

473

82E/13W

REPORT
ON
CHROMITE POTENTIAL

OF

NANA, ROC MINERAL CLAIMS

CAMEO LAKE

KELOWNA, B. C.

50°01'N, 119°52'W

82L/4W and 82E/13W

FOR

NICOLA COPPER MINES LTD. (N.P.L.)

616 - 510 West Hastings Street
Vancouver, B. C.

BY

Gerhard von Rosen, P.Eng.

June 28, 1977

560080

TABLE OF CONTENTS

	<u>PAGE</u>
SUMMARY	1
LOCATION	2
CLAIMS	2
TOPOGRAPHY, VEGETATION AND CLIMATE	2
HISTORY	2
ECONOMIC GEOLOGY - CHROMITE	3
TABLE OF ASSAYS	4
GENERAL GEOLOGY	4
GEOLOGY OF ORIGINAL SHOWING	4
CHROMITE POTENTIAL	6
ECONOMICS OF CHROMITE	7
RECOMMENDED EXPLORATION	8
ESTIMATED COSTS	10
REFERENCES	11
CERTIFICATE OF QUALIFICATIONS	12

FIGURES

- FIGURE 1. LOCATION MAP
- FIGURE 2. CHROMITE PROPERTY
- FIGURE 3. ALOCIN CREEK SHOWING

Gerhard von Rosen
P. O. Box 48296
Bentall Three
Vancouver, B. C.

June 28, 1977

Nicola Copper Mines Ltd. (N.P.L.)
616 - 510 West Hastings Street
VANCOUVER, B. C.

Dear Sirs:

