A MANGANESE OCCURRENCE ON CHENEGA ISLAND, PRINCE WILLIAM SOUND, ALASKA

By:

Joseph M. Kurtak
Alaska Field Operations Center, Anchorage, Alaska

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UNITED STATES DEPARTMENT OF THE INTERIOR

James G. Watt, Secretary

BUREAU OF MINES

Robert C. Horton, Director

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ABSTRACT

A previously unreported manganese occurrence was discovered in 1981 by the Bureau of Mines while making a mineral assessment of the Chugach National Forest, Alaska as part of the RARE II Program.

Manganese minerals rhodochrosite and pyroxmangite occur in a weather-resistant siliceous bed exposed between beach gravel and muskeg vegetation in a small bay on the northeast end of Chenega Island in Prince William Sound. The exposure is 6 feet wide and 50 feet long and is interbedded with calcareous shales and phyllites. A 3.5-foot continuous chip sample contained 17% manganese. Two grab samples contained 36% and 37% manganese. Other minerals found include magnetite, pyrrhotite, and a trace of pyrite. The average grade and extent of the deposit was not determined.

INTRODUCTION

Beginning in 1979, as designated by Public Law 94-588 under the RARE II Program, the Bureau of Mines, in cooperation with the U.S. Geological Survey, undertook a mineral assessment of the Chugach National Forest, Alaska (figure 1). Mines, prospects, and mineral occurrences were mapped and sampled. During follow-up investigation of an anomalously high copper stream sediment geochemical sample on Chenega Island a bedded manganese occurrence was found. It is both unique and important as an occurrence of the critical mineral, manganese.

1/ Project Geologist, Bureau of Mines, Alaska Field Operations Center, Anchorage, Alaska

