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Review of application for license
submitted to FERC on February 28, 1983
for the Susitna Hydroelectric Project
FERC 7114. Cover letter and comments to
Eric Yould, Alaska Power Authority,
Anchorage, AK. 4 pp.

6-000

Mr. Eric Yould
Alaska Power Authori
34 West 5th Avenue
Anchorage, Alaska 9

Subject: Applicatio
for the Su

Dear Mr. Yould:

Your application for the subject project has been reviewed by the staff. The application is not in complete conformance with the relevant requirements of the Commission's regulations. A list of those non-conforming items is enclosed as Schedule A.

Further, in order for staff to be able to fully evaluate your application, please submit the supplemental information described in Schedule B. The supplemental information need not be included in the copies of the application but may be submitted separately.

Section 4.31(d) of the regulations provides that an applicant whose application for a license fails to conform to the requirements of the Commission's regulations may be given up to 90 days in which to correct those items.

Accordingly, you have 90 days from the date of this letter (April 12) to correct the non-conforming items in your application. If you fail to correct your application within that time, it will be rejected. Additionally, please file the supplemental information within 90 days. If you cannot provide the supplemental information within 90 days, please provide a schedule, for Commission approval, within 30 days for filing that information.

If you have any questions concerning this letter or the filing of your application, please contact William Wakefield at (202) 376-1911.

Sincerely,

Lawrence R. Anderson

Lawrence R. Anderson
Director, Office of Electric
Power Regulation

Enclosures

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169

APR 22 1983

FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON 20426

IN REPLY REFER TO:
OEPR-DHL
Project No. 7114-000

Mr. Eric Yould
Alaska Power Authority
34 West 5th Avenue
Anchorage, Alaska 99501

Subject: Application for license submitted on February 28, 1983 for the Susitna Hydroelectric Project No. 7114.

Dear Mr. Yould:

Your application for the subject project has been reviewed by the staff. The application is not in complete conformance with the relevant requirements of the Commission's regulations. A list of those non-conforming items is enclosed as Schedule A.

Further, in order for staff to be able to fully evaluate your application, please submit the supplemental information described in Schedule B. The supplemental information need not be included in the copies of the application but may be submitted separately.

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Sincerely,

Lawrence R. Anderson

Lawrence R. Anderson
Director, Office of Electric
Power Regulation

Enclosures

Exhibit B

GENERAL

1. The applicant does not provide a sufficient documentation of the load fo.ecast modeling effort or a sufficiently broad and comprehensive sensitivity analyses that would enable a reasonable evaluation of the impact of critical variables, e.g. current world crude oil prices.

   Staff's preliminary analyses of documents made available as part of the application for license indicate recent changes in world crude oil pricing will have a significant impact in reducing the forecasts included in Exhibit B of the application. Significantly reduced world crude oil price and power requirement forecasts could change the development of and the proposed financing for the alternative plans for the region that are shown in the application, and would alter the related cost analyses used in evaluating these plans, thereby affecting both Exhibit B and D.

2. The applicant does not provide documentation that will allow replication of the modeling effort described in the application and, therefore, information that can fully support the reasonableness of the load forecast modeling effort and the credibility of its output.

3. The documentation that is provided does not include data to explain and support the forecast used in the cost analysis of alternate plans and related sensitivity analyses (i.e., the forecast shown in Table B.73.)

The following items are keyed to the numbering system used in the prefiling review.

Item 4. Provide generation capability of the Susitna project considering the various minimum releases proposed by the fishery agencies. Provide an estimate of the dependable capacity and average annual energy production based upon minimum flow releases recommended by the appropriate state and federal agencies. The release schedules provided in Exhibit B, are estimates and do not reflect state and federal negotiations. Evidence of agency consultation should be provided.

Item 5: Include an assessment of the impact the Susitna project would have on system reliability, at least in terms of generation reserve margins and appropriate reliability criteria.

Specifically, provide all studies, reports, analyses and surveys which were relied upon establish the reliability criterion selected for the evaluation of the Susitna project. Is there any information which establishes the level of reliability of electric service which customers in the state of Alaska are willing to pay for? If so, please provide copies of all such information. Since Susitna is projected to supply an unusually large portion of total system power, include an assessment of the reliability of transmission and to what extent the various railbelt utilities will be required to maintain standby thermal capacity as a precaution against transmission or other power outages?

Item 6: Include a sensitivity analysis on the impact that the crucial variable, world oil prices, has on the Need for Power.

Specifically, for -2%, -1%, 0%, +%1 and +2% real growth in world oil prices (from January 1982), submit the following projections --- by years.

1. State oil revenues (royalty and severance taxes).
2. State gas revenues.
3. State general fund expenditure.
4. State population.
5. State employment.
6. Railbelt population.
7. Railbelt employment.
8. Railbelt-No. of households - by type household.
9. Railbelt-electricity demand per household - by type.
10. Railbelt-electricity demand, by area, (Fairbanks, Anchorage, etc.), sector (residential, commercial, and industrial), and use (lighting, power space bent).
11. Railbelt-peak demand.
12. Railbelt-generating capacity required.

In addition, list projections of any other variables, not listed above, that were used in predicting demand or capacity requirements.

Provide a complete explanation of the derivation of alternative fuel price projections for the time period 1982-2040. Limit the response to price projections of coal, natural gas and residual and distillate fuel oil. If the world oil price were to decline at a rate of 1% per annum, how would this alter the assumptions about the prices for natural gas, coal and residual and distillate fuel oil in Alaska over that same time period?

Finally, include analysis of the impact on the demand forecast of a base crude oil price reflecting the most current information available regarding world oil prices.

Item 7: Combine or relate the sensitivity analysis on Need for Power requested above to one performed in the cost benefit analysis.

Specifically, for the HH, M, and LL projections used in the cost benefit analysis submit the data requested in projections 1-12 listed in Item (6), above, for the "with Susitna" and "thermal alternative" plans.

Item 8. Provide calibration data, comparing computer outputs to actual historical performances, on the econometric models used in the Need for Power analysis.

Specifically, (1) present 1961-1982 data for projections 1-12 listed in Item (6), above.

(2) Provide equations or coefficients relating projections 1-12, to the extent such equations or coefficients were used in calibrating the basic demand model.

(3) For projection (10), present data by area (Fairbanks, Anchorage, etc.), by sector (residential, commercial, industrial), and by end use (lighting, power, and space-heating).

(4) Provide the results of any model runs made starting at some prior point in time which compared predicted values with actual data. If no historical comparison runs were made to check model calibration, so state. For instance, the ISER Regional Allocation Model, as documented in Electric Power Consumption For the Railbelt: A Projection of Requirements Technical Appendices (May 1980) pages B-18 to B-19, presents regression equations estimated with data ending in 1976---how well have those equations predicted actual values for the dependent variables in the years subsequent to 1976? Alternatively, if actual values which have become available subsequent to the original estimation of the model have been used to reestimate the coefficients in these equations, how do those new estimates compare with the old values? Provide all information available to establish the stability of the coefficient estimates, or necessary to determine new coefficients.

Item 9: Provide a comprehensive and integrated explanation of how the several modeling efforts were combined to develop the final forecasting model, including how the models work, how exogenous variables were selected, how sensitive the demand forecasts are to assumptions and variables and how the various models are linked, e.g., the Institute for Social and Economic Research (ISER) model linkage to Man in the Arctic Program (MAP) which is used to generate input assumptions.

The draft application was modified to a considerable degree with regard to this deficiency and additional information was made available in separate reports which were not available at the time of the prefiling review. However, the noted changes and additional reports do not provide a sufficiently comprehensive compilation of the information needed to make a reasonable review of the forecasts included in Exhibit B of the filed application.

Evaluation of a load forecast modeling effort should involve evaluation of the structure of the forecasting model, including its internal consistency, its correspondence with common sense and good practice and the ease with which modeling assumptions can be implimented and understood. It should also involve identification and evaluation of the required exogenous variable

forecasts, the parameter values used in the modeling effort and the response of the model to variations in exogenous and endogenous variables.

A large number of choices of parameter values and exogenous variable forecasts are necessary for each forecast, but all the parameters appearing in the modeling of the Susitna forecasting effort cannot be identified from the application and staff cannot be sure all the necessary exogenous forecasts are even mentioned in the application. In addition, little documentation is available regarding the ISER/MAP model. Accordingly, with regard to the Exhibit B, item 9 deficiency please:

> Specifically, (1) Clearly identify all models and submodels used in preparing the economic projection and sensitivity analyses filed, from the point of initial assumptions through the demand projections to the final economic projections. Clearly identify how the models relate and identify all break points in the system where data from one model, or sets of models, must be loaded into another model. At each breakpoint, including the initial point, identify all input variables by name into the downstream model and the source of data (i.e. output from an upstream model, or exogenous variables and assumptions). Include only those models used to generate the input data used in the filed economic projections and sensitivity analyses, or that generated input into any subsequent model which generated input data used in the filed economic projections and sensitivity analyses. For each model or submodel clearly identify all output variables and their time series form (i.e. by years, total only, etc.). Our purpose here is to clearly understand the details of information flow from the various points of information input to the final output. If various models supply input to one forecast (i.e. high medium, low, etc.) but not another, clearly identify the forecasts in which a model output is used.
>
> (2) For each model identified in (1) above, supply the version of the model used to provide input to the filed economic projections and sensitivity analyses in sufficient detail that it can be programmed. Supply the values for each parameter or coefficient used within the models. State whether any parameter or coefficient values are changed in alternative model runs. If parameter or coefficient values change, clearly identify the parameter or coefficient values used in different cases and state the reasoning used to justify such changes. Supply all data, studies, and other material relied upon to support the choice of parameter values or regression coefficients used.
>
> (3) For the low, moderate (base case) and high projections (including the "with Susitna" and "without Susitna" variations) used in the application for the economic analyses list the values of all exogenous variables,

data, and assumptions used as input into each model (by year, if input is by year). Clearly identify the output values (by year) from any model that are used as input into any subsequent model through the final economic projections. Clearly show the output values by year from the overall demand model that is used as the basis for economic projections. For each model also show the individual data or projected time series that each model generates internally and uses to generate the final model output. The information presented should be sufficiently detailed to allow us to trace the projection from initial data and assumptions used as input through all models to the final demand projection used in the filing, by area, sector, and end-use.