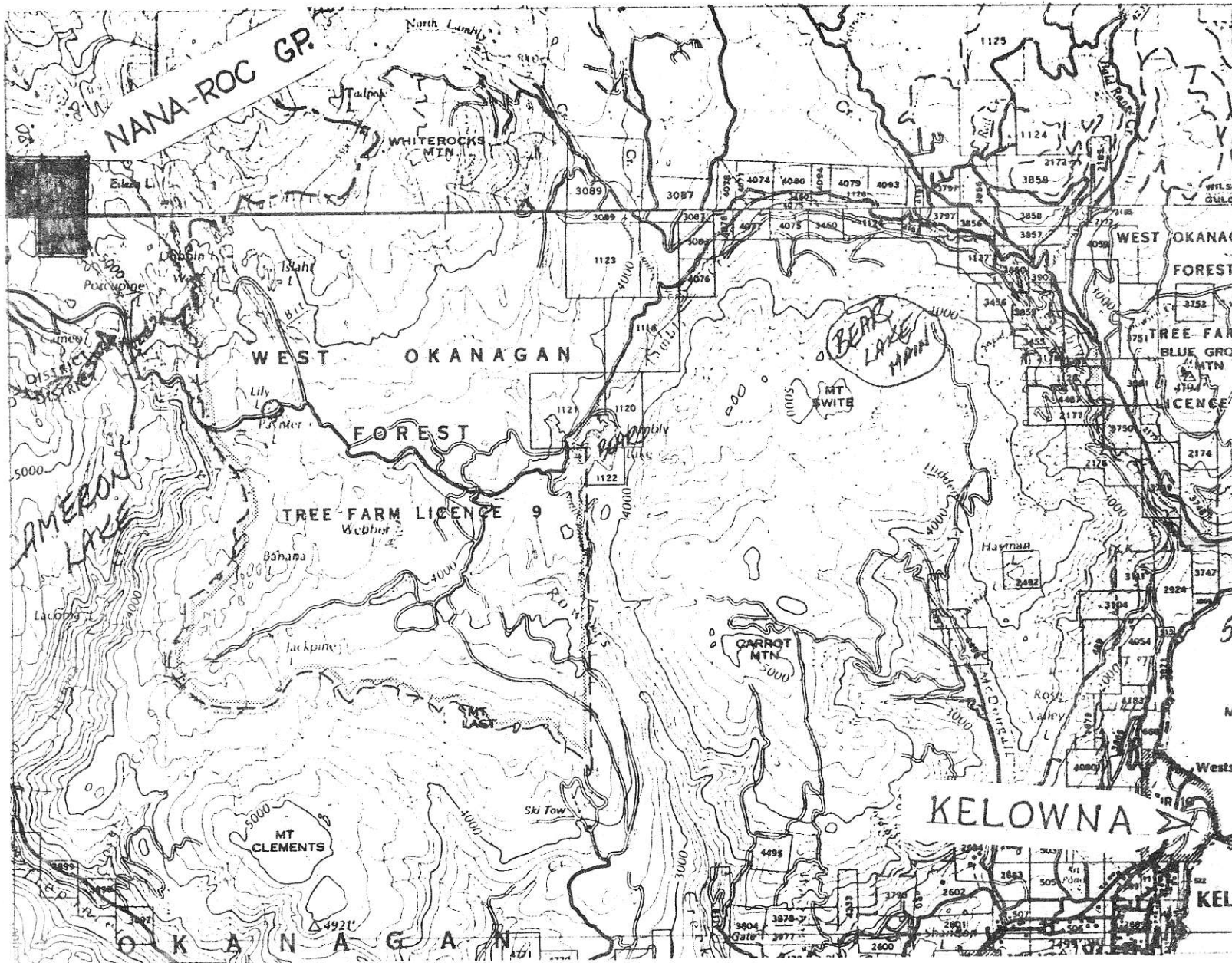
RE: CHROME PROPERTY
NANA-ROC CLAIMS
CAMEO LAKE
KELOWNA, B. C.
82L/4W & 82E/13W

SUMMARY:

The Nana-Roc claims at Cameo Lake display similarities to the world famous chrome-bearing deposits as the Bushveldt and the Stillwater intrusions consisting of serpentized chromitite-bearing ultra-basic rocks.

The Alocin showing, (a massive-chromite showing reported by Cairnes in 1932) and the newly discovered Cameo Lake zone, one separated from the other by about 1,700 meters, lend the property a long strike length of exploration potential.

To fully explore the possibilities of this intrusion for a large volume, low grade chromium deposit along the ^{5525'} 1,700 meters of serpentine it is recommended to carry out a Phase I program of mapping, sampling, and surveying as itemized to cost an estimated \$42,000. Further work, based on the results of this program will most likely consist of testing drill targets.

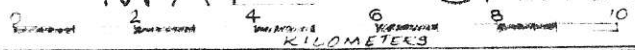


50° 00' N

50° 00' N

OKANAGAN

LOCATION MAP CHROME PROPERTY



7.07

LOCATION:

50°01'N, 119°52'W, NTS 92L/4W and 82E/13W. The property lies about 27 kilometers northwest of the Kelowna bridge. To reach the site by road, two-wheel drive transportation via 5 miles of paved westshore road northerly from Westside (Kelowna, B. C.) and then about 43 kilometres (27 miles) of good gravel road to Cameo (Cameron) Lake. See the claim map for the layout of the numerous four-wheel drive logging roads through the property.

CLAIMS:

Nicola Copper Mines Ltd. (N.P.L.) owns by right of purchase the following recently staked claims in the Nicola Mining Division.

NANA (Tag 35575) 4 units Recorded June 17, 1977

ROC (Tag 35574) 8 units Recorded June 23, 1977

TOPOGRAPHY, VEGETATION AND CLIMATE:

The claims straddle a northwesterly trending ridge of outcrops ranging in altitude from about 4,500' to about 5,000' ASL. The southern portion of "ROC" is an old burn. The remainder of NANA and ROC consists of swampy valleys, Balsam wooded north facing slopes and Pine forested ridges. Rainfall in summer is low to moderate and snow pack remains until about May due to the altitude.

