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SUSITNA
HYDROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION
PROJECT No. 7114

ALASKA POWER AUTHORITY COMMENTS ON THE FEDERAL ENERGY REGULATORY COMMISSION DRAFT ENVIRONMENTAL IMPACT STATEMENT OF MAY 1984

VOLUME 1
INTRODUCTION

AUGUST 1984
DOCUMENT No. 1770

ALASKA POWER AUTHORITY

Document No. 1770
Susitna File No. 6.4.6.2

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Volume 1

Introduction

August 1984

ALASKA POWER AUTHORITY

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August 21, 1984
Susitna File No. 6.4.6.3

Mr. Kenneth Plumb
Secretary
Federal Energy Regulatory Commission
400 First Street, N.W.
Washington, D.C. 20001

Subject: Susitna Hydroelectric Project
Draft Environmental Impact Statement

Dear Mr. Plumb:

Transmitted herewith are the comments of the Alaska Power Authority (APA) on your Draft Environmental Impact Statement (DEIS) for the Susitna Hydroelectric Project, No. 7114, as noticed in the Federal Register on May 25, 1984.

The APA's comments consist of this letter, plus the following attachments:

1. An Executive Summary in which the APA summarizes its principal comments on the DEIS.

2. Section-by-Section Technical Comments, arranged to follow the organization of the DEIS. The technical comments respond to the specific points made in the DEIS; and

3. Technical Appendices, which contain thorough analyses or updated data on fuels pricing and economics, the alternative hydroelectric projects described in the DEIS, the alternative thermal (gas/coal) projects described in the DEIS, and the most recent results of the Susitna Study Program.

The Executive Summary and the Technical Comments together comprise the APA's comments which should be incorporated in the Final Environmental Impact Statement (FEIS).

By organizing the DEIS comments in this manner, the APA intends to permit the reader to progress from the most general observations to the most specific. In keeping with that organization, the APA's major concerns with the DEIS are highlighted below:

- A key factor in assessing the economic feasibility of the Susitna Project is the world oil price forecast. In its analysis FERC relies on an internally generated and undocumented oil price forecast which lies at the extreme low end of the range of forecasts prepared by established and respected experts.

- FERC projections of future natural gas prices and availability of supply are also inconsistent. The low gas prices forecasted would discourage rather than encourage exploration for and development of the additional gas reserves which would be necessary to fuel FERC's proposed thermal alternatives.

- FERC seriously underestimates the price of coal by dismissing the possible development of an export market and by holding the price of coal steady even though the price of oil is forecasted to increase from 2010 through 2050.

- FERC greatly overstates the potential adverse impacts the project will have on fisheries and wildlife. FERC has made several erroneous and unsupported assumptions concerning the degree of utilization by salmon of the Susitna mainstem for spawning activities, and by moose and black bear of the Susitna impoundment zone habitat.

- FERC overlooks and fails to give appropriate weight to serious adverse consequences which would result from the recommended DEIS alternative generating scenarios.

- FERC has failed to consider adverse socioeconomic impacts of the recommended DEIS alternative access route and has given undue weight to fish and wildlife impacts of the APA's preferred routing.

- FERC has used inconsistant project costs and economic analyses to demonstrate an economic advantage for the mixed hydro-thermal scenario. When the correct costs and an unbiased analysis are adopted, this advantage will disappear.

APA is disappointed with the quality of the DEIS and concerned with the potential for delay that it represents. The State of Alaska has invested approximately $100 million to date in its efforts to implement a cost-effective solution to the energy needs of the Alaska Railbelt. The State should be able to rely upon the Federal Government to produce an unbiased and accurate assessment of those efforts.

Since the public expects an independent and impartial assessment of the proposed project by FERC, the premature conclusions drawn in FERC's DEIS have created concern and confusion over one of the most significant issues facing the people of Alaska.

APA expects that FERC will proceed with preparation of the FEIS on schedule. Further, APA expects a professional, balanced, and objective document that will address all concerns and result in a FEIS upon which the Commission can adequately base its decision with respect to licensing the project.

APA is available to provide additional information or lend assistance as the Commission deems necessary. Questions may be addressed to Mr. Jon S. Ferguson at (907) 279-6611.

Sincerely,

Larry D. Crawford

Larry D. Crawford
Executive Director

JSF/LDC/sm

PREFACE

In May 1984 the Federal Energy Regulatory Commission, Office of Electric Power Regulation, published a Draft Environmental Impact Statement (DEIS) in connection with an application filed by the Alaska Power Authority for the proposed Susitna Hydroelectric Project. This Comment Document contains the Alaska Power Authority's comments on the DEIS. The Comment Document consists of an Executive Summary, Technical Comments and Appendices.

The Power Authority has prepared Technical Comments on specific points made in the DEIS. The Technical Comments are organized into five general areas roughly parallel to the manner in which the DEIS is organized to facilitate use of both FERC Staff and others reviewing the DEIS. These topic areas are:

	Topic Area	Code
1.	Need for Power	NFP
2.	Alternatives	ALT
3.	Aquatic Resources	AQR
4.	Terrestrial Resources	TRR
5.	Social Science	SSC

Each Comment by the Power Authority is identified by an alphanumeric code which comprises the three-letter topic area code followed by a three-digit number. The Comments within each topic area are numbered consecutively from the beginning to the end of the DEIS document. In addition, each Comment identifies the location and subject of the DEIS statement referenced. For the reader who would like to read the DEIS and Power Authority Comments in parallel, a Cross-Reference Index is provided which lists the Comments applicable to each section of the DEIS.

For those interested only in very specific topic areas, a Subject Index is provided which lists comments applicable to specific subjects by use of key words.

Ahead of and supported by the Technical Comments, the Power Authority presents an Executive Summary of the Comment Document. This Summary provides a general discussion of the major conclusions of the DEIS and the Power Authority's assessment of those conclusions. A Bibliography is also included in this DEIS Comment Document.

Detailed technical documentation for many of the Comments are contained in Appendices to the Comment Document. Appendix I, Fuels Pricing and Economics, documents the economic feasibility of Susitna based on the latest oil, gas, and coal prices forecasts and revised thermal plant costs and characteristics. Appendix II evaluates Non-Susitna Hydroelectric Alternatives. Appendix III, Thermal Alternatives to Susitna, addresses the environmental assessment of thermal (coal- and gas-fired) alternatives to Susitna. Appendices IV through VII transmit results of environmental studies on the Susitna basin impacts of the Proposed Project.

ALASKA POWER AUTHORITY

COMMENTS

ON THE

DRAFT ENVIRONMENTAL IMPACT STATEMENT

OF MAY 1984

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EXECUTIVE SUMMARY

I. Introduction

The hydroelectric potential of the Susitna River Basin was first identified by a U.S. Bureau of Reclamation Reconnaissance Study completed in 1948. The Bureau completed a project feasibility study in 1961 which recommended that a five stage river development plan be authorized by the U.S. Congress. In 1975, the U.S. Army Corps of Engineers (COE) completed a comprehensive feasibility study which recommended the current two dam development concept. The COE prepared an environmental impact statement for the project which was issued in final form, after all required reviews, in January 1977. The COE updated its feasibility study in 1979 and reaffirmed both project economics and the proposed Devil Canyon - Watana combination as representing optimum development of the Susitna Basin.

In February 1983, the Power Authority submitted to the Federal Energy Regulatory Commission (FERC) an Application for License for the Susitna Hydroelectric Project, as a two-stage project substantially the same as that proposed by the COE. Submittal of the Application followed three years of additional engineering, economic, and environmental studies by the Power Authority. After requesting additional information from the Power Authority, FERC accepted the Application in July 1983. FERC used the Application, comments on the Application by Resource Agencies, and some additional information submitted by the Power Authority to prepare a Draft Environmental Impact Statement (DEIS). In May 1984 the DEIS was distributed for review and comment by interested parties.

The DEIS Comment Document constitutes the Power Authority's review and comment on the FERC DEIS and provides, where appropriate, more recent and/or improved analyses for FERC's review and use. Based upon comments received from reviewers and its own further analysis, FERC will prepare a Final Environmental Impact Statement (FEIS) on the project.

The organization of the DEIS Comment Document is discussed in the

Preface. In summary, however, it is composed of three major portions: 1) the Executive Summary which identifies the Power Authority's chief concerns about the DEIS conclusions; 2) Technical Comments which deal with specific data, analyses or conclusions in the DEIS; and 3) Appendices which provide additional data and analyses on a number of topics.

II. General Comments on DEIS

The Power Authority concurs with FERC methodology which is: (1) to estimate future requirements for power in the Railbelt; (2) to develop alternative means of meeting projected power requirements for the Railbelt; (3) to assess the economic, engineering and environmental costs of a range of representative generation scenarios; and (4) to select a preferred alternative. Further, the Power Authority would agree that FERC has examined a variety of reasonable projects that are probably the best alternatives to the Susitna Project.

Based upon FERC's consideration of engineering feasibility, economic characteristics and environmental effects, as stated in the DEIS, FERC found that a mixed hydro-thermal scenario totaling 1853 Megawatts would be the most effective solution to meet Railbelt generation requirements. The Power Authority feels that this conclusion acknowledges the need for power development to meet future Railbelt needs and that it recognizes that hydroelectric projects will provide the greatest long term economic advantage. However, the Power Authority feels that FERC has incorrectly and inadequately analyzed the engineering feasibility, economic characteristics and environmental effects of both its preferred scenario and the Proposed Project.

In spite of the importance of the forecasted price of oil, FERC relied upon internally generated and undocumented oil price forecasts rather than upon forecasts prepared by established and credible experts. The Power Authority presented a range of established credible forecasts in its License Application. Yet, FERC inexplicably chose to ignore those forecasts and instead generated its own projected prices, which fall into the extreme low end of the range of price forecasts from other respected sources.

