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PRELIMINARY SUMMARY OF RECONNAISSANCE FOR URANIUM IN ALASKA, 1951

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PART 1.--SEWARD PENINSULA

By Max G. White and Walter S. West

ABSTRACT

Reconnaissance examinations for uranium were made at nine localities in the York, Nome, and Koyuk districts of the Seward Peninsula, Alaska, during the 1951 field season. In addition, carborne radiometric traverses were made of four roads in the Nome and Council districts. Only at Brooks Mountain in the York district were uranium-bearing deposits found that required detailed study.

On the southwest flank of Brooks Mountain, zeunerite occurs as a surface coating on quartz-tourmaline veins occupying joint fractures in granite; at a second locality, also on the southwest flank of the mountain, zeunerite is disseminated in a highly weathered, altered zone of granite near a contact with limestone. Preliminary radiometric analyses show an average of about 0.05 percent equivalent uranium in the vein material and about 0.07 percent equivalent uranium in the weathered, altered granitic zone.

INTRODUCTION

Appraisal of Alaskan uranium possibilities (Wedow and others, 1951)[1] indicated that a number of localities on the Seward Peninsula (fig. 1) were favorable for the occurrence of uranium. The nine localities examined during the 1951 field season were as follows:

Locality	District	Designation on figure 1
Brooks Mountain area ----------------	York --------	BK
Lost River area --------------------	York --------	BK
Peace River area --------------------	Koyuk -------	BO
Potato Mountain area ----------------	York --------	CJ
Charley Creek bismuth prospect -------	Nome --------	CK
Sinuk River iron area ---------------	Nome --------	CL
Hed and Strand antimony mine ---------	Nome --------	CM
Big Hurrah gold mine -----------------	Nome --------	CY
Quiggley (Gray Eagle) antimony prospect. ----------------	Nome --------	CZ

In addition to examination of the above localities, carborne radiometric traverses were made along the Penny River, Snake River, Osborn, and Nome-Council roads (fig. 1) in the Nome and Council districts.

Radiometric traversing on the ground was accomplished with standard portable survey meters mounted on packboards equipped with interchangeable 2- by 20-in. gamma and 6-in. beta-gamma probes. For all road traverses a gang of six 2- by 40-in. gamma tubes, connected in parallel, was mounted on top of a jeep and connected to a portable survey meter inside the vehicle. The latter type of equipment was also used for airborne traversing over the Sinuk River iron area with the gang of probes lashed to the stretcher struts of a helicopter.

Helicopter support for the investigation of the Sinuk River iron area and the Hed and Strand mine was furnished by the U. S. Army, 30th Engineer Base Topographic Battalion. Daniel Jones, Territorial Department of Mines, and Robert Thorne, U. S. Bureau of Mines, accompanied the Geological Survey party in these two investigations as well as in the radiometric examination of the Quiggley antimony prospect and the Big Hurrah mine.

[1] See reference cited.

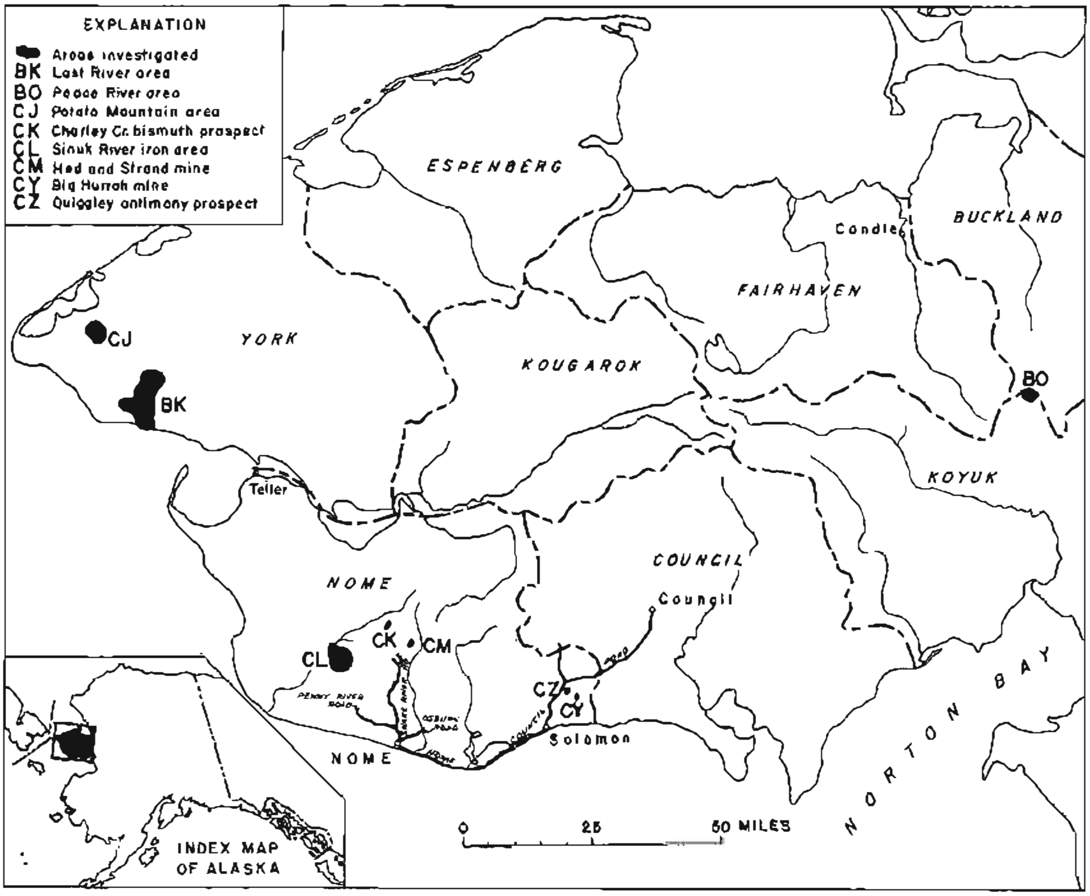

Figure 1.--Districts of the Seward Peninsula, Alaska

Most of the investigations during the 1951 season were of short duration and made in the course of a few hours or, at the most, two or three days. The contiguous Brooks Mountain and Lost River areas, were investigated jointly during the latter part of July and in August. At the time of the investigation of the uranium prospect at Brooks Mountain, the United States Smelting, Refining, and Mining Co. was prospecting the site under a lease from the owners, George Hellerich of Fairbanks and Associates. There was no uranium prospecting at any of the other locations examined, nor was any prospecting for uranium reported from elsewhere on the Seward Peninsula.

