GEOPHYSICAL SURVEY OF RIVERS IN ALASKAS ARCTIC COASTAL

PLANE BETWEEN PRUDHOE BAY AND THE CANADIAN BORDER

NOV 3 TO NOV. 23, 1976

By Dora Gropp

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ARCTIC ENVIRONMENTAL INFORMATION AND DATA CENTER 707 A STREET ANCHORAGE, ALASKA 99501

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Alaska Resources Library & Information Services Anchorage, Alaska

The instruments used for this survey were:

Geonics EM 16R	RADIOHM METHOD
• .	(Depth of investigation up to 200 m)
Geonics EM 31	INDUCTIVE COUPLING
	(Depth of investigation \sim 10 m)
Geonics EM 34	INDUCTIVE COUPLING
	(Nenth of investigation -50 m)

GENERAL

The survey was conducted in areas, where the proposed Alaskan Arctic Gas pipeline crosses major rivers and in the coastal areas. The purpose was to determine the presence of thawed zones under or in these rivers during the winter months. The generally mild weather had delayed the freeze-up of several rivers or associated springs. Snow cover observed was quite extensive and thicker than expected (approx. 0.2 m)

DISCUSSION OF INVESTIGATION

The instrument readings for every investigation site are attached. Due to miscalibration of the EM-31 the sensitivity of the instrument was rather low and the data had to be corrected. Due to this problem no "trend" interpretation will be attempted.

SAGAVANIRTOK RIVER

The test-site showed open water on 11/22/76. Therefore, no readings were taken.

KADLEROSHILIK RIVER

No channels or thawed zones at test-site.

SHAVIOVIK/KAVIK RIVER

Readings taken near the <u>coast</u> show a thawed zone at a depth of ~ 3 m. The readings at the <u>confluence</u> of Kavik and Shaviovik do not show thaw within 18m depth. This applies to the Kavik River also.

CANNING RIVER

Open water was observed $\sim 1/2$ mile upstream from the test-site <u>applied route</u>, water was standing on the ice at 50m from the east bank. Instrument readings however, do not indicate a thawed zone within 20m from the surface. The <u>EAST AND WEST CHANNEL</u> in the coastal area appear to have thaw within 12 m.

TAMAYARIAK RIVER

No thawed zone in the coastal area within 22 m. Near the <u>applied route</u> site bedrock seems to be as close as 1 to 4 m underneath the surface. No thawed zone could be detected. Open water was observed \sim 4 miles down-stream from the applied route crossing on 11/20/76.

KATAKTURUK RIVER

At the site of the <u>applied route</u> the conditions appear to be the same as on the Tamayariak River (see also: Peter Hoekstra, April, 1976).

In the coastal area a thawed zone exists in \sim 22 m depth.

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SADLEROCHIT RIVER

The readings at the <u>applied</u> route crossing were taken in the main river bed, not in the creek that is fed by the spring. No thawed zone could be detected. The depth to bedrock appears to be \sim 70 m. Approx. the same was observed in the <u>Coastal</u> area.

HULA-HULA RIVER

No thawed zones, bedrock in ~ 50 m. <u>AKUTOKTAK RIVER</u>

No thawed zone.

OKPILAK RIVER

In the <u>coastal</u> area a thawed zone exists in more than 30 m depth. Near the <u>applied</u> route crossing an overflow covered by snow was observed near the east bank. Approx. 100 m west of this location a thawed zone seems to exist in ~ 17 m depth.

The lake east of the river near the coastal test-site showed thaw within 10 m. depth.

JAGO RIVER

The main channel near the coast has thaw within less than 4 m from the

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surface. Near the <u>applied route</u> crossing a thawed zone of approx. 1 m thickness appears to exist at approx. 4 m depth. The depth to bedrock east and west of the channel seem to be less than 2 m.

OKEROKOVIK RIVER

Test location was upstream from the spring (open) and no thawed zones have been found. The depth to bedrock seems to be 10-20 m.

AICHILIK RIVER

At the <u>coastal</u> test-site a thawed zone appear to exist between 50 and 100 m west from the east bank within 5 m depth. Bedrock near and at the shores at this location is only 2 m below surface. At the <u>applied</u> route crossing does not show thawed zones. Although water on the ice was observed below the $\sim 12^{\circ}$ high east bank.

EGAKSRAK RIVER

The readings taken near the <u>coast</u> indicate thaw throughout the channel at a depth of less than 2 m. Salt-water infiltration is suspected.

KONGAKUT RIVER

Readings were attempted down-stream from the <u>"Delta" Springs</u>. The aufeis extended well into the Beaufort Sea on 11/10/76 and the tests were abandoned after more than 2" of water on the ice were encountered.

At the applied route crossing the readings indicate bedrock in \sim 1 m depth and a possible thawed zone in ~13 m depth near the east bank.

CLARENCE RIVER

No thawed zone

CONCLUSION

Due to the occurence of bedrock at shallow depths east of the Canning River, the detection of aquifers at these locations appears to be rather difficult. The additional test-series planned for this season should make a better interpretation possible.

Since several Rivers appeared to be frozen to the bottom, additional investigations at these locations seem not to be necessary.

These rivers are:

KADLEROSHILIK

SHAVIOVIK (applied route) TAMAYARIAK (except spring) KATAKTURUK (applied route) SALEROCHIT HULA-HULA AKUTOKTAK OKEROKOVIK AICHILIK (applied route) CLARENCE The known springs in all rivers will be closely observed and investigated should they freeze over.

Several lakes known to be more than 5' deep will be added to the program.

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