Given the linkage between the world price of oil and gas and coal prices, FERC's analysis leads to miscalculations of future coal and gas prices as well. In forecasting future coal prices FERC compounded its original error by determining that an export market for Alaska coal will not develop. FERC therefore projects coal prices based upon production costs plus transportation costs, rather than upon the higher prices which could be obtained in an export market. These production and transportation costs are themselves understated in the DEIS. More importantly, the determination that an export market for Alaska coal will not develop is based upon assumptions as questionable as the FERC's oil price forecasts.

While FERC does not explain the manner in which construction costs for the non-Susitna hydro alternatives were estimated, it is apparent that the 1980 Development Selection Report prepared by Acres American, Inc., which contained screening level estimates for the alternative hydro projects, was compared with 1982 feasibility estimates for the Susitna Project. As a result, the costs of the non-Susitna hydro alternatives are seriously understated.

Because of the questionable assumptions about fuels prices and the cost of alternatives to Susitna, the Power Authority believes that the credibility of the economic analysis contained in the DEIS is questionable.

The FEIS should incorporate revised economic analyses based upon additional data provided in this document. Such revision will show no economic advantage for the mixed hydro-thermal alternative, but rather, a substantial economic advantage to the Proposed Susitna Project.

The DEIS states that there are benefits for the decentralized and diluted impacts of the mixed hydro-thermal alternative. This is unsupportable in view of the aggregate impact of the hydro-thermal alternative and the poor showing of the hydro alternatives in terms of environmental impact per Megawatt of installed capacity.

FERC's analysis of the environmental impacts of the Alternatives, including Susitna, is inadequate. Hydropower development in the Susitna Basin has been exhaustively studied since the 1950's. If the proposed alternatives were subjected to the same intense scrutiny, FERC's list of environmental impacts associated with them would undoubtedly grow and become more detailed. For example, FERC quantifies the projected impact on salmon of the Susitna Project as a 50% reduction in annual juvenile growth for salmon, and growth reduction by 60% to 70% for early emigrating chum and pink salmon. These calculations are themselves too high, and unsupported by data furnished to FERC, but for its proposed alternatives at Keetna, Johnson and Lake Chakachamna, all FERC can say is that there is potential loss of salmon population or habitat. Would these "potential" losses combined equal or exceed the alleged disturbance to be caused by Susitna? There simply is not the same wealth of data to allow detailed quantification of the environmental impacts of the alternatives. Moreover, FERC has seemingly ignored or downplayed the data that does exist concerning significant adverse consequences of the alternatives. The degree of analysis devoted to each alternative in an EIS should be substantially similar to that devoted to the Proposed Project. Where uncertainty exists regarding significant impacts of the alternatives, the EIS must include a reasonable, worst-case analysis. The Power Authority has supplied such analyses for significant impacts of the hydropower and thermal alternatives.

Another problem with FERC's environmental analysis is that some impacts associated with Susitna, such as accelerated slope and soil erosion, would result from any hydropower development. Yet FERC has not included such generic impacts in its list of impacts of the alternatives. The environmental impacts of alternatives to Susitna are therefore seriously underrated.

A basic problem with FERC's environmental analysis is that FERC has failed to adequately compare dissimilar impacts. For example, how can the substantial, adverse air quality impacts from virtually every element of the coal cycle (mine-transportation-powerplant-waste piles) be less significant than the mitigated impacts of the Project on aquatic resources? FERC has not documented its judgments in balancing one environmental value against another. Thus, the Power Authority cannot understand how the DEIS can identify any one environmentally preferable alternative. FERC should at least identify two or more environmentally preferable alternatives.

A final problem in the environmental analysis is that it is difficult to understand how FERC weighted similar impacts. For example, Susitna would inundate or disturb 56,000 acres while the FERC's combined hydro-thermal plan would similarly disrupt 124,000 acres, more than twice as much land. FERC states that the Susitna Project would disrupt wilderness-type recreation experiences in the middle Susitna Basin while the Brown hydropower alternative would disrupt a major river touring route along the Nenana river. With regard to socio-economic impacts, the Johnson site alone will completely inundate two communities--Dot Lake and the Living Word--and cause displacement of all residents (approximately 250) from their homes, social settings and sources of livelihood. In contrast, the Susitna Project would neither inundate communities nor displace residents but would cause rapid growth of several small communities. In light of these comparative impacts, the Power Authority questions FERC's determination that a combined hydro-thermal scenario is the preferred alternative.

The DEIS seriously underrates the environmental impacts of the mixed hydro-thermal alternative and overrates the impacts of the Susitna Project. With the benefit of improved information on the alternatives, the FEIS should change the characterization of impacts for the thermal components from "minimal" to significant and critical. Furthermore, the characterization of the environmental impacts of the mixed hydro-thermal alternatives should change from less than the Susitna Project to greater than the Susitna Project.

While in its summary of the DEIS, FERC states the mixed hydro-thermal plan is preferable from an engineering standpoint, it does not present any discussion in the DEIS to support this statement. The Power Authority is not aware of any engineering drawback to the Susitna Project and FERC does not identify any such problems in the DEIS. On the other hand, studies of some of the alternatives included in FERC's mixed plan have pointed out engineering problems. The DEIS does not discuss these engineering concerns. It is difficult, if not impossible, to understand on what engineering basis FERC found the mixed hydro-thermal plan preferable.

In sum, the Power Authority's analysis of the DEIS leads to the conclusion that, in assessing the Susitna Project, FERC used a worst-case analysis while it used a partial, best-case analysis on alternatives to the Proposed Project. If Susitna and its alternatives are given a balanced assessment as required by the National Environmental Policy Act, Susitna can be shown to be the preferred plan in terms of economic feasibility, environmental impact and engineering.

Although FERC prefers its mixed hydro-thermal plan, it recommends that if development in the Susitna Basin is authorized, the Proposed Project be licensed and constructed in stages. The first stage would be Watana at a lower height than proposed by the Power Authority. The Power Authority does not believe that such an approach represents the highest and best use of the resource.

The FEIS should result in a finding of the merits of the Susitna Project and recommend expeditious implementation of the Susitna Project as proposed by the Alaska Power Authority.

III. Energy Policy Issues

A. Use of Renewable Resources

The FEIS should recognize that the State of Alaska has chosen to invest a portion of its current revenues, which are being realized through the sale of non-renewable resources, in the development of economically and environmentally sound renewable energy sources to serve future generations which may be faced with declining revenues. This decision is manifested through the legislatively created Energy Program for Alaska. Susitna is an authorized project under this program and is proposed to serve the Railbelt Region of the State where the majority of the population resides.

The Energy Program for Alaska is completely intrastate and is 100% funded by state equity contributions, loans or revenue bonds. Three hydroelectric projects within the program are operational and a fourth will soon be completed, none of which are located within the Railbelt. Rural residents not served by the existing projects, nor contemplated to be served by the Susitna Project, are recipients of rate equalization funds through the legislatively established Power Cost Equalization Program.

B. Fuel Use Act

Section 212(f) of the Power Plant and Industrial Fuel Use Act of 1978 acts as a legal constraint on adding gas-fired units for base-load generation as suggested by FERC. An exemption for the development of electric generating facilities in Alaska using natural gas as a fuel during the period December 30, 1982 to December 31, 1985 is provided by Section 317 of U.S. House Bill 7356. However, Section 317 goes on to say that this exemption shall not apply to any new electric power plant using natural gas produced by the Prudhoe Bay Unit of Alaska.

The Fuel Use Act mandates the highest and best use of gas resources and prohibits the addition of new base-loaded gas-fired generation in the nation. While Alaska received a three-year exemption from this act, as amended and noted above, the exemption expires in 1985. The Power Authority feels that it is imprudent to base long term planning on further exemptions to the Act. If FERC suggests that the Fuel Use Act will be waived permanently, the FEIS should provide justification for this supposition. None of the Railbelt utilities, nor the Power Authority, can legitimately plan for intermediate and long-term power supply based on gas-fired units.

C. Present Energy Scenario

The DEIS catalogues existing means of meeting electric requirements in the Railbelt, and notes that at present, natural gas is the primary fuel in electric generation, particularly in the Anchorage area. This is supplemented by coal generation located primarily in the Fairbanks area. As stated in the DEIS, the Railbelt has benefited from relatively inexpensive electrical energy by virtue of low-cost natural gas-fired generation. However, the DEIS fails to recognize that this resource cannot be depended upon for future electric generation to the extent it has been in the past. Cook Inlet gas reserves are declining, making uncertain the availability of gas for long-term generation planning. As supply declines, there will be intense competition for the resource among users. This will lead to increasing prices. The majority of homes in the Railbelt, particularly Anchorage, are heated with natural gas. This is a more efficient and higher priority use of the resource than electric generation. The benefit of conserving developed gas reserves for home heating has not been measured in the License Application or DEIS economic analyses, but it is of considerable value. FERC acknowledges that new gas reserves will have to be developed in the 1995-2000 time frame if present use patterns persist, and that prices must rise sufficiently to promote that development. The price of future gas delivered, whether new Cook Inlet discoveries or North Slope gas, will most likely be established on the basis of equivalent world energy price or the "net back" value of exported gas. The impact of this price increase, should it occur, will doubly affect the Railbelt consumer through increased electricity and heating costs.

The DEIS suggests that wood has potential as a fuel for widespread use in the Railbelt. While wood burning can potentially reduce heating costs in areas not served by natural gas, it is difficult to understand this suggestion as applying to the metropolitan areas of Anchorage and Fairbanks where serious air quality problems already exist and where the heating energy demand is focused. It should be noted that restrictions on wood burning have become necessary in Juneau, and could be anticipated in the Fairbanks area because of extreme air quality problems. Vehicle inspections for engine emissions are being instituted in Anchorage and Fairbanks in response to EPA air quality requirements. Any further increase in wood fuel use would present substantial problems. The FEIS should reevaluate its proposed use of wood as a fuel.

