in public libraries throughout the Railbelt for public review.

Preliminary review of the application by FERC staff revealed several areas

where more information was required. After receiving those supplemental materials, FERC accepted the application as adequate on July 29, 1983. The acceptance of the license application triggered FERC's formal review process, which includes detailed evaluations of energy load forecasts and engineering and design, and the preparation of a draft Environmental Impact Statement (EIS).

While FERC is scrutinizing the project for the next 2 or 3 years, the Power Authority will continue studying the project and its impacts. The Harza-Ebasco Susitna Joint Venture has been selected as the planning and design contractor. Their continuing studies are aimed at designing the safest, best project for the least cost, and at more accurately predicting what the environmental effects will be. Plans to reduce or eliminate impacts can then be refined as the project moves through the licensing process.

In this issue, William Wakefield, Susitna Project Manager for the Federal Energy Regulatory Commission, gives his views on the project in an interview. The licensing process and current status are described. Engineering and economic studies to optimize the project and update the estimates of needed power are also discussed.

Environmental programs continue to provide information on fish, wildlife, river flows, cultural resources, and other factors important in licensing and design. Pages 6 and 7 briefly describe each study area, what has happened to date, and the study as it is now underway.

The External Review Panel advises the Power Authority on the overall project, bringing to bear many years of technical experience and capability. The Panel's members are presented on page 6.

What's Ahead—the FERC Licensing Process

The FERC process for reviewing the license application, preparing an Environmental Impact Statement, and determining whether or not to grant a license is the most important and complex authorization required for the project. There are several major milestones that must be met in the FERC licensing process:

Determining the Adequacy of the Application

The Power Authority license application was first reviewed by FERC staff to determine if it contained sufficient information for FERC to start the formal review of the project. Additional information was requested from the Power Authority in April and submitted in July. The Susitna application was determined to be adequate and was accepted on July 29, 1983.

Public & Agency Comment Period

Once the application was judged to be adequate, public notices were placed in local newspapers and the Federal Register to invite public comment on the license application. Comments were requested by October 11, 1983. Federal, State, and local agencies were provided copies of the application and asked to comment on their areas of expertise.

FERC Staff Evaluation

The FERC staff will consider three areas in their evaluation:

- need for power
- project structures
- environmental impacts

Need for Power Evaluation

Two questions are considered in the evaluation: "How much electric

energy is needed in the Railbelt?" and "Is the Susitna Project the best way to provide it?" In the need for power hearings, the Power Authority will be required to demonstrate that the energy demand forecasts are reasonable, both in terms of methods used and results obtained. Practical alternatives to the project will also be assessed to satisfy the FERC that Susitna is the most attractive project. Those hearings will start in spring of 1984 and the hearing record will be considered by the FERC in making a need for power decision.

Project Structures Evaluation

Evaluating the safety of the dams and the engineering soundness of the project is a key FERC responsibility. The license application contains information on the hydrologic and geotechnical conditions of the site, availability of construction materials, and designs for all permanent project facilities, including stability and stress analysis under extreme floods and seismic conditions.

Environmental Impact Statement (EIS)

An EIS for the proposed project is being prepared by Argonne and Oak Ridge National Laboratories. The labs, retained by the FERC for this project, are both Federal research organizations. After a Draft EIS is issued, resource agencies and the public will have an opportunity to review and comment on it.

Environmental Issue Resolution

Environmental issues concerning the Susitna Project can be resolved in

several ways, including negotiated settlements or formal administrative hearings. The Power Authority is committed to accommodating valid environmental concerns at the local level, within Alaska, through cooperative agreements with various agencies and organizations. Negotiated settlements will allow many issues to be resolved early in the process and on the local level, without resorting to costly and lengthy hearings in Washington D.C. If formal hearings were to be held, a FERC administrative law judge would prepare an opinion on the environmental issues based on the testimony presented.

FERC License Order

The five FERC Commissioners will make their decision on whether or not to issue a license based on FERC staff findings and the opinion of the administrative law judge. The majority of the Commissioners will have to be convinced that the project is needed, the structures will be safe, and that the environmental impacts of construction and operation will be adequately mitigated. They may impose a number of stipulations. For example, issuance of the license may require use of a specified river flow regime downstream of the project.

A license order may be issued as early as 1985 or as late as 1987. For planning purposes, the Power Authority is using 1986. The timing in large part depends on whether licensing issues can be resolved by negotiations.

Who Is Involved?

Alaska Power Authority

The Alaska Power Authority is a public corporation of the State, mandated to develop new power sources for Alaska. The Power Authority, as the applicant for the Susitna Project, has taken the project through the feasibility stage and submittal of the license application. If the project is authorized and funded, the Power Authority will also manage construction and operation.

Federal Energy Regulatory Commission

The Commission is a Federal regulatory body, part of the Department of Energy, with Commissioners appointed by the President. The Commissioners must issue a license for the Susitna Project before construction can begin. (See adjoining article

and interview with William Wakefield)

Local, State and Federal Agencies

Agency review of the project has been going on since the beginning of the feasibility study. Their review role becomes more formal as the licensing process proceeds. Examples of the types of agencies that have had and will continue to have a review role include:

- Office of Budget and Management
- Bureau of Land Management
- U.S. Fish & Wildlife Service
- Department of Environmental Conservation
- Department of Natural Resources
- Department of Fish & Game
- Borough Planning Agencies
- School Districts
- Native Corporations

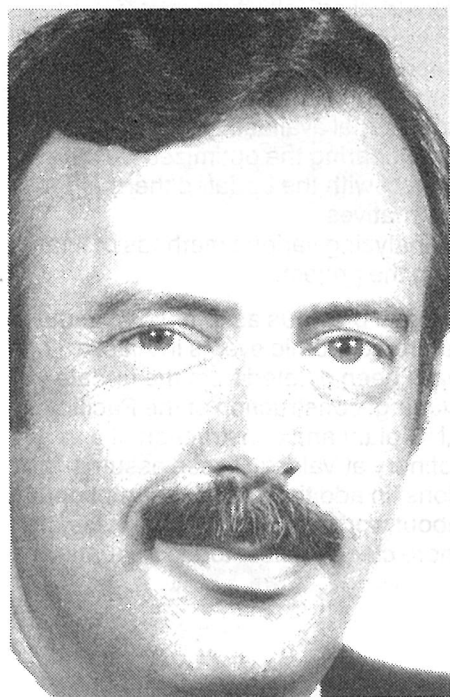
Public

Members of the public, community groups and landowners have actively participated in the project for three years. The Power Authority will continue to provide all types of information and encourage public comment through the Susitna Public Participation Program.

External Review Panel

A ten-member External Review Panel of distinguished experts is advising the Power Authority on engineering and environmental aspects of the project. Their recognized experience provides an objective overview and an alternate opinion on all project elements. See article on page 6, which describes eight panel members. Two more will be added this fall.

Interview with William Wakefield, Susitna Project Manager for the Federal Energy Regulatory Commission



"...the Commission has established a project manager and a project management schedule to track Susitna specifically."

Question: What is the Federal Energy Regulatory Commission (FERC)?

Wakefield: The Commission, under the purview of the Department of Energy, is the Federal regulatory agency that is charged with the regulation of natural gas and electrical energy in the United States. This regulatory responsibility includes both cost of energy, such as electrical rates and natural gas drilling, and construction of major pipeline and electrical generating projects, such as hydroelectric projects. The Commission is directed by five Commissioners and is organized into offices that take care of specific regulatory functions.

Question: Why does FERC need to review a project being developed and financed entirely by the State of Alaska?

Wakefield: It is mandated by the Federal Power Act. The basis of the FERC jurisdiction is the navigability of waterways and the use of Federal land. On each of these two points the Susitna Project would come under the Commission's regulatory control, in that the Susitna River may be determined to be navigable and there is a portion that the project touches that does utilize Federal lands.

Question: Has the Commission reviewed a project as large as the proposed Susitna Project recently?

Wakefield: No. The largest conventional hydropower project the Commission has reviewed recently was a project in Mississippi, around 192 megawatts. The largest project by capacity has been a pumped storage project in Bath County, Virginia, about 2,100 megawatts, in 1975-1976.

Question: How familiar is FERC with the Susitna Project?

Wakefield: We are very familiar with it. For the past two years we have been advising the Power Authority as to our regulations and what is required to file an application, particularly for a project the size of Susitna.

In October 1982, there was a special project team formed within the Commission to review the pre-filing application which was filed on the eleventh of November. For two months, we reviewed the pre-filing application and sent to the Alaska Power Authority a list of additional required information.

The official license application was filed on February 28, 1983. We then requested additional information from the Power Authority on April 12, allowing 90 days for response. The additional information was submitted on July 11 and we accepted the license for filing on July 29. Now that the application has been officially filed and accepted, we are reviewing the project in detail.

Question: You stated that a special team was formed within FERC to

handle Susitna. Is this the way things are usually done or is this a new procedure?

Wakefield: We only do this on very large projects such as, in Alaska, with the ANGTS project (the Alaska Natural Gas Transportation System). Susitna is by far the largest conventional hydroelectric project that we've undertaken and the most costly and complex project of this nature. As a result, the Commission has established a project manager and a project management schedule to track Susitna specifically.

Question: What aspects of the project will FERC review?

Wakefield: We review the environmental, engineering, and economic aspects. We try to answer a number of questions: does it meet the National Environmental Policy Act (NEPA) requirements; is it safe, sound, and adequate as far as the engineering structures are concerned; and is the project economically feasible?

Question: Will an environmental impact statement be prepared? If so, who will be responsible for preparing it?

Wakefield: Yes, a project of this nature certainly warrants an environmental impact statement (EIS). When the application was found to be acceptable, the analysis and work on the EIS started. It is the responsibility of the Federal Energy Regulatory Commission to prepare that statement. It is initially prepared in draft form, called a Draft EIS. It is noted in the Federal Register, and people have a period of time in which to comment. After all those comments are considered, a final impact statement will be issued.

Question: Will the Commission staff prepare the EIS?

Wakefield: Two national labs have been hired to assist in preparation of the EIS. They are the Argonne National Laboratory near Chicago, Illinois, and the Oak Ridge National Laboratory in Oak Ridge, Tennessee. Their experts are preparing the majority of environmental portions of the impact statement. The engineering, need for power, and economic portions are being analyzed by Commission staff.

Question: Have FERC personnel visited Alaska?

Wakefield: Yes. There were meetings in May in Anchorage, Talkeetna, Cantwell, and Fairbanks for agency scoping sessions in the morning and public hearings in the evenings. There was also a site visit in August by FERC engineering, economic, and environmental personnel.

Question: Did the hearings give FERC a chance to see how the people in the Railbelt feel about the project?

Wakefield: One of the main purposes of holding those public hearings was to test the public reaction to the project.

Question: Did you learn anything new on the site visits?

Wakefield: I think that all the FERC personnel and the people from the labs gained a greater appreciation of the unique environmental and engineering aspects of the Susitna Project. We were all able to visit the project sites, the lower Susitna River, and the upper basin. Being in the field with members of the Power Authority staff and their consultants allowed us to see firsthand many of the project features that we had read about.

Question: Who pays for the FERC staff time in Alaska?

Wakefield: It comes out of our budget as provided by the United States Congress.

Question: How do the FERC Commissioners make the final decision on whether or not to grant a license to construct?

Wakefield: They base it on whether the project is environmentally sound, sound from an engineering standpoint, and economically feasible. The Commissioners decide and the majority rules; three of the five is enough for issuance of a license.

Question: Can FERC require the State to do certain things in constructing the project?

Wakefield: Yes, particularly in the course of sound engineering practices. If there are engineering practices that our experts have determined have been addressed, but perhaps not to the full scope, we will condition the license to assure that sound engineering practices are followed. Generally each license that is issued has some license article that requires additional study or requires mitigation for something that had not been fully considered.

Question: So FERC can also require specific mitigation measures for direct project impacts.

Wakefield: Yes, that's correct.

Question: Can FERC prevent the project from being built?

Wakefield: Again, if the project is not environmentally sound, or if it is not safe, or if it is not economically feasible, the Commission will not issue a license. Without the license, the project cannot be constructed.

Question: How can people express their opinions on the project to FERC?

Wakefield: During the public notice period, notice of the project appeared in the Alaskan papers and the Federal Register, and people had an opportunity to make their comments or questions known to the Commission.

