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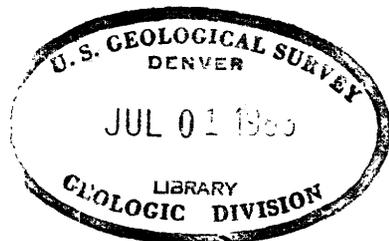
RADIOACTIVITY AND MINERALOGY
OF PLACER CONCENTRATES FROM THE
FORTYMILE DISTRICT, ALASKA

By
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Shorter Contributions to Alaska Trace Elements Studies
for 1948

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CONTENTS

	Page
Abstract	1
Introduction	2
Geology	3
Atwater Bar	3
Radiometric and mineralogic studies	4
Conclusions	7
Bibliography	8

ILLUSTRATIONS

- Figure 1. Map of east-central Alaska showing location of Fortymile district at end of report
2. Sketch map of part of the Fortymile district, Alaska, showing location of placer concentrates obtained from the district through 1948.....at end of report

RADIOACTIVITY AND MINERALOGY OF PLACER CONCENTRATES FROM
THE FORTY MILE DISTRICT, ALASKA

By M. G. White

ABSTRACT

Studies of 24 placer concentrate samples from the Forty mile district of east-central Alaska available in the Geological Survey's Alaskan Concentrate File revealed only two samples containing significant amounts of radioactivity. Both samples are from Atwater Bar on the South Fork of the Forty mile River, a short distance below the confluence of Mosquito and Dennison Forks. The radioactivity is due to traces of uranium-bearing thorianite, which occurs as minute black cubes and fragments. No data are available as to the source of the thorianite.

INTRODUCTION

The purpose of this report is to present the results of laboratory radiometric and mineralogic studies on the 24 placer concentrate samples from the Fortymile district, east-central Alaska (see fig. 1) available in the Alaskan Concentrate File of the Geological Survey through 1948. These samples were collected by several Survey geologists over a period of years from sluice boxes of placer-mining operations in the east-central part of the district. (See fig. 2.) Significant radioactivity was detected only in two samples, both from Atwater Bar on the South Fork of the Fortymile River.

Until after 1948 the only radiometric field investigation made in the Fortymile district was a reconnaissance along the Alaska Highway at the southwestern edge of the district in 1946 (Wedow and Matzko, 1947).

GEOLOGY

The geology and mining of the Fortymile district has been discussed by Prindle (1905, 1907, 1909, 1913) and Mertie (1930, 1937, 1938). The bedrock of the district consists chiefly of pre-Cambrian and Paleozoic metamorphic rocks of many different lithologic types intruded by both large and small masses of Mesozoic (?) granitic rocks. Minor amounts of Tertiary volcanic rocks and coal-bearing sedimentary strata are also found in the district.

Atwater Bar

Atwater Bar is a deposit of high-stream gravels located on the left limit of the South Fork of the Fortymile River several miles below the confluence of Mosquito and Dennison Forks. No extensive mining operations have been undertaken at Atwater Bar since it was dredged for several seasons during the mid-1930's. During the 1949 season a small outfit was prospecting in preparation for mining on a small scale.

RADIOMETRIC AND MINERALOGIC STUDIES

The equivalent uranium content of the placer-concentrate samples as determined in the laboratory by radiometric methods is given in the following table.

Equivalent uranium content of placer concentrates obtained from the Fortymile district through 1948.

<u>File No.</u>	<u>Location</u>	<u>Percent equivalent uranium</u>
256	Ingle Creek	0.001
2252	Ingle Creek	0.004
176	Chicken Creek, Claim 5 $\frac{1}{2}$ Below	0.001
248	Chicken, prospect pit (?)	0.004
530	Myers Fork, Purdy's claim	0.005
536	Myers Fork	0.005
535	Myers Fork	0.004
533	Stonehouse Creek	0.001
170	Chicken Creek, Burrett's claim	0.000
85	Chicken Creek, Busts' claim	0.001
27	Chicken Creek	0.001
534	Chicken Creek	0.001
532	Lost Chicken Creek	0.002
277	Atwater Bar	0.041
284	Atwater Bar	0.033
79	Gilleland Creek	0.003
538	Wade Creek	0.001
84	Wade Creek	0.000
537	Wade Creek	0.001
1	Wade Creek	0.000
2250	South Fork, Fortymile River, near mouth of Napoleon Creek	0.004
1149	Franklin Creek	0.001
29	Dome Creek	0.001
2251	Fortymile River, near mouth of Steel Creek	0.007

