RAY MOUNTAINS MANGANESE OCCURRENCE, TANANA QUADRANGLE

By James C. Barker

**********Field Report

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UNITED STATES DEPARTMENT OF THE INTERIOR

Manuel Lujan, Jr., Secretary

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T S Ary, Director

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INTRODUCTION AND SUMMARY

Manganese lenses of hausmannite and braunite occur in association with cherts and andesite of the Jurassic Tozitna Terrane in the southern Ray Mountains of central Alaska (fig. 1). They are also specially associated with a zoned unmapped unit of mafic and ultramafic rocks. The occurrences were found during a joint US Bureau of Mines - US Bureau of Land Management mineral resource evaluation in May 1979. In 1987 the site was revisited by the USBM and mapped at 1:63,360 scale to determine the approximate resource potential for manganese. This latter work was conducted as part of the Bureau's critical and strategic minerals program.

The ares of this report lies above the upper Tozitna River in a remote moderately rugged terrain with about 2000 ft of maximum vertical relief. Helicopter access is required. Outcrop or rubble crop in the general area is relatively abundant for interior Alaska. Low valleys are forested whereas hill slopes and ridges are tundra and scree covered.

There is no known previous geological or mineral exploratory work in this area.

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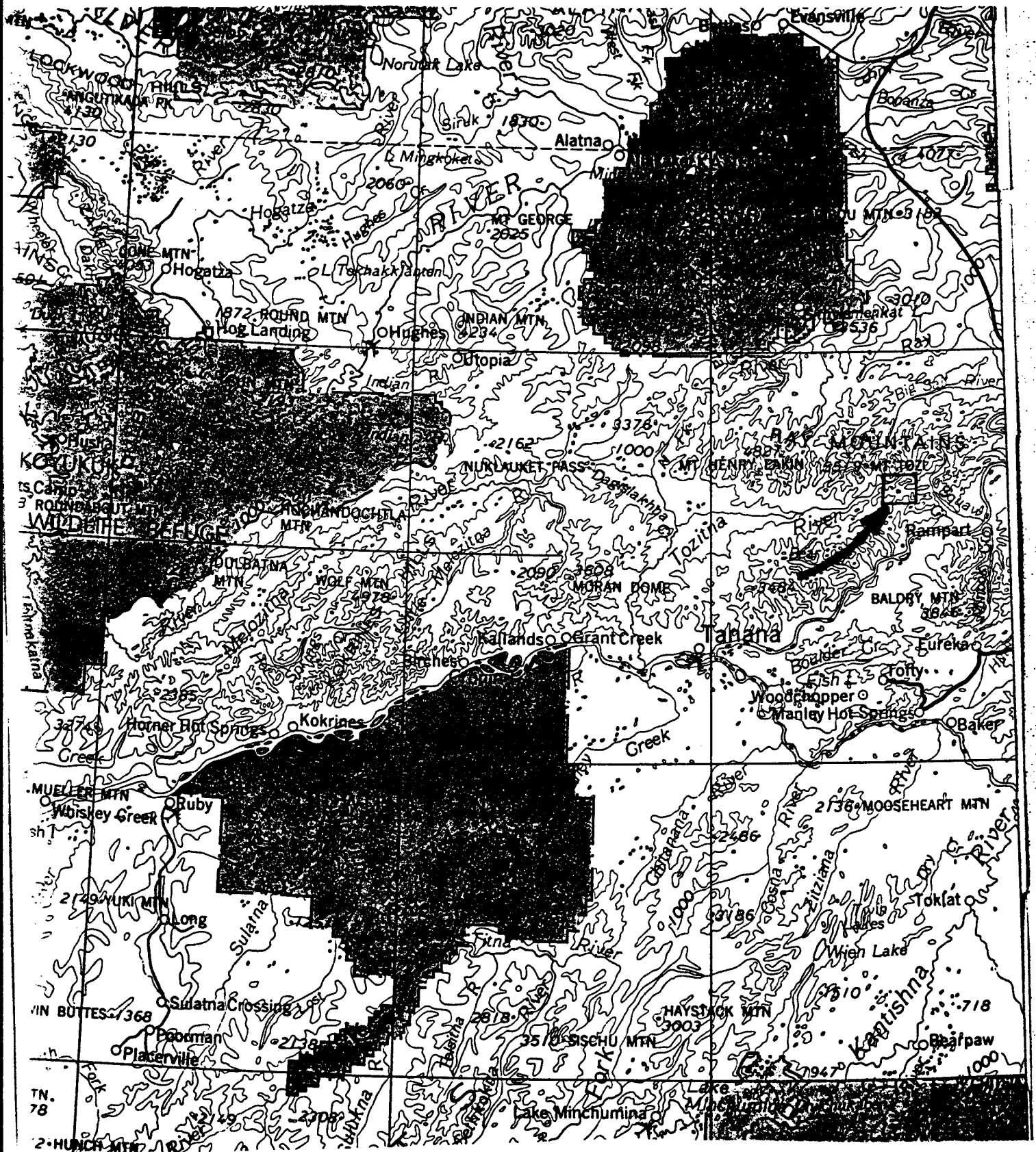