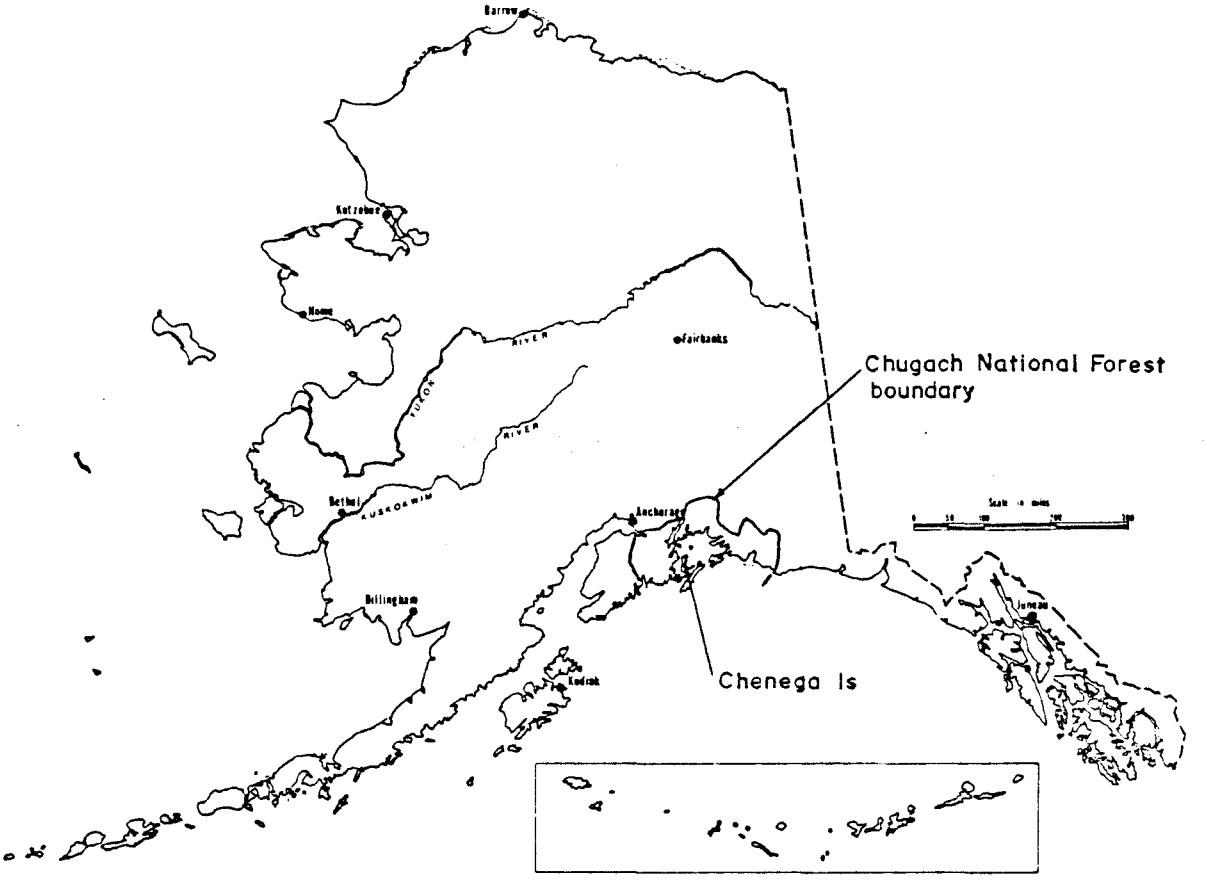


FIGURE 1. - Index map of Alaska showing Chugach National Forest and location of Chenega Island

Chenega Island is located on the west side of Prince William Sound in southcentral Alaska (figure 2). Topographic relief on the island varies from moderate to rugged. Considerable hemlock/spruce forest and muskeg vegetation cover the lower elevations. Rock exposures are best observed along the shoreline and near ridgetops above timberline.

A Bureau of Mines field party spent two days in the Chenega Island area during which approximately two hours were spent at the mineralized outcrop. This is a preliminary report that describes the manganese occurrence and summarizes the results of the brief examination.

LAND STATUS

Chenega Island, as well as considerable land on the mainland to the north and west and the islands to the south, is under the ownership of the Chenega Village Corporation, a village corporation established under the Alaska Native Claims Settlement Act. The subsurface estate is owned by the Native regional corporation, Chugach Natives, Inc. Chugach National Forest public domain surrounds these private holdings. The land status of the area as of May, 1981 is shown in figure 2.

REGIONAL GEOLOGIC SETTING

Chenega Island is underlain by a series of west-dipping shales, slates, graywackes, and pillow basalts containing intercalated sediments and metasediments (figure 3). This sequence is Paleocene to Eocene in age. The sediments are interpreted as being turbidites with a source area to the west. Pillow lava deposits formed contemporaneously with these sediments (1).

(1) Moffit, F. H. Geology of the Prince William Sound Region, Alaska. U.S. Geol. Survey Bull. 989-E, 1954, pp. 272-273.

