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UNITED STATES  
DEPARTMENT OF INTERIOR

BRIEF ON  
YUKON-TAIYA PROJECT  
ALASKA-CANADA

By  
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JUNEAU, ALASKA

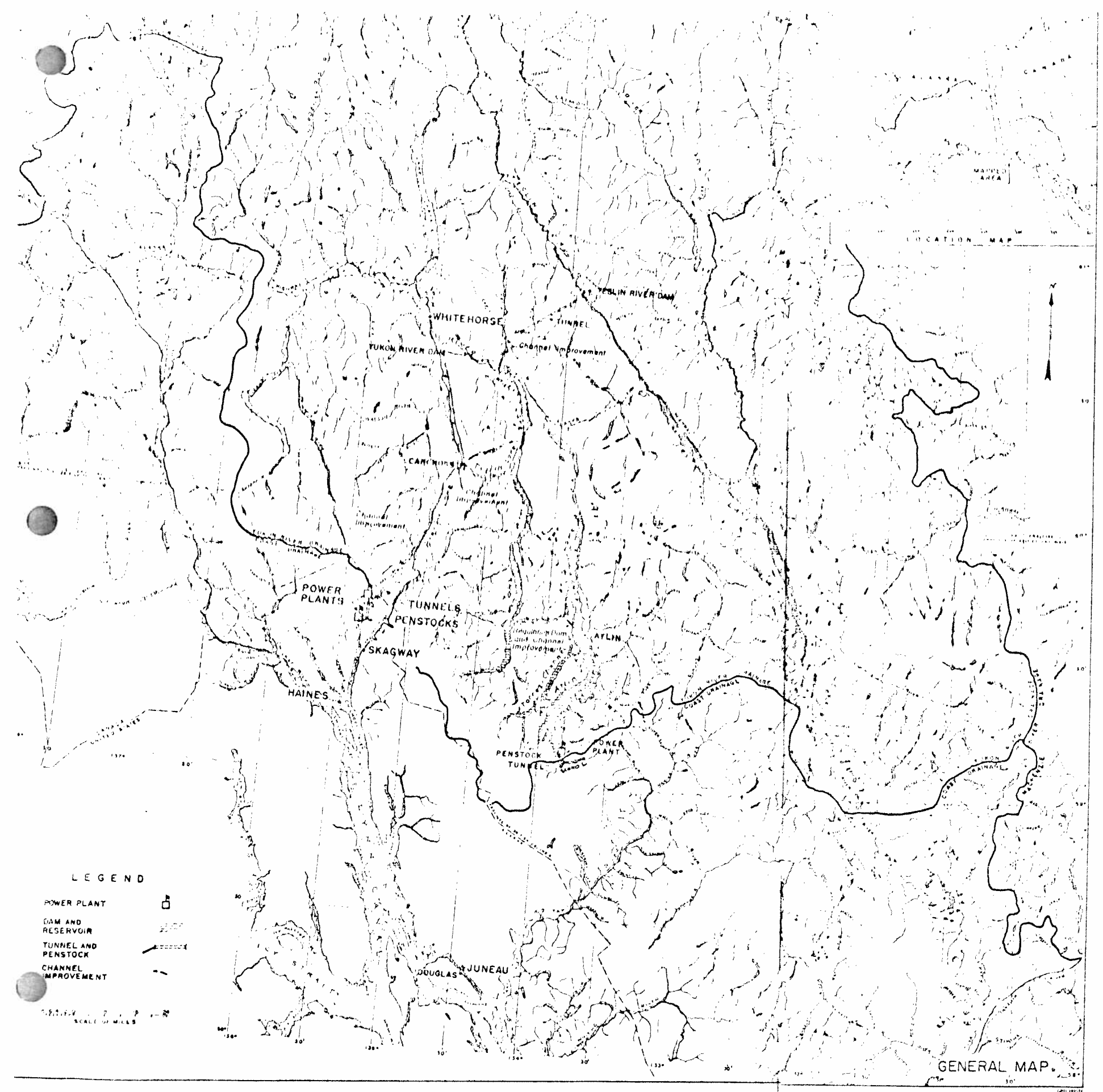
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GENERAL MAP.

