Draft
Bill Kohl 1/31/83

HARZA-EBASCO
Susitna Joint Venture
Document Number
2369
Please Return To
DOCUMENT CONTROL

MEMORANDUM

TO: Need for Power Study Team

FROM: Henry H. Chen

DATE: January 31, 1983

SUBJECT: Step 1 Report Preparation for Susitna Project, Need for Power Study

We discussed the general approach to preparing the report for the Step 1 work during January 29-31 and have made a start in report preparation. Because of the short time schedule, it is necessary that our work and product will be geared toward the final documentation. Our report preparation efforts will be in the following manner:

1. Table of Contents
2. Outline
3. Lists of Tables, Figures, and Exhibits
4. Dummy Report

The above will be developed and revised as necessary with progress of study.

First, to facilitate the parallel and somewhat independent efforts of (1) power market forecast and (2) project optimization and justification, we will assume two separate reports will be prepared.

Attachment 1 shows the summary Table of Contents of the Step 1 reports.

Attachment 2 shows the Report Outline for Chapters I through III of the Step IB Report.

ECL is requested to complete the Report Outline, Tables, Figures, and Exhibits for the first half of Step IA Report as a first priority.

WPK is requested to develop a complete list of tables, figures and exhibits, and dummy report for Chapters I through III of the Step IB Report as a first priority.

Work on Chapters IV through VII for Step IB will begin in Chicago next week.

We will present our reports in a format that will permit us to relate to the existing two principal documents--FERC License

MEMORANDUM

TO: Need for Power Study Team

FROM: Henry H. Chen

DATE: January 31, 1983

SUBJECT: Step 1 Report Preparation for Susitna Project, Need for Power Study

We discussed the general approach to preparing the report for the Step 1 work during January 29-31 and have made a start in report preparation. Because of the short time schedule, it is necessary that our work and product will be geared toward the final documentation. Our report preparation efforts will be in the following manner:

1. Table of Contents
2. Outline
3. Lists of Tables, Figures, and Exhibits
4. Dummy Report

The above will be developed and revised as necessary with progress of study.

First, to facilitate the parallel and somewhat independent efforts of (1) power market forecast and (2) project optimization and justification, we will assume two separate reports will be prepared.

Attachment 1 shows the summary Table of Contents of the Step 1 reports.

Attachment 2 shows the Report Outline for Chapters I through III of the Step IB Report.

ECL is requested to complete the Report Outline, Tables, Figures, and Exhibits for the first half of Step IA Report as a first priority.

WPK is requested to develop a complete list of tables, figures and exhibits, and dummy report for Chapters I through III of the Step IB Report as a first priority.

Work on Chapters IV through VII for Step IB will begin in Chicago next week.

We will present our reports in a format that will permit us to relate to the existing two principal documents--FERC License

Application and Battelle Northwest 17 volume reports. We want to refer to these two documents in future FERC proceedings. Therefore, if any basic data or reference are to be made, try to use the material from these reports.

The studies in Step 1 will be refined and revised, and the Step 1 report will be elaborated to develop the Step 2 comprehensive report due June 30, 1983. The latter may be considered a revision to Exhibits B and D of the License Application. We discussed the possible need to complete and submit certain documents to FERC soon after February 28, 1983 (schedule date of the License Application). For this reason, the Step 1 report should be designed in a format that would best resemble FERC Exhibits B and D.

We plan on the Step 1 report to be an independent document without need of reference to other reports. Wherever we use a map, table, or figure from the License Application and the Battelle as basic data for our study, let us reproduce it for inclusion in our Step 1 report. Credit should, of course, be given. This could add to the bulk of our report, but will require little effort.

We will standardize the format for text, tabulation, and references. For the time being, we will use Harza report standard. Paul Lambert will let us know the drawing sizes and title block. We will bring a copy of Harza's Word Processing Guide for report preparation.

HKC/skg

Attachments

cc: R. LaRusso
R. Heagher
S. Simmons

ATTACHMENT 1

TABLE OF CONTENTS

Susitna Project - Initial Review and Evaluation

Power Market Forecast

6.3 Comparison of Results of Previous Forecasts

APPENDICES

TABLE OF CONTENTS

Susitna Project - Initial Review and Evaluation

Project Optimization and Justification

ATTACHMENT 2

REPORT OUTLINE

Susitna Project - Initial Review and Evaluation

Project Optimization and Justification

EXECUTIVE SUMMARY

I. INTRODUCTION

Purpose--

APA filed FERC License Application, proceeds with project design for early construction. Harza-Ebasco engaged to perform design engineering and to assist in license processing. As an initial step in the licensing activities. APA requested Harza-Ebasco to perform a review and initial analysis of the proposed project relating to the Need for Power issue.

Review is timely because of the changing economic conditions in Alaska resulting from the reduced price level of oil and state revenues, affecting future electric power demand, and resulting in the need for the Susitna Project.

Scope--

Review and evaluation in two areas affecting Need for Power: 1) power market forecast, documented in a separate report and 2) project optimization and justification presented herein. Re-evaluate the proper size of the initial stage of the Susitna Project.

