CHROMITE INVESTIGATION OF AMERICAN AND COLORADO CREEKS, TOFTY REGION

By D. D. Southworth

Critical and Strategic Minerals in Alaska -

Livengood Project

* Field Report - February, 1983

UNITED STATES DEPARTMENT OF THE INTERIOR

James G. Watt, Secretary

BUREAU OF MINES

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CHROMITE INVESTIGATION OF AMERICAN AND COLORADO CREEKS, TOFTY REGION

By D. D. Southworth[1]

INTRODUCTION

A brief mineral investigation of a reported chromite occurrence in the area of Serpentine Ridge and American and Colorado Creeks (fig. 1) was made by the Alaska Field Operations Center, U. S. Bureau of Mines in conjunction with the cobalt investigation of the Manley Hot Springs area. The work was part of an Alaska-wide assessment of "critical and strategic" minerals and follows-up on the brief early reports of chromite by the U. S. Geologial Survey and local miners. The following manuscript is a summary of field work in 1981, and will be updated if additional work is undertaken. Specific objectives of this investigation were to re-examine previous reports of mineralization and to evaluate the potential for economic chromite mineralization in the area.

HISTORY AND PREVIOUS INVESTIGATION

Colorado and American Creeks have been mined for placer gold since the early 1900's. Mertie (1934)(4)[2] reported on the placer gold mining activity in 1931 and described the geology of the area. Waters (1934)(6) reported finding chromite in pan concentrates collected from American

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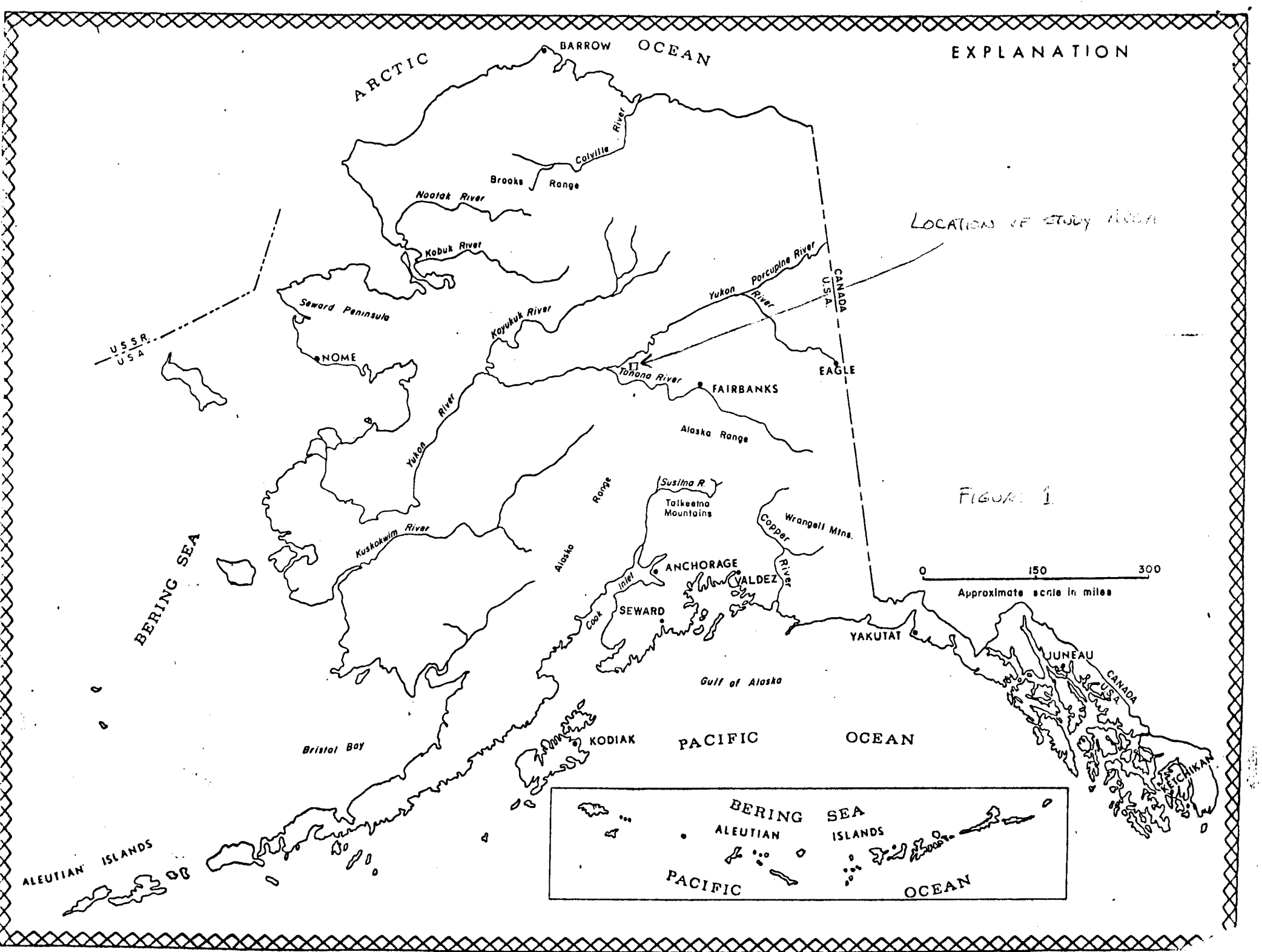
[2] Underlined numbers in parentheses refer to items listed in the references at the end of this report.