DISCUSSION OF DATA

Information regarding the geology, mineralogy and radioactivity of the various locations investigated is summarized in table 1.

Radioactivity in excess of 0.004 percent equivalent uranium was found at only three of the places examined on the Seward Peninsula: (1) in the Peace River area, Koyuk district; (2) the Lost River area, York district; and (3) the Brooks Mountain area, York district (fig. 1).

Peace River area

At the extreme head of Peace River (locality BO, fig. 1) uranothorianite, gummite, and thorite are associated with chalcopyrite, pyrite, hematite, bismuth, and silver in a stream concentrate collected by the Geological Survey in 1947. Radiometric reconnaissance of the area and a limited amount of trenching during late June and early July 1951 failed to reveal a bedrock source of the radioactive minerals. Detailed mineralogical examination of the samples from this locality is being made in the hope that a clue to the origin of the radioactive minerals will be found.

Lost River area

In the Lost River area (locality BK, fig. 1) minor amounts of radioactive material occur in mineralized portions of rhyolitic dikes and in an iron-enriched or replacement zone in limestone. The dikes contain up to 0.01 percent equivalent uranium locally and average 0.005 percent equivalent uranium. The radioactive material is mostly in a secondary hematite coating of the dike rock formed from the weathering of sulphide minerals. An iron-enriched zone in a prospect on the west side of Lost River valley has an average content of about 0.06 percent equivalent uranium with the radioactive material occurring in limonite, hematite, goethite and and mimetite. At this prospect the radioactivity is restricted to a zone or pocket about 3 ft wide. No extension of this radioactive iron-enriched zone could be found.

Brooks Mountain area

Zeunerite, a hydrous copper-uranium arsenate, is the principal radioactive mineral at Brooks Mountain (locality BK, fig. 1). It has been found at two places on the southwest flank of the mountain:

1) Associated with quartz-tourmaline veins filling joint fractures in granite on the southwest side of the mountain. The zeunerite occurs as a coating on both the

Table 1.--Data on localities examined on the Seward Peninsula, Alaska, during 1951

Locality	Age and type of rock	Significant minerals	Radioactivity (percent eU)
		York district	
Potato Mountain area (locality CJ, fig. 1)	Early Paleozoic black slate intruded by a large granite porphyry dike and many quartz veins of Mesozoic age.	Bedrock: Pyrite, cassiterite tourmaline, zoisite, hedenbergite, and fluorite. Concentrate from Nortnern Tin Co. placer operation on Birch Creek: Cassiterite with minor amounts of hematite, magnetite pyrite, tourmaline, and rutile.	Less than 0.001
Brooks Mountain area (locality BK, fig. 1)	Early Paleozoic black shale and white limestone intruded by Mesozoic granite.	Mineralized, oxidized granite near contact with limestone: Hematite, tourmaline, purple fluorite, and zeunerite.	Overall average about 0.07; best grade may average 0.3; scattered float specimens contain up to 2.1.
		Marmorized limestone near granite contact: sulfide veinlets.	Less than 0.001.
		Quartz-tourmaline veins in granite: Hematite and zeunerite.	Average 0.05; scattered pieces as high as 1.0.
		Granite mass as a whole: accessory monazite, zircon, tourmaline, and vesuvianite.	Averages 0.003.
Lost River area (locality BK, fig. 1)	Early Paleozoic limestone and Mesozoic granite cut by rhyolitic and basaltic dikes.	Mineralized limestone: pyrite, arsenopyrite, fluorite, cassiterite, and various copper minerals.	Less than 0.001.
		Iron replacement zones in limestone: Limonite, hematite, goethite, and mimetite.	Average 0.06.
		Rhyolitic dikes: cassiterite, wolframite, topaz, and minor amounts of sulfides.	Average 0.005; locally up to 0.01.
		Granite: Common accessory minerals.	Less than 0.002

Table 1.--Data on localities examined on the Seward Peninsula, Alaska, during 1951--Continued

Locality	Age and type of rock	Significant minerals	Radioactivity (percent eU)
	Nome district		
Sinuk River iron area (locality CL, fig. 1)	Veins and stockworks of limonite with hematite in early Paleozoic limestone; some residual concentration locally.	Limonite, hematite, magnetite, siderite, pyrolusite, galena, sphalerite, and gold; some limonite is botryoidal.	Less than 0.001.
Charley Creek bismuth prospect (locality CK, fig. 1)	Hydrothermal enrichment of early Paleozoic schist and white quartz veins.	Native bismuth, bismuthinite, and small amounts of iron sulfides.	Less than 0.002.
Hed and Strand mine (locality CM, fig. 1)	Quartz veins in early Paleozoic schist.	Stibnite, pyrite, and arsenopyrite.	0.001.
Radiometric traverse, Penny River road (see fig. 1)	Coastal plain gravels and Paleozoic schist.	Stibnite, pyrite, and arsenopyrite.	Schist: 17-20 divisions on 2.0 scale[1] Gravels: 13-15 divisions on 2.0[1]
Radiometric traverse, Snake River road (see fig. 1)	Paleozoic limestone and schist, and coastal plain and river gravels.	-------	All rock types: 12-14 divisions on 2.0 scale[1]
Radiometric traverse, Osborn road (see fig. 1)	--------------do----------------	--------	Do.
Quiggley (Gray Eagle) antimony prospect (locality CZ, fig. 1)	Quartz veins in Carboniferous slate.	Stibnite	Less than 0.001.
Big Hurrah mine (locality CY, fig. 1)	Carboniferous black slate intruded by quartz vein.	Gold, chalcopyrite, pyrrhotite, and stibnite.	Less than 0.001.
	Nome and Council districts		
Radiometric traverse, Nome-Council road (see fig. 1)	Granitic complex of the Cape Nome area, Paleozoic(?) schist, and coastal plain and river gravels.	-------	Coastal plain gravel: 3-4 divisions on 20.0 scale.[1] Granitic complex: 6-8 divisions on 20.0 scale.[1] Schist: 5-7 divisions on 20.0 scale.[1] River gravels: 5-11 divisions on 20.0 scale.[1]

Koyuk district

Peace River area (locality B0, fig. 1)	Weathered granitic rock containing decomposed iron-rich zones.	Granite: accessory sphene, zircon, pyrite and magnetite. Concentrate from stream gravels: Pyrite, chalcopyrite, hematite, ilmenite, uranothorianite, bismuth, bornite, gold, silver, chromite, thorite, gummite, and common accessory minerals from granite.	Granite: Less than 0.003. Iron-rich zones: Less than 0.005. Concentrate from stream gravels: 0.25.