(4) Identify, or supply, all data, studies, or other material relied upon to support the choice of values for each exogenous variable and assumption used as input into the various models. Where input values are primarily judgemental, so state.

(5) Economic and cost benefit data are computed through the year 2051. The various demand models and sub-models were apparently terminated at some earlier date. Clearly identify all assumptions used in extrapolating demand and system costs beyond the end period from model projections.

Item 10: It appears that the MAP model produces population forecasts only to 2000 thereby requiring extrapolation to 2010. Modify the model to produce forcasts up to 2010.

Specifically, where models which are used to generate input into other models that do not generate data for the same time period as the final demand model, specify the extrapolation methods and values used. Provide sufficient examples to clearly demonstrate the procedure. Provide at least one plot of generated data and extrapolated data as an illustrative example. Identify all points where the time series differ between models and extrapolation, or interpolation, is necessary.

Item 20: Specific details need to be included about:
(A) the data and forecasting assumptions;
(B) the "price adjusting intensity" (p. 5-6);
(C) conservation adjustments... (G) revisions of Battelle forecasts in 1982.

Item 25: The 2-4% reduction in heating consumption due to conservation seems to be very low. Provide the analysis justifying this reduction in heating energy use.

Item 27: There is ambiquity concerning the forecast used to incorporate load reduction measures. It is unclear why the ISER demand forecasts were chosen over the RED forecasts after modifications were made in the RED model to handle this. Explain this apparent inconsistency.

Specifically, provide all studies, reports and analyses that were relied upon in formulating the assessment of the impact of conservation (both price and non-price induced conservation) in the projections of energy consumption you have made. Explain which of these materials were judged to be relevant to the calculations of conservation impacts and which were judged to be of no direct consequence to the calculations. Reconcile and explain how the conservation impacts were quantified based upon the material of relevance in those studies, reports and analyses that were relied upon.

Clearly identify how price sensitivity, load reduction measures and conservation impacts affect the actual demand projections (Table B.73) used as a basis for economic comparisons. The United States and the World as a whole have experienced a significant reduction in total energy demand and demand per capita in the past few years as a result of the recent energy price increases. Please explain to what extent, if any, Alaska may differ from this very pronounced pattern. Also, identify and discuss the possible affects of the revisions made in the Battelle forecasts in 1982, i.e. after completion of the feasibility study generation planning.

Exhibit D — INTEREST DURING CONSTRUCTION

Provide line items, preferable in Table D.1 or Tables D.2 and D.3, for AFUDC and escalation. This is necessary to determine the actual cost of the project when it is brought on line and to determine the total amount of financing required for construction.

Exhibit E

WATER USE AND QUALITY:
FISH, WILDLIFE AND BOTANTICAL RESOURCES

p. E-24,
p. E-2-17,
p. E-3-83

Provide incremental flow analyses, beginning at 1000 cfs and increasing in 2000 cfs increments up to 31,000 cfs, as well as additional analysis at 12,000 cfs, demonstrating the relationship between main channel flows at Gold Creek and changes in physical habitat variables in selected sloughs (a) in the Devil Canyon to Talkeetna reach and (b) in the Talkeetna to Cook Inlet reach. The variables should include wetted surface areas of sloughs, wetted perimeter of sloughs, water depth and surface elevations at top and bottom end of sloughs, water table elevations in the vicinity of sloughs, discharge from bottom end of sloughs, and water velocity distributions within sloughs.

Exhibit F

1. Stability and Stress Analyses

Provide summaries of stability and stress analyses for the following structures; Watana Dam, Devil Canyon Arch Dam and thrust block abutements, Devil Canyon Saddle dam, Watana and Devil Canyon main spillway gate structure, and the Watana and Devil Canyon emergency spillway fuse plugs.

2. Spillway Design Flood (SDF)

Provide the basis for the determination of the SDF and the Probable Maximum Flood (PMF), for both the Devil Canyon and Watana developments, in sufficient detail to permit an independent staff evaluation. If this information is available in a separate reference, it should be included (by reference) in the Supporting Design Report and a summary provided which is similar to that shown for the seismic loads in Section 3.2(h).

Schedule B

SUPPLEMENTAL INFORMATION

CONTENTS

EXHIBIT E

1. GENERAL DESCRIPTION OF THE LOCALE

No additional information or clarification is required for this section.

2. WATER USE AND QUALITY

1.	p. E-2-5	Provide copies of the original photographs, with dates, and an estimate of mainstem flow at Gold Creek when the aerial photographs in Figs. E.2.11 to E.2.20 were taken. Provide similar sets of photographs at high, medium, and low flows to document channel stability, wetted surface areas, etc., in future Aquatic Studies.
2.	p. E-2-5, Figs. E.2.12 - E.2.20	Provide complete references to all cross-section data and staff gage data for locations indicated in these figures.
3.	p. E-2-17, ¶ 1	Provide stage-discharge diagrams for all gauging stations on both mainstem and tributaries.
4.	p. E-2-17, ¶ 5	Provide data used to prepare Figure E.2.66 and a detailed discussion (including input data) of this use of HEC-2.
5.	p. E-2-20, ¶ 1	Provide data on particle size distribution for suspended sediments collected over the annual range of discharges for the Susitna River.
6.	p. E-2-28, ¶ 4	Provide data on the contribution of organic matter to suspended sediment concentrations at each sampling station in the Susitna River on a seasonal basis.
7.	p. E-2-28, ¶ 4	The discussion presented here suggests the existence of data (10 mg/L, 2620 mg/L, 5690 mg/L) beyond that given in Table E.2.20. Provide these data.
8.	p. E-2-28, E-2-181	Provide the quantitative critaria that were used to determine that the proposed minimum flows were adequate to allow access to slough spawning grounds. Provide the habitat suitability criteria used to evaluate flows for adequacy of upstream migration, spawning, rearing, overwintering, and out-migration.
9.	p. E-2-29	Provide data on suspended sediment concentrations in sloughs on a seasonal basis.
10.	p. E-2-29, ¶ 4	Clarify reference provided on Figure E.2.79 and explain procedure used to create this figure.
11.	p. E-2-32, ¶ 2	Provide data on biologically available and total soluble phosphorus concentrations in the Susitna River water for each water quality sampling station.

12.	p. E-2-32, ¶ 5	Provide references for, or data on, ammonium concentrations (means and ranges) in water at monitoring stations on the Susitna River.
13.	p. E-2-40, ¶ 3	Provide water levels as a function of observation time for each well. Provide data associated with core drillings and piezometer installations. Provide bathymetry for sampled sloughs.
14.	p. E-2-40, ¶ 5	Provide correlations between observed slough groundwater parameters and local mainstem water elevations and flows.
15.	p. E-2-41	Describe or reference the technique that has been developed for measuring upwelling in sloughs. Provide the date and mainstem flow at the time groundwater flow was estimated.
16.	p. E-2-42, ¶ 4	Provide the following information for tributaries at their confluence with the Susitna River: bathymetry, morphology, and stage discharge relationships.
17.	p. E-2-46, ¶ 2	Provide the basis for extrapolating HEC-2 water surface profiles outside the range of calibration flows (9700 to 52,000 cfs at Gold Creek) listed in the R&M "Hydraulic and Ice Studies" report. Provide references to any additional calibration data sets for the HEC-2 model. Provide methodology and supporting data used to derive the estimated HEC-2 accuracy of ±1 foot.
18.	p. E-2-57, Fig. E.2.23	Provide a complete description of the curve-fitting technique used to generate this frequency analysis.
19.	p. E-2-58, Table E-2-34	Provide a table of proposed minimum flows which resolves the apparent contradiction between this table (Table E-2-34) and Exhibit B (Table B.54), especially for the months of lowest post-project flows (October-May).
20.	p. E-2-66, ¶ 2	Provide data and observations on changes in the Susitna River morphology during freeze over and ice breakup.
21.	p. E-2-67, ¶ 3	Provide estimates of the magnitude of increase in suspended sediments in Watana, Devil Canyon, and the Susitna River associated with vegetation removal in the impoundment zones.
22.	p. E-2-67, ¶ 3, p. E-2-143	Provide quantitative estimates of increases in suspended sediment concentrations in winter and in summer and the downstream extent of such increases during construction of Watana and Devil Canyon Dams.

23. p. E-2-67, ¶ 4 — Provide environmental criteria used for selection and elimination of borrow sites.

24. p. E-2-69, ¶ 3 — Provide data on the quantity and particle size distribution of materials lost through entrainment and erosion from borrow sites at other construction sites in Alaska (e.g., Lake Eklutna Hydro Project).

25. p. E-2-70, ¶ 1 — Provide description of methods for preventing entrainment of backfill materials in river water and erosion of such materials into the river.

26. p. E-2-75, ¶ 4 — Provide coefficient values used in regression analysis and how they were determined.

27. p. E-2-77, ¶ 1 — Provide details of regression analysis used for Deadman Creek including derivation of coefficients and input data.

28. p. E-2-87, ¶ 1 — Provide longitudinal profiles of predicted weekly average temperatures downstream of Watana Dam and Devil Canyon/Watana using the DYRSEM and HEATSIM models. Simulations for stations with pre-project temperature data should be provided with Watana in operation and Devil Canyon/Watana in operation using data for an average water year and for conditions of minimum releases (i.e., using data for a minimum flow year) from Watana and from Devil Canyon. Listings of inputs used and assumptions made in each simulation should also be provided. Outflow temperatures from each reservoir used in the HEATSIM model should include the temperatures that would have to be available at the multilevel intakes in order to match pre-dam temperatures. Meteorological conditions used as model parameters should be provided. These simulated average weekly temperatures should be compared to pre-project temperatures measured during low-flow and average flow years. Provide parameter values used in each simulation and document the source of the values used.

29. p. E-2-89, ¶ 3 — Provide river stage and flows at which overtopping and scouring of sloughs was observed.

30. p. E-2-90, ¶ 3 — Provide estimates of the magnitude of increase in suspended sediment concentrations and in turbidity in winter in the Susitna River compared to pre-project levels.