EXPLANATION
LOCATION OF STUDY AREA
FIGURE 1
ARCTIC OCEAN
BARROW
Colville River
Brooks Range
Noatak River
Kobuk River
Seward Peninsula
Koyukuk River
NOME
U.S.S.R.
U.S.A.
Yukon River
Porcupine River
CANADA
U.S.A.
EAGLE
Tanana River
FAIRBANKS
Alaska Range
Yukon River
Susitna R.
Talkeetna Mountains
Wrangell Mtns.
Copper River
Kuskokwim River
Alaska Range
BERING SEA
ANCHORAGE
VALDEZ
Cook Inlet
SEWARD
YAKUTAT
JUNEAU
CANADA
U.S.A.
KETCHIKAN
Gulf of Alaska
KODIAK
PACIFIC OCEAN
Bristol Bay
ALEUTIAN ISLANDS
0 150 300
Approximate scale in miles
BERING SEA
ALEUTIAN ISLANDS
PACIFIC OCEAN

and Colorado Creeks. Thomas and Maloney(3) made several traverses of Serpentine Ridge in 1962 and later reported "abundant" (10%-50%)(sample 93A) to "subordinate" (2%-10%)(sample 94) chromite in grab samples of the serpentinites. Geological reconnaissance mapping at 1:250,000 scale was compiled by Chapman and others (1975)(1). Present activity is restricted to American Creek where operations are conducted by claim owners Don DeLima and Jeff Knaebel of Fairbanks. A summary of references to the area are listed in Cobb (1977)(2).

OWNERSHIP

The areas visited along American and Colorado Creeks are on placer mining claims held by Mr. Don DeLima and Mr. Jeff Knaebel of Fairbanks. Serpentine Ridge is within lands currently administered by the U. S. Bureau of Land Management.

PHYSIOGRAPHY

The report area lies within a region of generally low lying topography and subdued relief. The floors of the valleys are at elevations of approximately 300 to 400 ft, while the highest point on Serpentine Ridge has a maximum elevation of approximately 1,460 ft. Roughtop Mountain, approximately 7 mi to the northeast of the study area is, at elevation 3,150 ft, the highest nearby feature. Roughtop Mountain is, in a sense, a northward extension of the highland of which Serpentine Ridge is a part.

Rock exposures are generally limited to boulders and patches of rubble on the ridges. Lower areas are obscured by brush and vegetative mat cover. Total rock exposure is estimated to be less than 5%. The

lowland is generally boggy and underlain by permafrost. The valleys in the region have been glaciated and later filled with loess. The gravels beneath the loess, however, have proven to be gold-bearing and, hence, mining continues.

The climate is sub-Arctic, with long, cold winters and short but comparatively warm summers. Annual precipitation is approximately 10 to 12 in. The snow-free period generally extends from May through mid-September.

Vegetation in the low lying areas consists of tundra, grasses and a few stunted black spruce. Higher elevations occasionaly support growths of alder, with some spruce and birch.

ACCESS

Access to the area during dry periods is possible via motor bike along a trail which follows Serpentine Ridge. The 1981 investigation was hampered by heavy rains and mechanical problems with the motorbikes, which ultimately necessitated the use of the only air charter service in Manley Hot Springs to reach Colorado and American Creeks.

WORK BY THE BUREAU

FIELD WORK

A brief investigation of the Serpentine Ridge and American Creek region was made in late May-early June, 1981. Work was conducted by a two-person team based in Manley Hot Springs. A one-day traverse was made of Serpentine Ridge via motor bike. American and Colorado Creeks were visited by air, and one afternoon was spent sampling the creeks, noting bedrock geology and observing lithologies within mine tailings on both creeks.