Figure 1. - Location of report area.

The manganese deposits of the upper Tozitna River are geologically similar to those of northern California[2] and are of probable submarine volcanogenic origin and may relate to manganese mineralization found in correlatable rocks north of Manley Hot Springs.[3] It is possible that similar manganese deposits may be found elsewhere in the Tozitna Terrane ophiolitic rocks.

It is recommended that no further site specific work be undertaken at this time. The manganese occurrences of this type are relatively small and access to the upper Tozitna would be difficult and costly. It is not expected that individual deposits would individually exceed 50,000 short tons and most would be considerably less. From the regional standpoint, however, the Tozitna Terrane underlies a large area of central Alaska. Any mineral evaluation activities within this area should include a focus on manganese.

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[2] Snyder W.S. Manganese Deposited by Submarine Hot Springs in Chert Greenstone Complexes, Western United States. Geology, V.6, 1978, pp. 741-744.

[3] Thomas, B.I., Reconnaissance Sampling of the Avnet Manganese Prospect, Tanana Quadrangle, Central Alaska, USBM OFR 10-65.

GEOLOGICAL SETTING

The upper Tozitna River area has not been geologically mapped, however figure 2 shows the local geology in the vicinity of the manganese occurrences. Two rock units are present. The lowermost unit includes mafic and ultramafic rocks including gabbro, pyroxenite and locally serpentinized peridotite and plagioclase peridotite. Contacts between the mafic and ultramafic lithologies are well defined suggesting a distinctly zoned ultramafic complex. A single outcrop three miles to the east was composed of similar rocks.

Capping the ultramafic rocks with a thrust fault contact are interlayered andesites with subordinate red and green cherts. These rocks are part of a large ophiolite complex in central Alaska. Similarly, the extent of the ophiolite complex beyond the map area is unknown. These rocks are part of the Jurassic Tozitna Terrane, formally known as the Rampart Group. The tendency for the Tozitna rocks to cap the higher elevations is due to the massive and resistant nature of the andesite.