Harza-Ebasco Susitna Joint Venture

The joint-venture firm of Harza Engineering Company and Ebasco Services, Incorporated (Harza-Ebasco) was selected as the planning and design contractor for the Watana portion of the Susitna Project. The Harza-Ebasco team will design the Watana dam and power facilities, as well as continue environmental investigations and licensing support for the entire project. Working from an Anchorage office, the project team includes several Alaskan organizations:

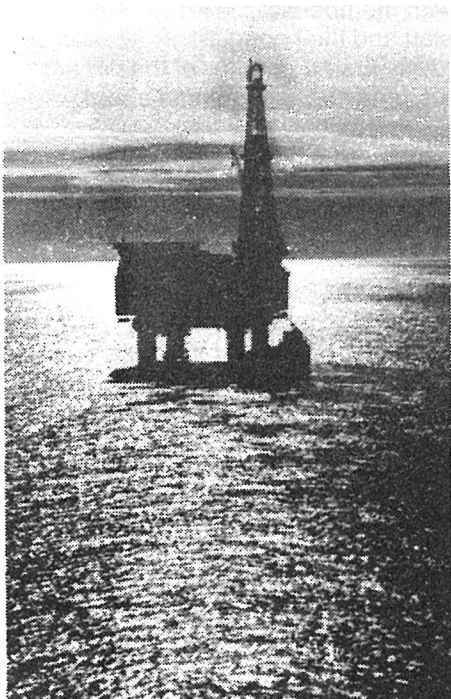
- R&M Consultants
- AEIDC
- University of Alaska Museum
- Frank Moolin & Associates
- Air Logistics
- Denali Drilling
- Alaska Department of Fish & Game
- University of Alaska, Palmer
- University of Alaska, ISER
- CIRI/Holmes & Narver
- Woody Trihey, Consultant

Additional Alaskan firms will be included in the team when design of the supporting facilities begins.

Both Harza and Ebasco have world-wide experience in designing and constructing large hydropower projects. Harza has been involved in the 10,00 megawatt Guri Project in Venezuela, the world's second largest hydroelectric project. Ebasco was cited by the American Society of Civil Engineers for the "Outstanding Civil Engineering Achievement of the Year, 1973" for their work on the 1900 megawatt Ludington Pumped Storage Project in Michigan. Both firms also have recent hydroelectric experience in Alaska. Harza has conducted feasibility studies for the Black Bear Lake and Chester Lake projects in Southeast Alaska. Ebasco is serving as construction manager for the Terror Lake Project on Kodiak Island, and has conducted feasibility and reconnaissance studies and independent cost estimates on several other Power Authority projects.

Project Update Results in Revise

Energy Forecasts Revised



Cook Inlet natural gas currently fuels electric energy generation in a large part of the Railbelt.

The key to the economic feasibility of the Susitna Project is the long-term world oil price. World oil prices directly affect Alaska's economy and, consequently, forecasts of population growth, energy demand, cost, and state revenue are sensitive to changes in oil prices.

When the Alaska Power Authority began the Susitna feasibility study in 1980, world oil prices were on an upward trend. Oil price forecasts made by Battelle Pacific Northwest Laboratories using information from the Alaska Department of Revenue were used in forecasting future levels of Alaska population and energy demand. These forecasts were done as part of the study of alternatives to the Susitna Project. Battelle's forecasts were then used in the Susitna feasibility study.

The feasibility study was completed in March 1982 and approved by the Alaska Power Authority Board of Directors in late April. A license application based on the feasibility study was submitted to the Federal Energy Regulatory Commission (FERC) in February 1983. In making their decision to submit the FERC application, the Board was sensitive to

changes in economic indicators and wanted to be in a position to take advantage of changes in the Alaskan economy. Their action was taken with the understanding that an update of the project based on changes in oil revenues would be completed later.

In November 1982, the Power Authority selected the Harza-Ebasco Susitna Joint Venture as the design consultant for the Watana phase of the Susitna Project. In January 1983, the Power Authority directed that an updated study of Railbelt electrical energy needs be made based on the decline in world oil prices and changes in some of the assumptions made about the future of Alaska's economy. As work began on an update, FERC made its initial review of the Susitna license application. They requested information on the effect of the downturn in oil prices on the future energy needs of the Railbelt and on the computer models used to forecast future energy needs.

The first step in the process of revising the Susitna need for power forecasts was responding to the request from FERC for additional information. This information was submitted on July 11 and FERC officially

accepted the license application on July 29, 1983. The next step in the need for power revision is a complete update of the electrical energy forecasts for the Railbelt and the comparison of the Susitna Project concept with those forecasts. The update will include:

- Reevaluating the demand and load growth forecasts.
- Reviewing the Susitna Project to optimize the size, costs, design, and construction schedule.
- Updating the thermal alternatives to Susitna (coal and natural gas fired generation) based on current information on fuel availability and cost.
- Comparing the optimized Susitna Project with the updated thermal alternatives.
- Analyzing various methods of financing the project.

Several previous assumptions about future economic events in Alaska have been deleted from the update including: construction of the Pacific LNG plant and construction of a refinery at Valdez. These assumptions, in addition to the assumptions about world oil prices, were revised to more clearly reflect today's situation.

Cost Savings from Design Refinements

The overall goal of the update is to determine if the Susitna Project concept as submitted to the FERC is still the optimum project. As part of the update, Harza-Ebasco has made a conceptual design review and engineering analysis of the Watana dam design and has identified several project refinements which reflect a net cost savings. These refinements are based on recent geotechnical investigations (see article at right) and more detailed engineering studies. Because much of the information used in the feasibility study was quite preliminary, extremely conservative engineering and construction estimates were used. With more complete information, the following refinements have been identified:

- Reduction in the amount of foundation rock to be excavated for

the Watana dam by 3.5 million cubic yards; and change in composition of the dam to more efficiently use available materials.

- Change in orientation of underground caverns and reduction in the number of power conduits for the generating units on the Watana project.

- Modification of main spillways for both Watana and Devil Canyon to handle Probable Maximum Flood, thus eliminating the fuse plug emergency spillways.

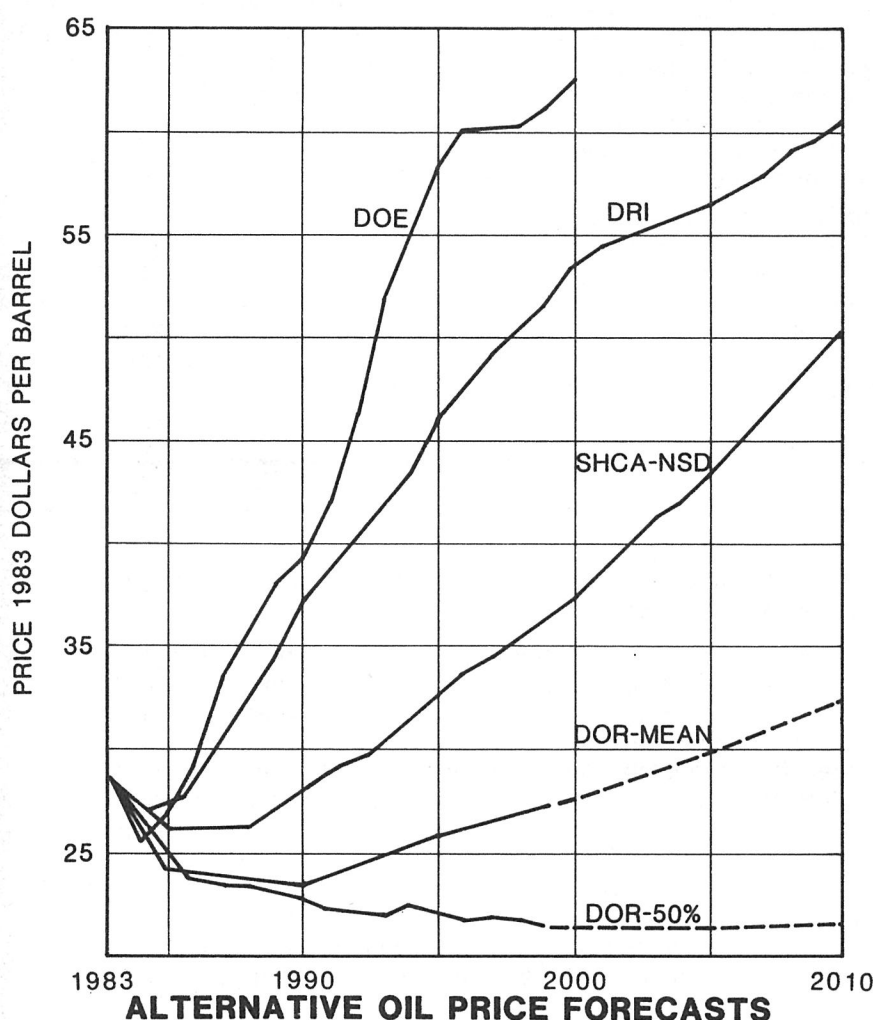
- Reduced transmission voltage from Gold Creek to Ester substation to meet Fairbanks' load requirements.

Harza-Ebasco has shown that the total project cost can be reduced by about \$421 million (or 10% of the 1983 project cost estimate) if these, and several other, refinements are implemented. They would not alter either the generating capacity or operation of the project.

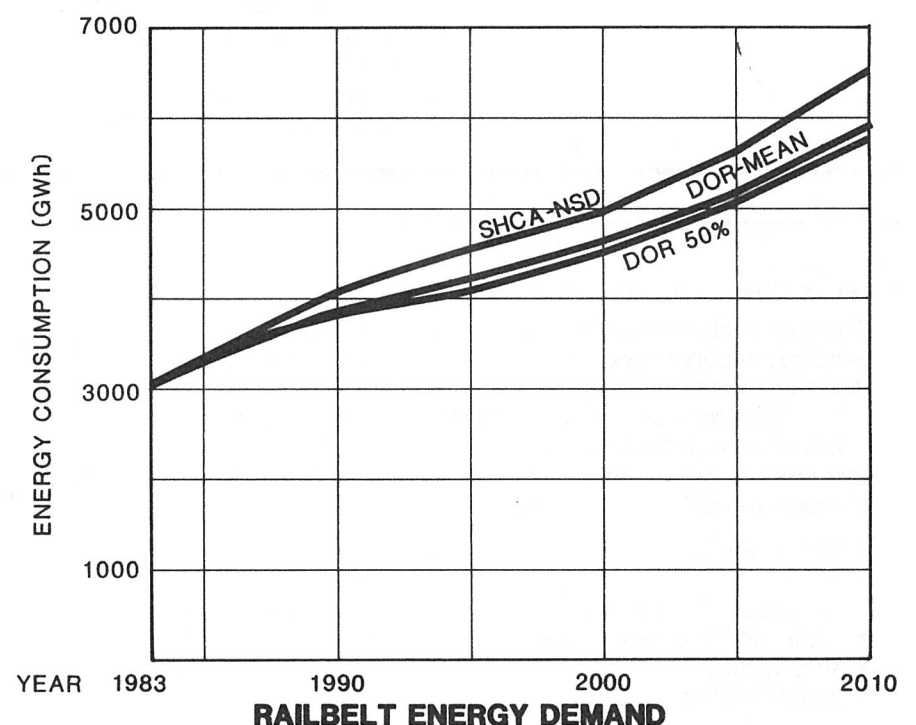
Several other design modifications are also being evaluated. Potential modifications to the Watana project could include constructing the powerhouse above ground rather than

underground, modifying the power intake structures and conduits, and reducing costs by sealing the reservoir upstream of the dam. Modification of the Devil Canyon project could include changes in the tailrace tunnel downstream from the dam. These changes could result in additional cost savings of up to \$250 million.

In addition to these potential design refinements, reduced economic projections have resulted in other modifications to the project that are being further evaluated. The primary one would be lowering the height of the Watana dam, with accompanying reductions in generation and transmission system requirements. This would bring project energy production more closely in line with current estimates of need for power. These refinements could also reduce the cost of the project by an estimated \$700 million and contribute to a further reduction in environmental impacts because of reduced reservoir size. Only the refinements listed on the left are recommended at this time. Any further refinements will be discussed in detail in the next newsletter.