SAMPLING AND ANALYTICAL PROCEDURES

Stream sediment samples were collected with a steel shovel from the finer sandy portion of the active channel or deepest most active part of a dry creek bed. Organic rich material was avoided. Samples were put in water-resistant paper sample bags and air-dried before screening at -80 mesh. Float-rock and stream characteristics were noted and recorded at each sample station.

Rock samples were usually taken as random chip samples across a geologic unit of interest; for example, a suspected mineralized area or a zone of alteration. The outcrop characteristics of the area covered by the chip sample was recorded. If a sample consisted of an individual high-graded rock or float material of unknown origin, this was also noted. Samples collected were approximately 1-2 lb in weight.

Pan concentrate samples were collected to enhance recognition of resistant minerals with high specific gravity. Generally, these materials are not easily detected using routine stream sediment sampling and analysis procedures. As with the stream sediment samples, the pan samples were collected with a steel shovel from the silty, poorly sorted material in the active channel. One or more (usually 4) 14 in pans were filled, panned to approximately 40 g and carefully washed into a plastic bag.

A pulverized fraction of each crushed rock sample and a pulverized -80 mesh portion of each stream sediment sample collected was analyzed by standard atomic absorption methods for Ag, Cu, Pb, Zn, Co and Ni. These analyses were made by TSL Laboratories of Spokane, Washington. Results are noted in table 1.

TABLE 1. - Geochemical analyses of American Creek area rock, stream sediment and pan concentrate samples

Map No.	Field No.	Ag	Au	Co	Cu	Ni	Pb	Pd	Pt	Zn	Field Description
	Li16692R	0.4		36	41	29	86			49	Rusty weathering, magnetite-bearing light green serpentinite.
	Li16693R	0.3		68	6	1620	17			9	Iron stained serpentinite.
	Li16720R	0.3		97	1	NA	11			19	Serpentinite with small veinlets of a silvery white mineral. Rock is weakly magnetic.
	Li16722R	1.2		44	18	NA	10			100	Medium to dark green mafic rock.
	Li16721S	0.9		9	18	--	7			71	Predominately phyllite with boulders of vein quartz and dark green mafics in creek bottom.
	Li16694P		14.3					<0.06	<0.06		Concentrate of (4) 14" pans. Float is phyllite (70%), quartz (10%) and serpentine (10%).
	Li16695P		231.6					<0.06	<0.06		Taken from a fresh cut just above phyllite bedrock. Concentrate of (4) 14" pans.

Note: All values reported parts per million (ppm).

MINERALIZATION

No chromite was observed in either Colorado or American Creeks during the present investigation. The operators of the mine on American Creek say they have not noted chromite in their concentrates. A geologist who works with one of the mine owners, however, has found a few thin chromite stringers in float rock on the American Creek trail approximately 1/2 mi from the turnoff on the Serpentine Ridge trail (Twelker, personal communication).

Bedrock on American Creek is a gray pyrite-bearing phyllite locally referred to as 'shale'. The phyllite breaks down easily into a sticky gray clay that makes the creek very turbid even when sluicing is not underway.

It is surmised that the geology of Colorado Gulch is more complicated, based on the varied composition of tailings at the mouth of this creek. A one-mile traverse up the creek revealed no bedrock. Tailings are comprised of graphitic phyllite (70%), diorite (15%), magnetite-bearing serpentinite (10%), and boulders of vein quartz (5%).

Serpentine Ridge is composed of a magnetite-bearing serpentinite. Undoubtedly a very small and economically insignficant quantity of chromite derived from Serpentine Ridge makes its way into the creeks.

The chromite values (2% to 50% chromite) reported from Serpentine Ridge by BOM in 1962 (3) were not duplicated. Indications from the earlier report (3) and the present investigation are that the chromite at Serpentine Ridge is present in insufficient quantity to be economically (or strategically) interesting. A copy of the 1962 petrographic report is appended.

SUMMARY AND RECOMMENDATIONS

During the examination of Serpentine Ridge and American and Colorado Creeks no chromite was observed, either in pan concentrates or in bedrock exposures.

Although chromite is undoubtedly associated with the Serpentine Ridge ultramafic body, it does not appear to be present in significant amounts.

No further work is recommended at this time.

REFERENCES

1. Chapman, R. M., W. F. Yeend, W. P. Brosge and H. N. Reiser. Preliminary Geologic Map of the Tanana and Northeast Part of the Kantishna River Quadrangles, Alaska. U.S. Geol. Survey OFR 75-337, scale 1:250,000. 1975.

2. Cobb, E. Summary of References to Mineral Occurrences (other than mineral fuels and construction materials) in the Tanana Quadrangle. U.S. Geol. Survey OFR 77-432, 1977.