HISTORY:

The first description of the property is given by Cairnes (1932, p. 94A). Jones (1959, 154) expands on this by describing other ultramafic dikes. Trenches and test pits have since been dug and blasted in a small area around the main pit, but no concerted effort appears to have been made

to follow the main zone either horizontally or vertically.

ECONOMIC GEOLOGY - CHROMITE:

(a) Original Occurrence

Referring to sketch map (Alocin Showing) of the pits blasted in the massive-chromite pods, it is evident that they have been traced over a length of about 60 meters and a width of 20 meters. The outcrop exposures extend, possibly 75 meters northerly and southerly from the last discovered showings in this chromite occurrence. The main pit is 3 meters deep, still in massive chromite and the indications are of slight widening of the mineralization in the bottom.

Using modern exploration techniques and the expected world chromium demand-created price increase, it is conceivable that the potential of just this zone can be increased by horizontal and vertical expansion. See table for assay results.

(b) Cameo Lake Zone

A buff-brown weathering hill, the Cameo Lake zone, has been prospected and chromitite occurrences found as high grade pods (#730), 3" x 2 feet, and as fine disseminations (#731) in the ultrabasic rock samples from this were assayed. See table.

TABLE OF ASSAYS:

<u>SAMPLE NUMBER</u>	<u>LOCATION</u>	<u>TYPE</u>	Cr%	Cr ₂ O ₃ %	Fe%	Fe ₂ O ₃ %	Al ₂ O ₃ %
727	Alocin, main pit	massive	26.37	38.54	ND	ND	ND
728	Alocin, main pit	nodular	24.18	35.13	ND	ND	ND
729	Alocin, main pit	"asbestos"	23.36	34.14	ND	ND	ND
730	Cameo, bluff	dissem.	0.80	1.17	ND	ND	ND
731	Cameo, bluff	massive	27.04	39.52	17.36	24.82	10.3

GENERAL GEOLOGY: (GSC map 1059A, Vernon)