IV. Need for Power

A. Load Growth Projections

1. Historical

The DEIS makes reference to the history of "boom and bust" cycles in the economic history of Alaska. The economic history of Alaska has been no more cyclic than that of other western states during their development, before sufficient infrastructure existed to support a diversified, stable economy. Since statehood the economic trend in Alaska has been towards stability coupled with long-term growth. Periods of relatively intense construction activity are unavoidable in the development of resources necessary to promote long-term stability. The FEIS should assume a reasonable sustained growth unless it demonstrates technical analysis supporting contention of assumed "boom and bust" cycles.

Net generation for the Railbelt in 1983 was 3024.5 GWh, as indicated in Railbelt Area Utility Historic and Forecasted Net Generation, U.S. Department of Energy, Alaska Power Administration, May 1984. The same document reports the mid-range forecast of load growth from 1983 to 2000 to be 4.6%. The DEIS mid-range forecast predicts 2802 GWH in 1983 (7.3% lower than actually experienced) and 2.2% growth for the same period. The FEIS should qualify the conservatism of their projections by reference to currently experienced load growth.

2. Population Forecasts

Rather than relying on load growth projections from utilities which are generally short-term projections and have come under criticism from some sources as being optimistic, the Power Authority chose to develop load projections through the use of state-of-the-art econometric modeling. Economic conditions are projected using the Man in the Arctic Program (MAP) model. The MAP model was selected because of its independence from the Susitna Project studies and its established reliability. The MAP model has been continuously updated since its development. It has been used by the Bureau of Land Management, the Federal Power Commission, the Department of Agriculture, and numerous state agencies and private interests. FERC also chose to use the MAP model in its analysis. However, the Power Authority finds that the DEIS outputs do not match the Power Authority's load projection outputs. The FEIS should more completely document inputs and outputs and any changes in model structure or parameters.

The DEIS uses the MAP model in developing population projections. The DEIS load projection implies that the population of Alaska in 1985 will be 468,452. The estimated present population of the state as of July 1983 is 510,500. The DEIS population projections are more conservative than the already conversative projections provided in Appendix I.

The DEIS projections differ significantly from the Power Authority's projections in the long term. The FEIS should acknowledge and explain the basis for the extreme conservatism of FERC's population projection or use population projections that are consistent with State experience.

3. Load Forecasts

MAP model economic projections were input to the Railbelt Electric Demand (RED) model, operated by Battelle Pacific Northwest Laboratory (Battelle), an independent economic consulting institution. Upon completion of its modeling effort, the Power Authority's analysis projected a 2.7% growth in demand over the 1983 - 2000 period. This estimate appears conservative when compared to projections developed by the U.S. DOE, Alaska Power Administration, based on Railbelt utility data. The DOE forecasts a 4.6% demand growth over the same period. In contrast, FERC, using the same

MAP/RED modeling tools as the Power Authority, derived a 2.2% growth over the 1983 - 2000 period.

It would be useful for FERC to compare the reference case load projections to similar projections nationwide and in the western states. FERC should also acknowledge that economic conditions implied by its assumptions and projected growth represent an extremely pessimistic view for both the state and the nation.

The net effect of the DEIS oil price forecasts and other economic assumptions, when input to the MAP/RED simulations, produce a projected electric demand of 5234 GWh in 2010 under the DEIS medium scenario, compared to the License Application Reference Case of 5858 GWh. The effects of the DEIS's low economic assumptions are then given double weight by the DEIS method of extrapolating the load out to 2020. Under the DEIS's extrapolation approach, by 2020 the load is only 6224 GWh, compared to the Power Authority's 7481 GWh.

B. Fuels Pricing

The Power Authority has gone to considerable effort, as shown in the License Application, to prepare a comprehensive fuels pricing analysis suitable for the 50-year period of project analysis using internationally recognized experts in the field. The Power Authority's analysis has been subject to continuous refinement and validation. An update of this analysis is contained in Appendix I of this document. The FERC fuels analysis, on the other hand, does not appear to be based upon any comprehensive, consistent review of the total world energy balance nor is it supported by a reasonable number of credible authorities in the field. FERC founds its analysis upon unsupportable assumptions about the direction of world oil prices. Given the linkage between gas and coal prices with the world price of oil, the assumptions in the FERC oil price analysis lead to miscalculations of future coal and gas prices and ultimately the economic feasibility of the project.

The economic framework underlying the FERC analysis determines the prices of competitive fossil fuels and the demand for electricity in the Railbelt area, and thus the economics of the proposed Susitna Project. FERC's economics framework can be described as follows:

- Oil prices will decline principally as a result of fuel switching, conservation, and the growth of non-OPEC oil production (p. 1-9 of the DEIS).

- Natural gas prices will remain low (less than oil prices) principally as a result of the oil price decline (pp. 1-30, B-7).

- The motivation for the substitution of coal for oil and gas has diminished because oil and gas prices have and will continue to decline; therefore, the demand for coal in international (Pacific Rim) markets will weaken (p. 1-33).

- An export market for Alaskan coal will not develop (i.e. zero value as an export commodity) because international demand for coal will grow less and the competition from alternative coal suppliers will increase (p. 1-33).

This framework is illogical because all of its assumptions or "conclusions" hinge on the continuation of a recent short-term decline in the price of oil. Yet the principal factors which FERC cites as contributing to the price decline, are highly unlikely to continue unabated in the wake of that decline, and do not provide adequate support for the assumptions in the DEIS which are critical to long-term pricing projections.

For example, the lower economic growth that has prevailed in the free world during the last decade is one major factor in the short-term decline in the price of oil. Yet that lower growth was itself largely caused by the huge increase in energy costs during that same period. High energy costs disrupted industrial planning. Industrial production slowed, resulting in less energy consumption. FERC now projects a significant decline in energy prices (oil prices to decline by almost one third between 1983 and 1990, down to the level of oil prices in 1979 before the last high price increase took place) which, based on the experience of the last decade, should stimulate economic growth again, not continue to depress it.

Conservation is the other major factor which contributed to the reduction of energy consumption during the last decade. Conservation increases as the cost of energy exceeds its utilization value in various applications, or as investments in energy saving processes or devices become economical. If the cost of energy declines as FERC forecasts, the trade-off between energy price on the one hand, and conservation on the other, will shift back again. While investments once made will likely not be undone by reduced energy costs, new investments in energy saving processes or devices will occur only at a much reduced level, and some energy conservation that took place in the past because energy prices exceeded its utilization value will be undone. Yet FERC assumes that conservation will continue unabated at the rate experienced by the world since 1979.

Finally, FERC anticipates oil prices to decline due to growth in non-OPEC oil production. While the growth in non-OPEC oil production over the past decade is undeniable, it is precisely the oil price increase that took place during this same period that caused the increase in production. If oil prices were to decline in the future as FERC projects, the major reason for the non-OPEC production increase that took place in the past not only would be removed, it would be reversed. Non-OPEC oil production would not only be arrested, it may actually decline in these circumstances.

FERC assumes that fuel switching, conservation and growth of non-OPEC oil production, phenomena that are attributable to increasing oil prices, will continue in the face of declining oil prices. This is illogical. If these phenomena continue it will be because of increasing oil prices. Increasing oil prices will then lead to increased gas prices, increased demand for coal (resulting from fuel switching), increased coal prices, and a significant value for Alaskan coal as an export commodity as predicted by the Power Authority.

Moreover, a close analysis of each of FERC's underlying assumptions on fuel switching, conservation and non-OPEC production indicates an approach of simply projecting past trends into the future without analysis of whether these trends reflect long-term developments or short-term phenomena. A close inspection of data underlying past trends in fuel switching, conservation and non-OPEC production does not support the FERC approach of simplistically extrapolating them indefinitely into the future without adjustment.

In making long-range pricing projections, FERC has placed an inordinate emphasis upon short-term oil market dips experienced in 1983 and has adopted the most pessimistic position on every variable affecting oil prices, such as world economic growth. This pessimistic view on economic indicators is not shared by most economists and, moreover, actual market experience in 1984 has not borne out the FERC projections.

The FERC 1984 price forecast has already proven to be too low, by several dollars per barrel. The posted price remains at $29 per barrel and the most recent meetings of OPEC's official committee has affirmed both the existing production quotas and the posted price. The spot price recently dropped to as much as $2 per barrel below posted; however, this is primarily a seasonal decline caused by decreased summer demand and failure to lower production in anticipation of such a decrease. Production will be adjusted to the market and spot prices will strengthen toward posted prices, most likely stabilizing to within 50 cents of posted. The spot price for market crude was quite stable from April 1983 through May 1984, generally running 25 cents to 50 cents per barrel below posted.

In 1984, FERC's projections have already proven to understate economic growth by 2%, oil demand by 2% or 3%, demand for OPEC crude by 10%

to 20%, and the price of crude by 10% to 15%. These incorrect estimates are sound indications that the FERC short-term oil price projection to 1990 will be too low and therefore is an inaccurate basis for analysis. The Power Authority has examined recent world oil price trends, which have developed since the License Application filing, and has updated certain projections made in the Application. These updated projections are presented in Appendix I of this document. Recent data amply demonstrate that the Power Authority Reference Case presented in the License Application is conservative in estimating future price trends.

The FERC projections of gas price and availability are influenced by the defects in its oil price analysis. FERC concludes that natural gas-fired generation will in the long-term prove more economic than the proposed Susitna Project. This conclusion is based on several misconceptions of Cook Inlet natural gas availability and is inconsistent with DEIS projected future gas price trends.