31. p. E-2-91, ¶ 2, p. E-2-170 — Provide quantitative estimates of increases in suspended sediments resulting from skin slides, biomodal flow type slides, and shallow rotational slides in the Watana and Devil Canyon impoundment

zones. Document locations where each type of slide is likely to occur in each of the impoundment zones.

32. p. E-2-92, ¶ 1 — Provide analysis of the effects of filling and operation of Watana on suspended sediment concentrations and suspended particle sizes passing downstream through Watana Reservoir.

33. p. E-2-96, ¶ 2 — Provide quantitative estimates of nutrient adsorption on suspended sediments (e.g., glacial flour) that will be transported into Watana Reservoirs. Provide data on levels of exchangeable phosphorus in soils in the Watana and Devil Canyon impoundment zones.

34. p. E-2-97 — Provide data on the seasonal fluctuations of groundwater levels for various river stages for the aquifers adjacent to the river and upgradient from the river mainstem. Provide data on the seasonal variations in groundwater discharge to the sloughs. Provide data on the areal extent and seasonal variability of upwelling in the sloughs for various river flows. Provide data on the areal extent of the alluvial aquifer in the reservoir area. . the seasonal fluctuation of the depth of the permafrost.

35. p. E-2-100, ¶ 4 — Provide real and simulated salinity dat ich show the accuracy of the Corp of Engineers salinity model for predicting salinity in Cook Inlet at different locations (e.g., Node 27) under different flow conditions. Also, provide parameter values used in these simulations and document the source of the values used.

36. p. E-2-112, ¶ 2 — Estimate the probability and magnitude of supersaturated water passing through Watana and Devil Canyon reservoirs. Include specific estimates for water entering Watana reservoir, the likelihood of supersaturated conditions persisting through the reservoirs to the intake structures, any differences between saturation values of water entering outlet facilities and the turbine intakes, potential for air entrainment at both outlet facilities and the turbine intakes, and a description of the processes affecting supersaturation at the turbine outlet facilities.

37. p. E-2-112, ¶ 6 — Provide data on the seasonal variability of bedload transport in the Susitna River at available cross sections.

38.	p. E-2-117, ¶ 2	Describe the uncertainties associated with data collected during this period.
39.	p. E-2-118, ¶ 1, Fig. E.2.170, Fig. E.2.171	Provide estimate of the error/uncertainty for Lake Eklutna DYRSEM simulations by month and season. Also provide data on model parameters used in the simulations in Figs. E.2.170 and E.2.171. Explain why the DRYSEM simulation run was restarted on August 19 (Fig. E.2.170).
40.	p. E-2-121, ¶ 5, Fig. E.2.179	Provide parameter values used in the DYRSEM/HEATSIM simulation of river temperatures in Fig. E.2.179 and document the source of parameter values used.
41.	p. E-2-124, ¶ 2	Provide documentation for ICESIM model. Provide validation of ICESIM model by comparing model predictions with ice observations on the Susitna River.
42.	p. E-2-126	Provide sensitivity analysis to estimate cumulative uncertainty in ice cover predictions by considering uncertainties in the sequence of models used.
43.	p. E-2-128, ¶ 2	Provide comparisons of trap efficiencies for Watana based on the Brune curve with those estimated using other methods.
44.	p. E-2-132, ¶ 2	Provide list of all discharges where cone valves will be used and a list of discharges where cone valves will not be used for Watana and for Devil Canyon.
45.	p. E-2-133, ¶ 3	Provide data for each fraction of nitrogen and phosphorus used in the calculation of the N:P ratio in Susitna River water.
46.	p. E-2-136, ¶ 4	Provide data on water quality, including nutrients, dissolved oxygen, and trace metal concentrations in Alaskan reservoirs of similar depths and in similar climatological regimes during and after filling.
47.	p. E-2-165, ¶ 4	Provide a list of differences and similarities among Lake Eklutna, Watana, and Devil Canyon, including physiographic characteristics (e.g., depth, area, aspect, shoreline development) known to affect responses of reservoirs to meteorological changes and thermal characteristics.
48.	p. E-2-187, ¶ 2	Provide bathymetry and substrate data for sloughs identified as candidates for remedial action.

49.	Fig. E.2.63, Fig. E.2.64	Provide clarification of the term "water depth" used in these figures (i.e., maximum depth, mean depth, or hydraulic radius).
50.	Fig. E.2.65	Provide a description of the modeling procedures used to generate the water surface elevations in this figure. Provide the appropriate reference to Trihey's work (Trihey 1982 is ambiguous) and other ADFG or R&M reports containing data used in this analysis.
51.	Table E.2.2, Table E.2.4	Provide tables of monthly average flow data at Gold Creek, Chulitna River, Talkeetna River, and Susitna Station for water years 1950 through 1981. Provide corresponding monthly average temperature data at these four stations for every month during water years 1950 through 1981 for which this is possible.

3. FISH, WILDLIFE, AND BOTANICAL RESOURCES

FISH RESOURCES

1. p. E-3-92, ¶ 2,3 — Provide criteria that require use of cold (4°C), deepwater releases through diversion tunnels in the second summer of Watana filling. Provide reasoning why warmer surface water cannot be used when it will, according to Table E-3.25, Plate F-17, and Figure C.1, be accessible to the outlet facilities.

2. p. E-3-96, ¶ 3 — Provide the depth-of-passage criteria used in the analysis of Slough 9 that led to the conclusion of unrestricted access at flows over 18,000 cfs but acute access problems at flows less than 12,000 cfs. Provide quantitative biological criteria for suitable water depths in sloughs for access and spawning.

3. p. E-3-110, ¶ 3; p. E-3-111, ¶ 2; p. E-3-115, ¶ 2 — Provide documentation, quantative if possible, from other hydroelectric projects in glacial areas that decreased open-water turbidity and reduced silt load downstream of Watana will improve benthic production and thus fish rearing.

4. p. E-3-112, ¶ 3 — Provide documentation of successful egg incubation, as well as overwintering in areas downstream of hydropower reservoirs where glacial silt loads and turbidity continue into winter months, e.g., below Eklutna Lake.

5. p. E-3-113, ¶ 3 — Provide your quantitative estimate and analysis of changes in growth rates and outmigration times of juvenile salmon in the Susitna mainstream and major side channels that could result from altered annual temperature and flow regimes such as those given in Figures E-2.174 through E.2.183, E.2.193 and E.2.194, or others if justified. Do for Watana and Devil Canyon scenarios.

6. p. E-3-120, ¶ 2 — Provide a species list of important resident finfish and shellfish in Upper Cook Inlet. Indicate the most dominant species and any species of commercial value.

7. p. E-3-128, ¶ 1 — Provide references from other projects or from experimental studies that form the basis for the

statement that turbidity and siltation of the Susitna River from gravel mining in the riverbed and tributaries for Watana and Devil Canyon Dams will not result in adverse impacts to fish.

8. p. E-3-130, ¶ 6, p. E-3-187, ¶ 6 — Provide water quality criteria used to determine suitability of Devil Canyon and Watana Reservoirs for fish production, especially for the decision to stock and manage rainbow trout only in Devil Canyon reservoir.

9. p. E-3-164, ¶ 4 — Provide references to studies at other sites where spring flows were manipulated at the time of ice breakup in order to stimulate out-migration of salmon fry.

10. p. E-3-170, ¶ 5 — Provide operating criteria for determining how the selective withdrawal capabilities of the multi-level intakes to the Watana and Devil Canyon powerhouses will be controlled to attain pre-established thermal objectives for fish populations.

11. p. E-3-178 — Provide the data and analysis procedure used to determine the maximum estimated spawning habitat (approximately 245,000 ft^2) required by salmon spawning in sloughs upstream from Talkeetna in 1981 and 1982.

12. p. E-3-179, Aquatic Studies Program — Provide the current work plan for the Aquatic Program for 1983 and 1984.

13. Table E.3.8 — Provide an evaluation of or reference that describes the correlation between helicopter surveys versus on-foot surveys as methods for estimating chinook salmon escapement (number live and dead).

14. Table E.3.17 — Provide estimates for each tributary listed in this table of the total length of tributary presently utilized by Arctic grayling.

15. Figures E.3.8 and E.3.9 — Provide population estimates and percentages of adult salmon migrating past the Sunshine Station (see Figs. E.3.8 and E.3.9) that enter the Talkeetna River, the Chulitna River, or stay in the Susitna River between the Sunshine Station and the Talkeetna Station.

TERRESTRIAL BOTANICAL RESOURCES

1. p. E-3-195, ¶ 3 — Provide an estimate of the amount and kinds of timber currently removed from the project area for subsistence use.

2.	p. E-3-202, ¶ 4	Estimate the average elevational limit for trees in the project area (and/or estimate the range for tree line).
3.	p. E-3-206, ¶ 1	Indicate whether the percentage of total area covered by open spruce is 1% as stated in this paragraph or 7% as shown in Table E.3.51.
4.	p. E-3-208, ¶ 4, to p. E-3-210, ¶ 1	Define sedge-shrub tundra and mat and cushion/sedge-grass tundra as used in Tables E.3.51 and E.3.52.
5.	p. E-3-219, ¶ 5, to p. E-3-220, ¶ 1	Indicate (e.g., as in Table E.3.87) how the vegetation types that were used by Commonwealth Assoc. (1982) and presented in Table E.3.79 correlate with the vegetation types used by McKendrick et al. (1982).
6.	p. E-3-221, ¶ 4	Provide clarification of the statements concerning modified mapping of wet sedge-grass and black spruce forest as wetlands in the Healy-to-Fairbanks and Willow-to-Cook Inlet transmission corridors. Were all the areas covered by these vegetation types considered wetlands, or were portions of each type selected on the basis of defined criteria?
7.	p. E-3-225, ¶ 2; p. E-3-240, ¶ 2; p. E-3-244, ¶ 3; p. E-3-245, ¶ 3; p. E-3-246, ¶ 5; p. E-3-247, ¶ 2-4; p. E-3-252, ¶ 5; p. E-3-253, ¶ 1; p. E-3-270, ¶ 1; p. E-3-280, ¶ 5	Check and correct, as necessary, all calculations of land areas to be impacted or mitigated. Discrepancies have been found within tables (e.g., Table E.3.83 totals for impoundment and for shrubland over the entire Watana facility) and between the text and calculations made from the tables. For example, on p. E-3-225 total direct vegetation removal due to Watana construction is given as 16,582 ha, but this figure should take into account the 2128 ha of unvegetated area; on p. E-3-245, the percentage of total wetlands occupied by palustrine forested areas is not consistent with calculations made from Table E.3.82. Indicate whether unvegetated or disturbed areas were included in the calculations for vegetation removals and whether unvegetated rocky areas were treated differently than river, lake, or ice areas.
8.	p. E-3-226, ¶ 4	Provide a more detailed description of fugitive dust emissions and impacts. Include calculations and/or discussions to support conclusions on the impacts of fugitive dust. Show on an appropriate map of the project area locations where significant fugitive dust emissions are expected during construction. Provide the time periods for construction activity at each location of expected significant fugitive emissions; provide mitigation measures.