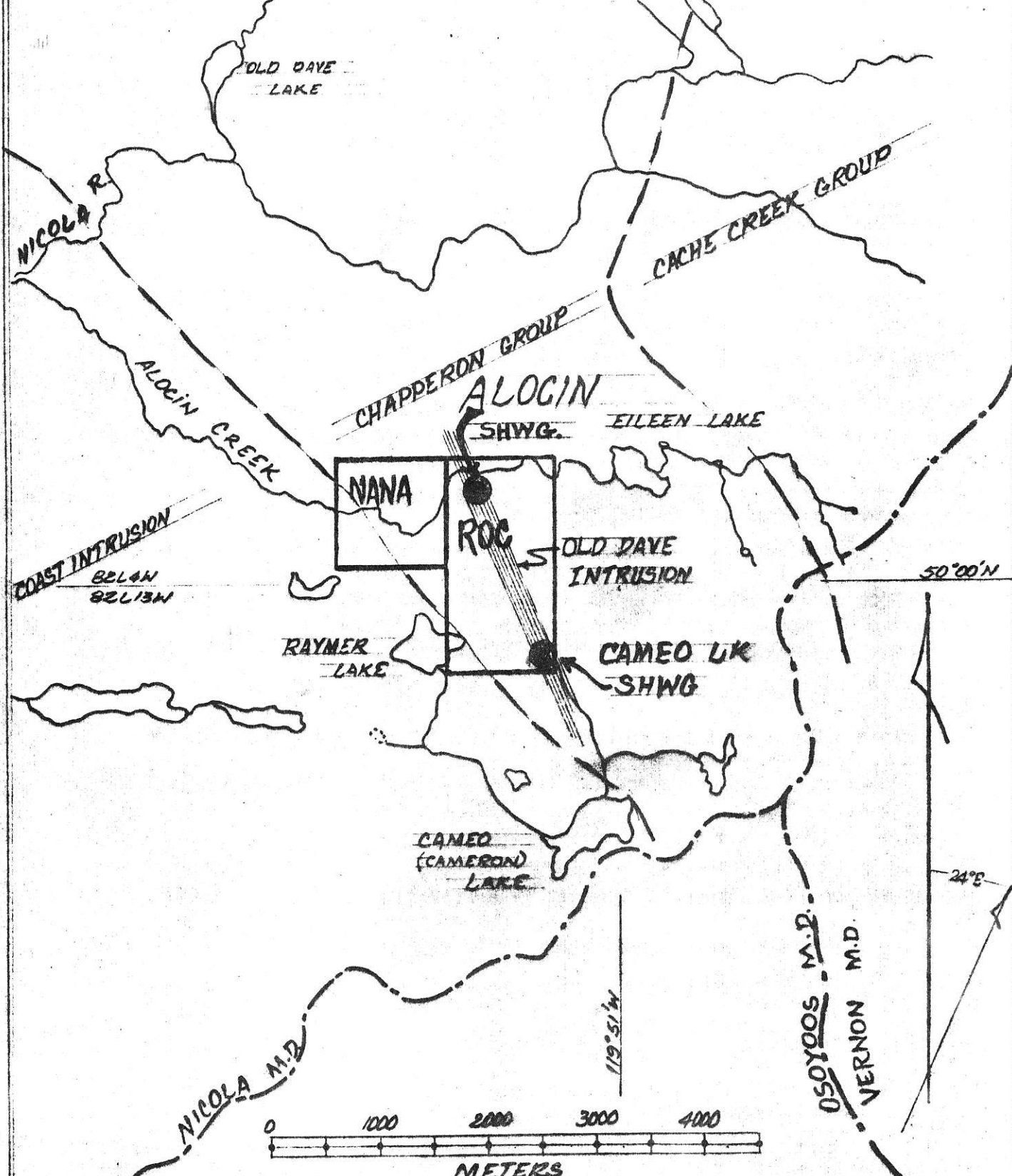
The Vernon sheet shows the area to be underlain by a northerly trending (2 to 4 miles wide) sliver of Chapperon Group metasediments (Archaean or later) overlain in part by Cache Creek group argillites (Paleozoic) to the east and intruded by Jurassic granodiorite to the west. Along the northerly grain and trend of the Chapperon rocks occur the Old Dave intrusions (Proterozoic and/or Paleozoic) consisting of chromitite-bearing serpentinized dunite and other ultrabasic rocks.

Tertiary lava capping occurs mostly on the higher ridges in the area. Glacial scouring has enhanced the north northwesterly grain of the rocks producing a ribbed effect in the topography between ridges and swampy parallel valleys.

GEOLOGY OF ORIGINAL SHOWING:

The showing is well described by Cairnes in Vernon's memoir. The attached pace and compass sketch by the writer shows the layout of the pits.

Cairnes (1932, p. 94A) writes:



DERIVED FROM:
 DSC MAP 1069A 1 VERNON
 BY: A.G. JONES

NICOLA COPPER MINES LTD (NPL)
CHROMITE PROPERTY
 82L4W 82E13W
 KELOWNA, B.C.

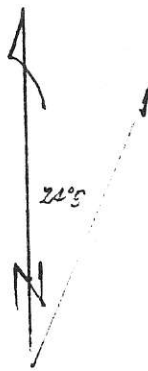
TO ACCOMPANY A REPORT BY:
 GERNARD VAN ROSEN P.ENG.
 JUNE 28, 1977

FIG 2

1987

← ALOCIN CREEK

ROAD TO SINK LAKE MAIN



WIDTH OF OLD DAVE INTRUSION
ABOUT 400 FEET WIDE



SEVERAL STRINGERS, CONTINUITY
NOT CLEAR

% CR	% CO_2O_3	TYPE	
26.37	38.54	MASSIVE	<p>4825' ASL MAIN PIT MASSIVE CHROMITE 8' DEEP x 6' x 4'</p>
24.18	35.33	MASSIVE	
23.36	34.17	MASSIVE	



ALOCIN CREEK SHOWING CHROMITE

GERHARD VON ROSEN, PENG.