[1]Using gang of six 2- by 40-in. gamma tubes connected in parallel, and attached to a portable survey meter; basic response of this instrument is about 8-10 divisions on 2.0 scale and 2-3 divisions on 20.0 scale.

vein surface and the fracture walls. In many places the space between the vein and the wall is filled with a mixture of hematite and finely divided zeunerite. The average radioactivity of the veins is about 0.05 percent equivalent uranium, although some pieces of high-grade float contain up to 1.0 percent equivalent uranium.

2) In granite near a granite-limestone contact, associated with deep-purple fluorite, bright-red hematite and black tourmaline, in a 6-ft wide zone of highly-weathered, porous, oxidized granite. Preliminary radiometric data indicate that the richest portion of this deposit is across a 4-ft wide central portion of the zone. Readings here average about 0.3 percent equivalent uranium. Overall average content of the entire weathered, oxidized zone is probably about 0.07 percent equivalent uranium.

Radiometric traversing of the granite and its borders failed to locate any primary uranium minerals disseminated in that rock. Accessory zircon and monazite are the only radioactive minerals found in the relatively unaltered granite.

CONCLUSIONS

It is concluded that possibilities for high-grade uranium ore in the areas investigated on the Seward Peninsula during 1951 occur mainly at Brooks Mountain, where zeunerite is found in quartz-tourmaline veins and disseminated in an altered granitic zone. Continued routine check, however, will be made in the Lost River area where underground exploration of tin-bearing deposits will expose at depth mineralized dikes which at the surface contain 0.01 percent equivalent uranium locally and average 0.006 percent equivalent uranium. Although radiometric traversing in the Peace River area failed to locate a possible high-grade source of uranothorianite found in placers, this lead is by no means exhausted and private prospecting should be encouraged.

The source of the uranium in the zeunerite at Brooks Mountain is problematical. The mineral has been found at only two places, and although other sites on the mountain are geologically similar to the zeunerite-bearing sites in almost every respect, they were devoid of zeunerite. Most of the many quartz-tourmaline veins on the mountain contain only a very small amount of radioactive material, and no other red oxidized zones are more than moderately radioactive. The restriction of the zeunerite to two localities indicates that the uranium may have been derived from one or two local primary sources within the granite.

PART 2.--ALASKA RAILROAD-ILIAMNA REGION

By Gene E. Tolbert and Arthur E. Nelson

ABSTRACT

Radiometric reconnaissance in several districts of the Alaska Railroad-Iliamna region during 1951 found no radioactive material in excess of 0.002 percent equivalent uranium associated with certain lode deposits that previously were deemed favorable for the occurrence of uranium because they contain mineral assemblages similar to uranium-producing lodes elsewhere.

Examination of two prospects in the Fairbanks district, upper Yukon region, failed to reveal any uranium deposits of commercial importance, although argentiferous galena containing up to 0.01 percent equivalent uranium occurs in one prospect.

INTRODUCTION

Wedow and others (1951) indicated that several areas in districts of the northern part of the Alaska Railroad-Iliamna region (fig. 2) warranted investigation for uraniferous materials because the mineralogy of certain lode deposits of these districts is similar to that of known uranium-producing districts elsewhere. These favorable lode deposits are as follows:

1) Silver-lead ores in the Kantishna Hills, Kantishna district.

2) Silver-copper-zinc ores in the Mount Eielson area, Kantishna district.

3) Gold-arsenopyrite-bismuth and other mineralization in the Nenana district.

4) A silver lode and complex gold-sulfide ores in the Chulitna district.

5) Hematitic copper deposits in the Iron Creek area, Talkeetna district.

In the summer of 1951 radiometric reconnaissances were completed on all the deposits listed above except those in the Chulitna district. Examination of the Iron Creek area in the Talkeetna district was accomplished with helicopter support furnished by the U. S. Army, 30th Engineer Base Topographic Battalion.

Also included in this report are data on radiometric examinations of the Anderson and Lindgren-Fultz prospects in the Fairbanks district, upper Yukon region. The examinations of the two Fairbanks district prospects were requested by the Atomic Energy Commission and the Defense Minerals Administration for region I, respectively. The information on the Fairbanks district was supplied to the authors by other members of the Alaskan Trace Elements Unit.

DISCUSSION OF DATA

No radioactive material in excess of 0.002 percent equivalent uranium was found in the deposits examined in the Kantishna, Nenana, and Talkeetna districts of the Alaska Railroad-Iliamna region. Data on these deposits are presented in table 2.

No radioactive material was found during 1951 in deposits previously deemed favorable for uranium in the Alaska Railroad-Iliamna region. Yet to be examined are the Mint silver lode on Portage Creek east of the Alaska Railroad in the Chulitna district and the belt of complex gold-sulfide lodes west of the Railroad, also in the Chulitna district. This belt extends from Costello Creek to Long Creek, and reappears on Ohio Creek to the southwest. It includes such properties as the Ready Cash, Copper King, Lindfors, Golden Zone, Silver King, and Eagle prospects.

Examination of the Anderson and Lindgren-Fultz prospects in the Fairbanks districts failed to reveal any commercial occurrences of uranium minerals, although samples of argentiferous galena containing up to 0.01 percent equivalent uranium were found in the Lindgren-Fultz prospect. Pertinent data on these two prospects are also given in table 2.

CONCLUSIONS

It is concluded from reconnaissance during 1951 that no high-grade uranium deposits occur in association with certain lode deposits of the Kantishna, Nenana, and Talkeetna districts of the Alaska Railroad-Iliamna region previously thought to be favorable for the occurrence of uraniferous materials. Further reconnaissance in these districts, therefore, is not warranted unless the results of private prospecting or further search of the literature changes the outlook for the districts. Yet to be investigated in the northern part of the Alaska Railroad-Iliamna region, however, are several favorable lode areas in the Chulitna district.