9.		Provide estimates of pollutant emission levels for the temporary diesel power generation facilities and the period of use during the construction period. What air quality impacts will result? Provide numerical values, explain their derivation, and provide a numerical estimate of the air quality impact.
10.		Were meteorological measurements made in the vicinity of the proposed dam sites? If so, provide data on frequence of occurrence of wind speed, stability class, wind direction, and inversion depths.
11.	p. E-3-230, ¶ 2; p. E-3-242, ¶ 2	Indicate whether the area affected by the drawdown zone has been included in estimates of direct vegetation removal due to the impoundments and/or in Tables E.3.83 and E.3.84. If not, provide estimates of the areas affected by drawdown for both Watana and Devil Canyon.
12.	p. E-3-246, ¶ 2	Provide estimates (using tables similar to Table E.3.82) of the number of hectares of different wetland types that will be crossed by each of the transmission corridors (including the intertie) and areas that will be cleared for access.
13.	p. E-3-256, ¶ 1	Describe how partially or completely excavated borrow areas for the access roads will be rehabilitated.
14.	p. E-3-259, ¶ 3	Indicate how the area of wet sedge-grass tundra in the access and transmission corridors was calculated to be 195 ha using Tables E.3.80, E.3.85, and E.3.86, and indicate if the intertie (Table E.3.79) has been included in the calculations.
15.	p. E-3-271, ¶ 4	Indicate whether, and in what situations, winter construction of transmission lines will be used as a mitigation measure (since the use of helicopter construction is not currently planned).
16.	p. E-3-272, ¶ 2	Indicate whether the use of balloon-tire or flat-tread vehicles as required for access to the Watana-to-Gold Creek corridor will also be required for the other transmission corridors.
17.	p. E-3-274, ¶ 4, to p. E-3-275, ¶ 1	Explain where the numbers in the examples in these two paragraphs came from; they do not correspond with previously stated numbers such as those on p. E-3-253.

18.	p. E-3-275, ¶ 3, to p. E-3-291, ¶ 3	Provide a more detailed description of possible mitigation options for wetlands where avoidance cannot be used as the method of mitigation. For example, describe special construction methods that could be used in wetland areas, and provide examples of the techniques or methods that could be used to mitigate potential alterations to wetland drainage patterns.
19.	p. E-3-279, ¶ 1, to p. E-3-280, ¶ 4	Provide examples of reclamation plans and procedures that could be used for various types of areas (e.g., slopes, flat areas) and major vegetation types.

TERRESTRIAL WILDLIFE RESOURCES

1.	p. E-3-311, ¶ 4	Provide a complete description of criteria for stratifying census area into low, medium, and high density strata.
2.	p. E-3-337, ¶ 3	Provide a schedule of when results from ongoing studies will be available.
3.	p. E-3-411, ¶ 1	Provide an estimate of the numbers of moose using the mineral lick and the number of other licks used by the local moose population.
4.	p. E-3-450, ¶ 2	Indicate the availability of bald eagles nest sites relative to food availability.
5.	p. E-3-494 to p. E-3-495	Describe the potential for impacts of operating transmission lines on wildlife use of rights-of-way.
6.	p. E-3-499, ¶ 2	Indicate the criteria for determining ". . . sufficient magnitude to influence mitigation planning."
7.	p. E-3-524, ¶ 3	Provide assays for soluble cations and salts as well as for total elemental levels.
8.	p. E-3-536, ¶ 4	Indicate if mitigation by shifting the road alignment also includes avoiding the use of borrow material near the nest as well as other sensitive areas identified in Figures E.3.80 through E.3.82.
9.	p. E-3-540, ¶ 1	Indicate if transmission lines were sited so as to reduce or avoid potential for collisions.
10.	Table E.3.92 and Tables E.3.83, E.3.71	Indicate which is the value to be used for the areal extent of low-mixed-shrubland.
11.	Table E.3.143.	Define the number in parentheses next to each species name.

12.	Table E.3.165 and Tables E.3.71, E.3.83, E.3.84	Indicate which values for areal extent of vegetation types are to be used.
13.	Table E.3.165	Define "total % of other projects".

4. HISTORIC AND ARCHAEOLOGICAL RESOURCES

The following archaeological field work must be completed during the 1983 field season. The order of the list indicates the priorities that should be placed on the completion of each task.

1. Completion of the reconnaissance survey of the proposed access roads, railroad, Watana and Devil Canyon dam sites, construction camp areas, associated impact areas, and reservoirs, including the resurvey of defined locales that have potential for containing sites.

2. Completion of aerial reconnaissance survey and on-ground reconnaissance survey as necessary to complete sensitivity maps of all proposed transmission corridors and recreation facility sites as may have been defined indicating the potential of these areas for containing archaeological and historical sites.

3. Completion of reconnaissance survey of any additional direct impact areas that may be defined prior to the 1983 field season.

4. Completion of systematic testing of archaeological and historical sites in the direct impact areas of the access roads and railroad, and the vicinity of the construction camp areas and the proposed sites of the Watana and Devil Canyon dams and associated facilities.

The following field work should be completed in the 1984 field season and according to the following priorities.

1. Completion of systematic testing of sites in the reservoirs.

2. Completion of reconnaissance survey along the proposed transmission corridors, recreation facility sites, and indirect and potential impact areas.

3. Completion of systematic testing of sites in these areas as may be necessary.

A preliminary report on the results of the 1983 field season should be filed at the conclusion of field work no later than September 1, 1983. A draft final report on the 1983 field season must be provided by December 1, 1983, followed by the final report by January 1, 1984. The final report on the 1984 season should be filed after completion of all field work, no later than January 1, 1985. The 1985 report should contain a site-specific cultural resources management plan. All work and final reports, including a cultural resources management plan, should be undertaken and prepared in consultation with the Alaska State Historic Preservation Officer, the National Park Service, and appropriate federal land-managing agencies. Five copies of each report (including five copies of the final reports on the 1980, 1981, and 1982 field work) should be filed with the Commission.

5. SOCIOECONOMICS

1.	p. E-5-8, ¶ 4, through p. E-5-26, ¶ 1	Provide data on the distribution of temporary and rental housing or lodging units throughout the project region. Provide date when supplemental information will be available.
2.	p. E-5-27, ¶ 1, through p. E-5-52, ¶ 4	Provide a discussion of impacts related to development of the proposed project on Native Alaskans. Provide date when supplemental information will be available.
3.	p. E-5-30, ¶ 2; p. E-5-38, ¶ 1; p. E-5-40, ¶ 5; p. E-5-64, ¶ 4	Explain the discrepancy between the ratios of direct workers plus dependents to support workers plus dependents (3:1, 1:1, 4:1) and the multipliers used to generate population projections (ranging from 1:1.2 to 1:2.4).
4.	p. E-5-34, ¶ 1; p. E-5-86, ¶ 2	Provide information on how expenses of the school onsite will be shared by APA and the Borough.
5.	p. E-5-37, ¶ 2	Document that the state will assume responsibility for maintenance and winter plowing of the Denali Highway and maintenance of the project access road during and after project construction, whether or not the road is eventually closed to public access.
6.	p. E-5-39, ¶ 5,6; p. E-5-42, ¶ 3,4; p. E-5-48, ¶ 1,2	Discuss the conditions under which "a strain on this informal system" will be defined as occurring, as well as a plan or alternatives for who will provide these services. Provide date when supplemental information will be provided.
7.	p. E-5-42, ¶ 3,4, p. E-5-48, ¶ 1,2	Provide information on the composition of the onsite medical and hospital staff and where that staff will come from (e.g., housed onsite or commute).
8.	p. E-5-45, ¶ 2	Provide an estimate of how many of the railhead construction workers would be employed at the Watana and Devil Canyon sites after the railhead facilities are completed.
9.	p. E-5-47, ¶ 2,3	Provide date that information will be available on road surface for the Denali Highway and on navigational and traffic aid needs in Cantwell. Provide description of these studies.

10.	p. E-5-55, ¶ 5, through p. E-5-56, ¶ 2	Provide information on whether the payroll figures include payments for housing, on whether meals will be included for all single workers living in onsite housing, and on how workers will qualify to live in onsite housing, both single and family units.
11.	p. E-5-59, ¶ 1	Describe the local hire program planned.
12.	p. E-5-60, ¶ 4, and p. E-5-71, ¶ 1	Provide the number of workers who will be housed at the railhead camp and whether they are included in these figures on settlement patterns for the Mat-Su Borough. Describe the railhead camp. Provide date when supplemental information will be provided.
13.	p. E-5-63, ¶ 2-4	Provide information on other projects proposed for the region during the same time period as this project.
14.	p. E-5-70, ¶ 1 through p. E-5-78, ¶ 4	Include the capacity of and impacts to lodges, other temporary lodging units, and trailer parks. Provide date when supplemental information will be provided.
15.	p. E-5-78, ¶ 6	Provide information on the location and numbers of these isolated residences that would be displaced by the project. Provide date when supplemental information will be provided.
16.	p. E-5-79, ¶ 1	Describe existing housing and commercial operations and potential project impacts along the proposed rail line. Describe the ongoing study of land improvements. Provide a date when this study and the supplemental information on housing and commercial operations will be provided.
17.	p. E-5-81, ¶ 3, through p. E-5-82, ¶ 6	Provide quantified estimates of project-related subcontracting expenditures.
18.	p. E-5-86, ¶ 4; p. E-5-90, ¶ 2; p. E-5-93, ¶ 2	Discuss how shortfalls in Borough revenues will be resolved. Provide date when supplemental information will be provided.
19.	p. E-5-95, ¶ 7	Provide explicit discussion of the relationship between the recreation plan and the exacerbation and management of increased competition within this user group. In addition, explicitly relate the establishment of a permanent village to effects upon this user group.