JUNE 27, 1977

NICOLA COPPER MINES (NPL)

FIG 3.

"Interest in the Chrome-Vanadium group is centred chiefly on the occurrence of segregated chromite in a belt of serpentized peridotite which extends across Nicola valley in a general north 25 degrees west, direction. This belt was followed to the southeast of the river for over half a mile and in the opposite direction for about a mile and picked up again over a mile farther northwest. In this total distance the belt maintains a remarkably straight course and apparently steep dip. On either side of Nicola river it has an observed width of about 400 feet and is doubtless somewhat wider, as its northeast contact is nowhere exposed. On the southwest side the belt is in contact with, and apparently intrudes, both granitic rocks and argillaceous sediments. In shape, structure, and contact relations this belt resembles a broad dyke and such it is presumed to be.

"This chrome-bearing dyke is composed mainly of dark green serpentine which commonly weathers a deep orange-red, but in places is coated instead with a thin, semi-transparent, whitish, talcose film. The serpentine has resulted from the alteration of an intrusive composed very largely of olivine. Microscopic studies reveal different stages of alteration ranging from those in which abundant small grains of olivine occur in a meshwork of serpentine to others in which no traces of unaltered olivine remain. Other minerals present include partly to completely altered crystals of pyroxene, talc, chlorite, magnetite, asbestos, chromite. The chromite is dark brown and almost opaque in thin section. It is an abundant constituent at one locality. At most other places the rock carries disseminated magnetite occurring either in crystals or in lumps and small, irregular streaks. At different places the serpentine was observed to contain small veinlets of cross fibre asbestos varying in thickness from that of a mere thread to $\frac{1}{4}$ inch. Where shearing or slickensiding is pronounced, lenses of partly-developed, slip-fibre asbestos have formed. In a comparatively narrow, steeply inclined belt of this sort, however, important deposits of asbestos are hardly to be expected. Small lumps and stringers of pearl grey, semi-transparent talc are abundantly scattered through some sections of the peridotite belt.

"The principal discovery was made less than 100 yards southeast of, and a few feet above, the left bank of the river, at a point nearly 450 feet from the southwest contact of the serpentine belt. Here a small segregation of high-grade chromite ore was discovered, apparently mostly dug out. It occurred in part as closely spaced kidneys of chromite $\frac{1}{2}$ inch to one inch in diameter, and in part as a heavy dissemination of small, granular aggregates occupying up to 75 per cent or more of the rock volume. The enclosing rock is a dull green, massive, partly serpentized dunite in which some further alteration to talc and chromiferous chlorite has occurred. Little or no magnetite appeared to be present. Though not of itself economically important, this discovery suggests the possibility of other occurrences in this serpentized belt. Little clue is furnished as to where to look for such deposits. The rock in the belt is a type that under favourable conditions might prove a valuable source of both chromite and asbestos and, perhaps, rarer minerals such as platinum. The belt should, consequently, be followed in both directions and particular attention paid to it at places where it either widens materially or changes in its general structure or appearance."

Jones (1959, p. 154) further adds with the benefit of further mapping.

The sedimentary rocks in which the peridotite dykes appear are members of the Chapperon group and extend as a narrow belt towards the northwest. Since Cairnes' report many other showings of the serpentized peridotite dykes (Old Dave intrusions) have been discovered along the belt. A little asbestos occurs in some of these rocks but no chromite segregations comparable to those of the Chrome-Vanadium claims have been seen. At the north end of the belt of Chapperon rocks the age of the peridotite dykes is indicated as pre-Cache Creek by the Salmon River unconformity. Ultramafic rocks are known elsewhere in the map-area but in every place they intrude rocks that are older than the Cache Creek group. The search for deposits in rocks of this type should therefore be confined to areas underlain by members of the Chapperon, Mount Ida, or Monashee groups.