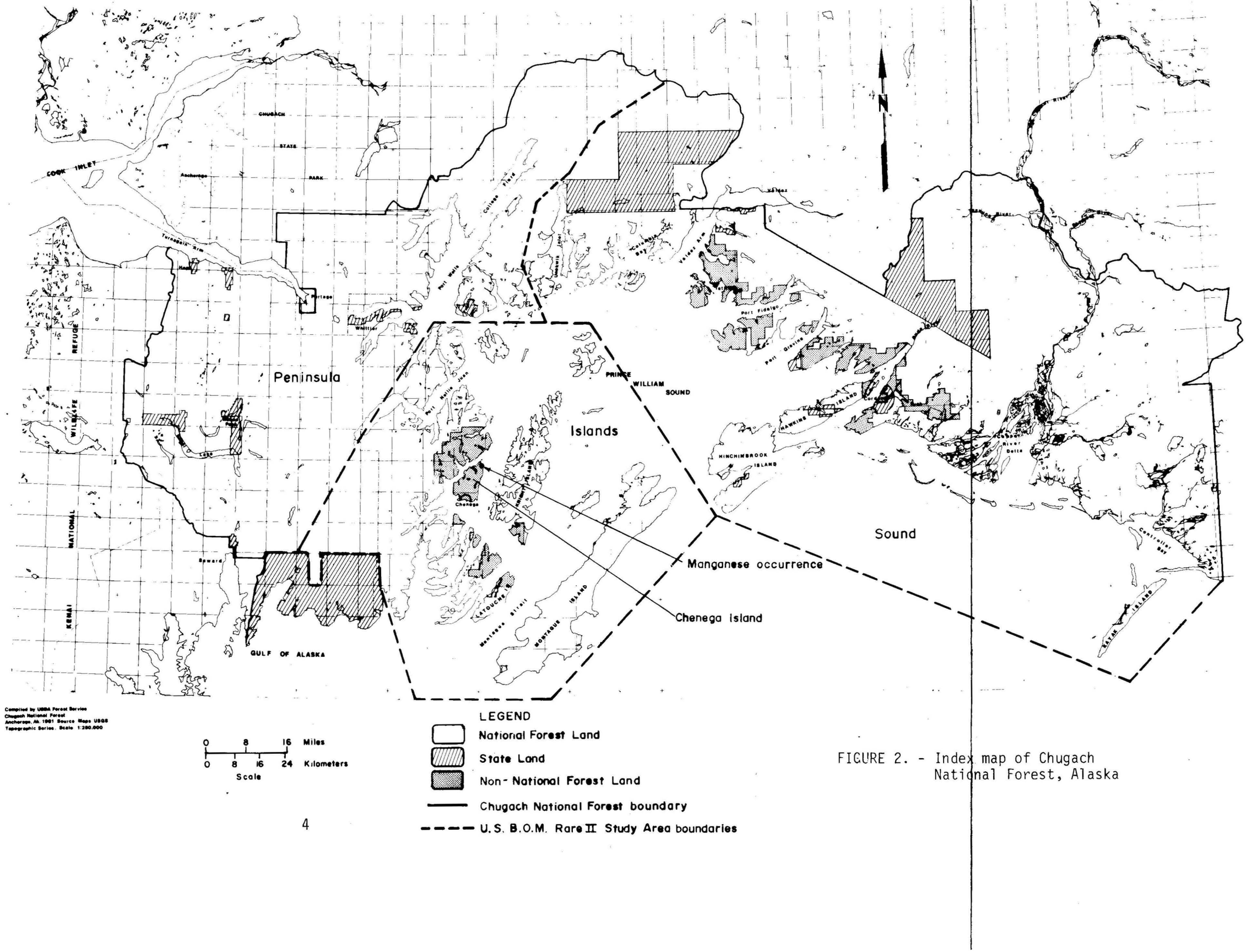
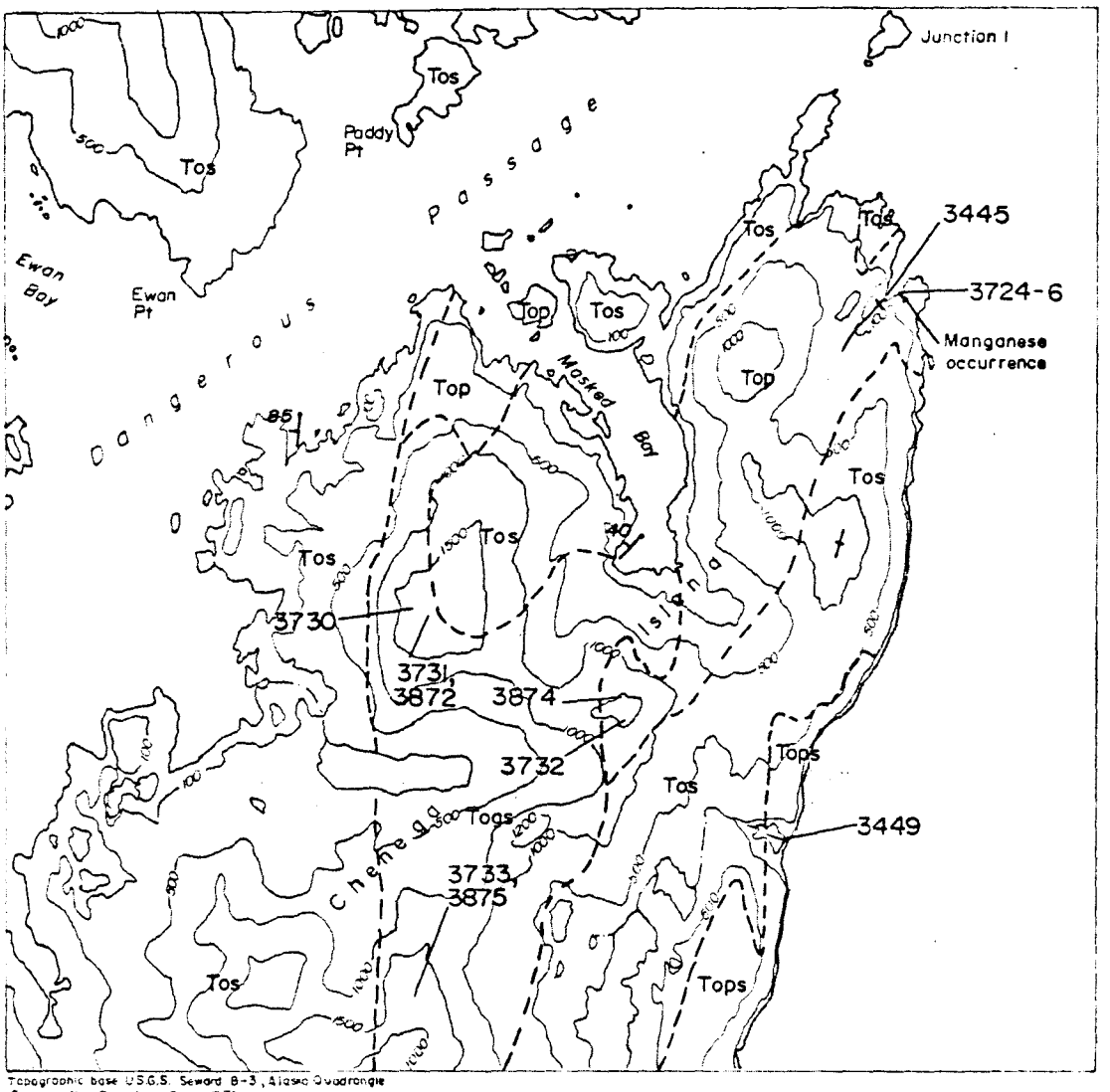