In FERC's view, natural gas in the Railbelt is at present "exceptionally inexpensive due to the bountiful supplies associated with petroleum production in the Cook Inlet area, coupled with the lack of an extensive export market." FERC should understand that, by the nature of the Cook Inlet and Kenai fields, gas production reflects development of the capacity to produce natural gas and is not a byproduct of oil production. Moreover, to assume that the present circumstances will hold throughout the economic planning horizon overlooks critical data presented in the License Application. Cook Inlet proven reserves will be exhausted in 1998, and undiscovered but economically recoverable reserves will be depleted no later than 2007. Although unexpected reserves may be discovered, they cannot be counted on to serve domestic requirements throughout the service life of Susitna. More recently developed data, presented in Appendix I, show that reserves have been steadily declining for the past three years, and indicate that Cook Inlet production will begin declining by the mid-1990's at the latest, with the resource exhausted shortly after the turn of the century. If FERC assumptions about future gas prices are correct, the exploration needed to find additional supplies would not be encouraged. Low prices would serve only to shorten the projected life of the Cook Inlet reserves because the reserves currently undiscovered may subsequently not prove to be economically recoverable.

A further ramification of the FERC gas price assumptions is that depleted Cook Inlet supplies could not be augmented by North Slope supplies. Neither the ANGTS nor TAGS projects would go forward at gas prices projected by FERC, because their sponsors could not recover project costs adequately. Therefore, it is not consistent for FERC to assume both low future prices for natural gas and that natural gas would be a viable long-term alternative to the proposed Susitna Project. Under FERC price assumptions, only Cook Inlet gas would be available, and Cook Inlet reserves are being rapidly depleted.

The Power Authority's Application assumes that an attractive export market would develop to justify construction of either ANGTS or TAGS. Therefore, the Application assumes North Slope gas would become available. The Application showed, however, that while gas supplies would be available, gas would not be an economic means of generating electricity when compared to the Susitna Project over the long-term. Since the Application, the Power Authority has updated its analysis of natural gas supply and prices. This update is presented in Appendix I of this document. The Power Authority's updated analysis confirms its License Application conclusions that natural gas, even though available, would not be an economic means of generating power when compared to the proposed Susitna Project.

The FERC miscalculations on future oil prices also distort coal price projections and, in some areas of the DEIS, the alternate fuel assumptions are not consistent with the oil price assumptions. For example, FERC has an increasing price for oil, beginning in 2010 after a short-term decline. By 2050, as shown in Table 1-23, the oil price reaches $66 per barrel, more than double the present price. By FERC's own statement and the precedent cited by FERC, this escalation in the price of oil should encourage conversion to coal, strengthen coal demand, and increase the price of coal. Yet, FERC holds the price of coal constant, at $1.55 per MMBtu, through 2050.

FERC further implies that there will be no export market for Alaskan coal because of interfuels competition and the diminished diversification from oil to coal. FERC acknowledges that the export price represents the real cost for local use if an export market develops, but, because it dismisses the possibility of an export market, concludes that the value for local use will in fact be the cost of extraction plus local transportation.

Finally, FERC makes no effort to assess the competitive position of Alaskan coal vis-a-vis the other sources of coal mentioned. FERC implies that shipments from all these other sources will increase, but for some unexplained reason Alaska can never be an exporter of coal. There is no basis given for this conclusion.

The sole basis for the coal price forecast appears to be vastness of the world's coal resources and Alaska's in particular. Despite the vastness of the world's coal resources, the world price of coal has increased during the same period of time that the price of oil increased in real terms.

More important in determining coal price than the vastness of the resource is the cost of production. The cost of production is affected by various factors which determine whether a resource is economically recoverable. FERC makes no analysis of any of those factors in projecting coal prices. In particular, FERC gives no consideration to the effect of mine size on cost of production. Market limitations will necessitate the installation of small mine capacity, e.g., in one million ton increments. The costs for such small increments will be much higher than FERC assumes for its base price of coal.

Since the License Application was filed, the Power Authority has updated its License Application Study of future Alaskan coal export potential, and its coal prices projections. The updated discussion is presented in Appendix I.

V. Proposed Project

A. Engineering Assessment

The DEIS states that:

> "Based on considerations of engineering feasibility, economic characteristics, and environmental effects, ... a mixed thermal-based generation scenario, supplemented with selected non-Susitna basin hydropower facilities would be the most effective approach to meeting the projected generation requirements of the Railbelt area."

However, in the Power Authority's review of the DEIS, no engineering problems associated with the Watana or Devil Canyon sites were identified. As discussed later, some alternative sites may present more significant engineering problems than the Susitna Project. It can only be concluded that FERC selected its preferred alternative based on considerations other than engineering feasibility. The FEIS should state the engineering problems associated with each alternative, and then identify a preferred alternative if one is identified.

B. Environmental Assessment

There have been extensive studies on the environmental implications of the Susitna Project. The DEIS uses the information provided in the Application, but incorporates little of the data or analysis which has since been accomplished and furnished to FERC.

Extensive comments have been prepared (and provided in the Technical Comments volumes of this document) on aquatic and fisheries, wildlife and terrestrial habitat, cultural resource, socioeconomic, recreation, aesthetics and land use analyses in the DEIS. These comments will permit updating and refining of these analyses in the FEIS. Appropriately, the conclusions and recommendations of FERC focused primarily upon hydrological and fisheries analyses of the Proposed Project because of the integral nature of design and operation of the Proposed Project and impacts on fisheries.

The principal environmental conclusions and recommendations in the DEIS with which the Power Authority takes exception are FERC's treatment of potential water temperature and flow fluctuations and their impacts on fisheries, the nitrogen supersaturation potential and the proposed alternative access plan. In addition, the Power Authority disputes the FERC findings with respect to adverse wildlife impacts.

1. Fisheries Impacts of the Proposed Susitna Project

FERC concludes that "Potential growth of juvenile salmon downstream of Devil Canyon and Watana dams would markedly decrease when both dams were in operation..." due to adverse alteration of the riverine temperature regimes (DEIS Section 4.1.4.2, Page 4-30). This conclusion reflects several unsupported assumptions.

FERC argued that the costly multilevel intakes proposed by the Power Authority at both Watana and Devil Canyon Dams to control the temperatures of water released from the dams and minimize environmental impacts would not be effective. The Power Authority disagrees with the unsupported statements in the DEIS. The Power Authority has extensively studied the performance of the proposed multilevel intakes using the state-of-the-art Dynamic Reservoir Simulation Model - (DYRSEM). The ability of this model to simulate intake dynamics and temperatures of released water has been demonstrated in applications of the model to Eklutna Lake. Additional results of temperature analyses of the proposed Watana and Devil Canyon Reservoirs for many hydrological and meteorological conditions, for various stages of project development and for several different levels of system energy demands, are included as Appendix IV of this document. The Power Authority believes that the effective operation of the multilevel intakes will minimize downstream temperature impacts.

FERC argued that, in the river downstream of the dams, water released from the dams would:

- warm up toward its natural temperature in the summer more slowly than estimated by the Power Authority, and
- cool down toward its natural temperature in the winter more rapidly than estimated by the Power Authority.

Based on these conclusions, the DEIS found greater temperature differentials between natural and with-project conditions in the summer and called into question the Power Authority's entire effort to predict environmental impacts resulting from altered river temperatures and river ice.

In this regard, the analysis provided in the DEIS is seriously flawed. The simplified equations used by FERC in predicting river temperatures contained errors. The Power Authority corrected these errors and refuted the summer warming and winter cooling rates estimated by FERC. In fact, the equations in the DEIS, when corrected, indicate that the Power Authority's river temperature modeling is accurate. Additional river temperature and ice simulations using sophisticated state-of-the-art computer models have been undertaken. The results, for various hydrological and meteorological conditions and for various levels of project development and system demands, are included in Appendices V and VI of this document.

The updated temperature studies that have been conducted by the Power Authority since those furnished in support of the License Application permit a closer examination of reservoir thermal structure and the effects of dam operation on Susitna River temperature than was possible by FERC in the DEIS evaluation.

These studies indicate that the project will introduce a temperature lag of approximately three weeks in late September and early October. Temperatures will be about 3° C warmer for any given day while the lag persists and the lag dampens out by mid to late November. In the spring, a lag of approximately three weeks will occur in May and June and temperatures will be about 3° cooler during the lag. The lag dampens out by late June. The Power Authority's studies indicate that these changes will not significantly affect spawning.

FERC uses its erroneous analysis of altered temperature regime as an input to an analysis of adverse impacts on incubating eggs and rearing juveniles. This analysis is in error because it fails to note that essentially no spawning takes place in the mainstem under present conditions. Chinook, coho, pinks, and about half of the chum spawn in tributaries upstream of mainstem effects. The remaining chum and sockeye spawn primarily in sloughs in areas of upwelling groundwater. Studies to date indicate that the temperature of upwelling water will remain unchanged by the Proposed Project's operation, and that these spawning/incubation sites will remain unaffected by Project flows unless overtopped by staging during the formation of an ice cover. Analyses of ice regimes indicate that sloughs are not likely to be overtopped more frequently with the Proposed Project than under natural conditions.

Juvenile salmon redistribute throughout the system following their becoming mobile after emergence. The following table shows the rearing habitat of each salmon species. It is apparent from this table that the majority of juvenile rearing habitat does not occur in areas which are directly affected by mainstem temperature.

Freshwater Rearing Habitats of
Salmon Species in the Portage to
Talkeetna Reach of the Susitna River

Species	Rearing Habitat
Chinook	side channels, sloughs and tributaries
Sockeye	upland slough
Pink	none -- immediately move downstream to saltwater before river warms, no freshwater rearing
Coho	upland sloughs and clearwater tributaries
Chum	sloughs (1 to 3 months) before passing downstream to saltwater

This information indicates that chinook juveniles would be the only juveniles likely to rear in mainstem temperatures regimes. They redistribute through the system in early summer and the greatest numbers are found in the side channels in July, August and September. During this period 23 percent of rearing juveniles are found in side channels. At that time they would experience a relatively small and possibly negligible temperature change due to the Project.