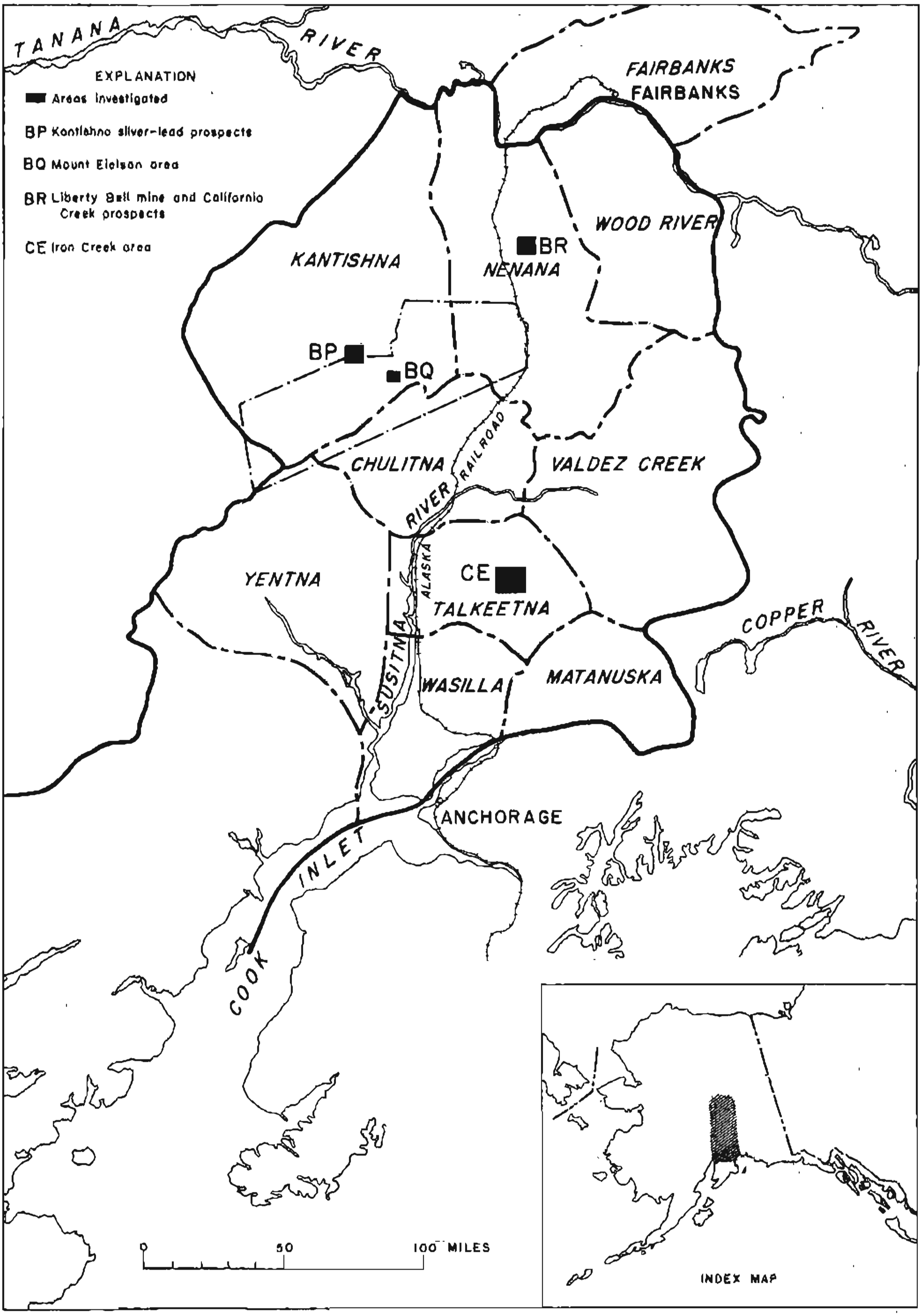

Figure 2. --Districts of the northern part of the Alaska Railroad-Iliamna region

Table 2.--Data on localities examined in the Alaska Railroad-Iliamna region during 1951

Locality	Geology	Mineralogy	Background reading	Equivalent uranium (percent)
Kantishna Hills area, Kantishna district (locality BP, fig. 2).	Quartz fissure veins in pre-Cambrian Birch Creek schist.	Silver-bearing galena and tetrahedrite, pyrite, arsenopyrite, sphalerite, and chalcopyrite, with malachite, azurite, and limonite in oxidized portions of veins.	2 on 2.0 scale[1]	0.001 or less
Mount Eielson area, Kantishna district (locality BQ, fig. 2).	Devonian argillite, limestone, slate, and schist intruded by granodiorite; ore occurs as replacement bands in calcareous rock.	Chalcopyrite, galena, sphalerite, pyrite, and arsenopyrite in quartz-epidote gangue; the galena and sphalerite contain silver in solid solution.	2 on 2.0 scale[1]	Less than 0.001
Liberty Bell mine and California Creek prospects, Nenana district (locality BR, fig. 2)	Quartz stringers in pre-Cambrian Birch Creek schist and Paleozoic(?) Totatlanika schist.	At Liberty Bell mine--arsenopyrite with minor amounts of pyrite, chalcopyrite, bismuthinite, and free gold in quartz gangue; at California Creek prospects--stibnite, pyrite, and chalcopyrite at one prospect, and silver-bearing galena at other prospect; quartz gangue at both prospects.	2-4 on 2.0 scale[1]	.002 or less
Iron Creek area, Talkeetna district (locality CE, fig. 2)	Andesite flows of unknown age and Triassic sedimentary rocks intruded by Mesozoic granodiorite; ore occurs as banded replacements in andesite.	Chalcopyrite, pyrite, and specular hematite with minor amounts of arsenopyrite, bornite, azurite, malachite, limonite, and quartz.	2-4 on 2.0 scale[1] 12-15 on 2.0 scale[2]	.002 or less
Anderson prospect, Fairbanks district.	Sheared quartz vein in granitic rock.	Gold and several of the common sulfides.	2-3 on 2.0 scale[1]	Less than 0.006.
Lindgren-Fultz prospect, Fairbanks district.	Quartz-carbonate veins along fracture systems in a highly weathered granitic rock.	Argentiferous galena, limonite, quartz, and carbonate minerals.	4-5 on 2.0 scale[1]	Less than 0.01; locally to 0.025 in weathered pockets.

[1]Using a 2- by 20-in. gamma probe attached to a portable survey meter.
[2]Using a probe consisting of six 2- by 40-in. gamma tubes attached to a portable survey meter for airborne traversing.

PART 3.--GULF OF ALASKA REGION

By Arthur E. Nelson and Gene E. Tolbert

ABSTRACT

No radioactive material in excess of 0.002 percent equivalent uranium was found during 1951 in a reconnaissance of possibly favorable lode deposits in the Nuka Bay, Moose Pass-Hope, and Girdwood areas of the Gulf of Alaska region.

