DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

RECONNAISSANCE ENGINEERING GEOLOGY FOR SELECTION OF HIGHWAY ROUTE FROM TALKEETNA TO McGRATH, ALASKA

by

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Work done on behalf of the U. S. Bureau of Public Roads

OPEN FILE REPORT
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In view of widespread interest in extending the highway system of Alaska, the Bureau of Public Roads requested the U.S. Geological Survey to prepare a reconnaissance engineering geologic report of an area through which a highway might be located between Talkeetna and McGrath. This report is designed to provide a general basis for determination of road location and is concerned only with the geological factors as they would affect construction. After a route has been chosen, detailed geologic and engineering studies in the field must be made.

The general area studied includes broad parts of the lower Susitna River valley, a smaller band through the Alaska Range, and a wide belt of the Nenana River valley in the mountains. At the eastern end of the area two possible sections were considered, one extending west from Talkeetna and the other west from the vicinity of Flat Lake. The route west from Talkeetna would take one of the Petersville Road and then extend southwest along the mountain front to Rainy Pass. Talkeetna will soon be accessible on the major highway system of Alaska and this route would help reduce the cache Creek mining district. The other route, the east end of which is already accessible from Anchorage, would more or less parallel the Alaska Railroad from the village of Gakona up the Tenta and Tyonek rivers to Rainy Pass. The latter route is 10 miles shorter between Gakona and Rainy Pass than the Talkeetna-Petersville route.

The entire area was examined by means of aerial photographs, a few of the Susitna region were made by R. W. Weber and others in the summer of 1949, and the rest by Fairchild and by Weber in the summer of 1950. In the Susitna drainage area, interpretation of the aerial photographs was aided by reports by Brooks (1911), Jagga (1912, 1930), and Mertie (1937), a map of the surficial deposits, and a detailed geomorphologic study supplemented by field checks. The geology of the Talkeetna-Petersville area is based largely on published and unpublished notes of Hartman Fernald (1950), Alaska International Highway Commission (1943), some of F. H. Weber and on the Rube-Kahiltna drainage area by Capps (unpublished) and Fernald (1950). The geology of the Nenana River valley between the C.O. Geological Survey, the Alaska Road Commission, and the Alaska Railroad, and by F. H. Weber. Because these contacts were determined primarily on aerial photographs they are, of necessity, approximately located.

The Fairbanks laboratory of the U.S. Bureau of Public Roads, under the direction of Thomas W. McLaird, made the analyses of the samples collected by F. H. Weber. The Soils laboratory of the Alaska Road Commission made the analyses of samples collected by A. T. Fernald in the Farewell-Mckinley area.

The geologic units were first delineated on aerial photographs and then transferred to topographic maps. The surficial deposits have been described in terms of their origin, not necessarily of their material geological formations which underlie them. Many of the deposits have road construction significance. They are arranged in chronological order, so that the youngest deposits are described first. Where material is mentioned in the sheet in which it is described, characteristics of the material are described in the accompanying charts, and mechanical sieve analyses of selected samples collected in the field are shown in cumulative-curve graphs.

Geography

The route between Talkeetna and McGrath includes nine natural regions. The Alaska Range, which is crossed by the Rainy Pass, Broad Pass, and Windy Pass trails, crosses the area from northeast to southwest in the largest mountain mass in Alaska. Mount McKinley, the highest peak in North America, and 11 other large glaciers in this area, the Tenta and the Kahiltna, drain into large amounts of water and debris into the Susitna valley. All north of the southwestern side of the Alaska Range is the Susitna River, a major northeastern stream with couples a broad, open valley. In addition the Tenta and the Kahiltna, the Chulitna, Talkeetna, West Fork, Yanert, Happy, and Mt. Yenta Rivers are important segments of the Susitna drainage from the west.

The Talkeetna Mountains form the eastern ridge of the Susitna Valley which itself is a segment of the Alaska Mountains. Talkeetna, the Alaska Railroad supply center, is on the largest tributary of the Susitna, the Talkeetna River, 14 miles from the mouth of the Susitna. Also an important trading center, the supply center for the Alaska Railroad, Talkeetna, a Federal Aviation Agency station at the junction of the Talkeetna River and the Susitna, and the center of considerable farming and recreational activity are the main settlements in the area. Trails lead from Talkeetna up the Talkeetna River to Lake Louise and Summit Lake and Portage Creek to Chickaloon.

The Alaska Railroad passes along the eastern edge of the area and a few relatively unused parallel to the railroad. It is planned that this road will be completed through to Fairbanks. A temporary road extends about 15 miles from Talkeetna to the Alaska Creek placer mines, via Talkeetna, Caswell, and Montana Creek. Trails are existing between Talkeetna and Petersville, and numerous trails are in the valley of Willow Creek. A jeep road extends a short distance up the Kashwitna River. Trails are existing between Willow and Hatcher Pass, and a road is under construction between Willow and Palmer. The present transportation in the area is by boat on the Susitna River and by airplane in the winter. The village is from Anchorage to Talkeetna, 115 miles; to Gakona, 115 miles; to Tyonek, 45 miles; to Willow, 75 miles; to Palmer, 70 miles; to Petersville, 115 miles; to Chickaloon, 115 miles; to Hatcher Pass, 115 miles; to Broad Pass, 115 miles; to Windy Pass, 115 miles; to Rainy Pass, 115 miles;