In addition to the problems associated with the predicted temperature regimes presented in the DEIS and the assumed distribution of juveniles in potentially affected areas, there are flaws in the analysis of juvenile salmon growth in the Susitna River under natural and with-project conditions. First, the method used to predict growth of juveniles was developed from data collected on juvenile salmon in lake systems of the Pacific Northwest. Presumably, salmon of the Susitna River have adapted to the colder temperatures and higher water velocities which occur in Alaskan rivers. Second, since growth of juvenile salmon is not only a function of temperature but also a function of food ration obtained by the juveniles, it is likely that under the slightly reduced temperatures induced by the

Proposed Project, the reduction in growth will not be directly proportional to the reduction in temperature. It is proposed that the juveniles will attain a larger proportion of their needed food ration and therefore will be able to grow at a more efficient rate.

In light of the data summarized above, FERC's assessment of a potential 50% reduction in annual juvenile salmon growth overall is overly pessimistic. Current analysis of project impacts on salmon is illustrated in the following table, which indicates that a more appropriate conclusion would be that it is unlikely that there would be significant impacts on salmon if the Proposed Project is pursued with the proposed mitigation program.

Salmon Populations
in the Portage to Talkeetna
Reach of the Susitna River

Species	Estimate of Total Adults Returning to the River 6/	% Reduction, Portage Creek to Talkeetna, Without Mitigation	Returning Adults Lost, Portage Creek to Talkeetna, Without Mitigation	Returning Adults Lost, Portage Creek to Talkeetna, With Mitigation
Chinook 1/	185,000	6%	550	6%
Coho 2/	45,000	0%	0	0%
Pinks 3/	150,000	1%	even yrs. 75 odd yrs. 6	0%
Sockeye 4/	175,000	25%	475	0%
Chum 5/	290,000	11%	1000	0%

1/ Assumes loss of 25% of side channel rearing habitat, 22% of chinook rearing in side channels, escapement past Curry is 9130 fish.

2/ Assumes no loss of spawning or rearing habitat.

3/ Assumes loss of 25% of slough spawning habitat, total even year slough escapment is 300 fish and odd years is 20 fish.

4/ Assumes loss of 25% of slough spawning habitat, total slough escapment is 1900 fish.

5/ Assumes loss of 25% of slough spawning habitat, total slough escapment is 4000 fish.

6/ Portage Creek to Cook Inlet.

This assessment presupposes that the habitats are at their carrying capacities, and that loss of spawning or rearing habitat will lead to an equivalent loss of adult escapement. This final assumption is extremely conservative.

In the Power Authority's view, most potentially adverse environmental impacts are mitigable. Therefore, a negative finding on environmental grounds is not warranted. The FEIS should find that the environmental impacts, with appropriate mitigation, are acceptable.

Concerning mitigation measures, the DEIS accepts the Case C flow regime recommended by the Power Authority in the License Application. FERC also recommended that spiking flows be implemented during August and September to improve access to certain salmon spawning areas. The DEIS is not clear in its recommendation of spiking flows; variously referring to"......flows up to ......20,000 cfs......" "....flows in excess of 20,000 cfs...... and "......spiked releases of 24,000 cfs......" The DEIS does not provide comparison of the benefits and costs of various releases. The Power Authority estimates that implementing the spiked flows may result in costs in excess of $200,000,000 over the life time of the project (the reduction in the present worth of net benefits in 1982 dollars), while providing improved access to spawning areas for about 1800 salmon per year. The Power Authority is continuing its mitigation and power planning studies which are aimed at developing optimal use of the resources in both the environmental and economic sectors. Alternate flow regimes are being considered which include spiking releases. However, the Power Authority believes that flow regimes should be selected after comparing both environmental and economic trade-offs, and that the effectiveness of mitigation measures in addition to flow regulation should be included in this analysis.

2. Nitrogen Supersaturation

FERC appears to contradict itself on the issue of potential occurrence of nitrogen gas supersaturation. In the DEIS Summary Section, Vol. 1 p. xxv, FERC finds that significant nitrogen supersaturation would occur in nearly every year of the Proposed Project's operation. This conclusion is unsupported by any analysis appearing in the main text or appendices of the DEIS. Indeed, the treatment of the issue elsewhere in the DEIS document supports the Power Authority's position that there currently exists a natural occurrence of gas supersaturation in the Susitna River which could be reduced by the operation of the project as proposed. This would result in an improvement to present Susitna water quality.

Early in the project's planning process, the Power Authority decided to include fixed cone valves in both the Watana and Devil Canyon dams. These valves will be used when power releases are insufficient to meet minimum downstream flow requirements or to release excess water from the reservoir when the reservoir has filled. Fixed cone valves are designed to release water under a substantial head of pressure, and to disperse water by releasing it as a spray. This spray does not plunge to a significant depth when it impacts the tailwater and therefore does not result in gas supersaturation. With the fixed cone valves it is unlikely that nitrogen supersaturation would become a problem under normal operation of the project.

3. <u>DEIS Proposed Alternative Access Plan</u>

FERC recommends that the proposed Susitna Project be accessed via a route departing from a Gold Creek railhead and traveling east to Devil Canyon and Watana dam sites. The Power Authority proposed a railhead at Cantwell and a project road departing the Denali Highway and traveling south to Watana, west to Devil Canyon and, when Devil Canyon is constructed, a rail link from Gold Creek.

Selection of an access plan requires decisions on (1) route, and (2) mode (road, rail, or road and rail). Analysis of access plans must be a multi-disciplinary exercise which includes assessments of:

- environmental impacts and risks;
- socio-economic impacts;

- road and rail design criteria;
- construction difficulty and risk;
- impacts on construction schedule; and
- life cycle construction and operating costs.

The Power Authority has undertaken substantial analysis of the access question which has been provided to FERC, and remains confident that its multi-disciplinary analysis and route selection remain valid. FERC recommends access from Gold Creek based upon its assessment of impacts on fish and wildlife resources. It fails to consider socioeconomic impacts upon the potentially affected communities of Gold Creek and Talkeetna. Both communities would experience increased populations, and resulting demand for services. The FEIS should include a multi-disciplinary assessment which presents all facets of the evaluation. In particular, the FEIS should determine the socioeconomic impacts of access via Gold Creek on Talkeetna and other small communities along the rail line. In addition, the evaluation should provide a quantitative assessment of impacts on fish and wildlife of the alternative routes, which thus far is not provided in the DEIS analysis. The Power Authority believes that using such an approach would lead to adoption of the Power Authority's access plan.

4. Terrestrial Wildlife Issues

The Power Authority review of the terrestrial wildlife and botanical resources sections of the proposed project portion of the DEIS has revealed various errors, inconsistencies, and inaccurate inferences. These have been noted in the Power Authority Comments. In addition, recently available results of current studies have been reported where appropriate. Some of the most important observations are summarized below:

- New data on peregrine falcon nesting locations demonstrates that the proposed transmission line route is situated 1.4 miles away from the closest nesting location rather than two locations within 1 mile of the route as previously thought;
- Incorrect inferences were made regarding moose and brown bear habitat preferences relative to the impoundment zone

and moose impact estimates, which imply that the impoundment zone is more important habitat than it really is, and which overestimates the number of moose impacted by the project;

- Additional data on black bear denning in the project area indicates that denning sites are not a limiting resource and that the DEIS overestimates impact on black bears;
- Updated information on the Jay Creek mineral lick indicates a lower potential for impact than previously thought.

C. Cost Assessment

When the License Application was filed, the projected project construction cost for the Watana and Devil Canyon hydro developments was $5,150 million (1982 dollars). The construction cost utilized in the DEIS analysis is $5,565 million. Since the filing of the License Application, the Power Authority has conducted additional geotechnical and engineering investigations, on which a report has been provided to FERC. These studies have shown that by refining certain design concepts the design could be improved. The estimated construction cost of the Proposed Project, taking into account these design refinements, actual and estimated pre-design expenses, and refined estimating procedures, could be reduced to $4,830 million. This represents a difference of $320 million from the License Application, and a reduction of $735 million from the cost estimate used by FERC in its analysis of project economics. The FEIS should adopt the revised construction costs of $4,830 million as this number reflects the additional investigations conducted since the Application filing.

VI. Evaluation of DEIS Proposed Alternatives

The DEIS recommends as a preferred alternative to Susitna, based upon engineering, environmental and economic considerations, a mixed thermal-based generation scenario, with selected non-Susitna hydro projects added as needed. FERC specifically suggested use of 5 non-Susitna hydro projects: Johnson, Browne, Keetna, Snow and Chakachamna. The alternative plan also includes one 200 MW coal-fired plant at Nenana, three 200 MW combined-cycle gas-fired plants and three 70 MW combustion turbines. Alternatively, FERC suggests that if Susitna Basin development were authorized, it should only be licensed in stages, with the first to be a Watana I development at 2100 feet elevation, rather than the proposed Watana development at 2205 feet design crest elevation. The DEIS further concludes that based solely on environmental considerations, an exclusively thermal based arrangement would be preferable. FERC studied a range of thermal plans and also considered an all gas and four mixed coal-gas scenarios. These plans involve three to five 200 MW coal-fired units. Under an all coal scenario, FERC proposed locating three of these units at Nenana and two at Willow.

The Power Authority disputes the FERC conclusions and recommendations with respect to the engineering, environmental and economic feasibility of the proposed alternatives. FERC has not considered a number of engineering, environmental and economic factors about the alternatives which, if properly evaluated, would diminish their attractiveness as alternatives to Susitna and, indeed, call into question the very feasibility of certain of the alternatives. These data on the alternatives are presented in the Power Authority's Appendices II and III of this document entitled Evaluation of Non-Susitna Hydroelectric Alternatives and Thermal Alternatives to Susitna. The following is a summary of the main conclusions reached by the Power Authority in its review of FERC's suggested alternatives concerning the engineering, environmental and economic difficulties associated with each alternative.