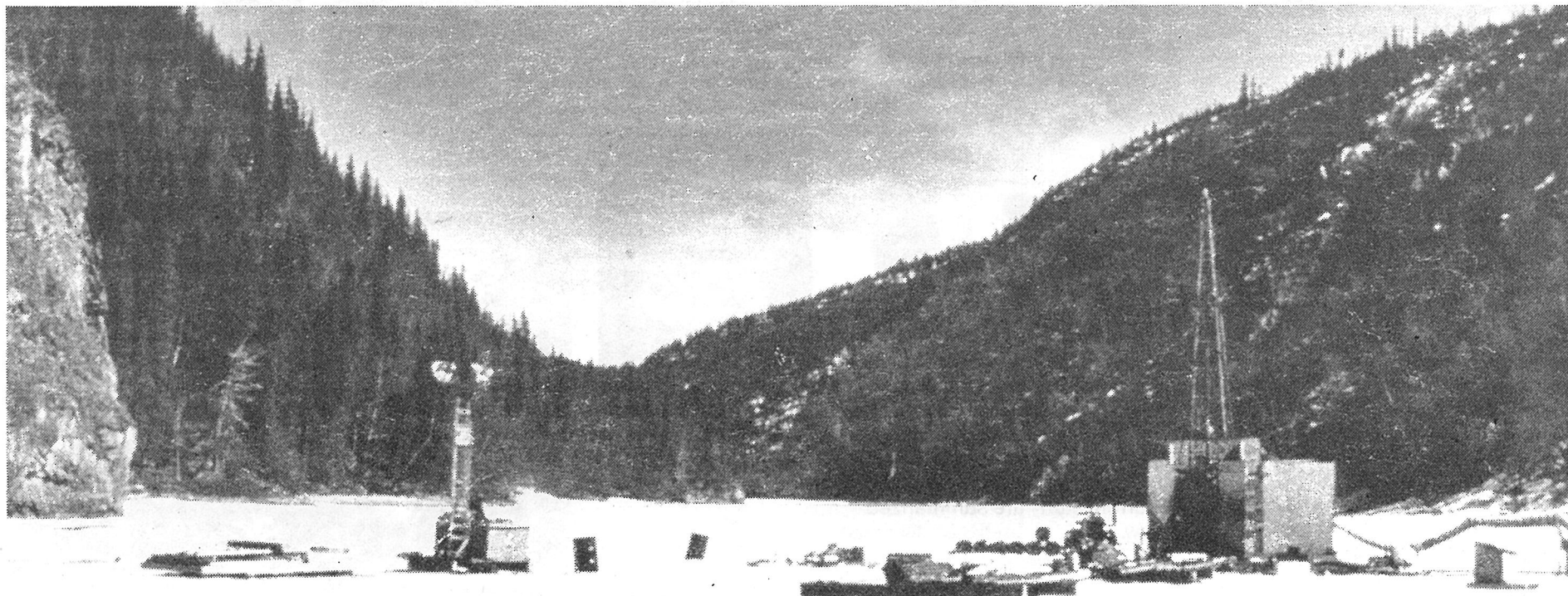


This graph shows the range of forecasts considered in the update, including the U.S. Department of Energy, Data Resources Inc., Sherman H. Clark & Associates, and the Department of Revenue.



Based on revised oil price projections, energy demand forecasts for the Railbelt have also been updated. Shown here are estimates by Sherman Clark and Associates and two versions from the Alaska Department of Revenue.

Forecasts and Cost Savings



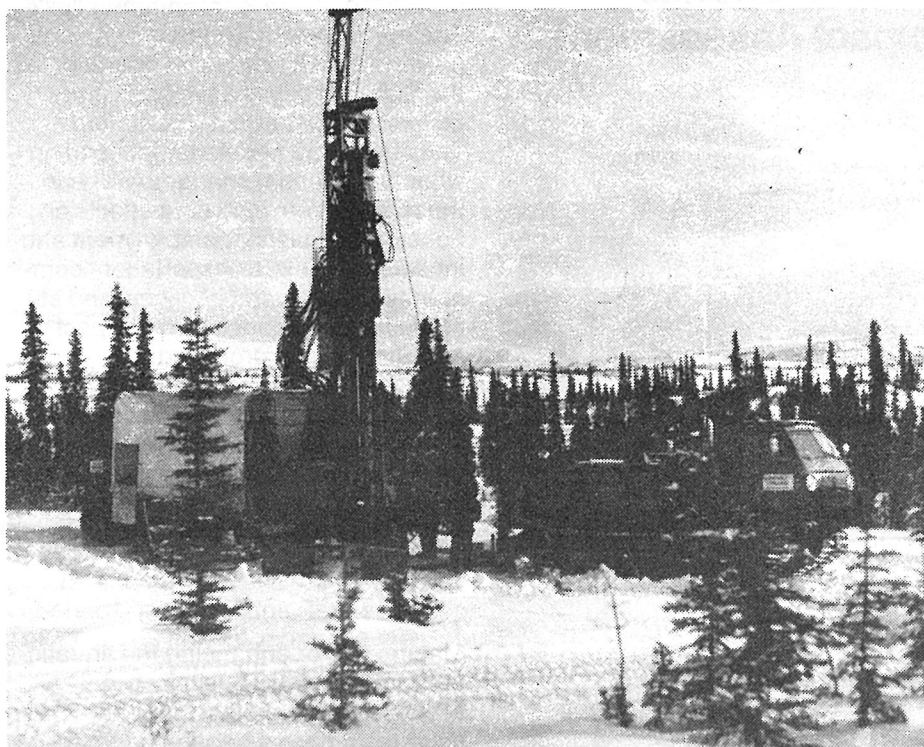
The winter geotechnical program used drilling and testing equipment on the river ice to confirm early work and improve design information.

Winter Geotechnical Work Provides Basis for Cost Savings

Good foundation conditions and appropriate construction materials are critical factors for the construction of any hydroelectric project. Exploration of the Susitna River Basin began in the early 1950s, when the Bureau of Reclamation investigated potential hydroelectric sites. Over the years, the Bureau and the Army Corps of Engineers continued to map the surface geology, perform seismic surveys to characterize underground features, and drill test holes in the potential damsite areas. When the Alaska Power Authority began the Susitna feasibility study in 1980, an expanded geotechnical program showed that there were no significant geologic or geotechnical problems which could affect the project feasibility. It also showed that suitable construction materials were available nearby.

In the winter of 1983, the Power Authority went back into the field to further evaluate the Susitna River channel. The winter geotechnical program had several main purposes: (1) to look at the river bottom to decide if the soils are suitable for dam foundations, (2) to provide information on the soils to be used in design, (3) to estimate how much material would have to be removed for construction, and (4) to assess the type and quality of bedrock in the proposed locations of the dam foundations.

Working in the winter allowed the geotechnical team to set up drilling and seismic equipment on the river ice and on stable ground nearby. This testing equipment helped develop a



Drilling results help engineers design a more cost effective project. This Becker hammer drill tested over 50 locations at the Watana site.

base of information on the critical geotechnical conditions that underlie the project area. For example, a very large hammer drill was used to drill 53 holes, and ground-penetrating radar provided an underground profile of where soil and rock came in contact.

The winter program confirmed earlier work and provided much improved information which is allowing designers to incorporate some cost-saving refinements. For example, information is now available to better assess the

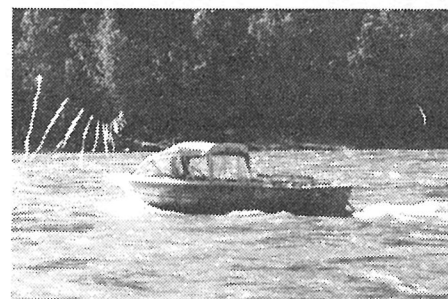
suitability of the river bottom deposits as a foundation for the dam embankment. This new information indicates that more river channel deposits may be left in place than was originally planned. Building on these deposits in some locations can save both time and money for the project. Rock excavation under the dam core may be reduced from earlier plans since the quality of the bedrock is better than earlier assumed.

Hydrology Studies Provide Details on River

It is important to know how the proposed dams will affect river flows, how the reservoirs will function, and what the effects will be on the river, side channels, and sloughs downstream. Dams, accompanying structures, and their operation will be designed in parallel with ongoing analysis of potential effects on fisheries, wildlife, and vegetation. To add to earlier hydrologic information, this year's program continues the focus on these analytical activities:

- Simulating reservoir water level changes and energy benefits due to water releases under various operating plans.
- Predicting reservoir water temperature patterns and ice conditions.

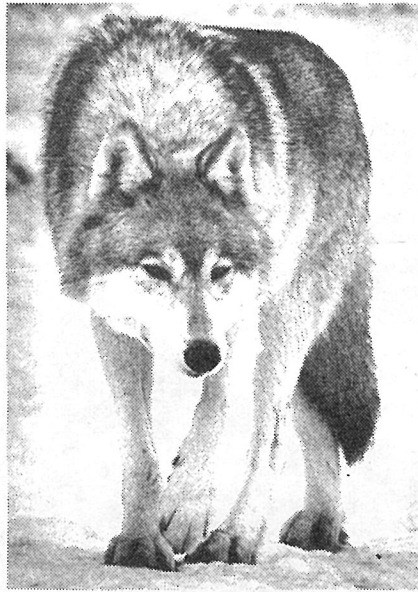
- Simulating, through computer models, the downstream river hydraulics, temperatures, and ice conditions.
- Analyzing sediment concentrations and volumes which will flow into and out of the reservoir and how they will be distributed.
- Predicting potential problems of sediments either building up or eroding downstream from the reservoir.
- Estimating effects of different water releases on the hydraulic and ground-water characteristics of sloughs and side channels downstream from the dams.
- Refining estimates of the largest probable flood (Probable Maximum



Flood) and other significant floods for use in designing the dams and other project features.

All of this information will be used in both engineering and environmental studies and will be especially useful in environmental mitigation planning.

Environmental Programs to Continue Through Licensing



Wildlife studies include wolves, shown at left, and involve evaluation of bear denning habits. An "inside-out" shot of a bear den is shown below, and the bear on the right is being measured for monitoring.



Efforts to characterize the Susitna River Basin and to predict project effects are continuing this year. Areas of current study are summarized below.



Archeologists are studying both historic and prehistoric sites. Shown is a cabin in the study area.



Socioeconomic Impact Assessment



How will the Susitna Project change the Railbelt? The local communities? The rest of the State? Impacts on people from construction and operation of the Susitna Project have been and continue to be carefully evaluated. The June 1982 newsletter focused on what the potential changes will be in the project area, including effects on housing, population, employment and income, schools, transportation, community facilities and services, and attitudes. The socioeconomic impact assessment has projected the population growth for potentially affected communities in the Mat-Su Borough, without Susitna, and then calculated what the changes might be in each community with the project. For example, predictions were that

approximately 810 people would move into the combined Trapper Creek and Talkeetna areas by 1990 as a result of the Susitna Project.

Predicting future conditions is a difficult task, and projections require periodic updating as conditions change. The Susitna socioeconomic program will attempt to accomplish two things this year. The first is to collect firsthand information on the communities that will be most directly affected by the Susitna Project. Household surveys will be conducted in Talkeetna, Trapper Creek and Cantwell in October. Surveyors will visit households chosen at random to collect information on household size, employment, housing type, services

and facilities, hunting and fishing, and community attitudes. The results will add to the understanding of conditions in the communities today so that impacts of the project can be more accurately identified.

Second, estimates of population and economic conditions in the Mat-Su Borough and potentially affected communities are being revised to reflect changes in state-wide and Railbelt forecasts. These revised estimates will represent conditions without the Susitna Project. With the updated information, a computerized socioeconomic impact assessment model will be used to update projected impacts. This impact assessment will be updated throughout the project.

Fisheries Program



Maintaining or enhancing the aquatic productivity of the Susitna River is a key objective in project planning. The fisheries program began during the feasibility study and has evolved into one of the most comprehensive aquatic studies programs ever conducted in Alaska. The Alaska Department of Fish and Game's Su-Hydro Studies Team started their characterization studies in 1981. That work led to detailed instream flow studies which examine the effects of various river flows on fish habitats. Results will be coupled with the results of hydraulic, temperature,

water quality and stream bottom studies, to determine the potential effects of the project on the downstream fisheries.

The Susitna River drainage contains habitats for various life stages of all five species of Pacific salmon as well as for resident species including rainbow trout, arctic grayling and burbot. The main river, tributaries, side channels, and sloughs all provide specific conditions for each of these species. Changes in the river due to the project could alter the availability and suitability of the existing habitats.

Habitats could be either lost or improved. Once the range of potentially adverse or beneficial effects are identified, appropriate tradeoffs and mitigation measures can be considered.

The study has focused to date on the stretch of the river between Devil Canyon and Talkeetna. This year's study of the river between Talkeetna and Cook Inlet is being expanded to determine the potential range of post-project effects throughout the Susitna drainage.

External Review Panel Advises Power Authority

The External Review Panel plays a key role in advising the Alaska Power Authority. As is often the case in major projects such as this one, an external panel of experts can provide an objective, overall review of all elements of the project from outside the organization to ensure the quality of the project's results. As planning and feasibility studies began, the External Review Panel was formed to review that phase. Now that the project has moved into the design phase, several new members have been added with appropriate expertise. The current membership is described below. Members bring to the project a wide range of relevant experience.

Mr. Robert A. Boyd, a Canadian electrical and mechanical engineer, was selected by *Engineering News Record* as Construction's Man of the Year for 1981, due to his engineering and managerial excellence in the over 10,000 megawatt development of the

Le Grande River in the remote subarctic James Bay region of Quebec. Mr. Boyd has served as past President of the James Bay Energy Corporation and Hydro Quebec, as well as Commissioner of Hydro Quebec. Currently he is Vice President for Gendron Lefebvre, Inc., and Laboratoire de Beton Ltee, as well as Director, Bank of Montreal.

