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SUSITNA-WATANA HYDRO

Susitna-Watana Hydroelectric Project
(FERC No. 14241)

Hydrology-Related Resources
Study Plan Section 7 Introduction

Final Study Plan

Alaska Energy Authority

SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

July 2013

7 HYDROLOGY-RELATED RESOURCES

7.1 Introduction

Operation of the Susitna-Watana Hydroelectric Project (Project) is expected to change the hydrology characteristics of the riverine portion of the drainage downstream of the proposed dam and the mainstem Susitna River reach inundated by the Project reservoir. Proposed Project operations will affect flow, water depth, surface water elevation, channel characteristics, and sediment regimes. The potential effects of the Project on ice formation, surface and groundwater temperature and quality, geomorphology, and other hydrologic characteristics need to be carefully evaluated as part of the licensing process, because changes to these parameters can affect aquatic and riparian habitat quality, which can in turn affect fish populations, riparian-dependent species, and roads, bridges, structures, and recreation opportunities along the river corridor.

This section includes three study plans: Groundwater Study; Ice Processes Study; and Glacier Runoff Changes Study. The overall goal of the studies is to collect data to characterize baseline conditions for these hydrologic resources and evaluate potential Project effects. These results and analyses will be incorporated into the environmental assessment that will be conducted in support of AEA's FERC License Application.

7.2 Nexus Between Project Construction / Existence / Operations and Effects on Resources to be Studied

Construction and operation of the Project have the potential to alter the GW/SW interactions and ice processes in the Susitna River. Changes to these processes may affect channel morphology and aquatic habitat downstream of the Project site. Understanding existing conditions provides baseline information needed for predicting the likely extent and nature of potential changes to the river that may occur due to Project construction and operations.

For any hydropower project it is important to understand the variability of the discharge. On-going retreat of the glaciers feeding the Upper Susitna drainage, along with the anticipated long life of the Project, means that glacial retreat could have significant impacts to the ecosystem, economics of the Project, and proposed mitigation measures. These impacts from natural changes to the environment may be additive to impacts from the proposed Project operations. The effects will be varied and could include the following:

- Glacial retreat can affect runoff contribution from glaciers that could result in reduced summertime stream flows.
- Decreased snowpack and glacial runoff, combined with increased air temperatures, could change the thermal regime of the Susitna River and affect fish and aquatic invertebrates.
- Sedimentation changes could affect Project longevity and thus cost-benefit calculations for the reservoir. The rate of sedimentation is strongly tied to erosion processes, which may change as glacial ice becomes a smaller contribution to the total runoff.
- An understanding of changes in the hydrologic regime (water timing, quantity, and quality) in combination with Project operations will inform post-construction monitoring

needs. This could include stream temperature measurements, assessment of fish habitat conditions under changing conditions, instream flow throughout the system to assess changes in flow contribution from tributaries, and stream temperature monitoring in the reservoir and downstream.

7.3 Resource Management Goals and Objectives

Water quality in the state is regulated by a number of state and federal regulations. This includes the federal Clean Water Act (CWA), and the State of Alaska Title 18, Chapter 70, of the Alaska Administrative Code (18 AAC 70). Aquatic resources including fish and their habitats, and wildlife resources, are generally protected by a variety of state and federal mandates. In addition, various land management agencies, local jurisdictions, and non-governmental interest groups have specific goals related to their land management responsibilities or special interests. These goals are expressed in various statutes, plans, and directives.

In addition to providing information needed to characterize the potential Project effects, these water resources studies will inform the evaluation of possible conditions for inclusion in the Project license. These studies are designed to meet Federal Energy Regulatory Commission (FERC) licensing requirements and also to be relevant to recent, ongoing, and/or planned resource management activities by other agencies.

7.4 Summary of Consultation with Agencies, Alaska Native Entities, and Other Licensing Participants Regarding Revised Study Plan Development

Input regarding the issues to be addressed in these studies has been provided by the Technical Work Group (TWG) during meetings commencing in late 2011. During 2012, workgroup meetings were held in January, March, April, June, August, September, and October, during which resource issues were identified and discussed and objectives of the studies were defined. A one-and-one-half day field reconnaissance was also conducted in October 2012 with agency representatives to tour three of the proposed Focus Areas and discuss riparian, groundwater, and fish habitat sampling and modeling. Various agencies and other parties (USFWS, NMFS, ADF&G, etc.) provided written comments that have been considered and will be addressed in these plans. Summary tables of comments and responses from formal comment letters filed with FERC through November 14, 2012 were provided in Revised Study Plan (RSP) Appendix 1 filed December 14, 2012. Copies of the formal FERC-filed comment letters were included in RSP Appendix 2. In addition, a single comprehensive summary table of comments and responses from consultation, dated from PSP filing (July 16, 2012) through release of Interim Draft RSPs, was provided in RSP Appendix 3. Copies of relevant informal consultation documentation are included in RSP Appendix 4, grouped by resource area.

Consultation subsequent to the filing of the RSP is described within each Final Study Plan (FSP).