FIELD REPORT ON MANGANESE MINERAL INVESTIGATION OF THE HINCHINBROOK ISLAND MANGANESE OCCURRENCE, PRINCE WILLIAM SOUND, ALASKA

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DEPARTMENT OF THE INTERIOR
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INTRODUCTION

A volcanogenic manganese deposit was discovered in 1980 and examined by the USGS (Goodfellow and others, 1984). The deposit occurs within a mixed sequence of pillow basalt, pillow breccia, and varied-color mudstone of the late Paleocene and early Eocene (?) Orca Group. These rocks underlie the entirety of Hinchinbrook Island (Winkler, 1973). Winkler's geologic map generally only distinguishes between major sedimentary and volcanic units and does not provide the detail of intercalated sedimentary units within the volcanic assemblage. Goodfellow's report describes detail mineralogy of the manganese minerals and a description of the geologic setting of the deposits formation without providing detail mapping of the distribution of mineralization.

The Bureau examined this manganese deposit in order to assess the grade and tonnage potential. Three days were designated for this examination. The Bureau's examination of the Hinchinbrook Island manganese deposit is part of a 4 year project to assess the manganese mineral potential of Alaska. Two geologists, Kerry Lear and Roger Burleigh, conducted this helicopter assisted project. Poor weather conditions permitted only a one day examination of beach outcrops and a one day evaluation of the manganese deposit.

RESULTS

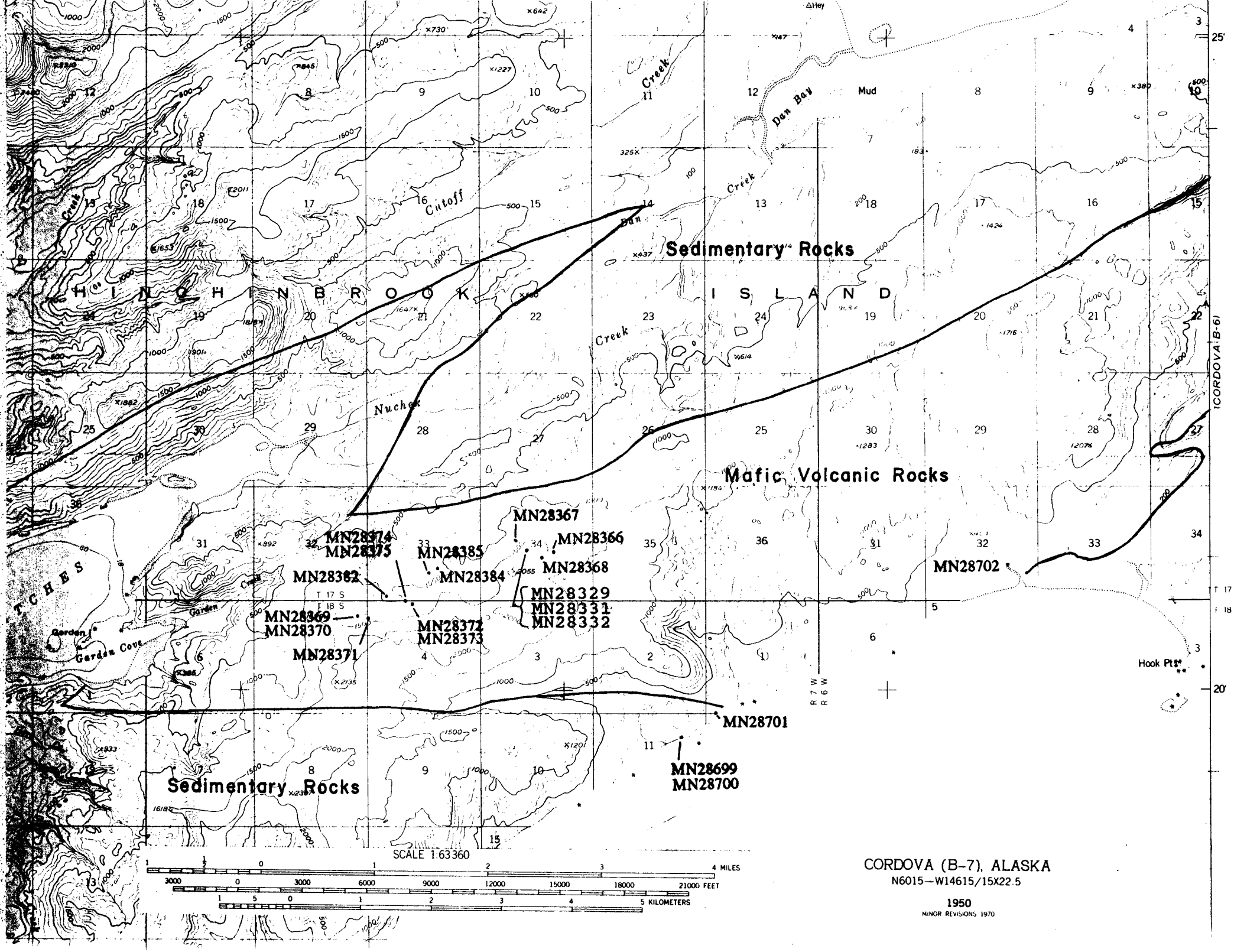
Significant manganese mineralization was found at two locations, 2.4 km apart, within the same sequence of volcanic-sedimentary rocks (MN28375 and MN28333, MN28368, MN28366, fig. 1, table 1). At sample location MN28375 a few irregular masses of black manganese mineralization occur in bedrock within what appeared to be a contact zone between pillow basalt breccia and red ferruginous mudstone. At the other location (MN28333, MN28368, MN28366) similar manganese mineralization could only be found as rubble which in part appeared to represent resistant lag deposits on weathered bedrock. Bedrock at this latter (eastern) location is dominantly pillow basalt breccia. The massive manganese mineralization found may represent a series of small manganese lenses dismembered during brecciation of the host pillow basalt. Further examination will be required to determine the small scale structural setting of the manganese mineralization. Intimately related to the pillow basalt breccia unit are red, orange, red-brown, and gray-brown mudstone. These units appear to be useful marker horizons to mineralization. Manganese content of the massive mineralization ranges between 16.65 to 31.45% Mn. Massive specular and earthy red hematite is often found in close proximity to manganese mineralization.