Mr. James W. Libby, an independent engineer, has served on hydroelectric consulting boards throughout the world. As Chief Design Engineer for International Engineering Company, his projects included the Furnas Hydroelectric Project in Brazil, a 12 million cubic yard rockfill dam; as well as the 210 megawatt Oxbow Hydroelectric Project on the Snake River. Subsequently he has served as a member of numerous boards of consultants, including the Nelson River development in Manitoba.

Dr. Andrew H. Merritt, a geologist,

has been involved in research investigations, design, construction, and review of major hydroelectric projects internationally. As a consultant in engineering geology and applied rock mechanics, Dr. Merritt serves as a specialist in tunnels and rock mechanics, with extensive hydroelectric experience. He has written several technical publications and is a member of the Underground Construction Research Council of the American Society of Civil Engineers.

Dr. Ralph B. Peck has served as Professor Emeritus of Foundation Engineering at the University of Illinois since 1974. Dr. Peck was a member of the Corps of Engineer's Board of Consultants on landslides induced by the 1964 Alaska earthquake. He has been selected as one of the top 10 U.S. Construction Men of the past 50 years by the American Society of Civil Engineers and has been the recipient of the National Medal of Science.

Cultural Resources Program



In 1980, a cultural resources program began in the Susitna River Basin as part of the Susitna feasibility study. Archeologists from the University of Alaska Museum began identifying sites where human activity had occurred in historic and prehistoric times. That first summer field season focused on testing the area to identify potential sites.

Now finishing its fourth summer, the University of Alaska team has continued to identify cultural sites (such as homesites, campsites, and hunting base camps) and systematically

excavate each site. Most sites are found where expected: attractive camping areas, high well-drained ground, hunting trails, and good viewpoints. Typical evidence of human activity includes "debitage," or flakes from forming tools, burned fragments of animal bones, and some flaked stone tools. Most artifacts are very small, but their importance is that different sites can be related to one another by using four tephras (distinct volcanic ash layers) that cover the study area. All artifacts have been cataloged and are being held in the

University of Alaska Museum's Susitna collection in Fairbanks, although ownership remains with the landholders.

Results of this program will allow mitigation planning within Federal and State guidelines for cultural sites that will be directly affected by the project; for example, covered with water or disturbed by construction. Planning for mitigation activities will occur in 1984 and 1985. The studies will help archeologists in reconstructing the prehistory and history of the Susitna River Basin.

Wildlife Studies



The effects of the Susitna Project on wildlife and their habitats are a major focus of continued studies. The Power Authority has supported intensive wildlife studies since 1980. Together with earlier work in the project area, these studies have substantially expanded the range of knowledge of wildlife and vegetation which allows the development of impact assessments and mitigation plans. Continuing investigations are designed to refine impact assessment and mitigation plans, especially for big game mammals.

Field studies continue on moose

(both in the project area and downstream), caribou, Dall sheep, brown and black bears, wolves, beaver, hawks and eagles, and vegetation. Most of the wildlife information is obtained by aerial survey to determine numbers, sex and age class, distribution, habitat use, and seasonal movements. Radio collars have been placed on some animals to provide better information on age, sex, and health. By tracking the animals from aircraft, details of their movements, habitat use, reproductive success, and eventually, cause of death, can be obtained.

Computer models have been developed to predict potential project effects on several species including moose, brown and black bears, and beaver. Biologists use information from the models to identify both adverse and beneficial impacts and to determine what further studies are most important to refine mitigation plans. Examples of mitigation techniques that are being studied include evaluating enhancement of moose habitat and techniques for providing artificial nesting sites.

Transmission Line Routing

The Susitna Project license application shows routes selected for carrying Susitna energy to users. Transmission lines from Watana and Devil Canyon will be run westward to connect with and parallel the Anchorage-Fairbanks Intertie, which will have capacity added to handle the additional Susitna power load.

Routes extending from the Intertie endpoints (Willow and Healy) to the Anchorage and Fairbanks areas were selected as well. The recommended transmission line system and routes resulted from an evaluation of numerous alternative corridors. Requirements included technical and economic feasibility, environmental

suitability, land availability, and compatible existing land uses.

The Power Authority is now further evaluating and refining the route selection. Community meetings were held in May 1983 to seek public ideas on the routing. The refinement studies will be completed late in 1983.

Surveys — Coming Soon

Survey teams will be contacting a sample of households in Cantwell, Trapper Creek and Talkeetna in October. Information on population, housing, employment and other factors will be collected for use in planning for the Susitna Project. The purpose of the surveys is to gain a more complete understanding of today's

conditions in communities likely to be affected by construction and operation of the Susitna Project.

Representatives may come to your home to interview an adult who lives there. We appreciate your cooperation with the interviewers and will hold all reports completely confidential.

We are interested in hearing from you. Please give us your questions or comments on this newsletter, the Susitna Project, or other topics you would like to read about in the future by writing:

Alaska Power Authority
Susitna Project Office
334 W. 5th Avenue
Anchorage, Alaska 99501

Meeting Notification

A weekly listing of Susitna technical working meetings between the Power Authority and resource agen-

cies will be posted at the Power Authority offices. That information will also be available by calling 276-0001.

Dr. H. Bolton Seed is a specialist in earthquake-resistant design. A Professor of Civil Engineering at the University of California, Berkeley, he has served as chairman of the Department of Civil Engineering. Dr. Seed has been a consultant on soil mechanics and seismic design since 1953, and has worked on over 80 dams worldwide, most of which were in seismically active areas. He was involved in analyzing the 1964 Alaska earthquake. After a dam failure in California in the early 70s, Dr. Seed wrote design procedures for California to avoid future dam failures. These procedures are now used throughout the world to produce safe seismic designs.

Stanley D. Wilson, P.E., is a Consulting Civil Engineer and former Executive Vice-President of Shannon & Wilson, Inc. Mr. Wilson is an internationally recognized authority on earth and rockfill dams and serves as a

consultant on major hydroelectric projects all over the world. He is also an expert in laboratory and field instrumentation used in geotechnical engineering and has developed techniques and special equipment for measurements of earth and rock movements. Mr. Wilson developed a tiltmeter, now known as a Slope Indicator instrument, after extensive research of earth and rock movements under dynamic loads and landslide conditions. He also worked in researching effects of the Alaska earthquake in 1964.

Dr. Vera Alexander is currently Dean of the College of Environmental Sciences for the University of Alaska at Fairbanks. Additionally, she directs the Division of Marine Science and the Institute of Marine Science. Her areas of expertise include nutrient cycles of aquatic systems, primary productivity, arctic and subarctic limnology, biological oceanography, and nutrient cycling, with special

emphasis on low trophic level biology, nitrogen fixation in aquatic and terrestrial ecosystems, and dynamics of marine marginal ice zone ecosystems.

Dr. Roy E. Nakatani is the Associate Director of the Fisheries Research Institute at the University of Washington. Currently he serves as a fisheries consultant to Centralia City Light, assessing instream flow issues on the Nisqually River. He has written numerous publications related to water quality, bioassay and heavy metal metabolism in fishes. Dr. Nakatani has served as a scientific consultant and lecturer for environmental management to a number of agencies and companies working in the energy field in the Pacific Northwest. Additionally he has testified as an expert witness in Federal Energy Regulatory Commission hearings on fishery-hydro problems, as well as conducting independent technical review of Environmental Impact Statements.

Dr. A. Starker Leopold, recently deceased, was nationally recognized as a zoologist and had worked in Alaska since the 1950s. He co-authored the book "*Wildlife in Alaska*," which discusses ecologic problems in the State (the decrease in caribou, the increase in moose, and the basic causes for both). Later Dr. Leopold acted as an advisor on several major project proposals: the Rampart Dam proposal and the U.S. Forest Service timber sale to Champion International in Southeast Alaska. His involvement in the External Review Panel has been invaluable and will be missed.



september 1983

susitna hydroelectric project

Newsletter

This is the sixth of several newsletters published by the Alaska Power Authority for citizens of the Railbelt. The purpose is to present objective information on the progress of the Susitna Project so that readers may make their own conclusions based on accurate information.

Eric P. Yould, Executive Director
George E. Gleason, Public Information Officer
Patricia J. Serie, Public Participation Coordinator

Alaska Power Authority
334 W. 5th Avenue
Anchorage, Alaska 99501

The state of Alaska is an equal opportunity employer.

IN THIS ISSUE:

susitna project today	2
FERC licensing process	2
who is involved?	2-3
interview with FERC project manager	3
energy forecasts revised	4
design cost savings	4
winter geotechnical program	5
environmental and engineering programs	6-7
external review panel	6-7



ALASKA POWER AUTHORITY
PUBLIC PARTICIPATION OFFICE
334 W. 5th Avenue
Anchorage, Alaska 99501

BULK RATE
U.S. POSTAGE PAID
PERMIT NO. 272
ANCH. AK. 99502

susitna hydroelectric project

Newsletter

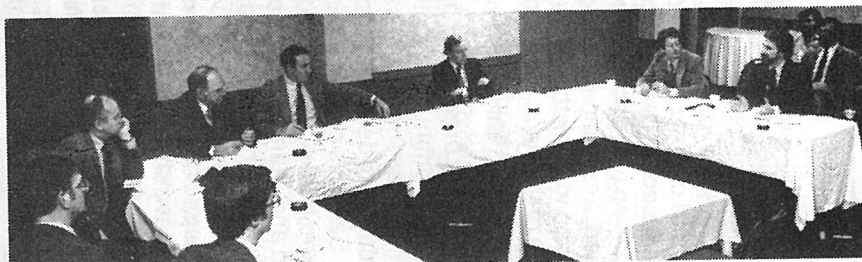
february 1984

Power Authority Board Makes Susitna Decisions

Actions taken by the Alaska Power Authority Board of Directors in October and November will maintain "fast-track" licensing of the Susitna Hydroelectric Project. The Board approved budgets through mid-1985 that provide environmental and engineering support for the license application now under review by the Federal Energy Regulatory Commission (FERC). The work involves continuing programs such as fisheries and socioeconomics monitoring as well as supplying FERC with the additional engineering, geologic, economic, and environmental information they need to evaluate the project.

Governor Sheffield approved a \$22 million budget for work in Fiscal Year 1984 (ending June 30, 1984), with \$6 million in additional funds set aside as a contingency to be used at the Board's discretion. Because it was not known exactly what added licensing information would be requested by FERC, the contingency fund was included to cover unforeseen activities. The Power Authority Board has approved use of \$2.8 million of the fund at this time, making the working budget for this year \$24.9 million. The additional funds were applied to efforts of the aquatic program (Alaska Department of Fish and Game), updating project economic and financial analyses, and maintaining the fast-track licensing schedule.

For Fiscal Year 1985 (July 1, 1984 through June 30, 1985) the Board of Directors approved a Susitna budget of \$32 million. This will continue support of licensing as FERC completes the environmental impact statement, holds hearings, and continues their detailed review of the project. Several



environmental studies will also continue into FY 1985 (e.g. the aquatic, wildlife, habitat, and socioeconomics programs).

The Susitna Project license application contains a conceptual design of the two-dam project and all related facilities, along with detailed information on project costs, economics, and environmental impacts.

Further review has revealed several areas that, based on the latest geotechnical and engineering information, can be changed to save money and minimize environmental impacts. The Board voted to incorporate the following refinements to the Watana development, with the understanding that including them in the application would not significantly delay the licensing process.

- Foundation excavations would be reduced by 3.5 million cubic yards because of new geotechnical information on the quality of the rock under the dam.
- The Watana dam design uses zones of different earth and rock materials (e.g. gravel, sand, earth). Based on revised excavation plans and location of construction materials, some changes would be made in how the zones would be arranged. The changes would make better use of available materials without affecting dam safety. The embankment slope would also be changed slightly to further reduce earthquake risk.
- The upstream cofferdam and

diversion tunnels reroute the river water during dam construction. The cofferdam height would be increased for added protection against ice buildup and the tunnels modified to reduce sediment deposits.

- The channels approaching the power station intake structure and the spillway would be combined to improve hydraulic efficiency.
- Based on a reassessment of geotechnical information, the underground powerhouse would be realigned to be more compatible with the rock joints. Instead of six power tunnels, three tunnels would carry water to the generators. These power tunnels would also be realigned to reduce construction cost without sacrificing power output.
- The main spillway would be enlarged to handle all predicted flows, instead of the earlier arrangement of a service spillway for normal flood discharges and an emergency spillway for the maximum probable flood.

The Devil Canyon development, planned to be built after Watana, would have only one design refinement. As at Watana, the emergency spillway would be eliminated and a combined spillway large enough for all floods would be included.