FIGURE 2. - Index map of Chugach National Forest, Alaska



LEGEND

Top	Pillow basalt
Tops	Mixed pillow basalt, sandstone, and siltstone
Togs	Mixed greenstone, slate, and sandstone
Tos	Shale, slate, and greywacke undivided
----	Geologic contact, inferred
85	Strike and dip of bedding, top known
+	Strike of vertical beds
— 3730	Rock sample site
+ 3444	Stream sediment sample site

N

0 .5 1 Mile
0 1 2 Kilometers
Scale
Contour interval 500 feet unless otherwise noted

FIGURE 3. - Geologic and sample location map of Northern Chenega Island, Alaska

Regionally, the rocks have been metamorphosed to greenschist facies (2). Higher metamorphic grades occur locally due to a Tertiary granite intrusion located 1.5 miles to the north of Chenega Island (1).

BUREAU OF MINES WORK

Both the drainage anomalous in copper and nearby sections of the beach were prospected. Quartz cobbles in the stream bottom contained up to 5 percent combined pyrite and arsenopyrite, minor amounts of calcite, sphalerite(?), and malachite.

A few beach cobbles were coated with manganese oxides. These cobbles could be traced to their source, a 6 x 50 foot rib-like weather-resistant bed, exposed just above the high tide line (figure 3). The bed trends N10°E, dips 80°W and is interbedded with calcareous shales and phyllites which locally are metamorphosed to chlorite schist. The mineralized bed disappears under beach gravel to the north; to the south it is covered by moss and sedges. Fresh surfaces of the mineralized rock are pink colored, overall very siliceous, but locally calcareous.