Goodfellow and others (1984) identified the following manganese minerals: bementite $Mn_7Si_6O_{15}(OH)_8$; todorokite, $(Na,Ca,K,Mn^{2+})(Mn^{4+},Mn^{2+},Mg)_6O_{12}\cdot H_2O$; birnessite, $(Ca,Na)(Mn^{2+}, Mn^{4+})_7O_{14}\cdot 3H_2O$; ranceite, $(Ca,Mn)Mn_4O_9\cdot 3H_2O$, and traces of tephroite, Mn_2SiO_4; and rhodonite, $(Mn,Fe,Ca)SiO_3$. Many of the massive blocks of manganese mineralized rock appear to be composed of a black, brittle manganese mineral surrounding cores of a light red-brown or peach-colored, very fine-grained massive mineral(s). The latter mineral(s) appears to be replaced by the former dark-colored manganese minerals in total or along fractures.

Along the surf-pounded southern beach of Hinchinbrook Island boulders of red and brown ferruginous chert are found mixed with argillite and volcanic material. At sample location MN28701 a single boulder of chert had significant Mn-oxide staining and was found to contain 19.96% MN (table 1, fig.1). This boulder also contained anomalous amounts of gallium, silver, molybdenum, barium, bismuth, and tellurium (table 2).

RECOMMENDATIONS

It is clear from the limited amount of sampling that a favorable mappable unit(s) contains significant manganese mineralization. Available geologic mapping by the USGS and the Bureau have not delineated these units within the sequence of volcanic rocks. The Bureau's brief examination found manganese mineralization that was separate from that described by Goodfellow and others (1984). Hence, the prospect of finding other sites, and possibly larger accumulations, of manganese mineralization within the favorable unit(s) is good and additional exploration is warranted.



CORDOVA (B-7), ALASKA

N6015—W14615/15X22.5

1950

MINOR REVISIONS 1970

Table 1. --Iron and manganese assay results for rocks from Hinchinbrook Island

Sample Number	FeTot pct	Mn pct	Sample Description
MN28331	-	16.65	Rubble; black, massive mudstone with MnO staining; represents 1% of rubble material
MN28332	-	31.45	Rubble; black MnO-stained mudstone with massive brown-pinkish mineral on fresh surface
MN28333			Bulk Sample; 18 kg
MN28366	-	24.84	Rubble; black MnO-stained mudstone with massive brown-pinkish mineral on fresh surface
MN28367	-	0.33	Grab; brown, fine-grained, siliceous umber intercalated within massive pillow basalt
MN28368			Bulk sample; 18 kg
MN28369	-	0.33	Grab; red-brown laminated mudstone
MN28370	-	0.17	Grab; basaltic pillow breccia rudrock; altered, heavy, and weakly magnetic
MN28371	-	0.26	Grab; basaltic pillow breccia rudrock; altered, serpentine-like, nodular, and heavy
MN28372	5.51	0.34	Grab; reddish brown and green-gray-brown mudstone
MN28373	4.07	0.55	Random chip; earthy red mudstone adjacent to sample MN28372
MN28374	27.95	1.97	Grab; massive specular and earthy hematite; locally abundant boulders to 25 cm in red mudstone
MN28375	9.60	27.46	Grab; massive, irregular masses of black Mn-oxide material in basalt; adjacent to MN28374
MN28699	-	0.22	Beach cobble; red chert with veinlets of specular hematite along fractures
MN28700	-	0.17	Beach cobble; brown to brown-black weathered siliceous interpillow (?) material
MN28701	-	19.96	Beach boulder; random chip; Mn-oxide stained reddish chert with thin white veinlets and small masses of a vitreous submetallic mineral (up to 5 cm) containing sulfides