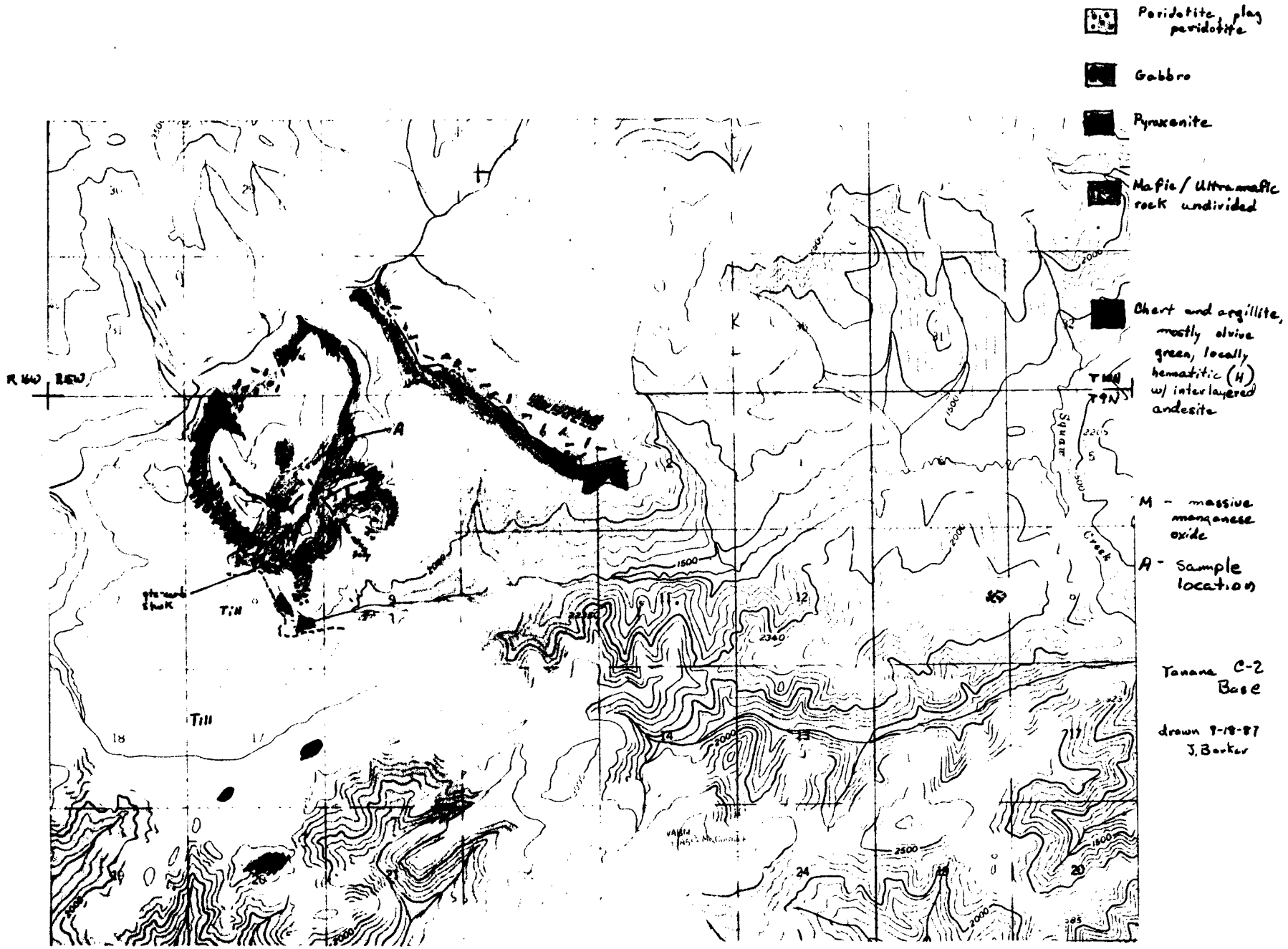

Figure 2. - Local geology.

DESCRIPTION OF MANGANESE OCCURRENCES

Lens-like layers of massive manganese mineralization occur intercalated with red and green cherts. Four occurrences of manganese were examined ranging in width from 2 inches to 3.5 feet. In each case the mineralized layer was bound top and bottom by hematitic chert (fig. 3). These rocks always occur within thick sequences of green andesite. At map location A the mineralization was 3.5 ft thick and could be traced in float about 200 ft to the west and 100 ft to the east along a strike of 105°. The zone dipped at 50° into the hillside. Minor shears or faults following the same dip and strike have occurred within the mineralized zone.