A. Engineering Assessment

In the DEIS, FERC does not identify any engineering difficulties involved with the Susitna Project as currently planned. Moreover, the alternatives, particularly the non-Susitna hydro alternatives have varying degrees of associated engineering problems, as discussed below, which were not noted or given any weight in the DEIS. Therefore it is difficult for the Power Authority to determine how engineering considerations influenced

FERC to favor the alternatives.

Johnson. Being remotely located with respect to the Anchorage-Fairbanks Transmission Intertie, this site would require a long transmission line. U.S. Bureau of Reclamation studies of this site raise significant questions about foundation suitability; surface geology suggests a deep valley filled with permeable, unconsolidated sediments. Potential difficulties exist with readily obtaining sufficient borrow materials. The Johnson site would probably require incorporation of fish passage facilities.

Browne. Relocations of the existing major highway route between Fairbanks and Anchorage, the Alaska Railroad, the Golden Valley Electric Association Transmission line, and several homes would be required. The site would potentially require substantial foundation excavations and would probably require incorporation of fish passage facilities.

Keetna. There would be potential difficulties with readily obtaining sufficient impervious borrow materials. The site would require incorporation of fish passage facilities.

Snow. This site would require upgrading a long transmission line from 115 KVA to 230 KVA. The site is subjected to glacial outburst flooding at approximately three year intervals. This would require special design treatment in the way of increased project freeboard, increased spillway capacity, or a reduced pool operating level.

Chakachamna. The proximity of the Barrier, Blockade, and McArthur glaciers, Mt. Spurr volcano (located seven miles from the lake outlet), and the high seismic risk would all require special engineering considerations. The glaciers could cause outburst floods and would require special design treatment of project features. An eruption of Mt. Spurr volcano could inundate the proposed power intake site with volcanic ash or trigger a landslide or mudflow which could bury numerous project features.

The ten mile long power tunnel will require detailed geologic investigations because of its greater susceptibility to problems created by changes in geology along its length. High in-situ rock stresses may occur near the underground powerhouse due to the nearby presence of the Lake Clark-Castle Mountain fault. This site would also require incorporation of fish passage facilities, of uncertain effectiveness.

Thermal. Additional transmission capacity would be required from Nenana and Willow to connect proposed coal-fired units under the all-coal scenario, and from Nenana under the mixed hydro-thermal. Additional transmission also be required from the gas generating stations.

As a result of the above noted engineering considerations, the FEIS should indicate that not only were engineering considerations not used to discriminate among alternatives, but also that the Susitna alternative is the preferred engineering solution.

B. Environmental Assessment

The FERC conclusion that, from an environmental standpoint alone, a thermal-based generating scenario would be preferable to Susitna seriously understates the significance of adverse environmental impacts which would occur in the all coal-based scenario and mixed coal-gas scenario both at the plant sites and as a result of increased mining activity required to obtain the additional coal. It also assumes away environmental difficulties with the all-gas scenario. Supplementing thermal generating plants with non-Susitna hydropower as needed would create additional adverse environmental impacts which the FERC analysis has failed to consider. Had FERC fully recognized the combined cumulative adverse consequences of either the thermal or the mixed thermal and non-Susitna hydropower generation that would have to be developed in lieu of Susitna, it would have concluded that the adverse impacts of its suggested alternatives far outweigh any environmental disruption associated with Susitna.

The following is a summary of the key environmental difficulties of each alternative which the Power Authority believes have not been properly weighed in the DEIS analysis, and which should be considered in the FEIS analysis.

1. Unavoidable Impacts of Non-Susitna Hydro

The unavoidable adverse impacts associated with the alternative hydro sites are significantly greater than the unavoidable adverse impacts associated with the proposed Susitna Project. Adverse impacts associated with the proposed Susitna Project would occur relatively close in time and would be constrained to one relatively small area of the state. In contrast, the adverse impacts associated with the hydro portion of the combined hydro-thermal alternative would occur over a longer period as additional units are constructed, and will severely impact at least five discrete areas within the state. The extent, magnitude and severity of each discrete impact for each alternative hydro site alone in some cases is greater than the extent, magnitude and severity of that same impact for the Susitna Project in some cases. The cumulative and sequential unavoidable adverse impacts associated with the five alternative hydro sites combined exceeds the comparable impacts associated with development of the Susitna Project.

The most significant unavoidable adverse impacts associated with development of the five hydropower alternatives are as follows:

- Permanent dedication of approximately 125,000 acres of vegetated land, including high quality palustrine wetlands, to project features, with resulting permanent loss of wildlife habitat.
- Inundation of the Native village of Dot Lake, and the community of the Living Word.
- Permanent inundation of a portion of the Nenana coal fields, as well as portions of the Alaska and George Parks Highway, the Alaska Railroad, portions of a Golden Valley Electric Association transmission line, a natural gas pipeline, a

power substation and the Alaska-Fairbanks Intertie.

- Alteration of the temperatures, flow regimes, ice regimes and turbidity of six rivers and one lake. These direct impacts necessarily lead to impacts on aquatic communities, including valuable and important anadromous fisheries, and terrestrial wildlife.
- Elimination of spawning and rearing habitats for all five Pacific salmon species in the Chakachatna and Talkeetna Rivers.
- Reduction in brown bear populations due to loss of salmon as a seasonal food.
- Loss of portions of white-water rafting and kayaking areas and river touring opportunities in the Nenana River and Talkeetna Rivers.
- Permanent adverse impacts on subsistence hunting and fishing in the region of each site, and permanent loss of sport fishing opportunities.
- Severe adverse impacts on small communities near the five alternative hydropower locations, including housing shortages, shortages in community services and revenues, and increased disruption of Native lifestyles.
- Permanent and severe impacts on visual aesthetics in widely dispersed areas of the state, due to construction of four dams and reservoirs (mud flats, beach erosion), transmission corridors, access roads, and relocation of highways, railroads and communities.
- Direct, possibly significant impacts on four nesting locations of the endangered peregrine falcon.

2. Johnson Dam and Reservoir

Construction of the Johnson Dam and Reservoir would have extremely adverse impacts on land resources in the project area. The reservoir itself would inundate approximately 94,500 acres of land. Beach erosion associated with the reservoir could be very extensive.

Relocation of 23 miles of the highway and the pipeline from the river flood plain to the foothills of the Alaska Range will result in significant impacts along the relocation route of those facilities, including slope stability problems.

Two communities, the Native community of Dot Lake and The Living Word (at Dry Creek) would be inundated by the Johnson Reservoir, necessitating their relocation.

Three species of salmon, the chinook, coho and chum, migrate upstream of the Johnson Dam site. It will be necessary to incorporate fish passage facilities into the Johnson Dam in order to facilitate both upstream and downstream passage of these fish. It is expected that the fish passage facility would be only partly successful in maintaining these runs given the size of the Johnson Reservoir and its water quality. It is questionable whether fish will be able to successfully navigate through the reservoir. The extensive habitat loss associated with this project would result in significant impacts to many wildlife species, especially big game. Habitat loss associated with the Johnson project is on the order of twice the loss associated with Susitna.

3. Keetna Dam and Reservoir

FERC's proposed Keetna project would be constructed on the Talkeetna River, a main tributary of the Susitna. Construction activities associated with obtaining impervious borrow materials from higher elevations will significantly increase the occurrence of slope failure. Construction of the 25 mile long access road along the south bank of the river will have similar effects. Permafrost deposits in the area will increase the probability of permafrost thaw impacts, thus necessitating the incorporation of special engineering designs into the construction of the dam and all access facilities. Since glacial deposits will form the shoreline of the Keetna Reservoir, a worst-case analysis would indicate that slumping and slope failure could result from construction of the Keetna alternative.

FERC underestimates the importance of the Talkeetna River as a spawning ground for the five species of Pacific salmon. Less than 25% of the migrating salmon continue up the Susitna above its confluences with the Chulitna, and Talkeetna Rivers. The majority, approximately 75%, migrate up the Talkeetna to spawn. Altered flow regimes could preclude downstream access into important sloughs, creeks and tributaries for spawning. The Alaska Department of Fish and Game (ADF&G) has specifically commented on the fishery impacts associated with the Keetna Site as follows:

> "The potential for fisheries impacts with the development of the Keetna alternative hydro site appears to exceed any individual site discussed in the DEIS. The Talkeetna River is a major producer of salmon with rapidly increasing levels of recreational use. The DEIS implies that little is known about the size and composition of fish migration up the Talkeetna River. The ADF&G regularly monitors chinook and sockeye salmon escapement on several major clearwater tributaries of the Talkeetna River. Prairie Creek, above the Keetna site, has the highest density of spawning chinook salmon per stream mile of any stream within the Matanuska-Susitna borough. Chinook salmon escapement in Prairie Creek generally range between 3,000 to 5,000 fish, but in 1976 it was as high as 6,513 fish. Equally important is the fact that these salmon support the highest concentration of brown bears during July and August of any known location within the Susitna basin. Nearly 40 brown bears are attracted to Prairie Creek to feed on chinook salmon. The ADF&G has recommended that this stream and its adjoining upland be protected from incompatible land uses. Prairie Creek also contains sockeye and coho salmon, but numbers are not well quantified.
>
> Disappointment Creek, located at the Keetna site has a chinook salmon escapement of 200-300 fish, and is also popular for rainbow trout and Dolly Varden fishing which occurs at its confluence with the Talkeetna River.
>
> Chunilna Creek, downstream of the Keetna site, is a major salmon producer and a major sport fishery occurs at its confluence with the Talkeetna River. On even years, pink salmon escapement often exceeds 250,000 fish. Chinook salmon escapements have been as high as 2,000 fish. Sockeye escapement into Fish Creek (a tributary to Chunilna Creek) range from 5,000 to 10,000 fish. Up to 2,500 coho salmon and 7,500 chum salmon have been estimated in this creek. Sport fishing on Chunilna Creek averaged 4,260 user-days annually of fishing effort between 1977 and 1981.
>
> The potential impact of the Keetna dam on salmon resources is greater than what would occur with the Susitna development because the Talkeetna River salmon populations greatly exceed those in the Susitna River above its confluence with the Chulitna

River. The size, composition and behavior of fish runs above and below the Browne and Johnson site are less well known and the magnitude of impacts are difficult to compare with the Susitna." 1/

4. Browne Dam and Reservoir

The Browne Dam would be located on the Nenana River approximately 65 air miles southwest of Fairbanks. The proposed reservoir will inundate rail, highway and electric utility corridors. As with the Johnson alternative, the Browne alternative would require extensive and expensive relocations. It would be necessary to relocate approximately 16 miles of railroad and nine miles of highway. Each could be relocated onto steeper slopes than exist at current location thus resulting in more highly exposed excavations, and increased slope stability problems. The existing Golden Valley Electric Association transmission facility and a portion of the Anchorage-Fairbanks Intertie would have to be relocated.