For this purpose study a smaller Watana Project with reservoir _____ 2100 and 2000. Also study the Devil Canyon Project as a first stage. The studies are comparative in nature and are not intended to cover all the details which do not affect project performance and cost. Basic design concepts for the Watana and Devil Canyon Projects, and the cost estimates of the projects are taken from the draft License Application (Nov, 82). The study will determine if the proposed Watana/Devil Canyon is still the optimum, deriving the greatest benefit.

Procedure--

Develop layouts and cost estimates of the alternative Watana and Devil Canyon Projects (based on License Application). Estimate

firm and average energy production. Develop construction schedule of alternatives (Chapter V).

Estimate availability and cost of fuel resource.

Gas (Current condition, reserve, use by fields, price, and contracts. North Slope gas. Expert potential as LNG)

Oil

Coal Chapter III

Study the more competitve generation alternatives (performance, cost, and schedule).

Simple Cycle GTs	Location
Combined Cycle	Location
Coal Fired Steam	Location
Chakachamna Hydro	Chapter IV

Analyze alternative system expansion programs.

Criteria for expansion.
Use of computer model.
Present worth (life cycle analysis)
Breakeven analysis and internal rate of return (Chapter V)

Acknowledgement--

APA
AP Administration
ISER
Acres
Battelle
D. Reaume

References--

Susitna Feasibility Report
Battelle Pacific Northwest Reports
Comments of the Above Reports
1983 Energy Plan by Selected References

II. DESCRIPTION OF ALTERNATIVE WATANA AND DEVIL CANYON PROJECTS AND THEIR COSTS

Introduction--

General description of Watana and Devil Canyon Project to demonstrate it is a combined development (show river profile as

an exhibit). Depending on development concept and alternative _____ concept, there are three major elements: 1) Watana, 2) Devil Canyon, and 3) common facilities as described in succeeding sections. Each of the three elements may differ depending on the development concept.

Description of the Watana Project--

The basic alternatives--2185, 2100, 2000

Project structures, general arrangement, dam, division, emergency release facilities, outlet facilities, main spillway, emergency spillway, power intake (initial and ultimate), penstocks (initial and ultimate), powerhouse, tail_____, access roads, site facilities, relict channel.

Project structures for the alternative reservoir elevations.

Reservoir operating fuels (three levels).

Turbines and generators (three levels).

Transmission facilities (three levels).

Appurtenant mechanical and electric equipment (three levels).

Construction schedule (three levels).

Estimated construction costs (three levels).

Disbursement schedule.

Description of the Devil Canyon Project--

Alternatives preceding or following the Watana Project.

Project structures for the proposed project in the License Applications (same as Watana).

Project structure if built before Watana--spillway, intake, diversion, 2-150MW and/or 4-150MW.

Reservoir operating level alternatives--1455-1405; 1455-1355.

Turbines and generators (same design).

Transmission facilities (minor difference).

Appurtenant mechanical and electrical equipment.

Common Facilities to the Susitna Project--

Staging Concepts--

Proposed in License Application. Alternatives under study.

Conversion of interconnection line from 138KV to 345KV.

Transmission--

Switching and sub_____ -- Gold Creek, Willow, Knik Arm, University, Ester

Transmission lines--Gold Creek to Willow, Willow to Knik Arm, and Knik Arm to University.

Connection to utilities.

Estimated costs and disbursement schedules for alternative stagings.

Energy Management and Communication Center--

Energy Management Center (Willow?)

Communication Center (Willow?)

Costs

Access Roads--

Access Roads (description, costs)

Permanent Town (description, alternative costs)

Summary of Estimated Costs--

Cost summaries by _____ under each alternative.

III. OPERATION OF THE WATANA AND DEVIL CANYON PROJECTS

General Statement--(Exhibit B(3)

Operation will be automatic. Control will be from Dispatch Center at Willow(?). Table shows annual energy production and plant factor for each alternative, including normal watch capacity, max and min generating capability, and generating capability in the peak load month (December).

Description of operation in dry season/peak load months and in wet season/low load months for each alternative. Description of how operation changes in adverse, mean, and high water months.

Identify flow records used for illustration/discussion purpose.

Description of purpose of operation for peaking, spinning reserve, meeting a portion of the peak demand, for firm energy production, and/or replacement of fossil energy generation.

Description of ability of system to utilize capacity and/or energy in initial/later years.

Water Supply--(Exhibit B(4)i)

Water supply from License Application Draft. 30(?) years of flow records at Gold Creek and Cantwell were used to derive natural flow data at Watana and Devil Canyon.

Give minimum, mean, and maximum recorded/computed flows. Give critical flow sequence(s). Give evaporation data (Table B60).

Reservoir Operation--(Exhibit B(4)ii)

Give rule curve (if any) of operation. Give minimum release data (Table B53, Case C?). Give area-capacity curves.

Give plant performance data--flow, efficiency (kw vs. cfs vs. head) and generator output. Give tailwater rating curve. Give powerplant capability versus range of oprating heads. Give tailwater rating curves.

Give results--monthly computer printouts are exhibits and summaries are tables in text. Summaries should show firm energy and dependable capacity for cash case.

Plant Dispatch on System--(Answers the Part of Exhibit B(5)

Illustrate plant operation on an hourly basis and dispatched on an integrated load curve (Anchorage and Fairbanks) under different cases of Watana/Susitna developments for key months (say July and December of 1994 or 5?).