CHROMITE POTENTIAL:

Chromite ore occurrences within serpentized ultrabasic rocks, especially dunites have made economic history throughout the world. There are many similarities between the Bushveldt chromite deposits in Rhodesia, the Stillwater complex in Montana and the B mine in Ontario, as examples, and the situation presented by the old Dave intrusions on this property. Following is a list of the characteristics of these well known chromite deposits:

1. Chromite is found in the dunitic "cumulate" of the ultrabasic intrusives.
2. The ultrabasics commonly occur within a belt of serpentine rocks also associated with asbestos formation.
3. The banding and bedding within these linear intrusives is usually parallel to the length and steeply dipping.
4. Chromite occurs in massive concentrations and finer disseminations.
5. The vertical extent is comparable to the length of the host rocks.
6. The grade and the chrome-iron ratio varies with the location within the fractionated-cumulated section.

The old Dave intrusions show the following attributes comparable to the Stillwater and favorable to large scale chromium deposition.

1. Massive chromite occurs in deposits of irregular shape generally conforming to the very fine grained ultrabasic host rocks, in places presumed to be olivine, pyroxene rich.
2. The ultrabasics are serpentinized and are associated with asbestos formation.
3. The banding and bedding is parallel to the length of the dikes and steeply dipping.
4. Chromite occurs as massive pods and as disseminations.
5. Further testing will clarify the relationship between grade and location within the dike.

Exploration for chrome on these claims would therefore take into account these aforementioned parameters, with the possibility of detecting widespread chromite deposits within the Old Dave intrusives.

ECONOMICS OF CHROMITE:

Chrome is a metal of many uses, mainly in the steel industry. The large suppliers of chrome to North America are Rhodesia, South Africa, U.S.S.R. and the Philipines, hence, little development of chrome reserves has occurred in our country. In view of the ongoing political upheavals in South Africa and Rhodesia, and President Carter's stance on U.S.A.'s self-sufficiency regarding mineral wealth, it is timely that chrome exploration be undertaken.

RECOMMENDED EXPLORATION:

In order to locate and partially delineate the high grade as well as the low grade chromite zones in the 1.7 kilometers of favorable strike length of the Old Dave Intrusive Dike, the following exploration system is hereby recommended:

1. Surveying

- (a) Establish the claim boundaries
- (b) The grid should be established by locating two baselines parallel to the strike of this Old Dave Dike straddling the intrusions. Cross lines between the baselines at 50 meters should be flagged at 10 meter stations to cross the entire width of the belt and partly into country rock, i.e., 250 meters.
- (c) The Alocin showing should be gridded even more closely and test surveys of magnetometer, gravity and soils run.

2. Geological Mapping

The total claims area should be mapped using the available air photos with the purposes of delineating the chrome favorable intrusion, and prospection of the Chapperon rocks for possible deposits of other metals such as gold.

The gridded area should be mapped in detail, firstly gaining knowledge about the ore controls from careful study of the lithology, "Stratigraphy", and alteration of the rocks comprising the original showing at Alocin River.

3. Magnetometer Survey

The claims were staked on the basis of air magnetometric survey results. Ground magnetic follow-up will outline the magnetic serpentin belt and thus delineate the zone of interest.

4. Gravity Survey

Due to the large extremes of density between serpentine, peridotite, massive chromite and country rock, it is appropriate to utilize gravity measurements in trying to pinpoint mass anomalies. Some test profiles should be run.

5. Geochemical Survey

Soils should be taken every 30 feet along the whole belt. Every second sample should be analyzed as a first probe and interesting zones filled in, possibly even with further sampling and depth profiles. Preliminary tests should be made to develop the best analytical techniques.