Only the two samples (277 and 284) from Atwater Bar show noteworthy amounts of radioactivity. The principal radioactive mineral in these samples, as determined by spectrographic methods, is uranium-bearing thorianite. It occurs in trace amounts as minute black cubes and fragments in the minus 100-mesh sized fraction of the samples. No detailed information is available on the source of the gravels at Atwater Bar; hence little can be said here as to the significance of this discovery of thorianite in these gravels. The two samples from Atwater Bar are almost identical in mineral composition. The average composition is as follows:

<u>Mineral</u>	<u>Percent by volume</u>
Franklinite	25
Spinel	25
Garnet	15
Magnetite	10
Zircon	10
Sphene	5
Rock minerals	5
Tourmaline	2
Pyrite	2
Olivine	1
Scheelite	trace
Cassiterite	trace
Thorianite	trace
Gold	trace

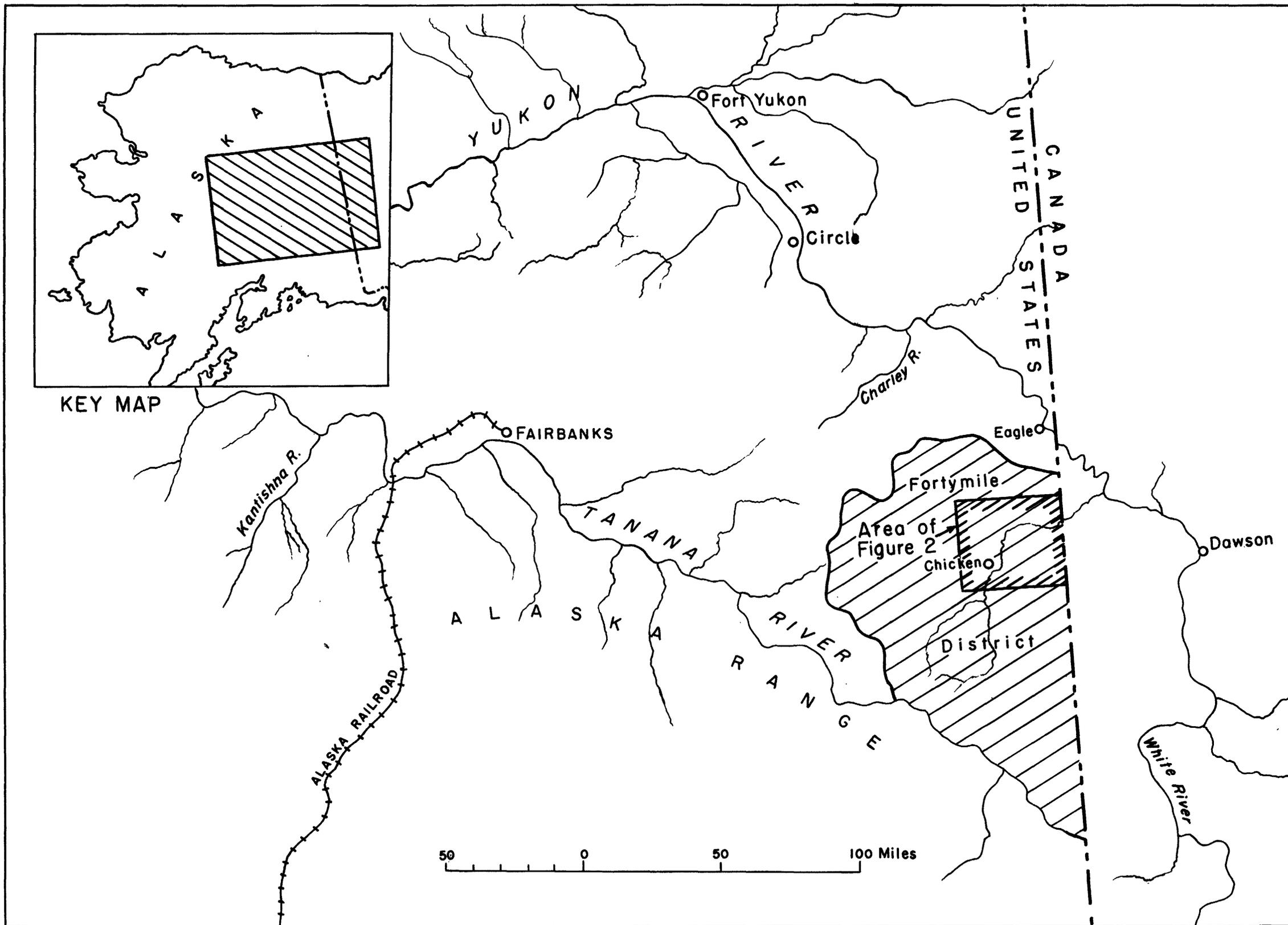
Mineralogic studies show that the slight amount of radioactivity in the other samples apparently originates in zircon and sphene.