INTRODUCTION

In an appraisal of the uranium possibilities of Alaska, (Wedow and others, 1951) lode deposits of several districts in the Gulf of Alaska region (fig. 3) appeared to warrant examination for radioactive materials, as these deposits contain mineral assemblages similar to certain types of uranium deposits elsewhere. These lode deposits in the Gulf of Alaska region were the silver-lead lode on Eagle River in the Anchorage district, the silver-bearing galena-pyrite-arsenopyrite-quartz fissure veins at Nuka Bay on the south coast of the Kenai Peninsula (Nuka district), and a reported occurrence of fluorite in auriferous quartz-sulfide veins on Passage Canal in the Wells district.

Radiometric reconnaissance completed in the Gulf of Alaska region during the 1951 field season was as follows:

1) Examination of metalliferous lodes at Nuka Bay and radiometric traversing by small boat of rocks exposed along most of the shore of Nuka Bay (locality CB, fig. 3).

2) Examination of many lodes in the Moose Pass-Hope area including the silver-lead deposit on Bear Creek; carborne radiometric traverses were made of roads and trails, and airborne (helicopter) traverses were made of otherwise inaccessible localities; all traverses, however, being incidental to the investigation of the lodes (locality CC, fig. 3).

3) Examination of lode deposits in the Girdwood area including an unsuccessful search for the silver-lead prospect on Eagle River and airborne (helicopter) traversing of many inaccessible mineralized and oxidized zones incidental to transportation to and from ground investigations (locality CD, fig. 3).

The helicopter support for these operations were furnished by the U. S. Army, 30th Engineer Base Topographic Battalion, with field headquarters at Seward.

The investigation of the reported fluorite occurrence on Passage Canal was postponed until another field season because weather conditions would not permit airborne operations in the Passage Canal area at a time when personnel and equipment were available for the reconnaissance studies in the Gulf of Alaska region.

DISCUSSION OF DATA

No radioactive material of significance was found in the course of reconnaissance investigations in the Gulf of the Alaska region during 1951. A summary of such data as were obtained is given in table 3.

CONCLUSIONS

In conclusion, the mineral assemblages at the lode deposits examined in the Gulf of Alaska region during 1951 do not appear to be favorable for the occurrence of high-grade uranium ores. No further work in the areas examined is warranted unless the results of private prospecting develops positive information on the uranium possibilities of these areas.

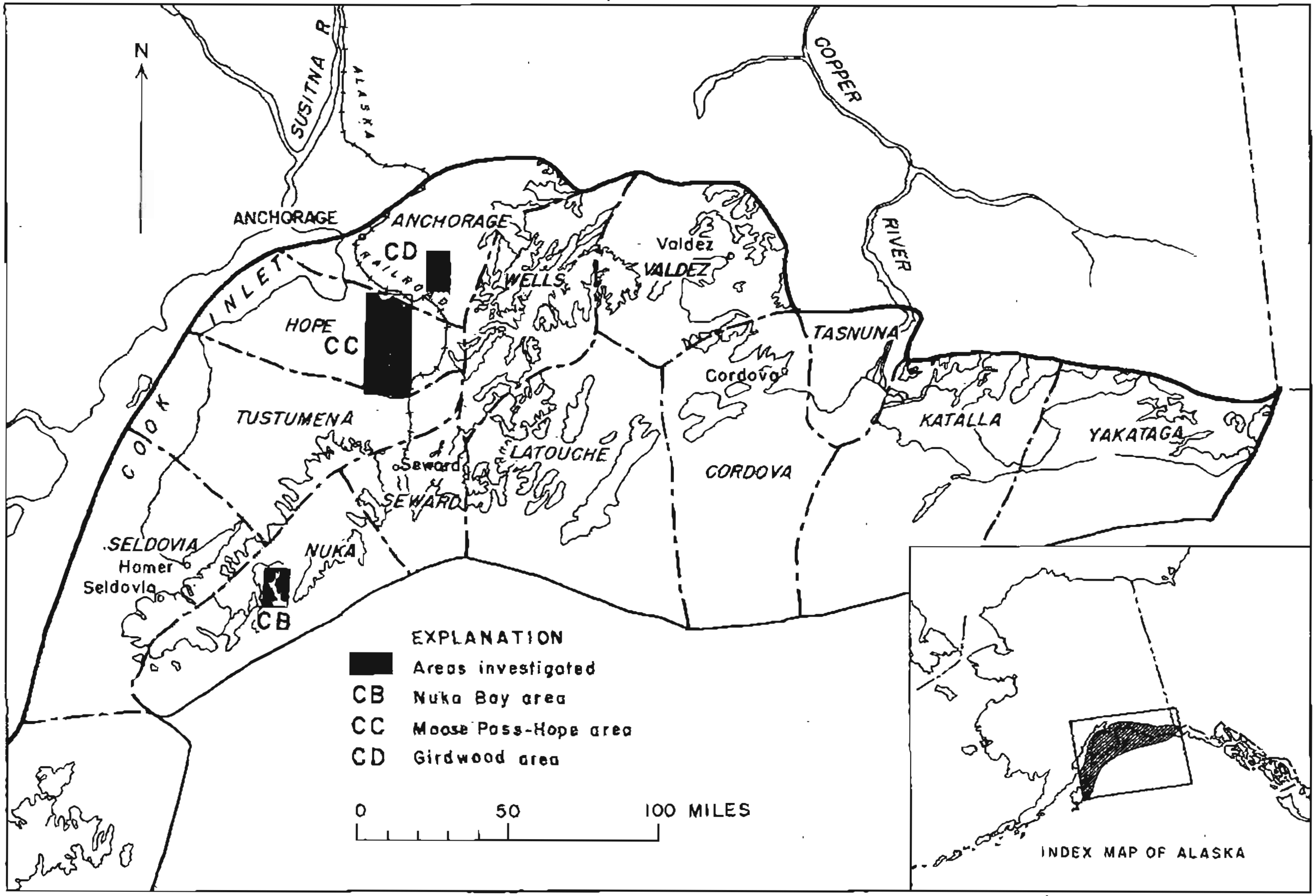

Figure 3. --Districts of the eastern and central parts of the Gulf of Alaska region

significant differences between the two designs will be mentioned. The description of the multiplex projector will also be aided by reference to figure 4, which shows diagrammatically the path of a light ray through the optical system.