3. Maloney, R. P. and B. I. Thomas. Unpublished draft of a Bureau of Mines Field Report for 1962. Available from D. D. Southworth, U.S. Bureau of Mines, 206 O'Neill Res. Bldg., University of Alaska, Fairbanks, Alaska 99701.

4. Mertie, J. B., Jr. Mineral Deposits of the Rampart and Hot Springs Districts, Alaska. U.S. Geol. Survey Bull. 844-D, 1934, pp. 163-226.

5. Twelker, Eric. Oral communication in conversation with K. Clautice, Geologist, U.S. Bureau of Mines, AFOC/Fairbanks, 1981.

6. Waters, A. E., Jr. Mineral Resources of Alaska, "Placer Concentrates of the Rampart and Hot Springs Districts". U.S. Geol. Survey Bull. 844-D, 1934, p. 241.

PETROGRAPHIC REPORT
Bureau of Mines
Alaska District - Region I

Project: 14.4149.17C
Petro. No. 2-109

Report to: R. L. Thorne
Sample source: Serpentine Ridge Tanana Quad.
Sample numbers: 81-I thru 90-SR-62*
Date received: 10-11-62
Submitted by: Bruce I. Thomas

Reported by: Walter L. Gnagy
Date reported: 10-19-62
Request: Rock type; Minerals major,mino -

Spectroscopic:	SAMPLES 81	82	83	84	85	86		88	89	90
Cr	-		X		T	X		X	X	
Cu, Zn					T	T				
Pb					-					
Rocks:										
Chromite rock								C		
Gossan					C					
Meta-andesite		C								
Quartzite				C						
Serpentine	C		C			C			C	C
Minerals:										
Albite		A		P						
Antigorite			P			P			A	S
Apatite	M									
Chlorite	P	S			M			A	P	
Chromite	-		T			(S)		(P)	(S)	(M)
Chrysotile			S							
Clinozoisite		A								
Dolomite			S							
Hornblende		A								
Ilmenite	S	-								
Limonite			F	T	A					
Pyrite	T		-			-				
Quartz				P	P					

Remarks: * 81 to 84-I-62; 85-T-62; 86 to 88-A-62; 89 to 90-A-62

Sample 87-A-62 is missing.

Legend:

P - Predominant	Over 50 percent	X - Detected in sample
A - Abundant	10 - 50 percent	- Sought but not detected
S - Subordinate	2 - 10 percent	f Fluorescent
M - Minor	.5 - 2 percent	R Radioactive
F - Few	.1 - .5 percent	Numerals Percent
T - Trace	Less than .1 percent	C - Rock classification

H - Highly magnetic
W - Weakly magnetic

PETROGRAPHIC REPORT
Bureau of Mines
Alaska District - Region I

Project: 14.4149.17C
Petro. No. 2-109

Report to: R. L. Thorne
Sample source: Serpentine Ridge, Tanana Quad.
Sample numbers: 91 to 96-SS-62
Date received: 10-11-62
Submitted by: Bruce I. Thomas

Reported by: Walter L. Gnagy
Date reported: 10-19-62
Request: Rock type; Minerals major, mino -

	SAMPLES									
Spectroscopic:	91	92	93A	93B	93C	94	95	96		
Al, Ca, Fe, Mg					X					
Ba, Cr, Cu, Mn, Na, Pb, Sr, Ti, Zn					T					
Be, Bi, Cb, Ga, In, K, Mo					-					
Sn, V, Y, Zr					-					
Rocks:										
Meta-andesite		C		C						
Serpentine	C		C			C	C	C		
Minerals:										
Albite		A		A						
Antigorite	P		P			P	P	P		
Chlorite				A	A			A		
Chromite	(F)	-	(A)			(S)	(S)	(M)		
Chrysotile	S									
Clinozoisite		A		A						
Hornblende		A		A						
Limonite		T	T	T						
Unknown mineral					P*					
Chemical:										
P, As					-					
Radioactivity	-	-	-	-	-	-	-	-		

Remarks * SG = 2.94 - 3.32; I = 1.60 - 1.64; Monoclinic or triclinic; prismatic
This mineral may be an amphibole.

Legend:

P - Predominant	Over 50 percent	X - Detected in sample
A - Abundant	10 - 50 percent	- Sought but not detected
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M - Minor	.5 - 2 percent	R Radioactive
F - Few	.1 - .5 percent	Numerals Percent
T - Trace	Less than .1 percent	C - Rock classification

H - Highly magnetic
W - Weakly magnetic