20.	p. E-5-102, ¶ 2, and p. E-5-104, ¶ 5, through p. E-5-105, ¶ 1	Describe the monitoring program and provide dates when data will be available.
21.	p. E-5-104, ¶ 5	Provide estimates of the current level of permit violations and non-permit hunting, especially in accessible areas, and of effects of increased demand upon these levels.
22.	p. E-5-110, ¶ 2	Provide dates when these data will be available.
23.	p. E-5-116, ¶ 4	Relate doubling of hunter demand indicated in Table E.7.13 to current use of GMU 13E, the main area of impact.
24.	p. E-5-117, ¶ 2	Present current ADFG management regulations for GMU 13.
25.	p. E-5-120, ¶ 4, through p. E-5-121, ¶ 3	Indicate impacts to trapping activity because of increased accessibility provided by project roads and structures.
26.	p. E-5-125	Identify options for reducing impacts to the fish/wildlife user group.
27.	p. E-5-125	Describe procedures that will be followed in optimizing the resolution among conflicting interests for mitigating impacts to recreation, fish/wildlife users, and the fish/wildlife supply.
28.	p. E-5-125, ¶ 1, through p. E-5-135, ¶ 5	Indicate specific applicant-proposed and committed monitoring and mitigation plans. Discuss role of local community and regional officials. Provide date when supplemental information on these plans will be provided. Provide plans for the railhead construction camp in Cantwell after the railhead is completed.
29.	p. E-5-126, ¶ 3	Describe studies and monitoring programs and give dates when data will be available.
30.	p. E-5-128, ¶ 2-5	Provide specific plans for adjusting project schedules with reference to other projects; timing of workforce demand; leave, shift, and shift rotation schedules.
31.	p. E-5-129, ¶ 3	Provide detailed plans for "siting, type, quality, and administration of housing and related facilities for workers" when available.

32.	p. E-5-129, ¶ 4, through p. E-5-131, ¶ 4	Indicate specific applicant-proposed mitigation plans on transportation, including rail, pooling, and air alternatives, and funding (e.g., conditions for payment of travel expenses for workers). Cite sources of information on other projects (p. E-5-130, ¶ 3). Provide date when supplemental information will be provided.
33.	p. E-5-132, ¶ 3	Indicate specifically how thresholds of "inadequately-met demand" and of cost-effectiveness of mitigation measures will be determined.
34.	p. E-5-133, ¶ 5, through p. E-5-134, ¶ 6	Provide descriptions of data and methods of data collection and analysis to be used in monitoring and updating impact assessments. Provide dates supplemental information on the monitoring plan and assessments will be provided.
35.	p. E-5-137, ¶ 3	Provide date information will be available on the study of the possible new location for the permanent townsite.
36.	Figure E.5.1	Provide a map showing major transportation routes plus all communities referred to in this chapter (e.g., Wasilla, Trapper Creek, which do not appear on other maps in the application).
37.	p. E-5B-3, ¶ 6, through p. E-5B-4, ¶ 1	The standards of 25 students per class for primary schools and 20-22 for secondary schools for the Borough are not the same ones which appear on Table 5.B.1, p. E-5B-7. Identify which were used.

In addition to the above items from Chapter 5, the following specific information requests are made based on the responses to agency comments which appear in Appendix E11J, "Comments Received from Agencies Concerning the Draft License and the Power Authority's Response to these Comments."

38. Responses to Alaska Department of Natural Resources Letter of January 13, 1983:

a.	Comment 9	Provide referencas of TAPS studies reviewed.
b.	Comment 10	Provide description of how impact model will be updated and dates when updates will be available.

39. Responses to Alaska Department of Fish and Game Letter of January 13, 1983: Chapter 5, Specific Comments.

a. G-5-001 E-5-6/1 — Provide description of study methods and plan, data on the "importance of the natural resource harvest to the local impact area" to be collected in 1983 "through interviews with residents of selected communities," and date when data will be available.

b. G-5-008 E-5-68 and G-5-017 E-5-71/5 — Provide data that will be collected on fish and wildlife user groups in Cantwell and other communities in the project region, and indicate date when these data will be available. Provide description of study plan and methods.

6. GEOLOGICAL AND SOIL RESOURCES

1.	p. E-6-1 to p. E-6-42	Include a detailed description of soils, including the types of occurrence, physical and chemical characteristics, erodability, and potential for mass soil movement for impoundment areas, access routes, transmission line routes, borrow areas, construction camps, and other project features.
2.	p. E-6-3, ¶ 1	If known, provide the geologic names of the stratigraphic units in the area.
3.	p. E-6-4, ¶ 4	Complete the last sentence in the paragraph.
4.	p. E-6-11	Provide a tabulation of significant seismic events and their intensities at the site. Also provide a plot showing cumulative magnitude-recurrence frequency for each seismic source area identified in the study.
5.	p. E-6-15	Document any studies that describe the origin of "the Fins" feature. Describe any investigations underway to discover other unidentified shear zones beneath the other incised portions of the relict channel. Indicate the scope of these investigations, provide summaries of these findings, and estimate completion dates for these studies.
6.	p. E-6-20, ¶ 2	Describe in greater detail the presence of stress relief joints 100 ft back from the Devil Canyon damsite gorge walls and the large detached rock blocks measuring 25 by 50 ft on the left abutment as described in the Acres American 1982 Geotechnical Report Vol. 1 (e.g., depth of joints, probability of failure of block during maximum intensity quake, probable seiche effects).
7.	p. E-6-25, ¶ 1	Estimate the number of hectares expected to be affected by each type of slope failure for each reservoir.
8.	p. E-6-28	Analyze how the previous substantial glacial loading and unloading of the region may affect the probability and magnitude of anticipated RIS.
9.	p. E-6-30, ¶ 4	Provide estimates of the amount of piping of the relict channel north of the Watana site exit point on Tsusena Creek that may be expected as a result

		of seepage. Discuss the nature of future investigations to assess the seepage problem and the criteria to be used in determining mitigation measures.
10.	p. E-6-34	Estimate the potential for slope failure and erosion to extend beyond the project boundaries. Identify areas where this may be most likely to occur and estimate the number of hectares to be affected.
11.	p. E-6-35, ¶ 3	Provide an analysis of the effects and probability of seismically induced seiches. Estimate the water-level fluctuations due to seiches.
12.	p. E-6-40, ¶ 3	Provide the criteria whereby the mitigation measures to reduce the leakage through the relict channel will be chosen. Provide an analysis of the impacts of each of these alternative measures.
13.	p. E-6-41	Estimate the liquifaction potential for all unconsolidated alluvial and glacial deposits within the river valley and access and transmission line routes.
14.	p. E-6-41, ¶ 8	If the excavation of the buried channel area is required, estimate the amounts of additional borrow material that would be required and indicate which borrow areas would be used.
15.	general comment	Indicate what potential impacts would be associated with construction of access roads, transmission towers, and temporary and permanent construction villages on permafrost and what mitigation measures will be used during such construction. Document other studies that have analyzed such impacts and mitigation measures in similar regions.

7. RECREATION RESOURCES

1.	p. E-7-12, ¶ 6	Provide documents and other availabe information supporting the conclusion that the middle Susitna River Basin is unsuitable for inclusion in the State Park System.
2.	p. E-7-17, ¶ 5	No structures are apparent in Figures E.7.6, E.7.7 and E.7.8. Are the structures referred to those that are shown in Figure E.7.4?
3.	p. E-7-18, ¶ 4	Verify that there are 11 structures at High Lake Lodge; e.g., seven structures are shown in Figure E.7.4. Table E.9.5 and Figure E.9.9 indicate the presence of nine structures and two cabin foundations at High Lake Lodge. Information concerning structures as presented in Figures E.7.4 and E.9.9 and Table E.9.5 should be compared and the discrepancies corrected. For example, the Tsusena Lake Lodge is located more than five miles from Tsusana Lake in Figure E.9.4.
4.	p. E-7-19, ¶ 1	Provide copies of any regulations developed by BLM for management of public trails located on local lands selected by Native Corporations. Are the six easements identified in the study area shown in Figure E.7.4? If not, provide a map showing locations of the easements.
5.	p. E-7-30, ¶ 2; p. E-7-97, ¶ 4; p. E-3-422, ¶ 3	Provide an explanation of the basis for anticipating that all game hunting by project personnel would be prohibited and provide a rationale as to how such a prohibition would be justified and enforced.
6.	p. E-7-34, ¶ 3	Specify target dates for completion of studies and submission of the recreation development plan for transmission line corridors.
7.	p. E-7-44, ¶ 8	Provide details demonstrating how this calculated recreation demand [Sec. 3.2.3(a)] was factored into development of the Recreation Plan, as presented in Section 5. For example, which of the proposed recreation sites would be required to satisfy demand at the year 2000? How would visitation to visitors centers at dam sites be factored into demand estimates?

