Ground water in the vicinities of Healy and Homer, Alaska

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Introduction

Information concerning the availability of ground water in the vicinities of Healy and Homer, Alaska, has been obtained from the early stages of an investigation of the ground-water resources of Alaska and from studies of the fuel resources in the vicinities of the two towns. The information in this report, however, gives only a very general impression of conditions in the two areas, and more detailed ground-water studies, involving considerable test drilling, must be made before any conclusions can be reached as to the availability of specific quantities of ground water. Such studies might lead to conclusions differing widely for either or both areas from those that might be made on the basis of statements in this report.

Healy area

The Healy area lies along the Nenana River Valley on the north slope of the Alaska Range and is heavily glaciated. Ground water is available near Healy in glaciofluvial terrace gravels, and may possibly be available from Tertiary conglomerate and sandstone. The possibility also exists that clear water could be obtained from the Nenana River by means of pumping from wells near the stream. The following summary of ground-water possibilities is based on (1) geologic mapping of terrace gravels and measured thicknesses of gravel where exposed, in connection with coal and permafrost investigations on the Alaska Railroad, and (2) observation of springs issuing from the base of terrace gravels. It is intended only as a basis on which to plan future

investigation and is not intended to be a reliable estimate of the groundwater possibilities. The areas underlain by the possible aquifers are indicated on figure 1.

High terrace west of Healy.--The area marked A on figure 1 is a high terrace about 1 mile wide and about 7 miles long. It is 350 to 500 feet above the Nenana River and is underlain by 40 to 100 feet of gravel which is coarse and porous. The gravel rests upon tilted and beveled strata of the Nenana gravel, a middle Tertiary slightly cemented, moderately porous sandy conglomerate, which, however, acts as an impervious layer, and in part on the coal-bearing formation, consisting of alternating sandstone, shale, and coal, which also acts as an impervious floor. Several springs emerge from the base of the gravel underlying this terrace and flow the year round. These include:

(1) Two large springs at Garner, one of which supplies water for the community.

(2) One large spring at Healy, which, in addition to supplying all water for the town and railroad facilities, has an overflow stream about 18 inches deep and 5 feet wide, flowing more than 1 cubic foot of water per second.

(3) Several large springs at Lignite which are about the same size as the spring at Healy. One of these supplies all water needed for the roadhouse at Lignite including the operation of an electric power plant.

In addition to the springs mentioned above, clear water emerges from the gravel bed of Dry Creek, about half a mile upstream from the railroad bridge. The water flows in several channels which range in depth from 1 to 2 feet and in width from 5 to 15 feet. The gradient of Dry Creek in this vicinity is about 1 foot in 50.

The total outflow from this terrace is estimated to exceed 30 or 40 second-feet. Recharge to the terrace is derived primarily by loss of water from intermittent streams that cross the terrace and by direct rainfall on the terrace.

Intermediate terrace west of Healy and Lignite.--The intermediate terrace, shown by the letter B on figure 1, is half a mile wide, 5 miles long, and lies 150 to 300 feet above the Nenana River. It is underlain by 10 to 30 feet of coarse gravel but no large springs emerge from the base of these deposits.

Terrace east of Ferry and Lignite.--This terrace is 10 miles long, 1 mile wide, and 480 feet high. The upper 150 feet is porous glaciofluvial gravel underlain by the middle Tertiary Nenana gravel. No springs are known to issue from this terrace south of Ferry. However, it is cut by two or three deep draws, which may drain away most of the water. A large spring at Ferry has caused considerable trouble from icing during the winter. The recharge area is in the hills of the Nenana gravel conglomerate to the east.

Artesian water.--Water under artesian pressure may exist at depth within the Nenana gravel and the coal-bearing formation in the area marked by D in figure 1. Deep wells drilled west of Healy and near Lignite could test for such water. Drilling to determine the western extent of the coal beds has been proposed at both of these localities for the accelerated coal-investigation program, and presumably the drill holes could serve to test for both coal and water.

Alluvial gravel between Rex and Clear stations.--Deposits of coarse alluvial gravel occur in the Nenana River alluvial fan between Rex (Kobe) and Clear stations on the Alaska Railroad. Part of this area is shown by the letter E on figure 1. The area has been tested adequately by the U. S. Army Engineers who report that large quantities of ground water are available from these deposits.

Bed of Nenana River.--The bed of Nenana River is composed of 10 to 30 feet of well-sorted porous gravel, similar to the gravel underlying the terraces. Water in the Nenana River generally is turbid between May and October but

generally is clear during the remainder of the year. Large quantities of water probably could be obtained from wells constructed on low terraces near the river so as to draw river water through the gravel.

Homer area

Small quantities of water, less than 25 gallons a minute, have been obtained from a few wells in the vicinity of Homer. The water is contained in a 10-foot bed of sand lying beneath a cover of silt and clay about 100 feet thick. Beneath these deposits lie the consolidated beds in which coal is found. The local structure is adverse to the possibility of developing large supplies of fresh water from the bedrock formations because the beds dip gently toward the north (landward), and recharge would come from the sea. Inasmuch as the existing wells yield water that tends to be a little high in chloride, it is believed that deeper wells would encounter brackish water. In addition, the bedrock formations in this area are largely fine-grained and probably would not yield large quantities of water to wells.

Moderate quantities of fresh water may be available in surficial deposits within distances of several miles from Homer, but more detailed studies, involving considerable test drilling, would be required before any conclusions could be reached in this regard.