CONCLUSIONS

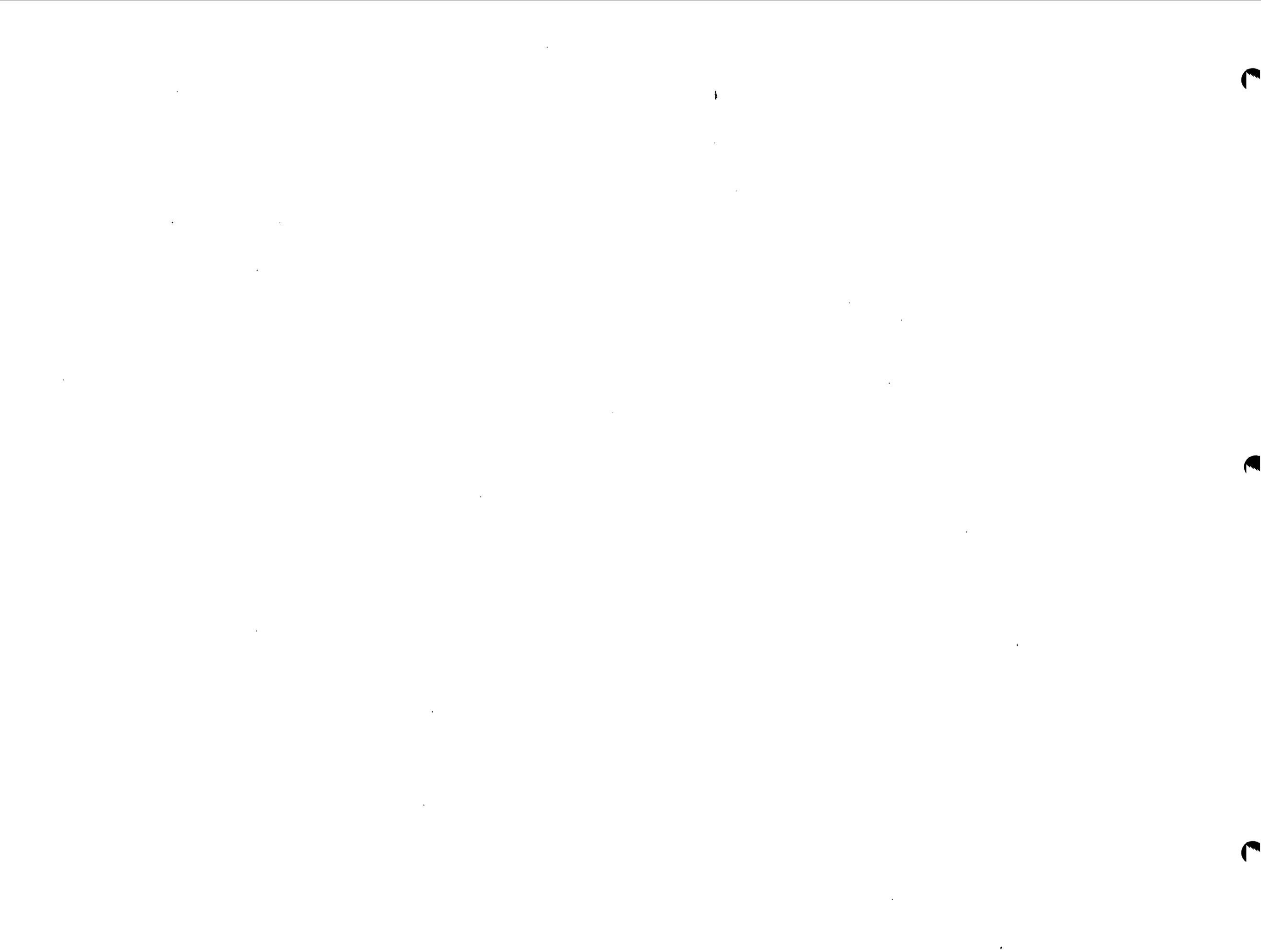
The radioactivity of placer concentrates obtained through 1948 from the Fortymile district is due to zircon and sphene. In two samples from Atwater Bar, however, most of the radioactivity is due to a uranium-bearing thorianite. Because the source of the Atwater Bar gravels is unknown, the significance of this thorianite cannot be evaluated. However, this occurrence may be a clue to possible bed-rock sources of uranium in the drainage basin.