8.	p. E-7-67, ¶ 2	Provide a copy of the 1974 document by the U.S. Department of Agriculture that was used as a basis for calculating carrying capacity of the various recreation sites. Also provide details as to how the methodology presented in the document was "modified" for use in calculations of carrying capacity as presented.
9.	p. E-7-69, Section 5.4.1	Compare information common to Section 5.4.1 through Section 5.4.5, Section 6.1.6, Tables E.7.17 and E.7.18, and Figures E.7.7 through E.7.17 and correct all discrepancies with respect to (1) phasing of development, (2) proposed facilities to be provided, and (3) estimated costs of "recreation plan project features." Provide more specific information for proposed recreation sites D (Tyone confluence with Susitna), B (Butte Creek/Susitna River), A (Middle Fork-Chulitna River), and H (Tsusena Creek), i.e., information comparable to that shown for other proposed recreation areas in Figures E.7.7 through E.7.17 (include additional maps as appropriate).
10.	p. E-7-97, ¶ 3	Indicate if the proposed airfield will be available for general public use during project construction and/or operation.
11.	p. E-7-101, ¶ 3	Provide target dates for finalizing plans and submission of information relative to Phas Two engineering design specifications, final site selection, and site-specific data for all Phase-One recreation developments identified in the Recreation Plan.
12.	p. E-7-101, ¶ 5	Provide "typical or similar facility design standards for the Susitna project," as proposed in the text.
13.	p. E-7-101, ¶ 5; p. E-7-110, ¶ 4; p. E-7-113, ¶ 3	Copies of any existing agreements, as well as any future arrangements between the applicant and cooperating entities relative to implementation of the proposed recreation plan, must be submitted to the Federal Energy Regulatory Commission.
14.	p. E-7-105, ¶ 1	Aside from APA, the Division of Parks, and directly affected land owners, specify how other local residents would be involved in decisions concerning scheduling and implementation of increased recreational developments.

8. AESTHETIC RESOURCES

1.	p. E-8-30, ¶ 1, to p. E-8-31, ¶ 4	Indicate if the four natural features of Clear Valley (p. E-8-22), Watana Creek Falls, Watana Lake (p. E-8-24), and Tyone River are considered exceptional in relation to the project area. If so, describe them in the Exceptional Natural Features Section 5.2; include photos in the appendix, and show their locations on Figure E.8.5.
2.	p. E-8-33, ¶ 1-8	Provide a brief description (e.g., viewer vantage point, viewing distance, number of potential viewers, duration of view) of those significant views that are indicated on Figure E.8.8 and mentioned in the charts of Appendix 8.F. Provide a similar level of information for the the transmission line corridor, including the intertie.
3.	p. E-8-36 to p. E-8-41	Indicate if there is a distinction between use of the terms "medium" and "moderate", which are used interchangeably in the Aesthetic Value and Absorption Capability Rating Charts and on the Composite Rating Matrix.
4.	p. E-8-39 to p. E-8-40	Indicate whether the absorption capability rating for the landscape character type of Tanana Ridge is "low" (p. E-8-39) or "moderate" (p. E-8-40).
5.	p. E-8-41	Indicate if the absorption capability rows have similar high, medium, and low designations as shown for the aesthetic value rating columns.
6.	p. E-8-50, ¶ 3-5; p. E-8-53 to p. E-8-59	Indicate if all (or which) mitigation options mentioned within the text will be undertaken.
7.	p. E-8-61, ¶ 1, to p. E-8-68, ¶ 3	Provide a similar level of description and analysis to that used for the project area, access roads, and transmission line stubs (including photos, mapping, and descriptions of landforms, waterforms, vegetation, and views) for the intertie transmission line corridor landscape types of Talkeetna Lowlands, Chulitna River, Broad Pass, Alaska Range, and Yanert River Valley (Step 3). Briefly describe and indicate on maps (Step 4) all significant viewpoints, viewsheds, distances, and potential numbers of viewers along the entire transmission line corridor (e.g., at road crossings, river

crossings, skylined areas, etc.). Provide aesthetic value and absorption capability ratings for the intertie landscape character types (Steps 5 & 6) and determine the project feature impacts (Steps 7 & 8). Finally, provide proposed mitigation measures for the intertie project feature (Step 9).

8. p. E-8-61, ¶ 1 to p. E-8-68, ¶ 3

Indicate the potential extent of visual impacts to the Denali National Park and Denali State Park due to the location of the proposed transmission line. Discuss the significance of these impacts in relation to viewpoints, distances, duration, and number of viewers. Indicate how any visual impacts to these areas will be mitigated.

9. LAND USE

1.	p. E-9-9, ¶ 2, to p. E-9-13, ¶ 2	Describe the existing land status for the intertie portion of the proposed transmission line corridor. Indicate if Tables E.9.1 and E.9.2 include data for the intertie. If they do not, please include land status/ownership information for the intertie. Provide figures (similar to Figures E.9.4-E.9.6 and E.9.10-E.9.12) indicating land status and land use development maps for the intertie section of the proposed transmission line corridor. Land ownership should be provided for the intertie portion of the transmission line corridor in Exhibit G, plates 34-37 and 41-45.
2	p. E-9-13, ¶ 3	Indicate the existing land values for the project area, transmission line corridor (including the intertie), and adjacent lands to assist in substantiating statements in Section 3 of the Land Use chapter concerning changes in land values. Include a projection of future land values. If land values cannot be precisely determined for the project area or transmission line corridor, include some indication or examples of typical land values for the types of land in the project area.
3.	p. E-9-27, ¶ 3, to p. E-9-29, ¶ 6	Describe existing land use management plans for the proposed transmission line corridor, including the intertie.
4.	p. E-9-31, ¶ 2, to p. E-9-52, ¶ 2	Estimate impacts to land values within and adjacent to the project area and transmission line corridor.
5.	p. E-9-31, ¶ 2, to p. E-9-52, ¶ 2	Indicate how proposed land uses within and adjacent to the project area and along the entire transmission line corridor will affect existing wetland and floodplain areas.
6.	p. E-9-49, ¶ 3, to p. E-9-51, ¶ 4	Estimate induced land use changes (development and activity) for the intertie section of the transmission line corridor.
7.	p. E-9-50, ¶ 1	Indicate if there are any other proposed agricultural sales along the entire transmission line corridor other than the Point Mackenzie agricultural sale.

10. ALTERNATIVE LOCATIONS, DESIGNS, AND ENERGY SOURCES

1.	p. E-10-6, ¶ 5	Provide the basis for determining the "cut-off points" for rating the 16 sites and a description of how partial and total scores were integrated to yield selections.
2.	p. E-10-7	Describe what, if any, geologic constraints were analyzed in assessing the alternative damsite impacts.
3.	p. E-10-7 to p. E-10-12	Provide available information describing the potential for slope failure that may be expected at the three alternative dam sites, as well as their potential for RIS, the extent of permafrost soils, location of major fault systems, the extent of mineral resources in the area, and the projected reservoir sizes.
4.	p. E-10-11, ¶ 5	Provide a brief description of what is considered "typical scenic quality" for the Snow Site region.
5.	p. E-10-11, ¶ 5. through p. E-10-12, ¶ 10	Provide a brief description of the socioeconomic environment of the Snow and Keetna sites.
6.	p. E-10-12, ¶ 10	Provide a brief description of the identified land uses for the Keetna site.
7.	p. E-10-13, ¶ 1	Provide estimates of the acreage of vegetation that would be lost by construction of the Chakachamna, Snow, and Keetna sites.
8.	p. E-10-23, ¶ 6	Provide a comparison of socioeconomic factors (e.g., housing, transportation, community attitudes) in the comparison of alternative plans.
9.	p. E-10-24, ¶ 3ff	Indicate what weighting was assigned to economic, environmental, and social attributes.
10.	p. E-10-26, ¶ 5, to p. E-10-28, ¶ 5	Provide estimates of the acreage of vegetation that would be lost by construction of the High Devil Canyon-Vee damsites.
11.	p. E-10.27, ¶ 6	Provide documentation for importance of Vee reservoir area to key furbearers.

12.	p. E-10-38, ¶ 5	Describe the criteria used for evaluating responsiveness of access plans.
13.	p. E-10-40, ¶ 2	Explain how aesthetic resource issues were factored into the evaluation and comparison of alternative access plans.
14.	p. E-10-42, ¶ 1, to p. E-10-43, ¶ 2	Indicate whether the alternative access route corridors will follow the alignments shown in Figures E.10.7 and E.10.8 or those in Figures E.3.42-E.3.47. If the alignments shown in Figures E.10.7 and E.10.8 will be used, then provide vegetation and wetlands maps for these alternative routes. Also provide estimates of the number of hectares of vegetation types that would be cleared for the alternative access routes.
15.	p. E-10-42, ¶ 1. to p. E-10-43, ¶ 2	Estimate the acreage of wetlands to be impacted by each of the three alternative access routes, and provide a brief comparison among routes of the extent of access route effects on wetland drainage patterns.
16.	p. E-10-42 to p. E-10-83	Indicate if the impacts associated with excessive slope, permafrost, erodable or problem soils, landslides or slumps will be any more (or less) severe within the alternative transmission corridors than within the preferred corridor. Also indicate whether construction material requirements are expected to be similar and if agricultural soils will be crossed to the same extent in the alternative and preferred routes. Document these conclusions by citing applicable studies.
17.	p. E-10-49, ¶ 5	Describe weighting factors given to the criteria used in making the final choice.
18.	p. E-10-54, ¶ 4	Provide a description of the selection process for routing from Healy to Willow.
19.	p. E-10-61, ¶ 1	Provide the criteria for assigning ratings to each alternative corridor.
20.	p. E-10-61, ¶ 3, to p. E-10-77, ¶ 2	Provide estimates of the number of hectares of wetlands within each of the alternative transmission corridors in the Northern and Southern Study Areas and each of the technically and economically acceptable alternatives in the Central Study Area. Provide similar estimates for vegetation types that will require extensive clearing.
21.	p. E-10-69 to p. E-10-79	Indicate if any transmission line alternative is expected to require more (or less) construction of access roads.

22.	p. E-10-80, ¶ 1, to p. E-10-83, ¶ 3	Explain how aesthetic resource issues were factored into the evaluation process for the transmission line corridor to link the dam sites with the intertie.
23.	p. E-10-83 to p. E-10-104	Document whether the surface soils at the alternative borrow sites are expected to be similar to or different from those in the proposed project area.
24.	p. E-10-83, ¶ 4, to p. E-10-104, ¶ 4	Provide a brief discussion of how aesthetic resources were used in the evaluation process of determining borrow site alternatives.
25.	p. E-10-129	Provide estimates of the aggregate and rock requirements and the acreages that would be disturbed by the construction of new access roads associated with the Tidal Power alternative. Indicate if there will be topographical, permafrost, or slope stability constraints associated with these roads.
26.	p. E-10-143, ¶ 4, through p. E-10-172, ¶ 2	Provide a generic description of socioeconomic impacts of thermal alternatives other than coal, nuclear steam electric generation, biomass, geothermal, wind, and solar alternatives.