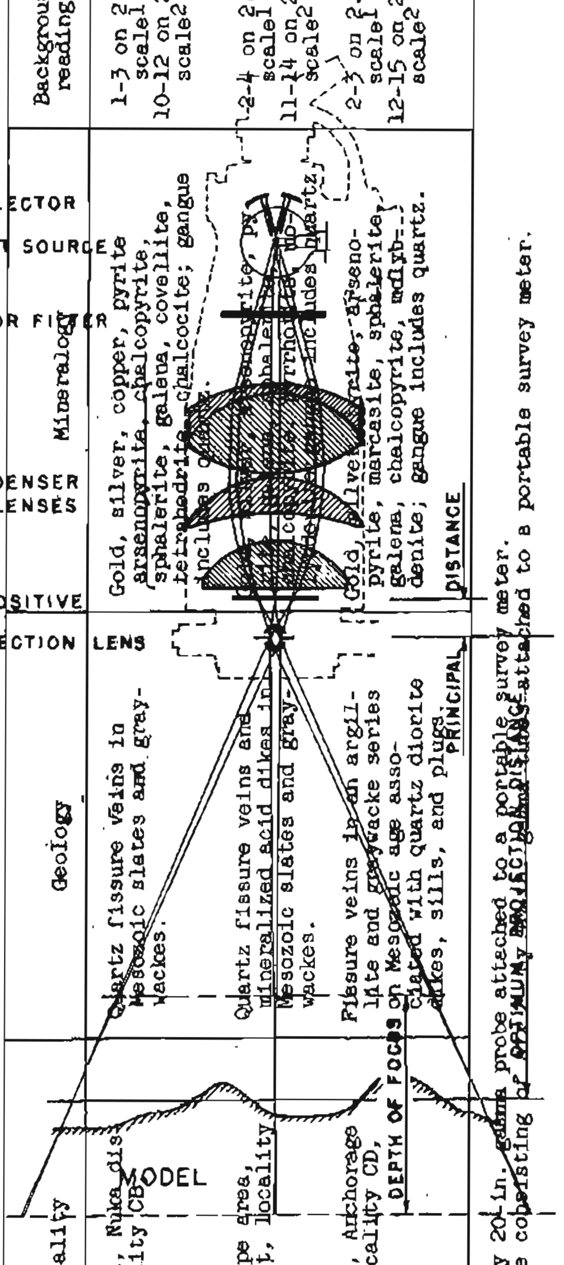

Figure 4. --Multiplex projector optical system.

The essential parts of the multiplex projector are: the light source (1, fig. 5); the color filter (2, fig. 5); the condensing system in the condenser housing (3, fig. 5); the projector supporting bracket (4, fig. 5); and the camera body (fig. 6) containing the projection lens (1) and the diapositive stage (2). The camera body is sometimes called "projector cone" or "lens cone." In a discussion of multiplex operation it is convenient to distinguish between the two main assemblies: the lamp-filter-condenser assembly (5, fig. 5), which is quite generally termed the "lamp house;" and the camera body-supporting bracket assembly (6, fig. 5), which is variously referred to as the "base," the "projector body," or simply as the "projector." The components of this base portion of the projector will be described first.

b. The projection lens. --The multiplex projection lens is small and essentially distortion-free. Its focal length and aperture opening have been selected so as to bring the image of the diapositive to optimum focus in a plane 360 millimeters below the projector, with an approximate range from 290 to 460 millimeters within which the loss of definition is hardly perceptible. This depth of focus is necessary because the tracing table platen on which the projected image is viewed must be raised and lowered in accordance with the relief of the stereoscopic model.

c. The diapositive stage and centering mechanism. --The diapositive is supported in the projector at a fixed distance above the projection lens. In the Geological Survey-type projector, the diapositive is supported upon four bosses, one under each corner, which duplicate those used to support the diapositive in the multiplex diapositive printer. In the later-model projectors these bosses are mounted in a frame (2, fig 6) which surrounds the diapositive and in which the diapositive can be securely fastened. Centering adjustment screws (3, fig. 6) slide this frame in its own plane (perpendicular to the lens axis) for the purpose of alining the principal point of the diapositive with the principal point of the projector ("centering" the diapositive).

PART 4.--SOUTHEASTERN ALASKA

By Joseph R. Houston

ABSTRACT

Radiometric reconnaissance during the summer of 1951 of 47 abandoned lode mines and prospects in the predominantly mesothermal mineral belt in the central and southern parts of southeastern Alaska revealed radioactivity in excess of 0.005 percent equivalent uranium at only one locality. In the vicinity of Salmon Bay on the northeastern end of Prince of Wales Island several narrow, steeply-dipping, carbonate-hematite veins contain up to 0.07 percent equivalent uranium. No uranium minerals have been identified yet, and laboratory tests for uranium are negative or only weakly positive.

INTRODUCTION

Alaskan uranium possibilities, as appraised by Wedow and others (1951) included a number of areas in southeastern Alaska (fig. 4) in which the mineral assemblages of various lode deposits are similar to those characteristic of uranium deposits in other parts of the world. Many of these areas were visited during the summer of 1951. Investigations were concentrated in the central and southern districts of southeastern Alaska (fig. 4) because it was thought that the mesothermal mineral deposits there were more likely to contain conventional uranium deposits than the higher temperature gold-quartz deposits in the Juneau and Chichagof districts to the north.

The field party engaged in these reconnaissance investigations consisted of J. R. Houston, geologist, and D. L. Norton, field assistant. Pertinent information on the Salmon Bay area, the north end of Kulu Island, and the Union Bay "carnotite" occurrence was furnished to the party by members of the Territorial Department of Mines through Leo H. Saarela, Territorial Commissioner of Mines. A. E. Glover, Territorial Department of Mines assayer-engineer at Ketchikan, accompanied the party in the reconnaissance of the Salmon Bay area and the Union Bay "carnotite" occurrence.

Radiometric traversing in the areas investigated was done with standard makes of portable survey meters equipped with interchangeable probe attachments consisting of 2- by 20-in. gamma and 6-in. beta-gamma tubes. A gang probe of six 2- by 40-in. gamma tubes, connected in parallel, and also interchangeable with the other probes used on the portable survey meters, was used for shoreline traverses by small boat. This large probe was also used for airborne traversing, incidental to flying for transportation and other reconnaissance purposes. The background readings in the areas investigated were approximately 2-4 divisions on the 2.0 scale for the portable survey meters when using the 2- by 20-in. gamma probe, and 2-4 divisions on the 0.2 scale when using the 6-in. beta-gamma probe.

DISCUSSION OF DATA

A total of 47 abandoned mines and prospects was visited. The mineral association in some of them is so similar that for the purpose of this summary they have been consolidated into 16 areas. The pertinent data on each area are summarized in table 1, and the location of each area is shown on figure 4. All 16 areas are indicated in the above-mentioned appraisal of Alaskan uranium possibilities as being favorable for the occurrence of uranium.