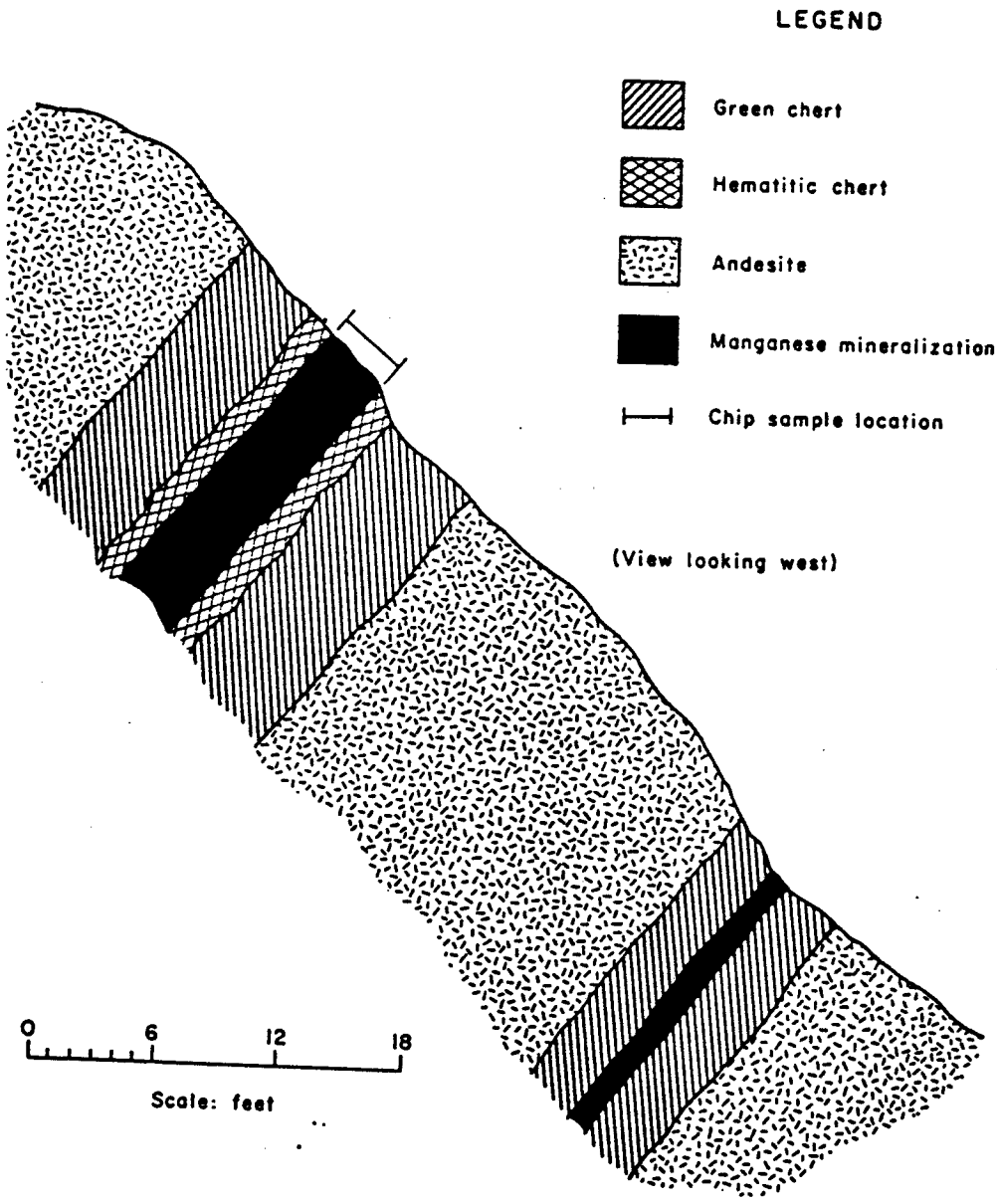

Figure 3. - Profile of map location A.

Table 1. - Analysis of massive manganese lens.

	RM 23330	RM 24197
Mn	16.1 pct	26.2 pct
Si	19.3	--
Ca	2.57	--
Al	0.75	--
Fe	2.07	--
Co	<0.01	25 ppm
Au	ND	ND
Ag	ND	1.8
Cu	--	43
Ni	--	92
V	--	30

ND not detected -- not analyzed

The black colored mineralized rock has a fine-grained, soft, earthy texture and is noticeably heavy A grab sample (RM 24197) contained 26.2% Mn, whereas a 42 inch channel sample (RM 23330) of the zone shown in figure 2 contained 16.1% Mn. X-ray diffraction analyses identified the minerals hausmannite (Mn_3O_4) and braunite ($MnO{\cdot}3Mn_2O_3{\cdot}SiO_2$).

Approximately 30 lbs of the mineralized material was collected and forwarded to the Bureau's Albany Research Laboratory for preliminary pyrometallurgical testing. At this time no further results have been received.