## INTRODUCTION

The purpose of this brief is to invite attention and to encourage effort to be directed toward bringing about joint planning between Canada and the United States for the development of the Yukon-Taiya Project.

The proposed Yukon-Taiya Project is an international hydroelectric power development. Nearly all waters originate in Canada. The power head, over 2000 feet, is located within Alaska. Potential generation is estimated to be over 23 billion kilowatt-hours annually. The estimated installed capacity would be about 4,000,000 kw.

## HISTORY OF PROJECT

In January 1948 a brief report was prepared by L. N. McClellan and L. G. Puls of the Assistant Commissioner and Chief Engineer's Office. The report was titled THE POTENTIAL HYDROELECTRIC POWER OF SOUTHEAST ALASKA AND THE YUKON TERRITORY. This was followed by a RECONNAISSANCE GEOLOGY REPORT which was prepared by the Alaska District Office, Juneau, Alaska in December 1950. A concluding interim report prepared by our District Office in June 1951 titled YUKON-TAIYA PROJECT, ALASKA-CANADA terminated the Yukon-Taiya studies. The latter report proposed an initial powerplant capacity of 340,000 kilowatts and an ultimate capacity of 900,000 kilowatts.

Data contained in the report was provided through a joint effort between Canadians and Americans. Project studies were discontinued at the request of the Canadians. At the time of the interim report, navigation downstream from Whitehorse to Dawson was a factor affecting water available for power generation. Following construction of a highway to Dawson City, river traffic was discontinued.

#### Alternate Development Study

In August 1954 a priority permit was granted Northwest Power Industries Ltd. by the Canadian Government for studies of a hydroelectric power development along the British Columbia-Yukon border. Frobisher Ltd., of which Northwest Power Ltd. is a subsidiary, had previously been given the go-ahead signal by the British Columbia Government. A \$2,500,000 bond was reported posted which required the development of 120,000 horsepower by 1957. By 1962 the horsepower objective was 880,000. Expenditure was estimated to involve \$270,000,000. This program failed to materialize.

The considered plan of development proposed diversion of the Yukon River's headwaters by tunnel from Atlin Lake into Sloko Lake, from Sloko Lake a tunnel would convey water to a powerplant on Nakonake River, a second tunnel would convey water to a powerplant on Taku River. Under this plan of development all project features would be within Canada.

### CLIMATE

Southeast Alaska and Western British Columbia, warmed by the Japanese current, have temperatures more moderate than heavily populated areas in both Southern Canada and in some of our northern states. Precipitation averages only 26 inches in Skagway. The climate of Northern British Columbia and Southern Yukon Territory is not unduly rigorous. Although extreme low temperatures occur, they do not hang on. Summers are pleasant with long daylight hours. Rainfall varies from 11 to 13 inches annually.

### WATER SUPPLY

The water supply records for the Yukon River at Whitehorse date back to year 1902. The drainage area comprises 7,500 square miles. The average runoff for the 58-year period of record is 5,720,000 acre feet. The Teslin River at Johnson's Crossing has a drainage area of 11,700 square miles. Water supply records date back to 1949. Average annual flow for the full eleven years of record is 6,962,700 acre feet. The combined flow of the system is equivalent to an average daily flow of 17,550 cubic feet per second. This flow could be increased by diversion of the Sloko and Quiet Lakes' runoff.

### REGULATION

Several large natural lakes situated just over the Alaska border line in Canada gather the project's water supply. Ample storage for full regulation of all flows could be obtained within the lake systems. A low dam at the head of Atlinto channel would be necessary to regulate the outflows from Atlin Lake. The diversion dam required on the Teslin River would need be constructed to sufficient height to provide essential regulation within Teslin Lake. Lake Marsh, Taggish, Nares and Bennett, whose water surfaces range from elevation 2147 to 2150 feet, would afford regulation through draw down. If it were found economically desirable to materially increase the water surface of these lakes for storage purposes, it could be done but it would require relocation of the small village of Carcross and the White Pass and Yukon Railroad tracks. A storage dam located on the Yukon River a short distance below the mouth of Marsh Lake would be essential for the determined regulation within these lakes.