No radioactive material in excess of 0.005 percent equivalent uranium was found in southeastern Alaska during 1951 except in samples taken from narrow, steeply-dipping, carbonate-hematite veins in the Salmon Bay area (locality CA, table 4, and fig. 4). These samples contain up to 0.07 percent equivalent uranium. Most of the veins are less than 5 in. wide, but at one locality about 3/4 mile north of the mouth of Salmon Bay, a vein 6- to 10-ft wide is exposed for more than 100 yd. The vein material consists chiefly of carbonate gangue but also contains small amounts of red hematite, specular hematite, and pyrite, and locally, purple fluorite, feldspar, chalcedony, mica, galena, chalcopyrite(?), an unidentified green micaceous mineral, and an unidentified yellowish-white mineral. No radioactive minerals have yet been identified in the vein samples; it is likely that the radioactive elements may be proxying for iron in the hematites or carbonates.

The reported occurrence of "carnotite" at Union Bay on the Cleveland Peninsula (locality BT, table 4 and fig. 4) is presumed to be in error. The "carnotite" sample, submitted to the Ketchikan Assay Office of the Territorial Department of Mines and examined there by the author in June 1951, proved to be coaly material containing tyuyamunite. The uranium content of the sample was estimated to exceed 1 percent. As mafic and ultramafic rocks, and low- to middle-grade metamorphic rocks constitute the bedrock in the vicinity of Union Bay, the geology of the area is not favorable for the occurrence of tyuyamunite in association with coal material. More likely, the tyuyamunite specimen has been "imported" in a

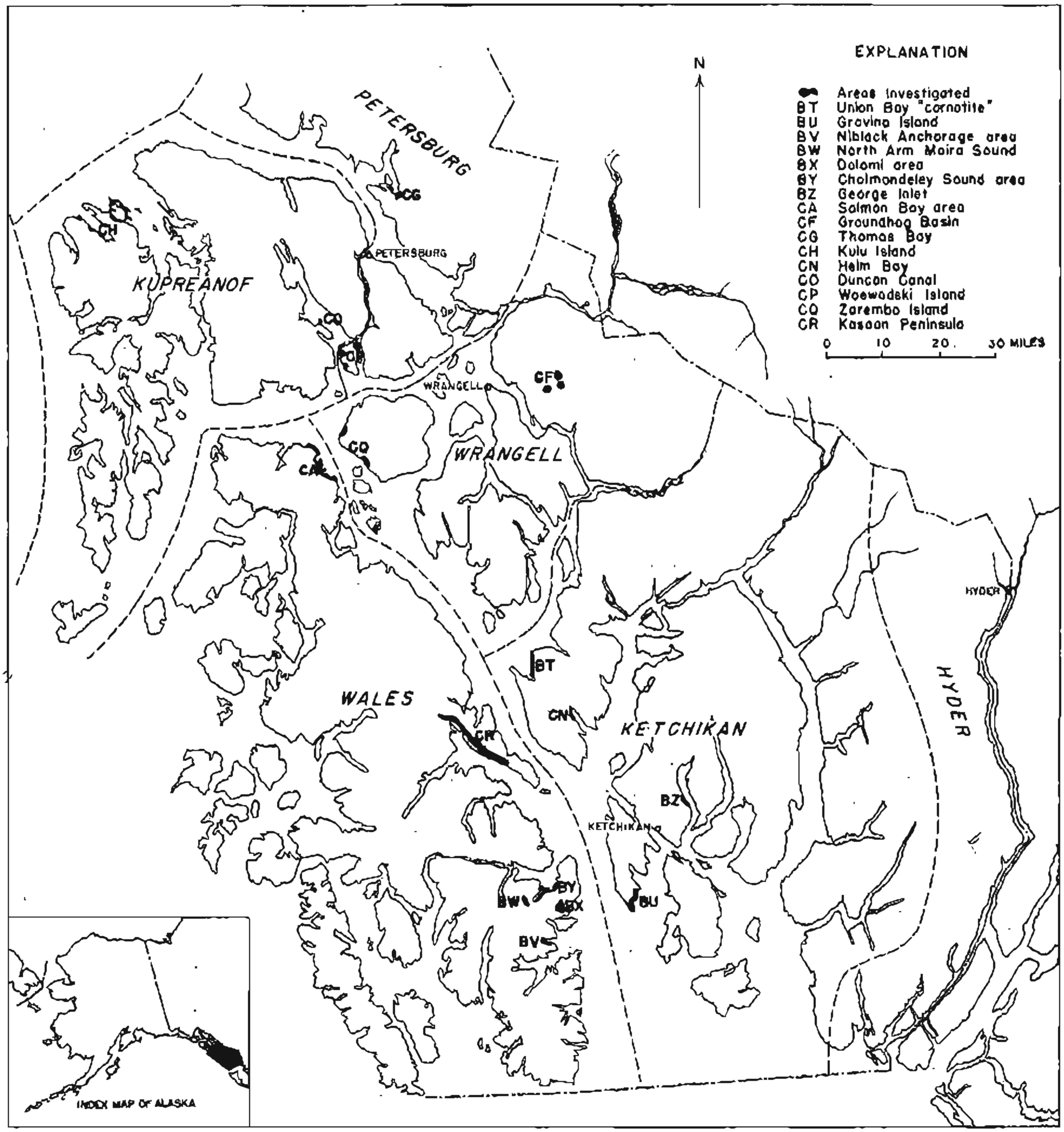

Figure 4.--Districts of the central and southern parts of southeastern Alaska

shipment of coal from western United States or British Columbia to an old salmon cannery site which is located about 300 ft from the spot where the uraniferous sample was reported to have been found.

CONCLUSIONS

The supposedly favorable areas in southeastern Alaska examined during the summer of 1951 apparently have no potentialities for the occurrence of high-grade uranium ores except for the Salmon Bay area on Prince of Wales Island. Further reconnaissance is needed in the vicinity of Salmon Bay before the area can be either designated as a potential uranium district or eliminated from future consideration. Also, yet to be investigated are favorable silver-bearing lodes on Whiting River and at Point Astley in the northern part of southeastern Alaska, and an occurrence of pitchblende(?) in the Hyder district recently reported by the Territorial Department of Mines.

REFERENCE CITED

Wedow, Helmuth, White, M. G., and Moxham, R. M., 1951, Interim report on an appraisal of the uranium possibilities of Alaska, (Trace Elements Memorandum Rept. 235 in open files of U. S. Geol. Survey).