11. LIST OF LITERATURE

Provide adequate reference information for the following:

1.	p. E-3-232, ¶ 4	Wood et al. (1975).
2.	p. E-5-129, ¶ 2	Provide references for statement on commuting experiences of workers on similar projects.
3.	p. E-7-87, ¶ 1	National Recreation & Park, Open Space Standards.
4.	Table E.7.9	Frank Orth & Assoc., 4/82. Borough Planning Department, 10/21/82.
5.	p. E-8-71 to p. E-8-72	All references listed in the Aesthetic Resources References Section should be appropriately cited within the written text of the application. If these listings are not citations, please indicate that they constitute a bibliography.
6.	p. E-10-120	CIRI/Placer 1981.
7.	p. E-10-121	Battelle 1978.
8.	Table E.7.13	EDAW estimate.
9.	Table E.7.16	EDAW Inc.

Provide copies of the following:

1.	p. E-2-195 through p. E-2-202	Acres American 1982c, 1983; Acres Am. Consulting Service Ltd. 1980; Alaska Department of Fish and Game 1982a, 1982c, 1983; Alask: Department of Natural Resources 1982; Dwight 1982; Peratrovich, Nottingham and Drage 1982, 1983; Peterson and Nichols 1982; R & M Consultants, Inc., 1981a, 1981c, 1981d, 1981e, 1981f, 1981g, R & M Consultants, Inc., Harrison, W.D., 1982a, 1982c, 1982e, 1982f, 1982g, 1982h, 1982i, 1982j; Resource Management Associates, 1983; Schmidt, 1981; Trihey, 1982a, 1982b, 1982c.
2.	p. E-3-198, ¶ 2	Commonwealth Assoc. 1982.
3.	p. E-3-198, ¶ 2	Joint Federal-State Land Use Planning Commission for Alaska 1973.
4.	p. E-3-205, ¶ 1	Hettinger and Janz 1974.
5.	p. E-3-230, ¶ 4	Kerr 1973.
6.	p. E-3-279, ¶ 2	Pamplin 1979.
7.	p. E-3-284, ¶ 1	Foote 1979.
8.	p. E-3-551 through p. E-3-556	ESSA/WELUT/LGL 1982; Alaska Department of Fish and Game 1982d, 1982e, 1982f, 1982g, 1983; Arctic Environmental Information a.d Data Center 1982; Bell 1973; Burger et al. 1982; Edfelt 1981; Friese 1975; Mills 1979, 1980, 1981, 1982; R&M Consultants 1982e, 1982f; Trihey 1982b, 1982c, 1982d, 1983.
9.	p. E-5-6, ¶ 5	Stephen R. Braund & Associates, Inc. March 1982.
10.	References, Chapter 5	Policy Analysts, Limited and Dr. Richard Ender May 1980.
11.	p. E-6-7, ¶ 4	Woodward-Clyde Consultants' 1980 report.
12.	p. E-6-11, ¶ 3	Woodward-Clyde Consultants' 1982 report.
13.	p. E-10-115, ¶ 1	Battelle reports on power alternatives (Battelle 1982) and coal consumption (Battelle, no date, BNWL-RAP-21, UC-11).

TRANSMISSION FACILITIES

12. STATUS OF FACILITIES

Load flow plots and electrical transmission data contained respectively in Engineering Report, R-2423, "System Studies of the Anchorage-Fairbanks Intertie," March 1982 and "Anchorage-Fairbanks Transmission Intertie Transmission System Data (Revised June 1981)" provides 1983-1984 system loads and 230/138/69 kV network configurations for the five Anchorage/Fairbanks, Alaska utility systems following implementation of the 138 kV Anchorage-Fairbanks Intertie. With the installation of Susitna generation, the Intertie, designed for 345 kV operation, will become part of the Railbelt 345 kV transmission system. At that time, 345 kV step-down substations (Ester, Willow, Knik Arm, and University) will be established as shown on Exhibit F, Plate F74. Therefore, information is needed, and was requested, on the integration of the Anchorage/Fairbanks area utility systems' 230/138/115kV facilities via the Ester, Willow, Knik Arm and University substations, for 1995 and 2002. The years correspond respectively to the proposed Watana plant (1020 MW) and Devil Canyon plant (600 MW) in-service availability dates.

The following information should be provided for the 1994 and 2002 Alaska interconnected system.

(a) For 1995, electric single-line schematic diagrams showing the electrical connection of lines and substation facilities from:

(1) the Ester 345/138 kV substation to the Golden Valley Electric Association, Fairbanks Municipal Utility or other area systems;

(2) the Willow 345/138 kV and Knik Arm 345/115 kV substations to the Matanuska Electric Association or other area systems; and,

(3) the University 345/230-115 kV substation to the Anchorage Municipal Light & Power, Chugach Electric Association or other area systems.

(b) Similar information for the 2002 systems should be provided, when available.

The information should be provided in the format used in the APA document "Anchorage-Fairbanks Transmission Intertie Transmission System Data (Revision June 1981)."

13. ELECTRICAL ENVIRONMENTAL EFFECTS

I. Engineering Report R-2394, June 1982, was provided containing a discussion and data on the electrical environmental effects associated with the Anchorage-Fairbanks (Willow-Healy) 345 kV transmission intertie. The following additional information associated with this analysis should be provided:

(a) Audible noise and radio frequency noise levels wherein three 345 kV transmission lines will ultimately be in the right-of way (ROW) were calculated "using methods developed at Project UHV 2/," where 2/ refers to the first edition of Transmission Line Reference Book, 345 kV and Above dated 1975.

(1) Indication should be given of the specific equations and/or design curves used in the reference book.

(2) Provide the method used to account for the effects of multiple lines on the same ROW.

(b) Provide the predicted levels of Television Interference (TVI) at a measuring frequency of 75 MHz and a meter bandwidth of 150 kHz, specifying the calculation method used including how multiple lines on the same ROW are accounted for.

(c) Give the method used to calculate the electric field strength (R-2394, Table 7).

(d) Provide the method used to calculate induced currents (R-2394, Page 12).

(e) Ambient audible noise level data on the intertie ROW route should be provided.

II. Communication interference, audible noise generated by corona formation and ground-level electric and magnetic field intensity data for all 345 kV transmission line ROW sections to be constructed as part of the Susitna Project was requested. As indicated in I, Engineering Report R-2394 only addresses the Willow-Healy section. Therefore, similar information should be provided, as augmented by I (b) and (e), for the following other 345 kV overhead transmission line ROW sections:

ROW Section	Approximate ROW Miles
Healy-Ester	96
Gold Creek-Watana	8
Willow-Knik Arm	44
Knik Arm-University	19

ENGINEERING

14. GENERAL

1. In Section 1.3(b) on page A-1-6, provide a statement of the flood frequency which was used to determine the 9 feet of freeboard for wave runup and ice protection at the upatream cofferdam.

2. In Section 7.4(b) on page A-7-7 provide a detailed discussion of the thermal studies conducted to determine that water flowing through Devil Canyon will be at 34°F. The 2° difference between freezing and the anticipatad water temperature has been used as the basis for not providing freeboard allowance for ice. This assumption requires a high degree of analysis accuracy. Demonstrate the accuracy of the computer model by submitting calibration studies using known data. Also, provide a statement of the flood frequancy used to determine the wave runup freeboard allowance.

3. Provide Ebasco's detailed cost estimate in support of Table D.8, showing unit costs and quantities.

4. Provide the 1981 Bechtel report titled, "Chakachamna Hydroelectric Report, Interim Raport," prepared for APA and cited on page E-10-7.

5. Provide the 1983 Bechtel Report titled, "Chakachamna Hydroelectric Report," Draft report prepared for APA and citad on page E-10-9.

6. Provide the U. S. Department of Energy report title, "Hydroelectric Alternatives for the Alaska Rainbalt," prepared by APA and cited on page E-10-12.

EXHIBIT F AND SUPPORTING DESIGN REPORT

1. Provide wave run-up calculationa showing the methods and assumptions used to determine the 3 and 5 feet freeboard allowances built into the Devil Canyon and Watana Dams respectively (Exhibit F, Supporting Design Report SDR).

2. Provide the results of model tests, or calculations, used to determine (or verify) the modes of failure for the proposed fuse plugs used in the Watana and Devil Canyon emergency spillways. (Dwgs F18 and F58). These tests, or calculations, should show the failure times under adverse conditions such as freezing weather. Submit examples of similar designs, used at other locations, under comparable weather conditions. Also, submit details of cost comparison studies conducted in support of the decision to utilize the fuse plug design rather than increase the size of the emergency and main service spillways to handle the PMF (Exhibit F, SDR).

3. Provide calculations and criteria in support of the hydraulic design of the Watana and Devil Canyon main spillways (Dwgs F12 and F54). Specifically, show calculations to support the proposed locations of the areation slots and the design of the energy dissipating flip buckets. In addition, provide a discussion of the extent of hydraulic model testing proposed to verify the hydraulic designs of the spillways and flip buckets (Exhibit F, SDR).

4. Provide a discussion in the report of the types of hydraulic model tests (including those requested in No. 3 above) which are proposed for the Watana and Devil Canyon developments. Areas of concern are; the Watana right abutment area where three intake structures are located and the Watana main spillway tailrace area where the diversion tunnel portals, outlet facilities and power tailraces are located (Exhibit F, SDR).

5. Provide a discussion of the geology and the foundation and excavation treatment proposed for the Watana main spillway tailrace area. This area is located near the "fingerbuster" geologic feature and is highly congested with several underground and surface structures. Adverse joint orientation, shear zones or weak rock in this area would affect the design and construction. The steep slopes, deep cuts and excavation required could have an impact upon the stability and safety of these structures, especially the spillway flip bucket structure (Exhibit F, SDR Section 4.1(c)).

6. Cite a reference for the equation proposed for the at-rest earth pressure coefficient, i.e. $k_o = 1 - \sin\phi$ (Exhibit F, SDR, Section 3.2(b)).

7. In new designs, a cracked base is acceptable only for earthquake loading. The second paragraph should be revised to indicate that cracking will only be allowed under earthquake loading (Exhibit F, SDR, Section 3.2(g), page F-3-4).