6. Alocin Zone

Very careful and detailed study of the horizontal and depth extensions of the Alocin deposits should be carried out. This may involve drilling and blasting or possible bulldozer ripping. Drilling may be considered to test depth extensions and certainly very careful inch by inch geological mapping and categorizing of all the data is imperative

ESTIMATED COSTS:

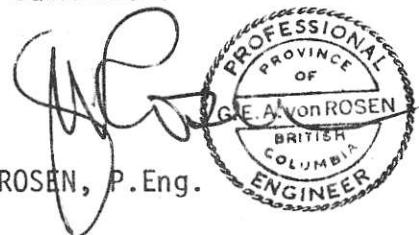
Phase I

1. Surveying	\$10,600
2. Geology	5,000
3. Magnetometer Survey	3,000
4. Geochemical Survey	3,500
5. Gravimetric Survey	2,000
6. Trenching and Assaying	6,000
7. Supervision	6,000
8. Compilation and Report	7,500
	<hr/>
	\$37,600
Contingencies at 10%	3,700
	<hr/>
	<u>\$41,300</u>

NOTE: The allocation of the above funds should be prorated at \$25,000 to the Alocin showing and \$16,300 to the Cameo Lake showing.

Respectfully submitted.

GERHARD VON ROSEN, P.Eng.



June 28, 1977

REFERENCES

Cairnes, C. E., 1932, G.S.C. Summary Report, p. 94A.

Jones, A. G., 1959, Vernon Map Area, G.S.C. Memoir 296, p. 154.

STATEMENT OF QUALIFICATIONS

I, Gerhard von Rosen, hereby certify

THAT I reside at 33476 Richards Avenue, Mission, B. C.

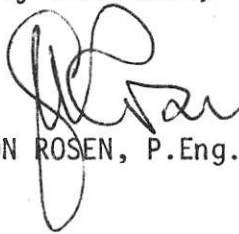
THAT I graduated with B.Sc., M.Sc., Geology degree from the University of British Columbia.

THAT The report is based upon personal prospection of the claims.

THAT I do not own any securities, nor do I expect to receive any, of Nicola Copper Mines Ltd. (N.P.L.).

THAT I consent to the use of this report title for public purposes.

Respectfully submitted,


GERHARD VON ROSEN, P.Eng.



June 28, 1977

20. STATUTORY RIGHTS OF RESCISSION

Sections 61 and 62 of the Securities Act (British Columbia) provides in effect, that where a security is offered to the public in the course of primary distribution:

- (a) A purchaser has a right to rescind a contract for the purchase of a security, while still the owner thereof, if a copy of the last Statement of Material Facts, together with financial statements and a summary of engineering reports as filed with the Vancouver Stock Exchange, was not delivered to him or his agent prior to delivery to either of them of the written confirmation of the sale of the securities. Written notice of intention to commence an action for rescission must be served on the person who contracted to sell within 60 days of the date of delivery of the written confirmation, but no action shall be commenced after the expiration of three months from the date of service of such notice.
- (b) A purchaser has the right to rescind a contract for the purchase of such security, while still the owner thereof, if the Statement of Material Facts or any amended Statement of Material Facts offering such security contains an untrue statement of material fact or omits to state a material fact necessary in order to make any statement therein not misleading in the light of the circumstances in which it was made, but no action to enforce this right can be commenced by a purchaser after expiration of 90 days from the later of the date of such contract or the date on which such Statement of Material Facts or amended Statement of Material Facts is received or is deemed to be received by him or his agent.

Reference is made to the said Act for the complete text of the provisions under which the foregoing rights are conferred.

21. CERTIFICATE OF THE DIRECTORS AND PROMOTERS OF THE ISSUER:

The foregoing constitutes full, true, and plain disclosure of all material facts relating to the securities offered by this Statement of Material Facts.

July 14th, 1977

(Date)

NICOLA COPPER MINES LTD. (N.P.L.)

Gerald Halliwell
GERALD WILLIAM HALLIWELL

John Jessup Ketteringham
JOHN JESSUP KETTERINGHAM

Jack Anthony List
JACK ANTHONY LIST

CERTIFICATE OF THE UNDERWRITER(S):

To the best of our knowledge, information, and belief, the foregoing constitutes full, true, and plain disclosure of all material facts relating to the securities offered by this Statement of Material Facts.