X-ray diffraction analyses of the mineralized rock determined the pink acid-soluble mineral to be rhodochrosite and the insoluble mineral to be pyroxmangite (3). Visual estimate determined 10% magnetite content in the rock as well as 1% pyrrhotite and a trace of pyrite. A 3.5-foot continuous chip sample (No. 3726) collected across the mineralized

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(2) Tysdal, R. G., and J. E. Case. Geologic Map of the Seward and Blying Sound Quadrangles, Alaska. U.S. Geol. Survey Misc. Investigation Series, I-1150, 1979, pp. 4-7.

(3) Roberts, W. S. Lab Rept., January 1982, 3 pp. Available upon request from Alaska Field Operations Center, Juneau, Alaska, 3 pp.

bed contained 17 percent manganese. Selected specimens from the same bed contained up to 37 percent manganese (No. 3724). Sample locations are shown on figure 3 and analytical results are tabulated on table 1.

A stream sediment sample (No. 3445) collected near the manganese occurrence contained 1,090 ppm (parts per million) manganese while one collected further down the east shore and along the strike projection of the bed (No. 3449) contained 650 ppm manganese. These values appear to be within background range of samples collected from similar rock types in the area. (4)

The entire east shore and part of the west shore of the island were cruised with a small boat making random stops. No other exposures similar to the manganese-bearing one on the northeast shore were found. Several exposures of sheared greenstone found in the interior of the island were sampled with the high value being 1200 ppm manganese (No. 3732).

CONCLUSIONS AND RECOMMENDATIONS

The manganese content in the collected samples warrants further work in the area to determine the extent of the occurrence. Recommendations for further investigations are:

1. Detailed sampling of the exposure with further prospecting for similar exposures along its strike length is recommended.

(4) Jansons, U. 1979 Bureau of Mines Sampling Sites and Analytical Results for Samples Collected in the Chugach National Forest, Alaska. U.S. BuMines OFR 83-81, 229 pp.

2. The magnetite content of the manganese-bearing bed make it amenable to detailed ground magnetic surveys to locate possible covered extensions.
3. A detailed stream sediment sampling survey is also recommended for the entire island to delineate the area or areas anomalous in manganese.

TABLE 1. - Analyses of rock and stream sediment samples from Chenega Island, Alaska

			Analyses									
			Parts per Million (Unless otherwise indicated)									
Sample	Type	Sample length Feet	Mn[1]	Cu[2]	Pb[2]	Zn[2]	Cr[2]	Ni[2]	Sb[2]	Au[2]	Ag[2]	Description
5 3445	Stream sediment	----	1090	43	21	125	165	41	2	0.03	2.55	Collected from stream near manganese-rich outcrop.
5 3449	do.	----	650	20	21	125	140	29	1	.03	1.23	Collected on E. shore of Chenega Island.
3 3724	Grab sample	----	37%			200						High-grade grab sample from manganese bearing outcrop.
3 3725	do.	----	36%			80						do.
4 3726	Contin. chip	3.5	17.0%	115	20	70	35	130	4	<.02	0.2	Manganese-bearing outcrop.
4 3730	Random chip	15	800	120	15	70	115	135	<2	<.02	0.2	Sheared greenstone.
4 3731	do.	----	700	25	35	140	55	55	<2	<.02	0.2	Shale inclusion within greenstone.
4 3732	Contin. chip	15	1200	195	30	105	75	105	<2	<.02	0.2	Sheared greenstone.
4 3733	Random chip	----	1100	80	40	145	195	165	<2	<.02	0.2	Greenstone with inter-calated shale.
4 3872	do.	----	800	115	45	100	100	150	<2	<.02	0.2	Iron-oxide stained greenstone.
4 3874	do.	15	800	150	30	90	40	65	<2	<.02	<0.2	Sheared greenstone with manganese-oxide coatings.
4 3875	do.		950	95	35	95	155	175	<2	<.02	0.2	do.

(1) Analysis by colorimetric methods
(2) Analysis by atomic absorption
(3) Analysis by BuMines, Juneau, Alaska Lab
(4) Analysis by Rainbow Resource Lab, Anchorage, Alaska
(5) Analysis by TSL Labs, Spokane, WA