8. Clarify the earthquake loading which will be used for mass concrete retaining structures by showing the static seismic coefficients proposed. Also, show the seismic loading which will be used for the Watana and Devil Canyon Saddle Dam embankments and discuss the methods of analysis which will be used. Submit the analysis referred to in 4.1(g)(vii). (Exhibit F, SDR, Section 3.2(h), page F-3-5.)

9. Discuss the parameters considered in the selection of the ice load (10 kips/lin. ft.), such as winds, currents, and thermal strains as well as the geometric configurations of the various dams. Cite the references used where applicable (Exhibit F, SDR, Section 3.3(j), page F-3-6.

10. The overturning criteria shown in Section 3.3(c)(i) should be based upon the location of the resultant for all loading conditions. The Factors of Safety against Overturning (FSOT) shown are not consistent with the compression safety factors cited, and, in all cases (except the normal condition) allow the resultant to fall outside the middle-half of the base. For unusual conditions, the resultant should be inside the middle-third. This requires that the FSOT be greater than

1.5 if the resultant of the resiting forces is at the two-thirds point of the base (as measured from the toe). The criteria in Section 3.3(c) should be revised as outlined above (Exhibit F, SDR, Section 3.3(c), page F-37).

11. Submit stability and stress analyses for the following structures; Watana Dam, Devil Canyon Arch Dam and thrust block abutments, Devil Canyon Saddle dam, the Watana and Devil Canyon main spillway gate structures, and the Watana and Devil Canyon emergency spillway fuse plugs. The analyses should include: sample computer input and output, names of the computer programs used, and a summary of the material strength assumptions used in the analyses (Exhibit F).

12. Submit SDF and PMF studies for staff review. These studies should include: sample computer input and output, names of the computer programs used, and a summary of the assumptions used in the analyses (Exhibit F).

13. Borings are necessary along the Watana Dam centerline and under the dam base upstream and downstream of the centerline to properly assess the suitability of the Watana site for the proposed dam. The seismic profiles developed at the Watana site are inadequate to determine foundation conditions and top of rock elevations without borings. The need for these borings was pointed out by Staff Geologist Barry Thomas in a preliminary review of the license application in the spring of 1982. The deficiency was again pointed out in Staff comments on the pre-filing review of the draft application in the January 11, 1983 letter on Page 65. The lack of borings at the Watana site cast serious doubts on the adequacy of the cost estimate (Exhibit F).

14. Clarify the discrepancy concerning the upstream shell material to be used for the Watana Dam. Page F-4-9 indicates that fines less than 1/2 inch will be removed, but on Page F-4-10, it is stated that the processed upstream shell material will have no more than 10% of the material less than 3/8 inch in size (Exhibit F, SDR).

15. Provide additional information on the proposed impervious borrow area to enable a determination on the availability of sufficient quantities of impervious materials consistent with the design intent of the impervious zones of the proposed Watana Dam and Devil Canyon saddle dam embankments. This information shall include the types, range of gradations, plasticity index, and other physical characteristics of the materials to be placed in the core of the embankment. The highly plastic clays that exist in the proposed borrow pit shall be discussed with respect to their effect on the expected excavation methods needed to control the blending of various gradations of materials that will be encountered and any effects this might have on developing the quantities of impervious material required for the proposed embankments (Exhibit F, SDR).

16. EXHIBIT G

Plate G6

Complete boundary for PSC 443 in Sec. 6, T.31 N., R. 1E.

Delete reference to "ELEVATION 1500 MSL" from legend.

Plate G12

Show location of transmission line with reference to appropriate G sheet.

Plate G30

Identify the project boundary for the Knik Substation. (If the project areas are aliquot parts of the public land survey, simply delineate the areas accurately.)

Plates G30 through G37, and G39 through G52

Identify meridian (Seward or Fairbanks).

Plates G35 through G38, and G41 through G45

Add corodinates of the Alaska State Plane Coordinate System at angle points of the transmission line.

Plate G38

Indicate purpose of the 180 acre project area in Secs. 16, 20 and 21, T. 31 N., R. 2 W.

Plates G38 and G39

Show loction of railroad access corridor with reference to appropriate G sheet.

Plate G40

Correct Devil Canyon project boundary in Sec. 35, T. 32 N., R. 4 E., (compare with G12), and Watana project boundary in Secs. 3, 4, and 5, T. 31 N., R. 5 E., (compare with G13).

Plate G52

Identify the project boundary for the Ester Substation. (If it coincides with an approved Federal survey, simply identify the survey.)

Show the ownership status of the project land in Sec. 3, T. 1 S., R. 2 W.

NEED FOR POWER

17. EXHIBIT B

The following items are keyed to the numbering system used in the prefiling review.

Item 17: Unreferenced Information Requirements, Exhibit B.

3. A description of the assumptions embedded in the above methodologies specifically including but not limited to:

   A. The studies which were examined to determined elasticities of demand.

   B. The rationale for the particular values chosen in the range of elasticity values examined.

7. A more complete explanation of the methodology used to generate the future electricity prices used in the demand forecasts.

9. A sensitivity analysis of explanatory variables and model assumptions including those that drive the MAP model's economic and population projections.

10. The hourly loads for the combined Susitna market area for the most recent available year.

Item 18: Supplemental Reports

1. Provide a description of the Alaska Residential Conservation Survey Audits and a description of how this survey has been used.

2. Provide the BNW Railbelt End Use survey and a description of how it has been used.

The following item was included in Schedule A of the prefiling review.

Item 26: The claim of no energy reduction due to retrofitting in the commercial/industrial sectors should be verified. Provide information on the ISER demand model assumptions regarding this claim.

Specifically information provided should attempt to verify the assumptions made regarding energy reduction due to retrofitting in the commercial/industrial sectors.

18. EXHIBIT D

The following items are keyed to the numbering system used in the prefiling review.

Item 2(c): Provide the annual cost for the Susitna Project in actual dollars including: (a) escalation of project costs; (b) cost of capital including finance charges and (c) interest during construction. Project annual costs should be presented for all the years included in the life cycle analysis.

Item 5: Page 1-11, Section 1.5, specify allowance for funds used during construction (AFDC).

Item 31: Table D.8 and D.9, state interest during construction and provide copies of the references, i.e., Table 1, 5 R.L. 521, etc.

Specifically, for items 2(c), 5, and 31 provide additional information that will expand on and clarify the treatment of AFDC throughout the application.

Item 22: Pages 4-25 and 4-26, Section 4.7. Furnish details of the base period coal price estimations of $1.66/mBtu for Beluga, and $1.75/mBtu for Healy. Show details of the residually derived annual escalation rates of 2.6 percent and 1.2 percent during the intervals 1982 to 2000, and 2000 to 2040, respectively.

Specifically, provide details of the reaidually derived annual escalation rates.

Item 26: Page 4-31. Equal Environmental Costs - Provide details on analysis.

Specifically, provide information to support the premise that the treatment of anvironmental cost used in the Susitna analyses is in fact conservation with regard to evaluation of the Susitna project.

Item 19: Exhibit D

1. Pg. 1-6, section 1.1. Some estimates should be made of possible escalation in nominal as well as real terms for both direct and indirect costs.

4. Pg. 4-15. Provide copies of all input data and all output results of the OGP5 runs and a brief explanation of all data entry for each alternative case study discussed in Section 4.7 and 4.8.

Item 19: Exhibit D (continued)

5. Pg. 4-17, Section 4.6. Provide Beluga coal costs assuming commercial development does not take place. Discuss the relative economics of mining coal specifically for electric power generation, and its likelihood under this scenario.

6. Pg. 4-18, Section 4.7. There is currently a disparity between incremental, domestic market, and opportunity (shadow) values of natural gas prices. Quantify the sensitivity of using current incremental prices, assuming escalation will track world prices and eventually equal the international value, in the OGPS runs.

7. Pg. 4-19, Paragraph 2. If feasible, we would also like to see analysis conducted in nominal terms (including inflation.)

9. Pg. 4-30, On IRR - what is IRR for next largest Alaska project (power or non-power)?

11. Pg. 4-33, Section 4.7. In the single variable sensitivity analysis, a 5% discount rate resulted in a negative net economic benefit. Perform a multivariate sensitivity analysis using discount rates in lieu of capital costs as a key issue, assigned probabilities, and discuss results. Construct probability trees similar to Figures D.17 and D.18.

12. Pg. 4-35, Paragraph 1. It might be helpful to model the interactions. Section 4.9

19. ADDITIONAL SUPPLEMENTAL REPORTS REQUIRED

1. Battelle Pacific Northwest Laboratories, Alaska Coal Future Availability and Price Forecast, May 1981.

2. ISER. Alaska Economic Projections For Estimating Requirements For The Railbelt. Prepared for Battelle Pacific Northwest Laboratories (Oct. 1981)

3. Energy Probe, An Evaluation of the ISER Electricity Demand Forecast, July 1980.

4. Review of the University of Alaska Institute of Social and Economic Research Report "Electrical Consumption for the Railbelt Region: A Projection of Requirements." WoodwardClyde Consultants, San Francisco, 1980.

5. Institute of Social and Economic Research's (ISER) model documentation report 1/

6. ISER summary report on their economic development projection 1/

7. DEPD's 1983 Long Term Energy Plan 1/

20. FINANCIAL PLAN

As a minimum financial plan, please provide us with letters from the various "Railbelt" utilities expressing conditions under which they would be interested in purchasing power from Susitna. We also need some type of expression from the Alaskan legislature which will provide us with at least a reasonable expectation that the "expected" State appropriations will be forthcoming if the project is approved and that necessary additional funds will be committed in the event of cost overruns. Also, please submit a letter from an investment banker (or groups of bankers) of sufficient size and reputation to handle the sale of revenue bonds on a project of this magnitude, which sets forth their view of the conditions required to market revenue bonds. Their letter should specifically address the projections of expected demand and revenue which you expect us to act upon in the filing (either the current projections on file or revised projections) and contain a statement concerning whether or not such projections provide a basis that would allow sale of revenue bonds to finance the project. Finally, please provide us with a statement concerning what would happen if Susitna is constructed and energy costs of alternative options do not rise as you expect, or if cost overruns occur. Would additional State funds be appropriated, or would consumers be required to bear the burden of high cost energy?