These refinements would not change the basic concept being reviewed by FERC, yet could save the project over \$400 million, reducing the estimated cost of the project from \$5.4 billion to \$5.0 billion (both in 1983 dollars).

susitna hydroelectric project

Newsletter

february 1984

Profile—Board of Directors

The Alaska Power Authority Board of Directors oversees all activities and sets policy to fulfill the Authority's mission of developing new, cost-efficient sources of energy for the State of Alaska. Members are appointed by the Governor and confirmed by the Legislature; public members serve 2 to 3 year terms and state agency officials serve for unspecified durations.

The Chairman of the Board is Richard Lyon, Commissioner of the Alaska Department of Commerce and Economic Development. Commissioner Lyon was appointed in late 1982, and brings a variety of public and business experiences to the organization. Chairman Lyon was interviewed recently about the role of the Board:

Question: How were you chosen as a member of the Alaska Power Authority Board of Directors?

Lyon: I was sworn in as Commissioner at the same time as Governor Sheffield, December 6, 1982. Sitting on the Power Authority Board is a matter of statute, but being Chairman is not. I was selected for that position by the other directors. Since the Power Authority is in the Department of Commerce and Economic Development for administrative purposes, the Board felt it would be simpler to have

the Chairman and the Commissioner be the same person.

Question: What is the composition and organization of the Board?

Lyon: We have three other cabinet members on the Board, and we're also really fortunate in our three private sector members (see profile of Board members below). The current membership gives us good regional and experience balance. I am very comfortable with the calibre of the Board and I think the State is going to be well served.

Question: Are all the Board members new?

Lyon: The Governor has felt strongly that he wants to take a new look at everything the State is doing, and has a lot of new department heads. In addition, the entire 7-person Power Authority Board is new.

Question: There is a management study of the Power Authority underway now by the Charles T. Main Company. Do they have any recommendations on the function of the Board?

Lyon: Phase 1 of the study has been completed. The Main analysis indicates that the Power Authority and the Board should deal more with plan-

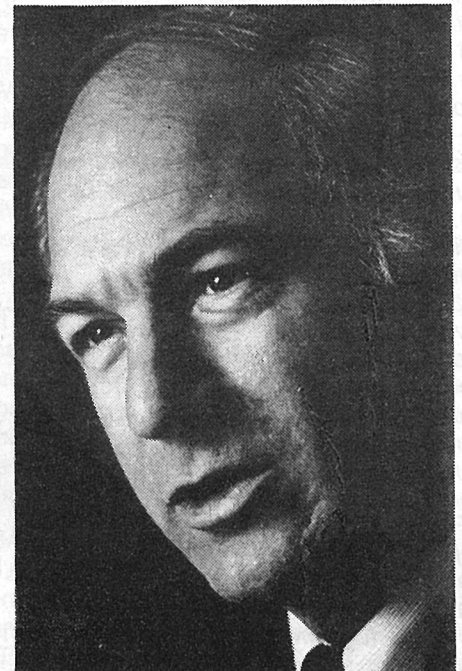
ning, and that's receiving more attention within the Power Authority, as it is within the Administration. The Department of Commerce and Economic Development now has an Office of Energy and we've had a high degree of cooperation with the Power Authority on the State Energy Plan.

Question: How are Power Authority decisions actually made?

Lyon: There's a clear distinction between day-to-day operating decisions and policy decisions. We are trying to define this very carefully so the Board is not involved in operating decisions and is not involved in negotiating for the Power Authority. Most of those things are staff functions. The state contracting procedures, for example, already put every contract through a rigorous process of approval.

Question: What is your feeling on the status of the FERC fast-track licensing schedule for the Susitna Project?

Lyon: I feel quite confident about our ability to stay with the process. Last December, I met with FERC Commissioner Georgiana Sheldon in Washington, D.C. and assured her of not only the Board's but also the Governor's dedication to maintaining the Susitna licensing schedule. We



Richard Lyon, Board Chairman

recognize some licensing needs are hard to predict, but if we fail it won't be for lack of commitment.

The Power Authority's posture is that we're fully supporting the fast-track licensing process, and that process will answer some basic questions: are the dams safe, do we need the power, and is it feasible? The Governor will be working with the Power Authority on outreach within the State to involve in the planning all the folks who will be using the power.



Robert Heath,
Commissioner of Alaska Department
of Revenue

Robert Heath came to state government in 1983 from several positions in private industry. He has served as Senior Vice President for Administration for Western Airlines, and as Vice President of Finance for Alaska International Industries and Burgess Construction Company. Mr. Heath was also Controller for the Anchorage Natural Gas Company.

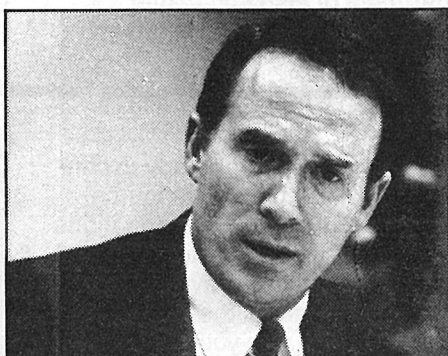


Peter McDowell,
Director of Office of Management
and Budget

Pete McDowell administers budget and internal auditing as Director of the Governor's Office of Management and Budget. He served on the Business Management Task Force of the Governor's Transition Team. Mr. McDowell has extensive management consulting and financial audit experience in industry, and is also a trustee of the Alaska Permanent Fund Corporation.

Lee Nunn,
ARCO, Inc.

Lee Nunn, the third public member of the Board, is the Prudhoe Bay Operations Staff Manager for ARCO, Inc. He was formerly Alaska District Engineer of the Army Corps of Engineers. Mr. Nunn, a West Point graduate, has been a White House Fellow and holds a master's degree in nuclear engineering.



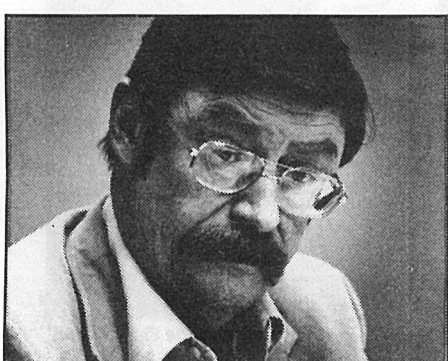
David Allison,
Past President of Alaska
Environmental Lobby

David Allison, a practicing Juneau attorney, is another public Board member. He served as president of the Alaska Environmental Lobby, a coalition of environmental groups in the State, and was also a policy program specialist for the Hammond Administration. Mr. Allison's experience includes two years in the Indiana House of Representatives.



Esther Wunnicke,
Commissioner of Alaska Department
of Natural Resources

Esther Wunnicke holds responsibility for managing Alaska's natural resources to the benefit of all Alaskans. She has served on the Board since 1982. Earlier she managed the Outer Continental Shelf Office of the Department of Interior and chaired the Federal-State Land Use Planning Commission. Commissioner Wunnicke chairs the Resources Committee of the Board.



Robert Huffman,
Past General Manager of Golden
Valley Electric Association

Robert Huffman is one of three public members of the Board. He retired as general manager of Golden Valley Electric Association after 14 years, with earlier experience in addition as a lineman and line supervisor. His excellent working knowledge of electrical utilities, rate structures, and the region, adds depth to Board decisions.



Process Underway To Resolve

Environmental Issues Settlement-Key Goal

A project as large and complex as Susitna raises a variety of issues — engineering, economic, and environmental. The project has been reviewed since the beginning of the feasibility study by the public, native groups, and local, state, and federal agencies. A primary goal now is to identify and resolve outstanding issues.

Two parallel efforts are underway: the process of settling environmental issues and the need-for-power evaluation. The settlement process is designed to resolve environmentally related issues with the responsible resource agencies, while need-for-power hearings are designed to respond to the economic and power need issues raised by FERC in their analysis of the license application. The environmental and economic issues come together, for example, in the development of flow regimes. FERC's schedule for the Susitna Project, in order to meet the fast-track goal, calls for early need-for-power hearings, early issues settlement with subsequent environmental hearings, and a licensing decision that considers both paths.

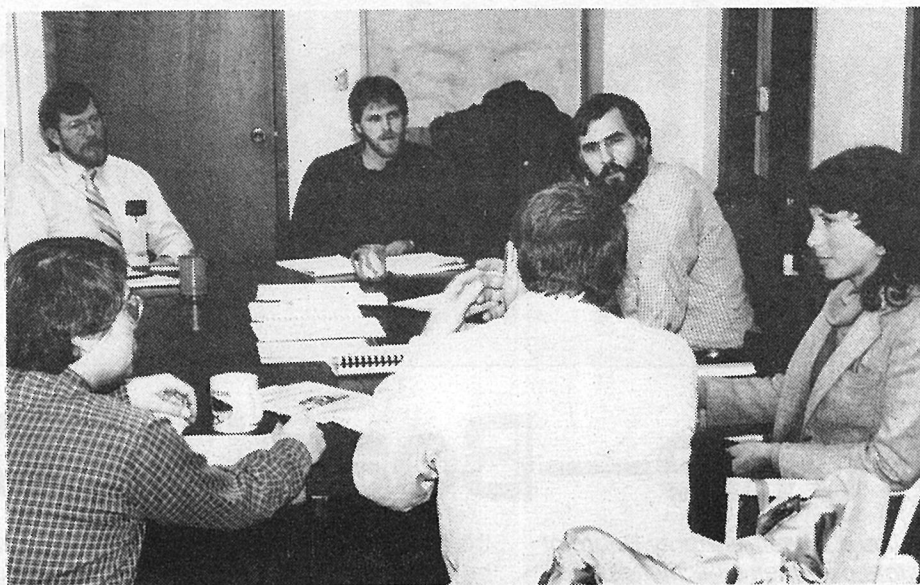
In this issue we consider the issues settlement process in some detail. The next Susitna Hydroelectric Project Newsletter will focus on need-for-power issues.

By resolving issues at the state level, it may be possible to reduce or possibly avoid the need for FERC environmental hearings, providing an "Alaskan solution" to environmental questions. Even if some issues cannot be fully resolved, hearings may be reduced in length, complexity, and cost.

Issues settlement is being coordinated by Tom Arminski, Alaska Power Authority Deputy Project Manager for Permitting. Legal expertise is being provided by Jane Drennan, a specialist in FERC licensing with the Washington, D.C. law firm of Pillsbury, Madison and Sutro. Local legal support comes from Richard Haggart and Jeff Lowenfels, Anchorage attorneys with Birch, Horton and Bittner. Their experience has focused largely on resource issues.

The goal is to resolve outstanding issues by December 1984. The settlement process is planned to reach agreement on project impact assessments and to agree on an acceptable level of environmental mitigation.

After more than four years of studies, a large amount of baseline environmental data has been collected. This information is being evaluated by FERC in the licensing process. The settlement process adds an additional mechanism for involving resource agencies and intervenors in that licensing process. (An intervenor is a group or individual with an interest in the project who has formal-



Agency participants and project team members discuss wildlife mitigation issues as part of the Susitna Project issues settlement process.

ly requested and been granted participation in the licensing process by FERC. An intervenor may support or oppose the project, and is involved to see that particular issues are adequately addressed.)

The first step in the settlement process is to identify the key issues and the agencies or other groups with whom these issues must be resolved. That activity is well underway. Lists of issues and concerns raised throughout the project have been sorted by commentators and given to them for review. Meetings have then been held with each group to discuss their issues and arrive at a current list. These meetings are open to the public and scheduled in advance; infor-

mation on them is available by calling the Alaska Power Authority at 276-0001. Issues important to organizations and individuals who have been granted intervenor status have been gathered from their petitions and will be addressed with a similar process once the first step is completed.

With definition of the issues, the next step is to consolidate the lists of issues, address each issue individually, and try to reach agreement on how to resolve it. The issues generally fall into four categories:

- aquatic
- socioeconomic
- wildlife
- land related

Aquatic Issues:

The project will change flows in the Susitna River, decreasing flows in summer and increasing them in winter. It will also cause some changes in water temperatures, cooler in summer and warmer in winter. Suspended sediment in the river will decrease in summer and increase in winter.

The license application presented estimates of aquatic impacts, but data collected since then are providing more precise projections. Models are being used to look at different ways of operating the project and how these scenarios would change downstream effects.

The goal of the aquatic settlement process is an acceptable project operating plan. The plan must consider projected effects on fish and aquatic resources. These effects will then be

balanced against economics and operating concerns to arrive at a final plan. In order to ensure that the objectives of water resource and fisheries managers and fishing/recreation groups are fully considered, workshops will be held. They will acquaint resource agencies with the aquatic models and allow discussion of the issues and alternatives. The workshop results will be used to help determine alternative flow plans. If it is not possible to reach agreement on a suitable flow regime, the issue will be decided by FERC following hearings. Once a flow plan is agreed upon, it may become part of the FERC license and other permit specifications.