### DEVELOPMENT PROPOSAL

The scheme for development proposes diversion of the headwaters of the Yukon and Teslin Rivers to powerplants located in Taiya River valley. Taiya River valley begins at the

head of Lynn Canal approximately seven miles northwest of Skagway, Alaska and extends from tidewater north about 9.0 miles into the coastal range.

Waters of the upper Teslin River would be diverted by dam and tunnel into Marsh Lake. By constructing a dam across the Yukon River downstream of Marsh Lake, adjusting outlets of the upper Yukon Lake system, and drilling a tunnel through the coastal mountains into Taiya River valley, diversion of all waters for power generation would be possible.

The proposed upper powerplant site would be located near the junction of the Nourse and Taiya Rivers at about elevation 255 feet. The lower powerplant site would be at or near tidewater. Flows of the Nourse and Taiya Rivers would be intercepted and used for power generation at the lower powerplant. (The accompanying map shows the general project layout and features.)

Any development should consider diversion of Quiet Lake into the Nisutlin River, a tributary of Teslin Lake and the diversion of Sloko Lake into Atlin Lake utilizing the power head for generation.



INTERNATIONAL COOPERATION

A first step to this study is to achieve a cooperative desire by the Canadians to jointly participate in developing the Yukon-Taiya Project. It would appear that this effort should be championed by someone at State level who could effectively sell the common benefit approach. Economic and political development occurring since 1951 may now make this project of interest to our neighbors.

Conditions and thinking change with people as is evidenced by Statehood for Alaska, the nationalization of electric power industry in British Columbia, the recent reversing of an earlier stand by the Canadian Government to now permit large-scale, long-term exports of electricity to the U. S., the recent declared intent to seek parliamentary ratification of the Columbia River Treaty signed almost two years ago by Eisenhower and Diefenbaker, and the forming of the International Highway Commission for joint planning of road systems network.

INTERNATIONAL BENEFIT

The Yukon-Taiya Project is of such magnitude that its development would attract electrochemical and electrometallurgical industries to both Canada and Alaska. These would

be followed by other primary industries, with secondary industries not far behind.

The project area is richly endowed with natural resources such as iron, copper, titanium, molybdenum, lead, zinc, antimony, nickel, asbestos and limestone. By bringing the project into being and thus providing a source of low-cost power within reach of every potential mining center, mineral resource development would forge ahead.

Canadians and Alaskans could share equally in costs and benefits through project development. The 2,700,000 kilowatt-hours of firm energy the project could provide annually would bring about immeasurable growth throughout the Yukon Territory, Northern British Columbia and Alaska. The unrealized potential of this vast region could provide an unlimited opportunity for millions of Canadians and Americans through the construction of the Yukon-Taiya Project.

#### MOST ATTRACTIVE ALASKAN PROJECT

The Yukon-Taiya is considered the best potential hydro project in Alaska. Many considerations have been weighed in its favor. Its ice-free tidewater location, excellent avenues to world-wide commerce through deep water shipping lanes,

mild climate, available industrial sites nearby, short transmission distance assuring a dependable power supply, a rail head into Canada, its central location to vast natural resources, and the absence of problems associated with fish and wildlife.

The Yukon-Taiya could be developed into the largest hydroelectric plant under the American Flag. The determining factor on this would be the amount of head developed on the Yukon system of lakes. At the present time it has been assumed the upper lake system of the Yukon would only be raised slightly.

Full utilization of all headwaters of the upper Yukon system would reduce the flow past the Rampart site by roughly 18 percent.

#### STUDY NEED

Early studies of the project were limited in scope. Aside from obtaining water supply, soundings of lakes and channel and limited topography, the making of on-site reconnaissance trips, all effort was confined to office studies.

Considerable field information will be a prerequisite prior to making a realistic cost estimate or preparing a project feasibility report for the Yukon-Taiya Project. Extensive geologic field investigations are essential, including core drilling at proposed dam sites, tunnel locations and in areas for which channel improvements will be necessary. The location and testing of suitable construction material will need be accomplished. Extensive topographic surveys will be required to supply information essential to locating and designing project features. The field studies along with office studies will make this a sizeable investigation.

#### RECOMMENDATIONS

1. That effort be directed through contacts with the Canadians to bring about a mutual desire to develop the Yukon-Taiya Project.
2. That a joint commission be established who would be responsible for directing all studies, preparing essential reports and seeking project authorization.