Land use in the Brown site area consists mainly of low intensity dispersed recreational use. Coal deposits and some mining occur in the area east of Healy. The Browne Reservoir would inundate a portion of the Nenana coal fields, but not where mining is now occurring. The DEIS does not discuss the effect of such inundation on the feasibility of its coal-fired alternative.

In contrast to the DEIS finding that no anadromous fish occur at the potential Browne site, chinook, chum and coho salmon occurrence have been reported by the ADF&G to occur upstream of the Browne site. Fish passage facilities would be needed. Again, a reasonable worst-case analysis would indicate that such facilities would be only minimally successful. Chum salmon could virtually be lost above the site.

1/ Yanagawa, C.M. - ADF&G Regional Supervisor, Habitat Division 1984 Memorandum to Jack Heesch OMB Project Coordinator on Susitna Hydroelectric Project DEIS.

5. Snow Dam and Reservoir

The Snow Dam would be located in a bedrock gorge in the Snow River near the southern end of Kenai Lake. Although the small size of the Snow Reservoir and its location in a bedrock gorge will minimize the length of shoreline subject to erosion and the potential for slope failures, the probability that erosion and slope failures will occur is still high. For example, excavation of impervious borrow would significantly increase the possibility of slope failures in the area. Glacial outburst floods on the Snow River have been observed on the average of every three years. Special operating instructions, and incorporation of costly engineering designs to facilitate control or passage of such flooding, would be necessary.

Development of the Snow site will result in the inundation of Lower Paradise Lake and a significant resident species recreational fishery of grayling and rainbow trout at that location. In contrast to the statement in the DEIS that no anadromous fish are known to occur in the Snow River, coho and sockeye salmon spawning areas exist in the Snow River downstream of its confluence with the south fork. The coho and sockeye salmon contribute to the highly important Kenai River sport and commercial fisheries. These could be adversely affected by development of the project.

6. Chakachamna Alternative Site

This alternative would affect the Chakachatna River, Noaukta Slough, the MacArthur River and Chakachamna Lake. It entails diverting Chakachamna Lake water to the MacArthur River. Chakachamna Lake and its upstream tributaries provide major rearing habitat for some 40,000 sockeye.

Decreasing flows in the Chakachatna River will adversely impact anadromous fish in the lower river including the important rearing areas on Noaukta Slough. Access to important spawning areas and tributaries and sloughs will be eliminated. The diversion of Chakachamna Lake water to the MacArthur River would result in miscuing, straying and delay of anadromous fish that normally spawn above Lake Chakachamna. Increased flows in the

MacArthur River are also expected to inhibit upstream migration of salmon.

Lake tapping could affect the lake's nutrient balance, and will increase temperatures. Operation of the project is expected to create significant changes in the hydraulic regime of the McArthur and Chakachamna Rivers, with potential adverse consequences for fish habitat.

7. Thermal Generation

a. Natural Gas Fired Generation

FERC has proposed alternate generating scenarios which vary in the extent to which gas is used. FERC proposals range from 10 combustion turbines of 70 MW under its coal scenario, to 8 combined-cycle 200 MW plants with two 70 MW combustion turbines under its all-gas scenario, to only three combustion turbine 70 MW plants with three 200 MW combined-cycle plants under the mixed thermal/hydro scenario. All of these scenarios have been found environmentally preferable to Susitna; however, the DEIS seriously understates the impacts of even the all-gas scenario, its "cleanest" alternative. FERC seems to has assumed a zero impact without data or supporting analysis. The National Environmental Policy Act (NEPA) requires a reasonable, worst-case analysis when such data gaps exist. Available data indicate several significant impacts of gas generation which should be included in the FEIS. The severity of these impacts will vary, depending upon the extent to which gas is a component of any alternate generation scenario.

The cumulative effects of carbon monoxide (CO) emissions from the Anchorage combustion-cycle plants, which will result under all of the DEIS thermal and mixed thermal-hydro scenarios, could significantly increase ground-level CO concentrations. Since Anchorage is a nonattainment area now, further public health degradation would occur.

Total NO_x, TSP and secondary aerosols from the combined-cycle plants can create regional haze in the Cook Inlet area under reasonable, worst-case conditions. Visibility would be degraded for the substantial proportion of the citizens of Alaska who live around the Cook Inlet.

Gas-fired power plants generate considerable noise. Effects on Wildlife and humans within areas of significant audibility could occur.

The DEIS lists potential sources of water pollution and states that adequate protection will be provided. There is no methodology included in the DEIS to determine the potential impacts of each of the pollution sources upon surface water quality or quantity. Further, there is no background data on existing surface and ground water quality and quantity. Therefore, this assertion is unsupported.

The DEIS does not identify the locations of the combined-cycle units or combustion-turbine units for purposes of analyzing specific impacts. FERC must either make its siting choice for gas plants or utilize assumptions regarding reasonable, worst-case siting.

FERC has failed to estimate properly the amount of wetlands to be affected by plant construction and operation. If the exact acreage of wetlands affected by construction and operation cannot be calculated, the DEIS must include a worst-case analysis.

Using reasonable, worst-case assumptions, visual effects could also be significant due to the highly scenic character of the potential areas subject to industrial development.

b. <u>Coal-Fired Generation Scenario</u>

As with gas generation FERC has assumed varying levels of coal usage in its proposed generating alternatives, which range from one 200 MW plant with the mixed thermal non-Susitna hydro plans to five 200 MW coal plants in the all coal scenario, and has found them all environmentally superior to Susitna.

FERC underestimates the impacts of coal fired development. Below is an inventory of potential effects of increased coal usage.

Land. The DEIS admits that increased levels of potentially hazardous materials in soil might occur without identifying the materials or their degree of hazard.

When considering worst-case estimate of the amount of land required for mining coal, the potential for acid leachate into soil from mining, leachate of hazardous materials from flyash and spent limestone slurries, the level of wind erosion of soils, modification of surface drainage and topography, and slope failures due to excavation and permafrost that result from vegetation stripping, it should be concluded that significant adverse effects can result.

Climate, Air Quality, Noise. Significant air impacts of both the Nenana mine and coal transport, have been ignored in the DEIS. The effects can be significant. The air quality impacts of the three 200 MW coal-fired plants at Nenana and the two 200 MW plants at Willow were studied by the Power Authority. Hypothetical power plant sites near both cities were assumed, to show the impacts that would be caused by power plants in the area. The impacts of the Lignite Creek coal mine expansion and the impacts of the required coal unit trains have also been investigated. The results of the analyses are as follows:

- The coal mine expansion would create long-term fugitive dust impacts in the Lignite Creek valley and would also impact Denali National Park.
- Fugitive dust from the coal-fired power plants would create long-term impacts near the power plants. The fugitive dust might cause exceedances of the PSD Class II increments near the power plants.
- Stack emissions from the power plants would cause long-term impacts in a large area around each plant. So_2 emissions would create the most significant impact. The calculated worst case SO_2 concentrations near both the Nenana and

Willow power plants are approximately 41 percent of the allowable PSD Class II increment. Stack emissions from the Nenana power plant would cause increases in the pollutant concentrations in Denali National Park.

- The degradation of visibility caused by the power plant plumes would be long term and would affect many key vistas that are considered a valuable cultural resource in Alaska.
- Ice fog and steam plume formation from the gas-fired power plants could be a significant siting constraint. The gas-fired power plants near Anchorage could have a significant impact on carbon monoxide, nitrogen dioxide, and ozone concentrations in the urban area.

The noise impacts of the coal mine blasting, continuous mining operations, coal unit trains, and the power plants were estimated, using realistically worst case assumptions. The results of the analyses are as follows:

- Blasting noise from the mine would probably be audible in some parts of Denali National Park. The blasting noise would occur daily.
- The continuous mining noises would affect a large area in the Lignite Creek valley.
- The coal unit trains would create long-term noise impacts along the entire railway between Nenana and Willow. The coal trains would add significantly to the existing rail traffic along the Alaska Railroad.
- The power plants would create long-term noise impacts, affecting a large area around each facility. Noise impacts on residential areas would be a major siting constraint for the gas-fired power plants in the Anchorage area.

Aesthetics. The potential aesthetic impacts of the coal mine, unit trains, and the power plants were considered. The results of the aesthetic impacts evaluations are as follows:

- The unit trains would create very significant, long-term aesthetic impacts. The unit trains would add significantly to the existing rail traffic along the Alaska Railroad.
- The power plants would create long-term, significant impacts for ground travelers and air travelers along the Railbelt. The large industrial facilities would probably be constructed in otherwise pristine areas. The disruption of the environment would be especially noticeable to air travelers.

Water Quantity/Quality. The water quality impacts of the coal mining operations and the power plants would be long term. The estimated impacts are as follows:

- The coal mining operations would cause long-term and possibly irreversible groundwater impacts in the Lignite Creek area. Surface runoff from the mining operations would cause changes in streamflows and increases in suspended sediments in surface waters.
- The power plants would require long-term water supply sources. The power plants would continuously discharge treated wastewater to the receiving streams, causing long-term changes in water quality.