Socioeconomic Issues:

Socioeconomic issues involve the effects that the project may have on nearby communities as well as on the region and the State. The socioeconomic model used to predict im-

pacts for the license application has been updated to match current population growth predictions and surveys of the adjacent communities have added to the baseline of community information (see article on page 6). Key issues have been identified, and programs will be developed to minimize community impacts. Participants in resolving socioeconomic issues include the Mat-Su Borough, the Alaska Department of Community and Regional Affairs and Department of Labor, and local communities.

Wildlife Issues:

Resolution of wildlife issues will proceed in much the same way as the aquatic and socioeconomic issues. Issues concern loss of habitat and displacement of animals due to project activities. Mitigation plans are being discussed with the Alaska Department of Fish and Game, Alaska Department of Natural

Resources, U.S. Fish and Wildlife, and other resource agencies, and assessments of the impacts of the project on wildlife continue to be refined. Discussions with resource agencies will result in a plan for avoiding or mitigating adverse impacts on the animals themselves and on habitats.

Land-Related Issues:

Land-related issues concern how land will be acquired for the project, which state lands may be devoted for wildlife mitigation, and potential new land uses. In addition, a Land Managers' Task Force is being formed to include the Department of Natural Resources, Bureau of Land Management, Native corporations, Mat-Su Borough, and others. This group will consider how the project might affect current land uses and provide a forum to allow comprehensive land use planning relative to the project.

Board Adds Resources Committee

Early in 1983, the Power Authority Board of Directors established a committee system in order to more closely examine policy issues and streamline the operation of the full Board. Three committees were originally established: Finance, Audit, and Project Management. In December, the Board combined the Finance and Audit Committees and added a Resources Committee.

The Resources Committee was added to provide guidance on resources issues related to Power Authority projects. Chaired by Esther Wunnicke, Commissioner of Natural Resources, the Resources Committee's efforts will ensure that Board policy decisions include consideration of resource issues and concerns.

The group will meet regularly to consider environmental and resource matters and make recommendations to the full Board. In addition to Board members Wunnicke, David Allison, and Peter McDowell, the committee will also include non-voting representatives of the Departments of Fish and Game, Environmental Conservation, and Community and Regional Affairs. Commissioner Wunnicke feels that this provides a broader forum in which Power Authority resource policy can be developed. She felt that the committee can help to evaluate the Susitna Project environmental studies, identify information needs, and make sure that the Board has the facts and the tools needed for good decision making.



Commissioner Wunnicke leads Resources Committee.

Licensing Issues

Need for Susitna Power-Key Goal

Projecting how much electricity the Railbelt needs in the next 50 years is a complex problem. The amount of power needed for homes and industry depends on population growth, electricity costs, and availability of other sources. Projections have been made for these factors in planning for the Susitna Project. The license application explains in detail how the projected need was established, what the alternatives are for producing the needed electricity, and how Susitna compares with those alternatives.

As FERC reviews the license application, they are critically

evaluating the assumptions used in planning, and are making their own analyses to test the results. A part of the licensing process involves administrative hearings on need for power. That hearing process is scheduled to begin in late spring 1984 with prehearing conferences, which are opportunities to identify the active parties, set hearing schedules, and order the period of discovery. A period of discovery allows the participants (Alaska Power Authority, FERC, intervenors) to request relevant documents from each other. Direct and rebuttal testimony is presented, with following cross-examination.

Briefs arguing the facts and law in the case are filed with the administrative law judge, who decides whether a need for power has been demonstrated. That decision is scheduled for approximately one month after the briefs are filed.

A positive decision on need for power is not an authorization to proceed; FERC must still consider dam safety and environmental issues. Currently FERC is scheduling hearings on safety and environmental matters to begin in February 1985 and continue into 1986. License issuance would be in late 1986 or early 1987.

Environmental Impact Statement-Draft to Final

The Federal Energy Regulatory Commission, or FERC, is responsible for assessing environmental impacts of the proposed project and preparing an environmental impact statement (EIS). Information in the 18-volume license application, additional requested supplemental data, agency comments on the application, and the Power Authority's reply to the comments, all serve as the basis for evaluating alternatives and assessing impacts.

In July 1983 FERC asked Alaskan agencies and residents to suggest key project issues. At scoping meetings held in Anchorage, Talkeetna, Cantwell and Fairbanks, agencies and the public reviewed a proposed list of issues and added their ideas.

FERC then prepared a document called "Susitna Hydroelectric Project, Scoping Document II," which included issues identified at the scoping meetings, and outlined the draft EIS which is being prepared.

FERC has contracted with two federal laboratories (Oak Ridge and Argonne) to develop the draft EIS by May 1984. The draft EIS will discuss the need for the project and alternative ways to produce the needed electricity. In addition, it will describe the project facilities and plans for construction and operation. Environmental impacts will be discussed, including land use, meteorology, water quality and quantity, fish and wildlife, vegetation, threatened or endangered species, recreation, socioeconomics,

and visual and cultural resources. The Susitna Project and all proposed alternatives will be described in terms of each of these categories, and their environmental impacts compared. The EIS will provide conclusions on impacts and recommend actions. An appropriate mitigation strategy will be assigned, and the license may include requirements for continued environmental studies.

When the draft EIS is complete in May, FERC will publish a notice in the *Federal Register*, and agency and public review and comment will be invited. After a 60-day comment period, the final EIS will be completed and issued by FERC in December 1984. FERC will provide an additional opportunity for intervention at that time.

New Power Authority Executive Director

Larry Crawford, new Executive Director for the Alaska Power Authority, was confirmed by the Board of Directors on November 16, 1983. Mr. Crawford came to the Power Authority from the Governor's Office, where he served as Governor Sheffield's Chief of Staff. Prior to becoming the Governor's Chief of Staff in December 1982, Mr. Crawford had served as Executive Vice President and General Manager of MultiVisions, an Anchorage-based cable television company. Before assuming that post, Crawford had served the Municipality of Anchorage as Municipal Manager for three years and Director of Management and Budget for two years. He is a Certified Public Accountant with nine years of experience with an international accounting firm. He answers some questions below on his new position.

Question: What are your chief responsibilities in directing the Alaska Power Authority?

Crawford: I am the chief operating officer for the Authority. Policy matters are brought before the Board, and we carry out that policy with their guidance. Our chief responsibility is to develop an electrification program and plan for Alaska, including an implementation schedule. Another key job is to work with the utilities throughout the State to determine with them the least-cost alternatives for generating electricity.

Finding creative ways to finance projects is certainly another major responsibility. We are becoming more oriented to an approach of planning a project, marketing its power, and then building, in that order. Working with utilities will be very important.

Question: How does the role of the Power Authority fit within the new State Energy Plan?

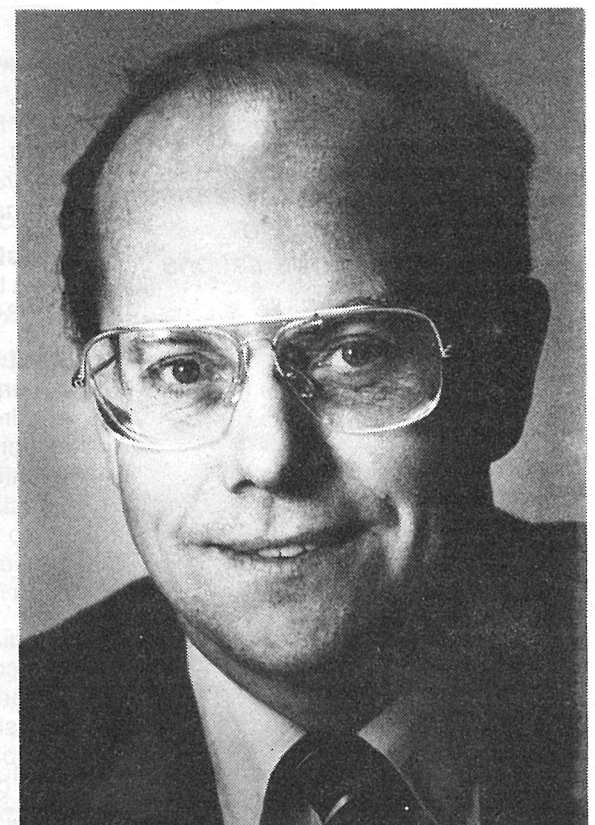
Crawford: I see the Energy Plan as a broad policy document. We will derive a set of assumptions from it which will guide us as we develop our specific program, under the umbrella of the plan. The Power Authority has a key role to play in carrying it out.

Question: What is your organizational structure for a project such as Susitna?

Crawford: Our organization is oriented along functional lines, with project teams put together from various functional areas to carry out a specific project plan. The people on the Susitna Project team have "homes" within these areas, but they work on the project and report to the fulltime Project Manager, Jon Ferguson, for the duration of their assignments.

Question: What are your thoughts on Governor Sheffield's Susitna Project budget recommendation of \$8 million for FY 1985?

Crawford: The Governor has made a commitment to Susitna, and his intent seems to be to have the Legislature determine their own level of commitment in their appropriation decision.



Question: What is your position on financing developments like the Susitna Project?

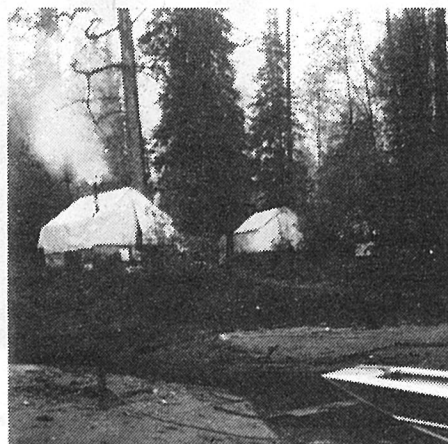
Crawford: If properly done, the electrification program can become self-sustaining, returning equity investments and providing additional monies in the long term for generation and transmission. I think we need to look at creative ways of financing the Susitna Project so the State can leverage its equity and maximize potential state revenues from the project.

Aquatic Studies—Key Environr



Tom Trent, Aquatic Studies Coordinator for ADF&G SuHydro Aquatic Studies Team

...“Substantial progress has been made since 1981 in moving from reconnaissance-level data collection to quantifying fish populations and habitats....”



The ADF&G Gold Creek Camp, shown here, is approximately 35 miles up river from Talkeetna.

In hydroelectric project planning, protection of fisheries and maintenance of fish resources must be balanced with the construction and operation of the project. Aquatic studies have been conducted in the Susitna River Basin since 1974. These studies have provided a broad base of information on the river, its tributaries and sloughs, and the distribution and abundance of fish. In the January 1982 issue of the Susitna Newsletter, fisheries specialists on the project team were interviewed. That issue also highlighted the activities of the Alaska Department of Fish and Game (ADF&G) SuHydro Aquatic Studies Team. Now, two years later, members of the aquatic team have updated those thoughts.

Following is an interview with Tom Trent, the Aquatic Studies Coordinator for the ADF&G Aquatic Studies Team. He answers questions on how the program has evolved since the original article.

Question: Since 1981, what have been the major changes in the ADF&G SuHydro Aquatic Studies?

Trent: The basic field study components remain: studies of adult anadromous fish; resident and juvenile anadromous fish; and aquatic habitat and instream flow. Substantial progress has been made since 1981 in moving from reconnaissance-level data collection to quantifying fish populations and habitats.

Populations of sockeye, pink, chum, and coho salmon in the Susitna River system are still monitored annually at four sites, and we are monitoring numbers of spawning salmon and their distribution in tributary and slough habitats above Talkeetna. We have cut back on the use of sonar salmon counters in the main channel, and are relying almost exclusively on traditional tagging and recapture methods. In 1982, we began counting chinook salmon that passed the main channel sites at Sunshine, Talkeetna, and Curry. We also made a comprehensive study of the eulachon or smelt populations. Sampling to determine salmon and Bering cisco spawning areas in the main channel was completed in 1983, but new work began to evaluate salmon egg production and the residence time of adult sockeye and chum salmon occupying slough habitats upstream of Talkeetna.

Studies that described the fish species and their seasonal habitat use now focus on measuring and quantifying the available habitat as related to the naturally varying flows of the river.

Our information on adult resident and juvenile anadromous fish has been refined each year, as is essential to determine the number of fish and amount of their habitat that may be impacted by the project.

We have marked and recaptured grayling in the Watana impoundment area to define the age structure of the population, and have modeled the effects of sport fishing on long-term yield. These streams may experience increased fishing when improved access is provided during project construction. The model will help to manage these grayling fisheries and mitigate impacts of increased fishing.