Table 4.--Data on localities examined in southeastern Alaska during 1951

Locality	Geology	Mineralogy	Equivalent uranium (percent)
	Ketchikan district		
George Inlet (locality BZ, fig. 4)	One deposit is a mesothermal fissure vein in black phyllite close to a granite contact; the other deposit is a fairly high-temperature filling and replacement in black phyllite, close to a granite contact, and closely associated with a garnet-rich "aplite" dike.	Pyrite, sphalerite, galena, chalcopyrite, pyrrhotite, "limonite", traces of secondary copper minerals; gangue includes quartz, carbonate, alkali feldspar, chlorite, sericite, biotite, garnet, graphite, green muscovite.	Less than 0.001.
Gravina Island (southern end) (locality BU, fig. 2)	Mesothermal filling and replacement along shear zones in andesitic metavolcanic rocks, volcanic breccias, "granite", and rhyolite.	Pyrite, specular hematite, chalcopyrite, bornite(?), "limonite", malachite, azurite, chrysocolla, barite, witherite(?); gangue minerals are quartz with some carbonate.	Less than 0.001; locally up to 0.005 in felsic volcanic rocks.
Helm Bay (locality CW, fig. 4)	Mesothermal filling and replacement along a well-defined fracture zone in green schist and greenstone.	Pyrite, chalcopyrite, gold; gangue includes quartz, sericite, talc, and graphitic material.	Less than 0.001.
Union Bay "carnotite" (locality BT, fig. 4)	Low- to middle-grade metasedimentary rocks, mafic and ultramafic rocks.	No ore deposits found; sample submitted to Territorial Department of Mines as from Union Bay consists of tyuyamunite in coaly material with a uranium content estimated to exceed 1 percent.	Less than 0.001.
	Wales district		
Niblack Anchorage area (locality BV, fig. 4)	Fairly high-temperature replacement deposit in greenstone, green schist, and other metasedimentary rocks.	Pyrite, magnetic specular hematite, chalcopyrite, sphalerite, galena(?), secondary copper minerals; gangue includes quartz with some carbonate and jasper.	Less than 0.001.

Table 4.--Data on localities examined in southeastern Alaska during 1951--Continued.

Locality	Geology	Mineralogy	Equivalent uranium (percent)
Wales district (continued)			
North Arm, Moira Sound (and Dora Lake area) (locality BW, fig. 4)	Mesothermal filling and replacement deposits along shear and breccia zones in argillaceous and siliceous limestones and marbles interbedded with thin green schists.	Sphalerite, pyrite, chalcopyrite, galena, oxidized copper minerals; gangue includes quartz and carbonate.	less than 0.001.
Dolomi area (locality BX, fig. 4)	Mesothermal filling and replacement in siliceous and argillaceous limestone.	Pyrite, tetrahedrite, chalcopyrite, galena, "limonite", malachite, azurite, gold; gangue includes quartz with some carbonate, chlorite, sericite, and clay minerals.	Less than 0.001.
Cholmondeley Sound area (includes Kitkun Bay) (locality BY, fig. 4)	Mesothermal filling along a well-defined fault cutting argillaceous and siliceous limestone and green schist.	Small amounts of pyrite, chalcopyrite, galena, specular hematite(?), sphalerite(?), "limonite", traces of secondary copper minerals; gangue includes quartz with some carbonate, sericite, and clay minerals.	Less than 0.001.
Kasaan Peninsula (locality CR, fig. 4)	Mainly contact metamorphic deposits near the contact of dioritic, and granodioritic stocks with graywacke, slate, and impure limestone; also one magmatic segregation deposit and one mesothermal fissure vein.	Magnetite, pyrite, chalcopyrite, specular hematite, bornite, molybdenite(?), "limonite", covellite, malachite, azurite; gangue includes epidote, garnet, calcite, hornblende, quartz, feldspar, chlorite, and talc(?).	Less than 0.001.
Salmon Bay area (locality C CA, fig. 4)	Mesothermal fissure veins cutting graywacke, sandstone, shale, and limestone breccia; mafic and felsic dikes also cut these sedimentary rocks.	Red hematite, specular hematite, pyrite, galena, chalcopyrite(?), "limonite"; gangue includes carbonates with minor purple fluorite, feldspar, and mica.	Up to 0.07.
Wrangell district			
Zarembo Island (locality CQ, fig. 4)	Epithermal fillings along small shears cutting basaltic, andesitic, and rhyolitic volcanic rocks.	Colorless, white, green and purple fluorite, and fine-grained pyrite; gangue includes carbonate, chalcedony, and quartz.	Less than 0.001; locally up to 0.005 in felsic volcanic rocks.

Wrangell district (continued)

Groundhog Basin (includes Glacier Basin and Lake claims) (locality CF, fig. 4)	In Groundhog and Glacier Basins the ore occurs in high-temperature replacement veins in schists and gneisses that are cut by aplite, quartz porphyry, and granite sills and dikes; at the Lake claims the ore occurs in a mesothermal fissure vein in phyllite; all of the mineralized areas are very close to a quartz diorite stock.	Pyrrhotite, dark sphalerite, galena, pyrite, chalcopyrite, molybdenite, pyromorphite(?), "limonite"; gangue includes quartz, biotite, hornblende, chlorite, epidote, pyroxene, actinolite, garnet, and apatite.	Less than 0.001.

Petersburg district

Thomas Bay (locality CG, fig. 4)	Mesothermal fissure vein along a well-defined fault which cuts quartz-biotite-hornblende-muscovite-garnet schist and gneiss.	Pyrite, arsenopyrite, chalcopyrite, pyrrhotite(?), "limonite", trace of secondary copper minerals; gangue includes quartz with graphitic seams.	Less than 0.001.

Kupreanof district

Woewodski Island (locality CP, fig. 4)	Mesothermal filling with some replacement in andesitic lava, schist, slate, and graywacke.	Pyrite, chalcopyrite, galena, sphalerite, chrysocolla, "limonite"; gangue includes quartz with some carbonate.	Less than 0.001.
Duncan Canal (locality CO, fig. 4)	Mesothermal replacement in schistose chert and andesitic volcanic rocks.	Barite, scattered pyrite, traces of sphalerite, galena, magnetite; gangue includes quartz and graphite.	Less than 0.001.
Kuiu Island (includes Saginaw Bay and Keku Islets) (locality CH, fig. 4)	Epithermal filling and replacement in andesite, rhyolite, basalt, basalt, graywacke, conglomerate, sandstone, slate, phyllite, limestone, and dolomite.	Barite, witherite, sphalerite, pyrite, marcasite, galena, "limonite", manganese oxides; gangue includes calcite, quartz, chalcedony, and clay minerals.	Less than 0.001; locally up to 0.005.

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