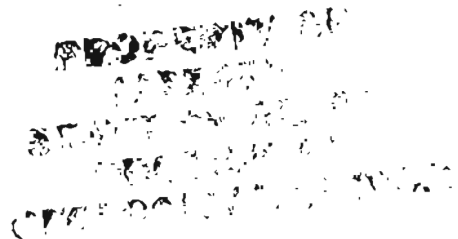


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A uranium occurrence in the Tertiary Kootznahoo  
Formation on Kuiu Island, southeast Alaska

by  
K. A. Dickinson



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Radioactive anomalies as high as 50 times background and uranium-bearing samples were discovered in parts of the nonmarine Tertiary Kootznahoo Formation in southeast Alaska by K. A. Dickinson and John Mitchell.<sup>1</sup> Samples containing as much as  $1300 \pm 400$  ppm uranium, measured by beta eU, were found. These samples have the highest uranium contents so far reported from Tertiary sedimentary rocks in southeast Alaska. Eakins (1975) reported two samples containing 12 and 13 ppm uranium and an anomaly of 13 times background from the same area. The purpose of this paper is to report the results of present studies and to suggest further work.

Six samples were collected from the Kootznahoo Formation in the intertidal zone on the point east of the entrance to Kadake Bay along the south line of sec. 29, T. 58 S., R. 73 E., in the Petersburg D-6 quadrangle. These samples are designated "Kadake Bay" in table 1. Four additional samples were collected from the Kootznahoo above high tide on the west side of the entrance to Port Camden in the northwest 1/4 sec. 32, T. 58 S., R. 73 E. These samples are designated "Port Camden" in table 1. The samples were examined in the laboratory under a stereographic microscope, whole-rock samples were X-rayed, and the X-ray cell mounts were counted on an alpha counter. One sample, number 727911, was counted on beta and gamma counters and the eU was calculated. The results of these procedures are listed in table 1.

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Table 1.--Alpha radioactivity and descriptions of samples.

Field number	Location	Alpha counts	Description of sample
712793	Kadake Bay	35	Sandstone, light-grayish-brown, poorly sorted; contains quartz, feldspar, dolomite kaolinite, and calcite.
712794	--do--	37	Concretion from sandstone, medium-gray, dense, granular texture; contains dolomite, quartz, feldspar, siderite, kaolinite, and a trace of magnetite.
712795	--do--	32	Siltstone, light-brown, thin-bedded; flaky fracture; contains quartz, feldspar, dolomite, kaolinite, muscovite, and siderite(?) or apatite(?).
712796	--do--	54	Carbonaceous fragments from fine-grained light-brown sandstone; contains quartz, dolomite, kaolinite, and apatite(?); dolomite occurs as white veins in trellis pattern.
712797	--do--	31	Sandstone, brown-mottled with black stain, fine- to coarse-grained, poorly sorted; contains much dolomite, some siderite, finely disseminated carbonaceous material, and small amounts of quartz and feldspar.
712799	Port Camden	59	Sandstone, light-brown, fine- to medium-grained, poorly sorted; contains quartz, feldspar, dolomite, kaolinite, and calcite. Collected from around nodule(?), sample No. 7127910.
7127910	--do--	67	Nodule(?), reddish-brown, black and white; composed mostly of dolomite and carbonaceous material, but also containing small amounts of calcite, quartz, kaolinite, and magnetite.
7127911	--do--	270	Carbonized wood fragments, black with reddish-brown stain; contains much dolomite, some in fine white veins about 1 mm in thickness.
7127912	--do--	48	Sandstone, light-gray with surficial reddish-brown stain, fine- to coarse-grained; contains much feldspar, a little kaolinite, a few lithic grains, and disseminated, fine grained-pyrite. Sample collected from around carbonized wood fragments, sample No. 7127911.
713791	Kadake Bay	37	Sandstone, brown, fine- to coarse-grained, poorly sorted, clayey; contains quartz, feldspar, kaolinite, and a trace of magnetite.

On the basis of mapping by Muffler (1966), the Kootznahoo Formation crops out on Kuiu Island along Keku Strait east of Kadake Bay and along the west side of Port Camden. In this area the unit dips  $10^{\circ}$  to the southeast. It overlies Triassic volcanic rock, is intruded by Tertiary gabbro, and is overlain by Tertiary volcanic flow and conglomerate beds. The Kootznahoo is about 1350 feet thick and the overlying Tertiary volcanic rocks are about 1500 feet thick in the Port Camden area (Buddington and Chapin, 1929). The Kootznahoo Formation outcrops on the west side of Admiralty Island in Kootznahoo Inlet, from which it gets its name (Lathram and others, 1965), and in the Pybus Bay area on the south end of Admiralty Island (Loney, 1964). The formation also crops out near the south end of Port Camden, Kuiu Island; near Hamilton and Big John Bays, northwest Kupreanof Island; near Kah Sheets Bay, southeast Kupreanof Island; and on the Snow Passage shore of southwestern Zerembo Island (Buddington and Chapin, 1929; Beikman, 1975). Only the northern Port Camden and Kadake Bay areas were visited during this study.

In the Kadake Bay-Port Camden area, the Kootznahoo Formation consists of light-brown, poorly sorted, very dolomitic sandstone that contains clay clasts, fragments of carbonized wood, and dolomitic concretions. It ranges from silty fine-grained thin-bedded sandstone to medium- and coarse-grained, partly conglomeratic, medium- and thick-bedded sandstone. Siderite, magnetite, pyrite, and apatite (?) were found in one or more of the samples (table 1).

All of the carbonized wood fragments showed radioactivity above background when tested in place. The readings over carbonized wood ranged from 2 to 50 times background. One carbonized wood sample from the 50-times-background site (sample number 7127911, table 1) yielded a beta eU value of  $1300 \pm 400$  ppm uranium and a gamma eU value of  $2300 \pm 700$  ppm uranium. The eU

was not determined for the remainder of the samples. Where the sandstone lacked carbonaceous material, the radioactivity was not significantly above background. An airborne radiometric survey flight line, about 7 km south of the sampled area, passed over an area mapped as Kootznahoo but which did not show a significant anomaly (LKB Resources Inc., 1979a, 1979b).

The results of this preliminary study suggest that further investigation, including perhaps drilling, will be necessary to fully evaluate the potential for uranium ore bodies in the Kootznahoo Formation in the Kadake Bay-Port Camden area. At the surface of the exposures, uranium mineralization seems to have occurred only in the carbonaceous fragments, which make up a small part of the rock; sandstone for the most part contains very little uranium. Surface leaching may have removed uranium from the sandstone, especially in the intertidal zone, but unoxidized sandstone containing larger amounts of uranium may be found in the subsurface.

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