We expanded the studies of hydraulic conditions needed for salmon spawning to include tributary, tributary mouth, side channel, and mainstem habitats, in addition to slough habitats which were already being studied. This information is then used to determine the availability of slough, side channel, and tributary habitat used by spawning salmon as a function of mainstem flow.

Question: Has the geographic scope of your project changed?

Trent: Basically, no. Ground surveys of salmon spawning work were expanded to include monitoring of chinook salmon discovered in three tributaries above the Devil Canyon site, and studies of fisheries resources in streams crossed by access road corridors were included in our 1983 investigations.

Our primary emphasis has been on the Susitna River from Devil Canyon to Talkeetna, because of the probable magnitude of the effects of flow regulation. We will work on providing similar levels of quantification in the reach of river below Talkeetna in 1984, because this area has very large numbers of salmon associated with it seasonally.

Question: What kind of new information is available regarding the Susitna River salmon resources?

Trent: We have concluded that two migrations of sockeye salmon enter the river, and only the second migration spawns in slough habitats upstream of Talkeetna. We have also determined that Susitna River chum salmon, which make up 80 percent or more of the chum returning to Cook Inlet, are produced mostly in the Talkeetna River drainage. Our data have allowed us to quantify escape-ment numbers of Susitna River chinook salmon as well as sockeye, pink, chum, and coho salmon for 1982 and 1983, and for the first time we have documented small numbers of chinook spawning in tributaries above Devil Canyon. With the new data, we have been able to refine our estimates of the numbers of sockeye, pink, chum, and coho salmon that spawn between Talkeetna and Devil Canyon. (See table on opposite page.)

New information has been gathered on juvenile fish as well. We can now estimate by species the number of juvenile salmon which outmigrate from the Devil Canyon-Talkeetna

reach, and have estimated numbers and survival for juvenile sockeye and chum that were spawned in this reach. These data only cover one complete year of the open water out-migration cycle, however.

Question: What kind of new information is available regarding the resident fishery resources of the Susitna River?

Trent: We have been studying resident fish so that habitat criteria can be developed for use in instream flow modeling. Monitoring radio-tagged rainbow trout tells us about their use of the Susitna and tributaries by season. It would have been difficult to use other means because of low population densities and the glacial nature of the river. These rainbow studies are helping us understand the relative population size and primary spawning areas for this species.

Question: What kind of new information is available regarding the Susitna aquatic habitats?

Trent: We have worked on providing information to define the instream flows that are needed to allow adult salmon to pass into sloughs. Information is now also available on the relationships between mainstem flow, water quality characteristics, and water levels in various habitats.

Question: You mentioned an instream flow study in your answer to the prior questions. What is an instream flow study, and why is it important?

Trent: Instream flow studies estimate the losses or gains of fish and wildlife habitat or other instream uses as a function of changes in the flow regime within the river. The primary effects of hydroelectric projects on downstream resources are changes in naturally occurring flows, so it is important to quantify the project effects on various flow-dependent resources and uses.

This information is then used to decide how flows can be regulated to support both generation needs and other instream flow-dependent values such as fisheries, recreation, and navigation. Ideally, an instream flow regime will be established which supports several beneficial uses.

Question: Is any of your work directed toward analyzing the impacts of this project?

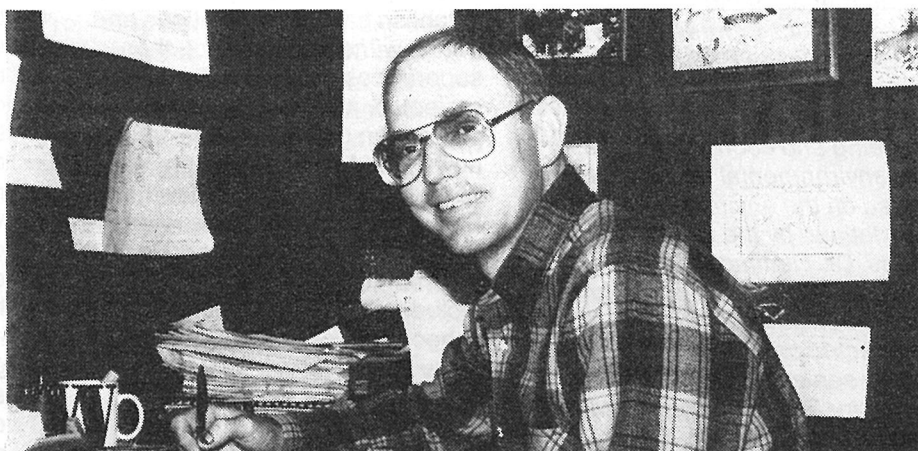
Trent: Impact analysis is not one of the direct responsibilities of the ADF&G SuHydro Team. Our charge is to provide the data and analytical tools to support that analysis.

Question: Based on your previous response, is any of your work directed toward development of mitigation options?

Trent: Instream flow studies can be used to assess project impacts, and they can also be used to estimate flows that may improve or enhance fish habitats. Therefore, flow recommendations may mitigate some of the adverse project impacts. We have proposed studies in 1984 to weigh the feasibility of enhancing selected areas by adding gravel or modifying the channel. These methods need to be coupled, however, with proper instream flows to ensure they will work. As with the impact analysis work, our studies are directed toward development of the data and tools that can be used by others to prepare project mitigation plans.

ntal Issue

Woody Trihey has participated in the Susitna aquatic studies program since 1980. He is a registered Professional Engineer specializing in river mechanics and instream flow assessments. He has provided the following answers to some questions that pertain to instream flow aspects of Susitna Project licensing.



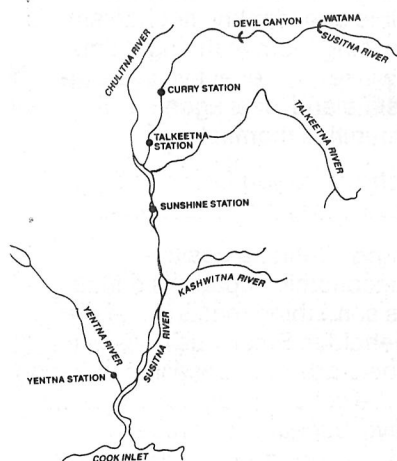
Trihey: Data have been collected that define the importance of a variety of physical aspects of the natural system. For example, we can demonstrate the importance of upwelling water to spawning chum and sockeye salmon, the response of juvenile salmon to the presence or absence of streambank cover, or the response of resident fish such as burbot or rainbow to changes in turbidity. Understanding how the proposed development might change these physical aspects of habitat, investigators can forecast quite accurately the effects of the proposed project on existing fish habitats.

Question: Can you describe the fisheries management objectives that generally are used to represent Alaska policy?

Trihey: The U.S. Fish and Wildlife Service introduced a mitigation policy in cooperation with several other federal agencies in 1981. It is my understanding that the Forest Service policy is compatible with the general policies and management objectives of the ADF&G and other resource agencies in Alaska. Basically, the mitigation policy recommends avoiding or minimizing impacts as the preferred form of mitigation. Remedial or corrective action is midway down the list, and compensation for impacts is the least-favored mitigation technique. The Alaska Power Authority's own mitigation policy strives for no net environmental loss.

Question: What is your opinion on the general adequacy of the information available on the project?

Trihey: I have a lot of confidence in our ability to produce a very fine description of how the natural system works and what the project effects are likely to be for the portion of the Susitna River upstream of Talkeetna. In my opinion, at least one additional year of well-focused, concentrated study will be required to bring our knowledge of the lower Susitna River up to a similar level of understanding with the river segment above Talkeetna.



SALMON SPECIES	% OF SUSITNA RUN (1981 - 1983)
Chum	12%
Coho	9%
Pink	7%
Sockeye	2%

These figures represent the percentages of salmon entering the Susitna River that reached the Talkeetna-Devil Canyon area in 1981, 1982 and 1983. (Estimates based on studies at the four ADF&G sampling stations shown on map.)

Question: You were first interviewed in 1981 about the Susitna Project's effects on fisheries. Have you seen major changes in the aquatic program since then?

Trihey: The basic framework and goals of the aquatic studies program have not changed significantly; however, there have been several major accomplishments since 1981 that have moved the study team much further along with regard to quantifying project effects and identifying mitigation opportunities. One of the major accomplishments has been ADF&G's identification of the seasonal fish use of six major riverine habitat types in the Susitna River corridor: mainstem, side-channel, side-slough, upland-slough, tributary, and tributary-mouth habitats. Engineering studies have also advanced a long way, greatly improving our knowledge of with-project streamflow, stream temperature, and sediment conditions in the river.

Question: What is an instream flow assessment?

Trihey: Basically, it is a scientific study undertaken to define the cause-effect relationships between changes in streamflow and various uses of the river. More specifically, it includes an evaluation of the effects of changes in streamflow, water temperature, sediment transport, and water quality, on instream uses or resources. Such an assessment is based on the premise that the physical condition and quality

of a stream determine its usefulness to fisheries or any other instream use.

The first step is to look at natural physical processes that provide for water quality, sediment transport, temperature and streamflow, and then to determine how these physical processes interact with biologic processes to provide a habitat which is occupied by fish and other biological organisms.

The second step is to identify how a proposed development might alter these natural processes and interpret the significance of the physical change from a biologic perspective. This gives us a solid framework for identifying specific impacts on that natural system, and developing a mitigation plan that addresses the real problem.

Question: What are the factors you consider in instream flow assessment?

Trihey: The basic factor is the watershed, which drives four major components of fish habitat: food web, water quality, flow regime, and channel structure. These components interact to make up fish habitat. In an instream flow assessment, one carefully examines a proposed project to identify how it will influence the existing relationships within each component.

Question: How are the habitat components related to the fisheries resource?

costs least to maintain a level thermal load whenever possible. The mixture of hydro with thermal works well, because hydro can be started, change load, and shut down very quickly with minimal effort or cost and with minimum loss of efficiency. The amount of thermal generating capacity that has to be built and paid for can then be reduced and the efficiency of the thermal plants can be improved.

On the Susitna River, the ideal operation, from just a power viewpoint, would be to maintain a continual discharge down river, with variations in discharge from hour to hour. Such discharge variation uses all available water to produce energy, rather than having energy losses on occasions when, otherwise, water would have to be released by means other than through the turbines. These are the kinds of operating issues we consider.

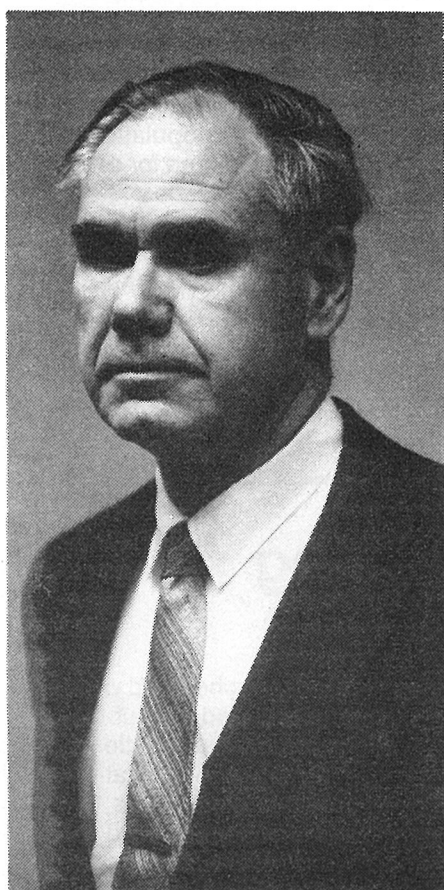
Question: Are there other factors that you consider?

Allen: Seasonal changes in load demand mean that more electricity is needed in the winter, while the maximum natural streamflows are in the

summer. An engineer would say that the two are 180 degrees out of phase, so we need to build up enough stored water in the high flow period to transfer hydroelectric energy to energy production in the low flow period. Within the limits of site characteristics and cost, a higher dam makes it possible to have more storage, which increases the benefits that hydro provides to the system.

Question: What are the constraints on operating with maximum benefit to the system?

Allen: All we have discussed so far are old-fashioned economics; those goals most definitely must be balanced with environmental concerns. My experience has been that we must analyze and then decide how to operate the system for the benefit of the power customers, the living creatures in and around the stream, and the humans who depend on the river for their living. Environmental concerns may set limits on discharge changes. Environmental and engineering studies are proceeding concurrently and cooperatively to analyze the various problems involved.



Mr. Art Allen retired from Harza Engineering in 1982 with nearly 40 years experience in designing, licensing, and building hydroelectric projects. He has been called back to help in designing an operating plan for the Susitna Project that will accommodate concerns for the aquatic resources. He answers questions below on that process.

Question: What are your primary objectives in designing an operating regime for a hydroelectric project?