DAVIDSON & CO. LTD., Underwriter

Per: *[Signature]*

Per: *[Signature]*

SELLING SHAREHOLDERS:

Jerry J. King
JERRY J. KING

Robert L. Carr
ROBERT L. CARR

Gordon Biddle
GORDON BIDDLE

Michael A. Ohlinger
MICHAEL A. OHLINGER

July 14th, 1977

(Date)

Charles H. Skipper Sr.
CHARLES H. SKIPPER, SR.

Hal Thornburg
HAL THORNBURG

Robert D. Carroll
ROBERT D. CARROLL

John St. Mars
JOHN ST. MARS

Wesley Plumbtree
WESLEY PLUMBTREE

5. THE FULL NAME, HOME ADDRESS AND CHIEF OCCUPATION, THE NUMBER OF SHARES OF THE ISSUER BENEFICIALLY OWNED, DIRECTLY OR INDIRECTLY, BY EACH SENIOR OFFICER OR DIRECTOR OF THE ISSUER AND, IF EMPLOYED DURING THE PAST FIVE YEARS, THE NAME OF EACH EMPLOYER.

<u>Name and Address</u>	<u>Chief Occupation</u>	<u>Number of Shares of Issuer Beneficially Owned</u>
Gerald William Halliwell 19710 Dewdney Trunk Rd. Pitt Meadows, B.C. PRESIDENT & DIRECTOR	Mining Executive	133,071
John Jessup Ketteringham 9897 - 138A Street Surrey, B.C. SECRETARY & DIRECTOR	Mining Executive	172,350
Jack Anthony List 711 Second Street New Westminster, B.C.	Sales Representative	Nil

6. PARTICULARS OF THE CORPORATE STANDING OF THE ISSUER.

The Issuer was incorporated in the Province of British Columbia on December 2nd, 1965 by Memorandum and Articles.

The last Annual Report was filed with the Registrar of Companies of British Columbia on December 2nd, 1976. All filings required to be made by the Issuer under the Securities Act and Companies Act of British Columbia are up-to-date.

The latest audited financial statements of the Issuer were dated May 31, 1976 and were placed before the members of the Issuer at the Annual General Meeting held on July 14th, 1976.

The main business of the Issuer is the exploration and development of mineral properties.

7. THE AUTHORIZED AND ISSUED SHARE CAPITAL OF THE ISSUER.

The authorized capital of the Issuer consists of 10,000,000 shares with a par value of \$1.00 each of which 3,181,820 shares are issued as fully paid (see Item 13).

8. THE PRICES AT WHICH SECURITIES OF THE ISSUER HAVE BEEN ISSUED DURING THE PAST YEAR.

The following shares of the Issuer have been issued during the past year:

350,000 shares at 15¢ per share, September, 1976.

No shares of the Issuer have been issued for cash during the past year.

A total of 300,000 shares of the Issuer have been issued to the following persons in consideration for the acquisition by the Company of all of the issued and outstanding shares of AmCan Nuclear Corporation, a private company, having an office at 660 Rood Street, Grand Junction, Colorado, on the basis of 1,000 shares of the Company for each 1 share of AmCan Nuclear Corporation so held. The deemed value attributed to such shares on the books of the Company is a total of \$75,875.00.

Jerry J. King Route #1, R.R. Ranch Blaine, Washington	60,000 shares
---	---------------

Robert L. Card 3170 Alma Road Vancouver, B.C.	45,600 shares
---	---------------

Charles H. Skipper, Sr. P.O. Box 3074 Grand Junction, Colo.	46,200 shares
---	---------------

Hal Thornburg 600 Rood Street Grand Junction, Colo.	12,000 shares
---	---------------

Robert D. Carroll 59½ South Main Moab, Utah	13,200 shares
---	---------------

John S. St. Mars #806 - 235 Keith Rd. West Vancouver, B.C.	24,000 shares
--	---------------

Wesley Plumbtree 9455 - 204th Street Langley, B.C.	45,600 shares
--	---------------