Table 2. --Inductively coupled plasma analyses of rocks and stream sediment samples from Hinchinbrook Island

Sample Number	Ag ppm	Cu ppm	Pb ppm	Zn ppm	Mo* ppm	Ni ppm	Co ppm	Cd ppm	Bi* ppm	As ppm	Sb ppm	Fe pct	Mn ppm	Te* ppm	Ba ppm	Cr ppm
MN28382	4.0	163	57	114	15	87	45	<2	98	134	96	>10.00	1844	64	186	88
MN28383	3.5	125	44	95	12	83	37	<2	79	125	70	7.78	1902	52	383	84
MN28384	3.2	118	53	100	13	85	36	<2	80	144	85	8.36	2360	70	584	79
MN28329	2.2	138	25	107	9	73	30	<2	59	85	51	8.63	2427	41	847	101
MN28372	1.5	83	25	104	8	80	30	<2	52	89	34	4.61	2754	29	845	81
MN28373	2.2	34	55	89	16	125	37	<2	71	153	73	2.91	4014	45	832	42
MN28374	0.7	32	26	40	16	92	11	<2	25	57	<5	>10.00	16494	30	1089	53
MN28701	8.2	33	67	<2	159	89	16	4.8	174	159	95	5.76	>20000	103	>2000	61
MN28702	3.3	46	52	67	16	76	28	<2	85	156	68	7.08	1369	63	249	101

	V ppm	Sn ppm	W ppm	Li ppm	Ga* ppm	La ppm	Ti ppm	Al pct	Mg pct	Ca pct	Na pct	K pct	Nb ppm	Sr ppm	Y ppm	Zr ppm
MN28382	359	100	<20	26	61	<5	0.95	3.56	1.87	2.28	1.56	0.70	19	117	15	83
MN28383	283	79	<20	29	49	5	0.77	2.98	1.37	2.62	1.36	0.78	16	158	9	62
MN28384	278	83	<20	28	57	6	0.69	3.58	1.52	2.36	1.51	0.99	16	158	11	67
MN28329	246	54	<20	25	50	<5	0.67	2.31	1.48	2.06	2.65	0.24	13	498	9	57
MN28372	172	37	<20	29	43	<5	0.37	1.81	1.11	1.67	1.46	1.13	14	89	<5	22
MN28373	86	50	<20	20	48	18	0.20	4.03	0.83	>10.00	1.90	1.34	18	187	10	59
MN28374	81	30	<20	22	36	<5	0.07	1.48	1.14	4.70	0.79	0.35	18	91	<5	40
MN28701	73	48	<20	2	443	6	0.02	0.53	0.32	2.80	0.09	0.06	10	173	5	7
MN28702	247	83	22	14	53	17	0.66	3.45	2.16	3.97	1.72	0.50	19	279	12	29

Sample Descriptions	
MN28382	Stream sediment sample from stream draining pillow basalt, pillow breccia and ferruginous and manganiferous deposits and mudstone
MN28383	Stream sediment sample from stream draining pillow basalt, pillow breccia and ferruginous and manganiferous deposits and mudstone
MN28384	Stream sediment sample from stream draining pillow basalt, pillow breccia and ferruginous and manganiferous deposits and mudstone
MN28329	Rubble; red hematitic mudstone with specular hematite coating; 100-m-long outcrop
MN28372	Grab; reddish brown and green-gray-brown mudstone
MN28373	Random chip; earthy red mudstone adjacent to sample MN28372
MN28374	Grab; massive specular and earthy hematite; locally abundant boulders to 25 cm in red mudstone
MN28701	Beach boulder; random chip; Mn-oxide stained reddish chert with thin white veinlets and small masses of a vitreous submetallic mineral that contain trace sulfides
MN28702	Stream sediment sample

REFERENCES

Goodfellow, R., S.W. Nelson, R.M. Bouse, and R.A. Koski. The Geologic Setting and Composition of a Newly Discovered Manganese Deposit on Hinchinbrook Island, Alaska. USGS Open-file Report 84 -671, 1984, 10 p..

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