Allen: Our energy goal is to produce the needed electricity as efficiently and economically as possible, taking full advantage of hydroelectric power's stable long-term costs.

Customer demand changes throughout each day, starting out low in early morning and peaking during the day. About 9 p.m. the load starts to drop steadily until it starts to increase again early in the morning. A mixed system of thermal and hydroelectric plants can use the coal or gas units to increase output gradually, meeting faster-increasing loads with the hydroelectric units. It is most efficient and

We've
been
asked

Questions on Socioeconomics

The following are responses to frequently asked questions about the socioeconomic impacts of the Susitna Project by Dr. Richard Fleming. Dr. Fleming manages the socioeconomic program in his role as Deputy Susitna Project Manager, Environmental, for the Alaska Power Authority. He is responsible for overseeing and coordinating the entire environmental program, which is based on the environmental issue areas defined by the FERC regulatory process. Dr. Fleming's experience includes supervision of environmental programs on several other hydroelectric projects, and he formerly served on the staff of the Institute for Environmental Studies at the University of Washington.

Dr. Fleming's master's degree in terrestrial ecology is from the University of Alaska Fairbanks; his B.S. and Ph. D. are from the University of Washington.



Computer Center

Teresa Skeen



Question: What is the purpose of studying socioeconomic impacts in the Susitna project area?

Fleming: The primary purpose is to establish baseline conditions and trends *without* the project, then superimpose the impacts of the project for analysis. An example is the population growth being experienced now in the Mat-Su Borough. We must consider that trend in the without-Susitna scenario before projecting impacts from the project on local communities and the region. Impacts include effects on services such as schools, fire protection, etc., and utility systems such as telephone and water supply.

Question: Can you describe the socioeconomic program to date?

Fleming: In the initial phases we relied on existing socioeconomic information from the federal census, the State and the Mat-Su Borough. That base of information is uneven — Cantwell, for example, is in the unincorporated borough, and little information was available. This year we have been collecting information more specific to the needs of the project through household, business and public sector surveys, and a survey of Intertie construction workers (see article below). The original information was used in a predictive model that considered the growth assumptions and the features of the project to produce an estimate of project impacts. We are currently refining that model to include the new information and recommendations by some agencies.

Question: How will you mitigate for adverse socioeconomic impacts?

Fleming: Our first strategy is to minimize or avoid adverse impacts through good planning and design early in the project. One example of this was in the selection of an access corridor. There was a perception that the Trapper Creek and Talkeetna communities generally wanted only moderate growth in population, wishing to avoid impacts on the community structure, services and quality of life. Cantwell, on the other hand, seemed more in favor of increased business opportunities and growth in population. These socioeconomic factors were considered in selecting an access route from the Denali Highway rather than the Parks Highway.

If there are impacts that can't be avoided, the next step will be to predict them as accurately as possible and identify mechanisms for addressing them at the right time. This will require effective coordination with state and local agencies and the communities themselves.

Question: Do you foresee any positive impacts from the project?

Fleming: Defining positive socioeconomic impacts is difficult — this is something that is in the eye of the beholder. Small businesses may see the staged increase in population from the construction work force as positive, because it increases business opportunities. People who chose to live in these communities because of the remote lifestyle may see the growth as a problem.

Socioeconomics- Update



Socioeconomic specialists have been examining population and economic characteristics of Railbelt communities for the past three years, and a description of potential socioeconomic impacts of the project was provided in the license application. Two major activities have been conducted since then to refine that assessment:

- Community surveys for the three communities that are expected to be most affected by the project — Trapper Creek, Cantwell, and Talkeetna.
- Update of the economic-demographic projections which are used to estimate project impacts on local economies and public facilities and services.

Community Surveys

The purpose of the community surveys, which were conducted in October and November, was to develop a base of information for local communities that will be potentially affected by the project. The

information obtained included population, composition of households, occupations, and hunting, fishing, and trapping activities. Surveys were also made of local businesses, government jobs, and an existing construction work force on the Intertie project. The survey results have been used to revise the socioeconomic forecasts, which in turn will be used to plan for the needs of the existing and projected population. The community survey report will be published in early 1984 and will be submitted to FERC to become part of the licensing process.

Economic-Demographic Model

A socioeconomic impact model was used to develop projections for the local and regional areas where project impacts are expected. The local impact area is defined as the Mat-Su Borough, including land in and around the project site and nearby communities such as Cantwell. The regional impact area includes the area from Kenai to

Fairbanks, including the North Star Borough. The model was developed to allow projections to be easily and periodically revised to reflect changes in existing conditions such as population or in assumptions about the project such as work force size or construction schedule.

The model is divided into three parts. It calculates project impacts on employment and population, by location and year. The model also provides detailed information on the movement of workers and their families, which helps determine impacts on public facilities and services. The additional facilities and services that will be needed to support both project-induced and baseline population growth are then estimated for each year of construction and operation. Finally, potential changes to community income and costs are projected. The projections made in the license application are now being updated to reflect changing economic conditions in Alaska and current population growth estimates.

Presentations On Susitna Status Available

Members of the Susitna project team made a presentation to the Anchorage League of Women Voters on November 9. Topics included background on the project, its licensing status, and the issues settlement process. Similar presentations have been made in past months to the Chamber of Commerce and Resource Development Council. If your organization is interested in scheduling a presentation for a meeting program, contact the Susitna Project Office, 279-6611.

Notice

We are interested in hearing your ideas and answering your questions on the Susitna Hydroelectric Project. Please contact us:

Alaska Power Authority
Susitna Project Office
334 W. 5th Avenue
Anchorage, Alaska 99501
279-6611

Meeting Notices

Working meetings scheduled with resource agencies and the public as part of the Susitna issues settlement process are listed each week at the Alaska Power Authority Offices, 334 W. 5th Avenue, Anchorage. You can find out about meetings by stopping by or by calling 276-0001.

Wildlife and Vegetation-Update



Moose field studies provide information on movements and habitat use.

Wildlife and vegetation studies continue to add to knowledge about animals and their habitats in the project area. In the last year the following studies were underway:

- Moose were counted by age and sex, and preliminary results indicate that about 2000 moose use the area of potential project impact. Radio-collared moose have been monitored to identify movements and determine the size of their home range. Tracking moose calves with radio collars is also important to provide information on causes of death and rates of predation by bears and wolves. Downstream of the project area, biologists are providing information on habitat use along the Susitna River floodplain. These studies also measure the tendency to use disturbed areas, which is key information in evaluating mitigation plans.
- Especially severe winters often change moose behavior by forcing them into lower elevations, adding nutritional stress, and adding to predation. A study to gain information on moose in such conditions has been planned if a severe winter with deep snow should occur. It would involve increased censuses, recording information on dead moose, and monitoring wolf kills.
- The Nelchina caribou herd ranges north and south of the Susitna River. Studies have aimed at learning their patterns in relation to the planned reservoirs and estimating the size and productivity of the herd. A potential project impact would be creation of barriers between different parts of the caribou range, which could affect migration and calving. Radio-collaring has been used to track individual caribou and herd movements, and to help locate different parts of the herd when censuses are conducted.
- Wolf studies are designed to map their use of the project area and to

monitor changes in wolf pack size. The principal potential impact on wolves would be loss of prey if moose and caribou populations were reduced, especially moose. About seven wolf packs have been identified, and radio-collaring has been used to track the number and size of the pack, locate den sites, and study food habits.

- Both black and brown bear have been under continual study to determine seasonal use of habitats, location of dens, and food habits. Samples of both types of bear were tracked and their dens marked and examined. The emphasis of the food studies was on spring and early summer food habits, especially use of salmon. Results have shown, for example, that salmon make up less of the black bear diet than previously assumed; the bears largely feed on berries. Radio collars help in locating sampled bears and their dens.
- Dall sheep range has been monitored to determine seasonal habitat use. Interest focused on the Jay Creek mineral lick, which receives heavy use by sheep. Sheep were color-marked and observed from a blind to determine numbers, sex, age, and use of the mineral lick. Last year's field work confirms that about 200 Dall sheep are located in the Watana Hills area near the mineral lick; roughly half of that population have been observed to use the Jay Creek lick. Research on location and mineral content of other mineral licks in the area will help in designing a mitigation strategy for portions of the lick that will be underwater or affected by construction.
- Beluga (Belukha) whales migrate within Cook Inlet depending on availability of fish moving in and out of river mouths. Reduced numbers of fish could affect the whales' food supply and calving. The whale study compares fisher-

ies information with field data to estimate potential impact from project-caused changes in the Susitna River.

- A beaver colony, in order to survive a winter, will stockpile food in underwater caches. Studying these caches provides information on how many beaver use the river. The survey last fall indicated the existence of a considerably larger number of colonies (11 versus 2 the previous year), perhaps because the fall river flows were quite stable. Data on beaver use of the river will be compared with estimated flows to estimate project impacts. For example, the averaging or stabilizing effect of the project may increase beavers' ability to successfully use the river for caching winter supplies of food.
- The Susitna vegetation program has studied plant phenology and moose browse in the project area. The plant phenology study evaluated the location, abundance, and timing of early spring moose and bear forage in the proposed reservoir areas. Moose are attracted to the early development of plant growth and early snowmelt in lower elevations. Similarly, brown bear emerging from hibernation move to those areas seeking overwintering berries and new vegetation growth generally found on south slopes. Early spring is a nutritionally critical period for bears as well as moose, and inundation of the impoundment areas will have an impact on both.

The purpose of the 1983 browse study was to develop cost-effective methods for conducting an extensive browse inventory of the project area. This inventory will be used in estimating the moose carrying capacity of the project area by assessing the amount and type of vegetation available. Moose carrying capacity represents the number of moose that can survive in the impoundment area over a given period of time.

Thank You Eric Yould



Eric P. Yould, Executive Director of the Alaska Power Authority since its creation in 1978, resigned on October 14, 1983. Power Authority Board Chairman, Dick Lyon, also Commissioner of the Department of Commerce and Economic Development, stated that Yould's decision to leave reflected part of the transition of the former administration to that of Governor Bill Sheffield, who was elected a year ago. Lyon said that "in terms of the formative years of the Power Authority, the Power Authority is in large part the persona of Eric

Yould.... He is a widely recognized and capable engineer.... He has provided a great deal of leadership...." Since Yould became Director in 1978, the Power Authority has initiated major construction projects (three hydroelectric and one 170-mile transmission line between Fairbanks and Anchorage), brought the proposed \$5 billion, two-dam Susitna Hydroelectric Project into the Federal Energy Regulatory Commission licensing phase, and initiated other construction and energy development projects throughout Alaska.

License Application On File

The Susitna Project license application is available for public review at the following libraries. Ask for the Susitna Hydroelectric Project License Application to the Federal Energy Regulatory Commission.

Alaska Historical Library Juneau	Library of Congress Washington, DC
Alaska Resources Library Anchorage	Z.J. Loussac Public Library Anchorage
Alaska State Library Juneau	National Library of Canada Ottawa, Ontario
Center for Research Libraries Chicago, IL	Rasmuson Library, University of Alaska, Fairbanks
University of Alaska Library Anchorage	Seattle Public Library Seattle, WA
Noel Wien Memorial Library Fairbanks	Sheldon Jackson College Library Sitka
A. Holmes Johnson Public Library Kodiak	University of Alaska Library Juneau
Kegoayah Kozga Public Library Nome	University of Washington Library Seattle, WA
Kenai Community Library Kenai	Washington State Library Olympia, WA
Ketchikan Public Library Ketchikan	Arctic Environmental Information and Data Center, Anchorage
Kuskokwim Consortium Library Bethel	Palmer Public Library Palmer
Talkeetna Public Library Talkeetna	

february 1984

susitna hydroelectric project

Newsletter

This is the seventh newsletter published by the Alaska Power Authority for citizens of the Railbelt. The purpose is to present objective information on the progress of the Susitna Project so that readers may make their own conclusions based on accurate information.

Larry D. Crawford, Executive Director
George E. Gleason, Public Information Officer
Patricia J. Serie, Public Participation Coordinator

Alaska Power Authority
334 W. 5th Avenue
Anchorage, Alaska 99501

The State of Alaska is an equal opportunity employer.

IN THIS ISSUE:

Profile on Board	1
Process to Resolve Issues	2-3
Crawford Executive Director	3
Aquatic Studies Key Issue	4-5
Socioeconomics Update	6
Wildlife/Vegetation Update	7
Board Decisions	8



ALASKA POWER AUTHORITY
PUBLIC PARTICIPATION OFFICE
334 W. 5th Avenue
Anchorage, Alaska 99501

SHEPARD, MARTHA
701 C ST BX 36
ANCHORAGE AK 99513

BULK RATE
U.S. POSTAGE PAID
PERMIT NO. 796
ANCHORAGE 99502