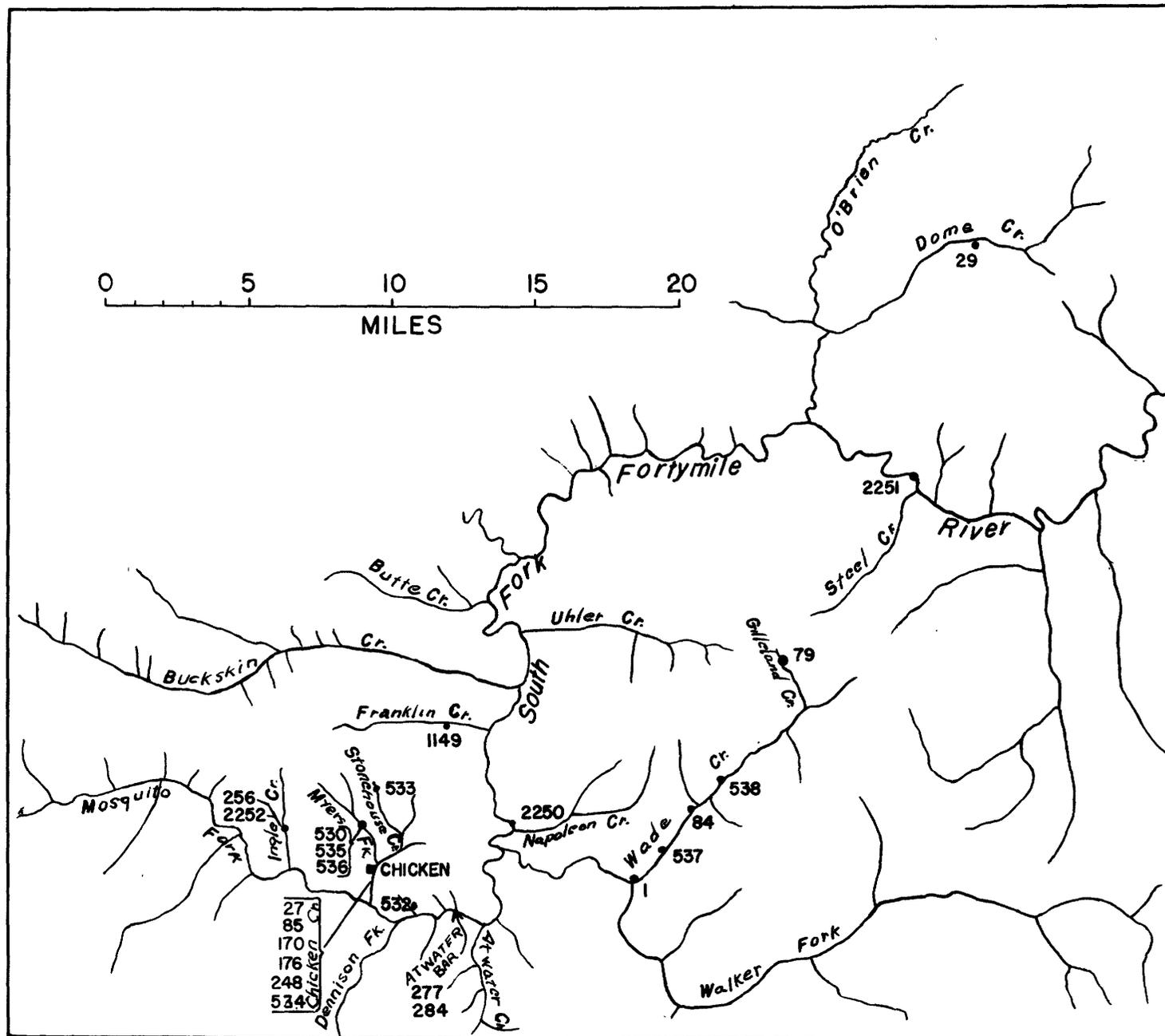
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MAP OF EAST-CENTRAL ALASKA SHOWING LOCATION OF THE FORTY MILE DISTRICT





SKETCH MAP OF PART OF THE FORTY MILE DISTRICT, ALASKA
SHOWING LOCATION OF PLACER CONCENTRATES
OBTAINED FROM THE DISTRICT THROUGH 1948