Terrestrial Ecology. The combined five coal-fired power plants would create long-term disruption of approximately 3,000 acres. Additional long-term terrestrial disruption would be caused by the access roads, railroad spurs, and gas pipelines.

Aquatic Ecology. The potential impacts of the gas pipelines, access roads, coal mine, and the power plants would be a major constraint on the thermal power alternatives. The facilities would have to be designed to avoid potential significant impacts on anadromous fish spawning grounds.

Socioeconomic Impacts. Construction and operation of the power plants could cause significant socioeconomic impacts in the small communities near the power plant sites. The communities could be faced with the need for more educational facilities, medical services, and social services due to the influx of temporary workers during the power plant construction.

8. Comparison of Impacts of Susitna and DEIS Preferred Mixed Thermal-Hydro Alternative

The following table highlights for comparison purposes the environmental consequences of Susitna versus the combined hydro-thermal alternative recommended in the DEIS as the FERC preferred alternative. The table illustrates that the aggregate effects of the combined hydro-thermal alternative are far more disruptive to the environment than Susitna would be.

ENVIRONMENTAL EFFECTS OF SUSITNA AND DEIS HYDRO-THERMAL ALTERNATIVE

Impact	Proposed Project	Hydro-Thermal Alternative
a. noise and fugitive dust during		
1. construction	present	present
2. operation	none	significant for coal mining and transport
b. population increase in small adjacent communities	significant	significant; plus loss of Dot Lake and The Living Word communities
c. permanent loss of lands		
		(hydro + thermal)
1. facilities/ road/transmission	15,000	8,000 ac. + 625 ac.
2. impoundments	45,000 ac.	115,000 ac. + 0 ac.
3. mines	0	0 + 450 ac.
Total	60,000 ac.	123,000 ac. + 1075 ac.
	Grand Total =	124,000 ac.

d. permanent loss of marsh and pond type wetlands	none	significant; more than 30,000 acres lost
e. impacts to wildlife habitat and wetlands	loss of moose habitat	significant loss of moose habitat
f. permanent impacts on subsistence use	minor subsistence use of wildlife in project area	Johnson impoundment critical to Dot Lake Native Community
g. permanent impacts on recreational hunting	redistribute access opportunities among hunters	Redistribute access opportunities among hunters
h. permanent impacts on aquatic habitat and fish	escapement of 2000-4000 salmon at risk if no mitigation. With mitigation, no net loss.	escapement of 50,000 to 100,000 salmon at risk if no mitigation. Permanent loss of several thousands chum for Johnson site.
i. loss of recreational fishing	minor loss associated with impoundments, redistribution of fishing opportunities	loss associated with impoundments
j. permanent loss of recreational white water	loss of several miles of class VI waters	loss of several miles of class IV waters
k. permanent loss of river navigation	minor impact on Portage to Talkeetna Reach. Opens navigation through Vee Canyon.	major impact on Lower Tanana River
l. visual impacts	present. Project in remote area, transmission enters developed corridors	present, some projects remote, some in developed areas. Plumes and haze impact widespread in substantial population areas
m. degradation of air quality	none	significant in major population areas.

C. Cost Assessment

FERC seriously understates the costs of both the mixed non-Susitna hydro-thermal alternative and the all thermal alternatives. In so doing, the DEIS analysis is skewed to make alternatives appear more attractive than Susitna. Inclusion of all costs of alternatives in the comparison would have reduced the alleged economic benefits of the alternatives. Below are summarized cost data on alternatives which should be factored into the FEIS analysis. These data are developed in more detail in the supporting Appendices II and III, Evaluation of Non-Susitna Hydroelectric Alternatives, and Thermal Alternatives to Susitna.

1. Hydro Alternatives

While FERC does not explain the manner in which construction costs for the non-Susitna hydro alternatives were estimated, it is apparent that the 1980 Development Selection Report (DSR) prepared by Acres American, Inc., which contained screening level estimates for the alternative hydro projects, was compared with 1982 feasibility estimates for the Susitna Project. The result is illustrated in the following table.

Project Alternatives	DSR Cost (1980 Level, $\$ \times 10^6$)	DEIS Cost 3/ (1982 Level, $\$ \times 10^6$)	Apparent Escalation, DSR to DEIS
Browne	624	681	9% increase
Johnson	896 1/	319 2/	64% decrease
Keetna	476	519	9% increase
Snow	254	305	20% increase
Chakachamna	1,480	905	39% decrease
Alternative Total	3,733	2,729	27% decrease
Proposed Project	2,860	5,565 4/	95% increase

1/ A cost for Johnson was not included in the DSR. The cost shown was computed using DSR quantity estimates and unit costs for Browne, Keetna, Snow.

2/ Basis for cost presented in DEIS unknown.

3/ DEIS costs used by FERC;

$5,565 million cost for the Proposed Project is a check estimate presented in the July 11, 1983 supplement to the License Application filing for comparison purposes. A more current estimate (by the Power Authority) of $5150 million was presented in License Application.

When the costs of the hydro alternatives are brought to a level appropriate for comparison with the Susitna Project, the analysis shows that the costs of the alternatives are significantly greater than those stated in the DEIS. FERC should incorporate in its FEIS the revised cost parameters for the hydro alternatives.

In addition, studies of the power and energy production of alternatives, which are presented in the Appendix II of this document, suggest that when energy generation is matched to load growth, the available annual energy of the alternatives cannot be absorbed by the system until 2025. Also, the studies show that the December 2010 total dependable capacity of the alternatives would only be 34% of the total installed capacity of the alternatives.

2. Thermal Generation

As mentioned earlier, the costs of coal-fired powerplants have received closer examination since the filing of the License Application. Recent actions by the Alaska Department of Environmental Conservation indicate that they would employ best available containment technology criteria on new coal plants, and would seek containment in the high range of 95 to 98%. Achieving these objectives would prove technically difficult in the subarctic conditions of the interior and would substantially increase capital and operating costs of these facilities. Recent Power Authority studies have demonstrated that the operating and maintenance costs, capital costs, and other cost components of coal plants are greater than earlier believed. Fixed costs have increased by more than a factor of three, while variable costs have increased by more than a factor of six. Moreover, the coal quality is less than previously calculated. Both of these factors further reduce the economic attractiveness of coal-fired units in any generation plan. Revisions to cost estimates of other thermal plants are also indicated by the Power Authority's studies. These revisions are presented in Appendix I of this document.

3. Susitna Basin Alternatives

Although FERC finds that the mixed thermal-based, with non-

Susitna hydro, scenario would be the most reasonable alternative, the DEIS states that should any hydroelectric development be authorized in the Susitna Basin, the first stage of this development would be the Watana I alternative. This development would be identical to the Proposed Project, except that Watana dam would be scaled down to have a crest elevation of 2125 feet (648m) and a normal reservoir level of 2100 feet (640m).

FERC estimates the total construction cost of the proposed Watana Development to be $4,062 million (1982 $). The Watana I alternative is estimated by FERC to be $3,494 million (1982 $). Studies conducted by the Power Authority since the filing of the Application indicate that the cost estimate for the proposed Watana Project is considerably less than the estimate presented in the DEIS. (The revised cost estimate for both Watana and Devil Canyon is $4,830 million in 1982 $).

The future opportunity to develop fully the Susitna River should not be precluded by a Watana I project. Therefore, cost estimates for Watana I should include those steps necessary to permit subsequent raising of the dam height to the full License Application elevation. Although the Watana I alternative has an obvious lower cost resulting from the lower dam height, the Power Authority analyses indicate that the Proposed Project is the optimum development for the Susitna Basin.

As presented in Figure B-19 of the License Application, the Watana Project as proposed results in a net benefit when compared to Watana I. In addition, Watana at reservoir elevation 2185 develops the full hydroelectric potential of the site.

VII. Conclusion

In the DEIS, FERC states that it favors a mixed hydro-thermal generation scenario based on considerations of economic feasibility, environmental impact and engineering. As shown in this Executive Summary and in greater detail in the Technical Comments and the Appendices, the proposed Susitna Project is preferable on all grounds, when it, and alternatives to it, are given a balanced assessment. At a minimum, the FEIS should incorporate the most current data available, particularly that within this Comment Document, which has been supplied to FERC on a continuous basis since the License Application filing. FERC should use such data to conclude that the Proposed Project represents the preferred means of meeting the future electrical needs of Alaska's Railbelt.

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Alaska Power Authority
Comments on the Federal Energy Regulatory Commission
Draft Environmental Impact Statement
of May 1984

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Acronym	Affiliation
Acres	Acres American, Inc.
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AEIDC	Arctic Environmental Information and Data Center
AIEE	American Institute of Electrical Engineers
AK	State of Alaska (General)
ALUC	Alaska Land Use Council
APA	Alaska Power Authority
ASL	Alaska State Legislature
Battelle	Battelle Pacific Northwest Laboratories
BLM	Bureau of Land Management
BP	British Petroleum
COE	Corps of Engineers
DCED	Alaska Department of Commerce and Economic Development
DOE	U.S. Department of Energy
EBASCO	Ebasco Services, Inc.
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission

Acronym	Affiliation
FNSB	Fairbanks - North Star Borough
FOA	Frank Orth and Associates
HE	Harza-Ebasco Susitna Joint Venture
IEA	International Energy Agency
IEEE	Institute of Electrical and Electronics Engineers, Inc.
ISER	Institute of Social and Economic Research
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
O&GCC	Oil and Gas Conservation Commission
PND	Peratrovich, Nottingham & Drage, Inc.
R&M	R&M Associates
SHCA	Sherman H. Clark Associates
SHP	Susitna Hydroelectric Project
TES	Terrestrial Environmental Specialists
UAM	University of Alaska - Museum
USBR	U.S. Bureau of Reclamation
USDASCS	U.S. Department of Agriculture, Soil Conservation Service
USGS	U.S. Geological Survey

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